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 2-2.14a-ao.* To aid in visualizing the proposed project, the approximate right-of-way is delineated on the photos.

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. on 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 43 km (27 mi) to Harbor Drive 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 Draft EIR/EIS and are incorporated by reference:

- Air Quality Report, August 2007
- Mobile Source Air Toxics Analysis, June 2008
- Natural Environment Study, June 2008
- Community Impact Assessment, October 2007
- Barrio Carlsbad Community Cohesion Report, June 2008
- Draft Relocation Impact Report, October 2007
- Noise Study Report, April 2007
- Noise Abatement Decision Report Volumes 1 and 2,, June 2007
- Historic Property Survey Report, March 2007; Adverse Effect Documentation November 2007
- Paleontological Report, June 2007
- February 2008 and 2009 Location Hydraulic Studies
- Preliminary Geotechnical Report, October 2005
- Limited Phase II Environmental Site Assessment Interstate 5 Expansion, Del Mar Heights Road to Birmingham Drive, San Diego California, November 2005
- Phase II Environmental Site Assessment Interstate 5 Expansion, Birmingham Drive to Vandergrift Blvd., San Diego California. October 31, 2006
- Aerial Deposited Lead Investigation, Contract No. 43A0012, Task Order No. 11-07830K-VW, Route 5 Between Leucadia Blvd. and Brooks Street, San Diego County California. KP R68.7/82.4 (PM R42.7/R51.2). Preliminary Site Investigation. June 2001
- Site Investigation, Lead Investigation on Route 5 from Via de la Valle to Leucadia Blvd., San Diego, Solana Beach, and Encinitas, California, KP R57.9/R68.7 (PM R36.0/R42.7). June 2001
- Freeway Operations Report. November 2008. Prepared by Caltrans District 11
- Direct Access Ramps/Local Circulation System Impact Study, Technical Report No. 1, Area of Influence Analysis. Draft, August 2004
- Direct Access Ramps/Local Circulation System Impact Study, Technical Report No. 2, Existing Conditions Data Collection. Draft, August 2004
- Direct Access Ramps/Local Circulation System Impact Study, Technical Report No. 3, Traffic Analysis Methodologies and Standards. Draft, July 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, Technical Report No. 7, Direct Access Ramps/Local Circulation System Operations Report. Draft, August2007
- I-5 North Coast Traffic Report. A Summary of Traffic Reports Revised November 2008
- I-5 North Coast Value Pricing Study Concept Plan Volumes 1 and 2, April 2006
- Visual Impact Assessment, April 2009
- I-5 North Coast Community Enhancement Plan, January 2008
- Water Quality Report, July 2009

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 Draft 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), 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 Programs; and
- Parks and Recreational Facilities.

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. Existing land use, development trends, and future development are discussed for each of these six cities below.

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 (1,223,400) and overall land area (887.07 km squared [342.5-mi squared]). 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 the University of California, San Diego (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 can not 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 11.7 dwelling units per hectare (du/ha) (0 and 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 30.4 du/ha (75 du/ac), while residential units on the southern portion of the community consist predominantly of single-family residential units on 464.52 square-meter (m^2) (5,000 square-foot [ft^2]) 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 ten precise planning areas of 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 0.4 and 23.9 du/ha (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 17.8 du/ha (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 18.2 du/ha (0 and 45 du/ac). The vast majority of residential land uses within the planning area consists 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.

Overall goals for growth within San Diego are outlined in the Guidelines for Future Development. Goal 1 is to "manage the growth of the region through adequate and timely public facilities to serve the additional population." In addition, San Diego strives to develop an effective "development management system" that would monitor the distribution and timing of growth in relation to environmental, physical, and public facility and service performance goals.

Future Land Use
Future land uses near the proposed project are shown in *Figure 3-1.3.* One proposed/planned project (representing potential land use changes) would be located near the proposed project and therefore could be affected. It is discussed below. Development of these projects is neither tied to, nor dependent upon, the proposed project.

Sorrento Valley Road Reuse Project: This project would leave vacant Sorrento Valley Road between approximately Carmel Mountain Road and Carmel Valley Road and implementation of either the "Pedestrian Trail/Multi-Use Path Option" or the "Park Road/Multi-Use Path Option." The first of these options consists of a pedestrian trail and an asphalt multi-use path (for runners, bicyclists, and service/emergency vehicles) along the vacated roadway. The latter option consists of a pedestrian trail and a two-way limited access road from the south closure point to the City sewer pump station No. 65 and a pedestrian trail, Class I bikeway, and northbound park road (limited hours) from the pump station to the north closure point. It is unknown if the project would be completed before the proposed project is constructed.

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 (4,389 in 2000) and overall land area (4.63 km squared [1.79 mi squared]). 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 Plan (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 0.4 and 7.1 du/ha (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 (.04 to 1.6 du/ac [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 (0.4 to 1.3 du/ha [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 1.7 to 7.0 du/ha (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 4.4 du/ha (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 "Village Center." The Village 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 Village 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, 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. Slower growth is most likely due to low vacancy rates, few multi-family developments, and high property cost. The 1999 to 2004 Housing Element of the Community Plan identified the possible construction of 51 residential units throughout the city. Based on development between 1991 and 1999, the City had constructed about seven 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 no proposed/planned projects (representing potential land use changes) located near the proposed project within Del Mar.

Solana Beach

Existing Land Use
Following Del Mar, Solana Beach is the second smallest city in the proposed project vicinity with regard to population (12,979 persons as of 2000) and overall land area (8.86 km squared [3.42 mi squared]). *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.

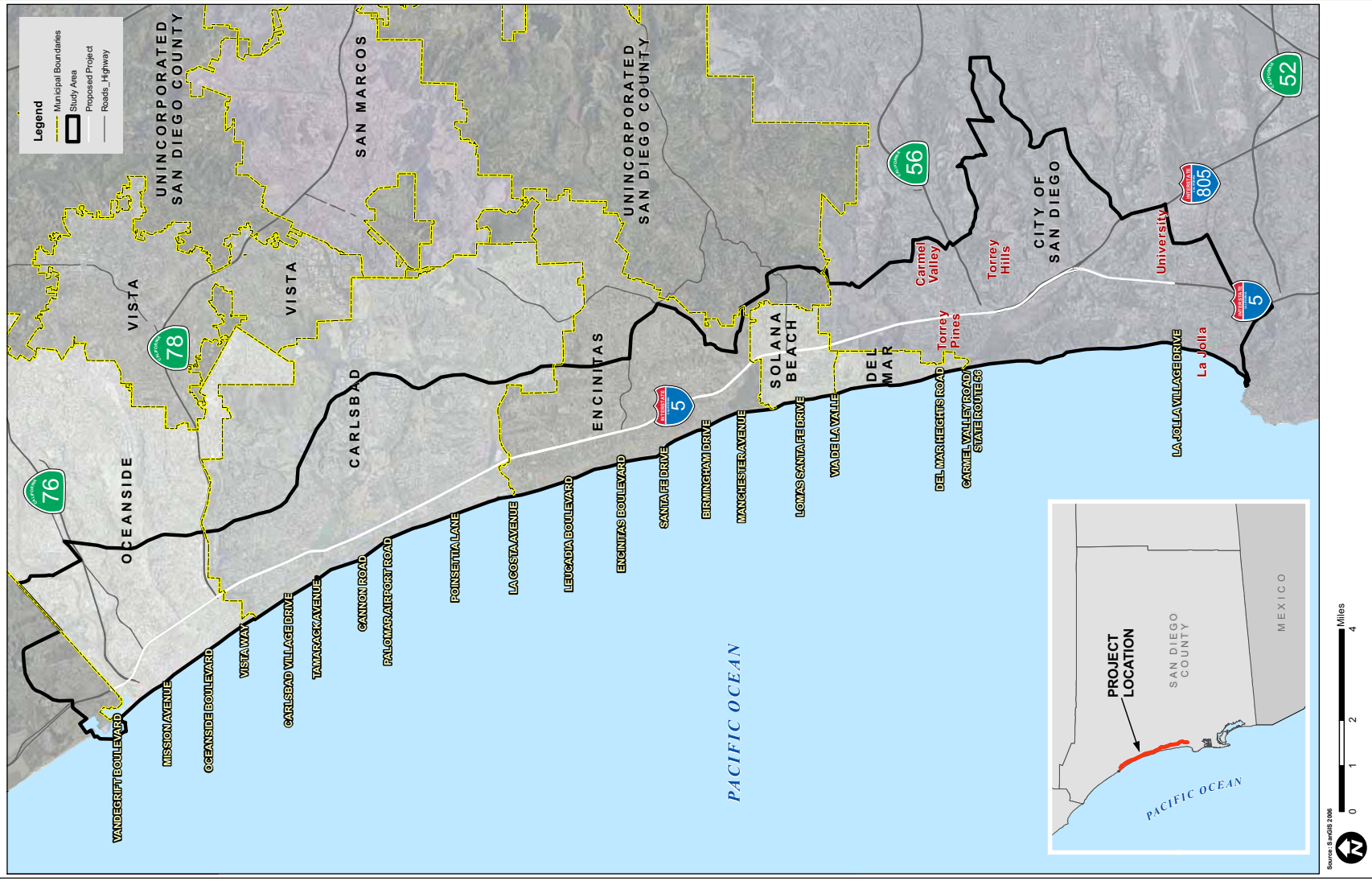
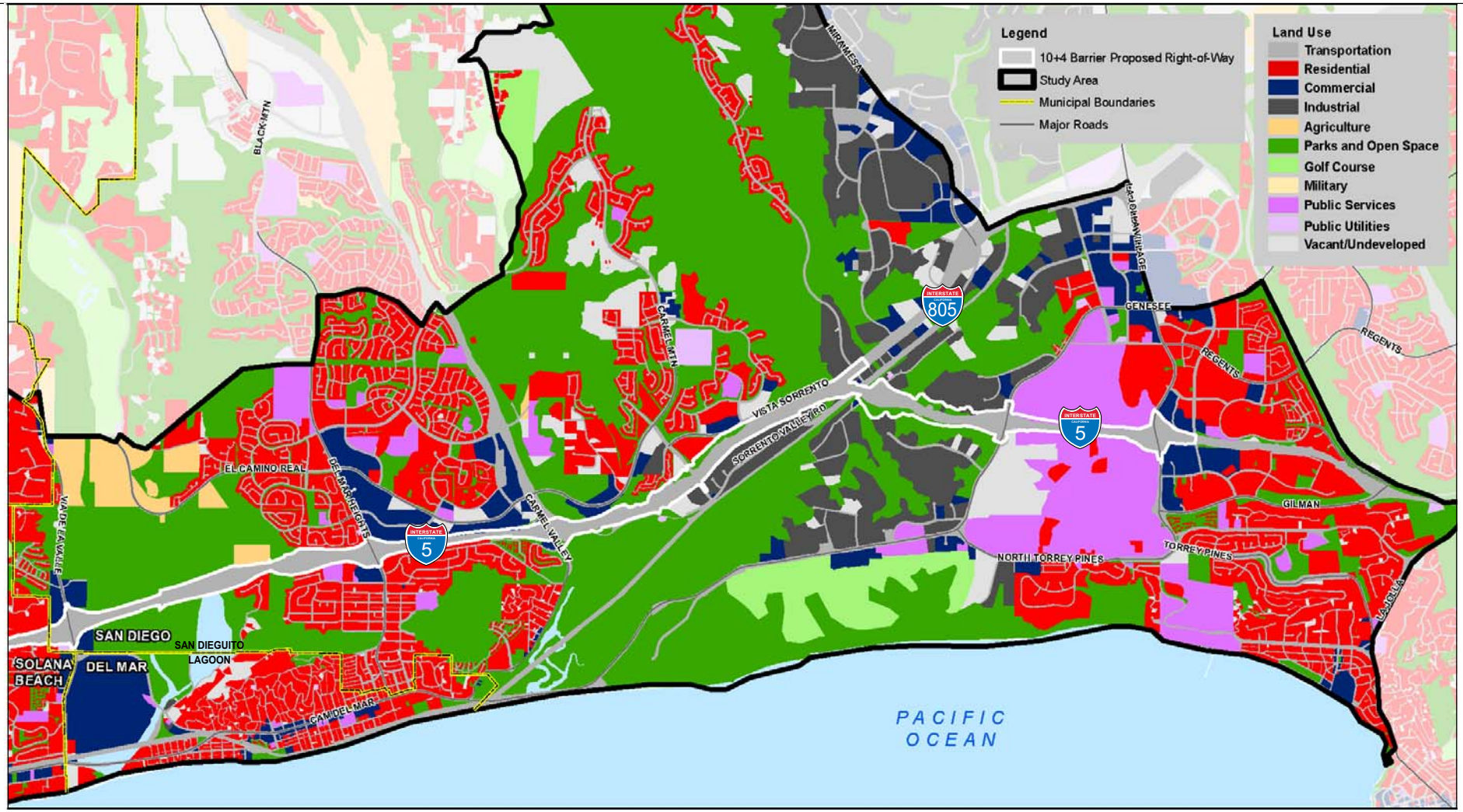


Figure 3-1.1 Study Area Communities



Source: SANDAG 2006; Caltrans 2006; EDAW 2007

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

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 (0.4 to 8.1 du/ha [0 to 20 du/ac]). Low-medium residential (1.6 du/ha [4 du/ac]) is the most common density, comprising 17 percent of the total land in Solana Beach. Covering a total of 152.0 ha (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 (0.4 to 0.8 du/ha [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. Medium-high and high-density residential, 3.2 to 4.4 and 5.3 to 8.1 du/ha (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. 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 2000 totaled 12,979 persons (U.S. Bureau of the Census 2000). 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 no proposed/planned projects (representing land use changes) to be located near the freeway corridor within Solana Beach.

Encinitas

Existing Land Use

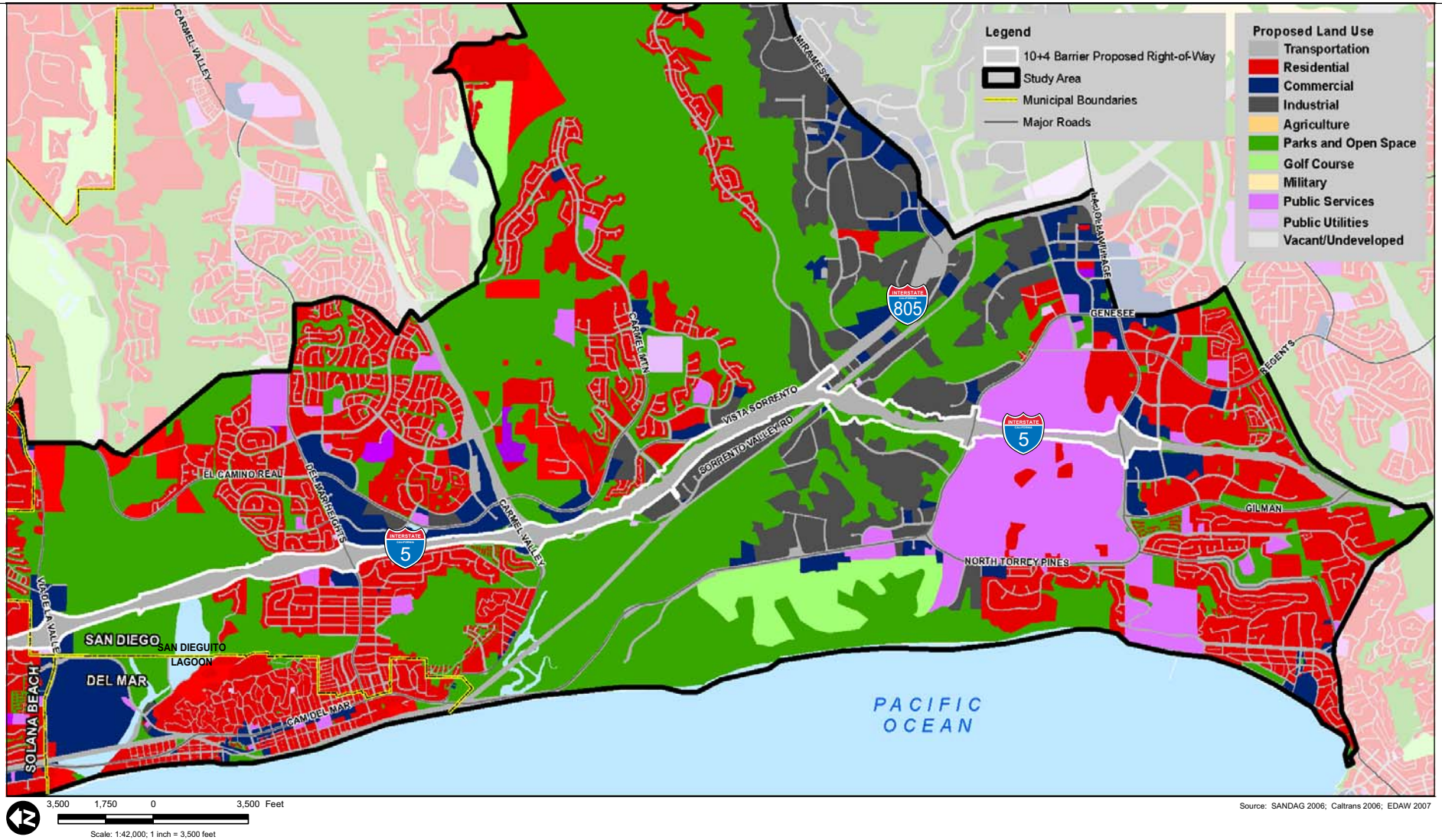
The City of Encinitas is the third most populous city located near the proposed project, with a population in 2000 of 58,014 persons and a total land area of 50.2 km squared (19.4 mi squared). *Figure 3-1.4* shows general land use patterns surrounding the proposed project. Encinitas is largely an urbanized 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 (0.4 to 0.8 du/ha [1 to 2 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 1.0 to 10.1 du/ha (0.25 to 25.0 du/ac). Land east of I-5 within Encinitas is primarily single-family residential with typical densities ranging from 0.4 to 3.2 du/ha (1 to 8 du/ac). High-density multi-family residential ranging from 4.5 to 6.1 du/ha (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 with 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.



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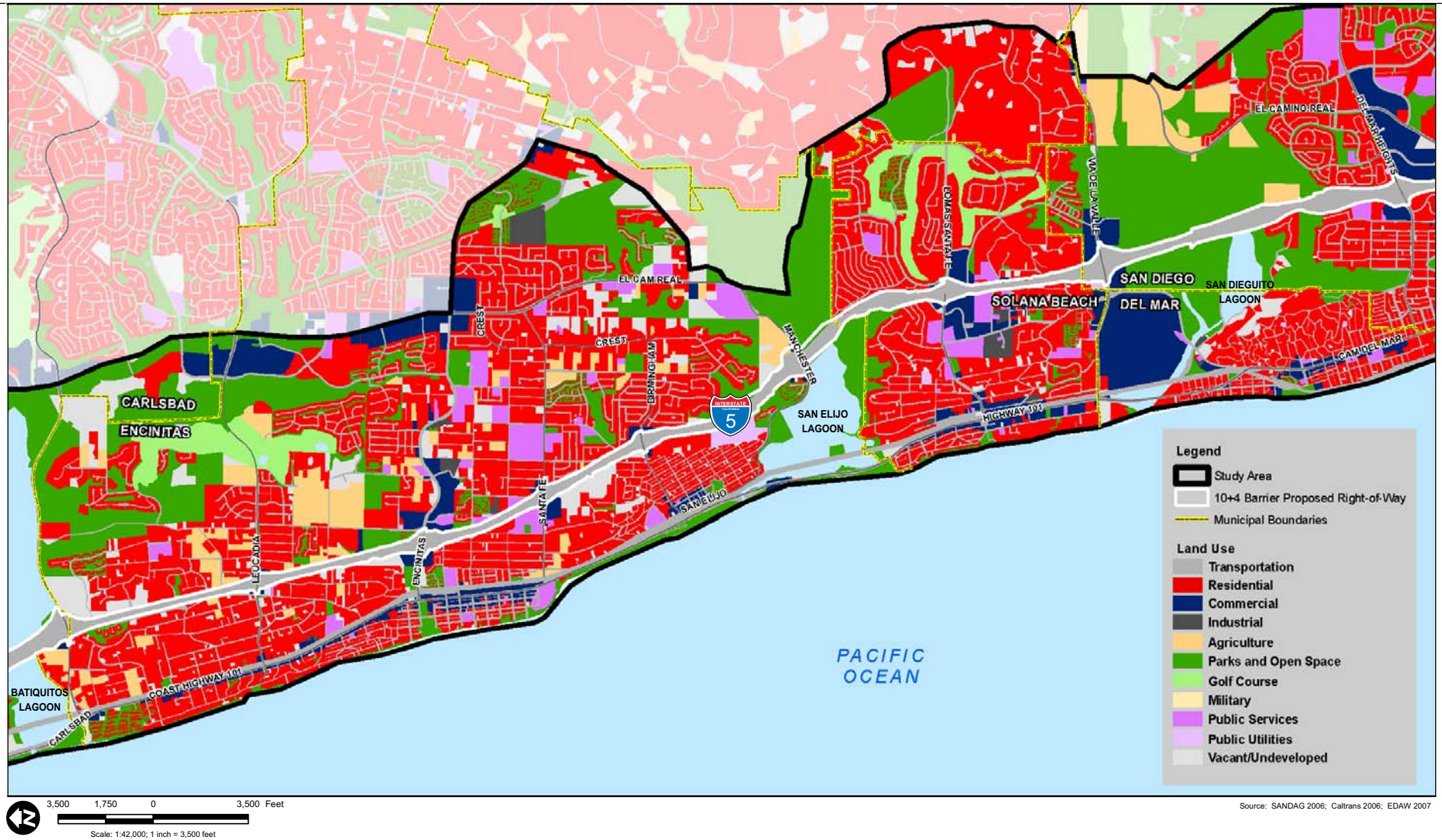
Source: SANDAG 2006; Caltrans 2006; EDAW 2007

Figure 3-1.3 San Diego/Del Mar Proposed Land Use



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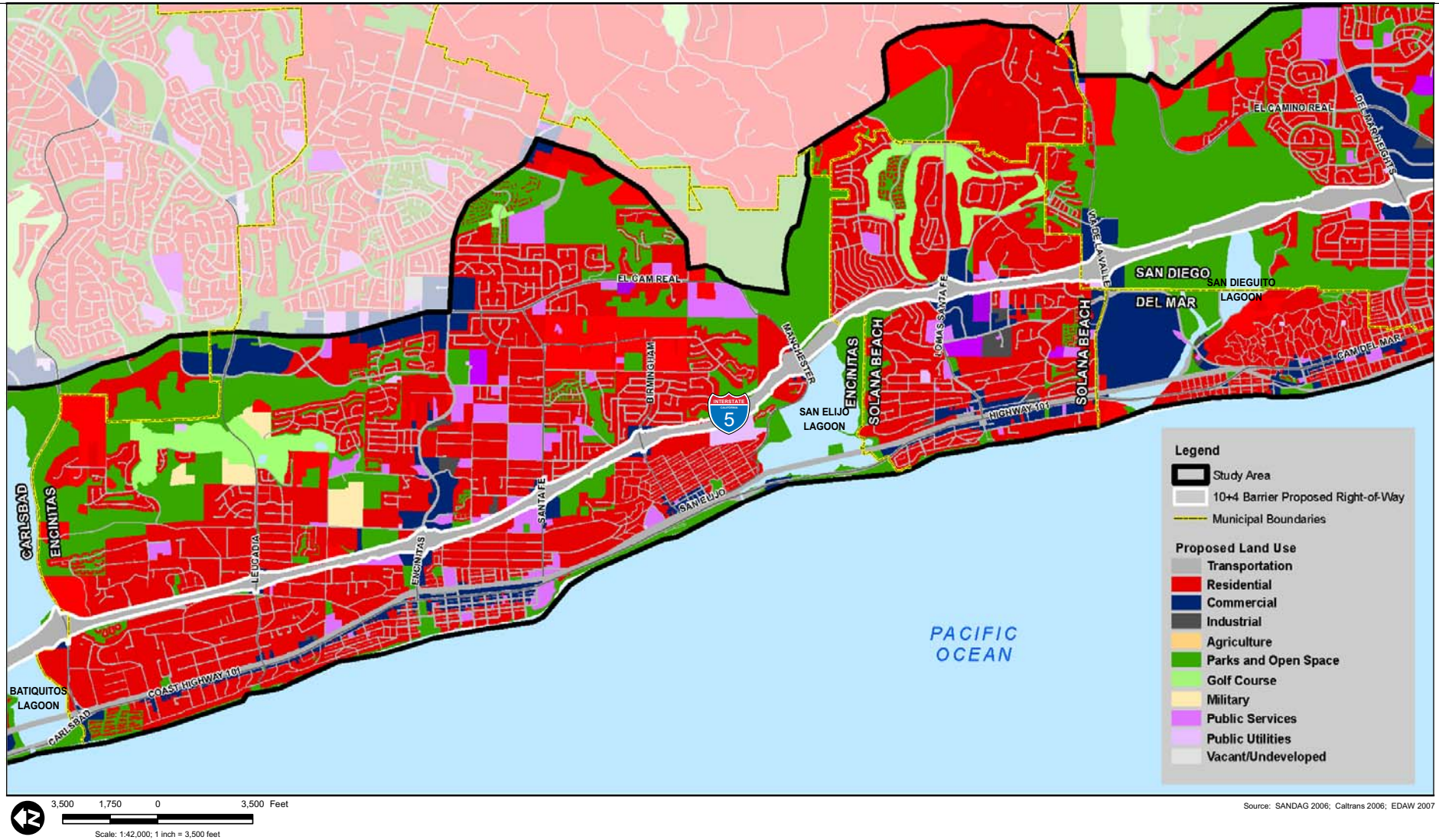
Scale: 1:42,000; 1 inch = 3,500 feet

Source: SANDAG 2006; Caltrans 2006; EDAW 2007

Figure 3-1.4 Solana Beach/ Encinitas Land Use



Source: SANDAG 2006; Caltrans 2006; EDAW 2007

Figure 3-1.5 Solana Beach/Encinitas Proposed Land Use

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 Housing Element, currently being updated by the City, the 2005 net developable hectares (acres) in Encinitas is 866.25, with a total development of 669 units. In addition to development on vacant land, there is also a potential for additional units as infill and mixed-use developments in downtown Encinitas and along Coast Highway 101.

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 58,014 as of 2000, this would represent an additional 7,108 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. One proposed/planned project (representing land use changes) would be located near the freeway corridor and therefore could be affected. Development of this project is neither tied to nor dependent upon the proposed project.

- The Hall Property Community Park is a 17.8-ha (44-acre) park planned for construction by the City to alleviate the City's shortage of dedicated park space. The project site was formerly a greenhouse operation, located immediately adjacent to the west side of I-5 south of MacKinnon Drive. Planning of this project and the proposed project has been coordinated to ensure that the two projects are compatible.

Carlsbad

Existing Land Use

Carlsbad is the fourth-largest city adjacent to the proposed project, with a population is 2000 of 41,681 persons and a total land area of 109.3 km squared (42.2 mi squared). *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 up to 1.6 du/ha (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 (3.2 to 6.1 du/ha [8 to 15 du/ac]) and high-density (6.1 to 9.3 du/ha [15 to 23 du/ac) single-family and multi-family residential developments are located in this area. Together, these higher densities encompass approximately 5 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, SR-78, as well as adjacent to I-5 along Carlsbad Village Drive and between Cannon Road and Palomar Airport Road.

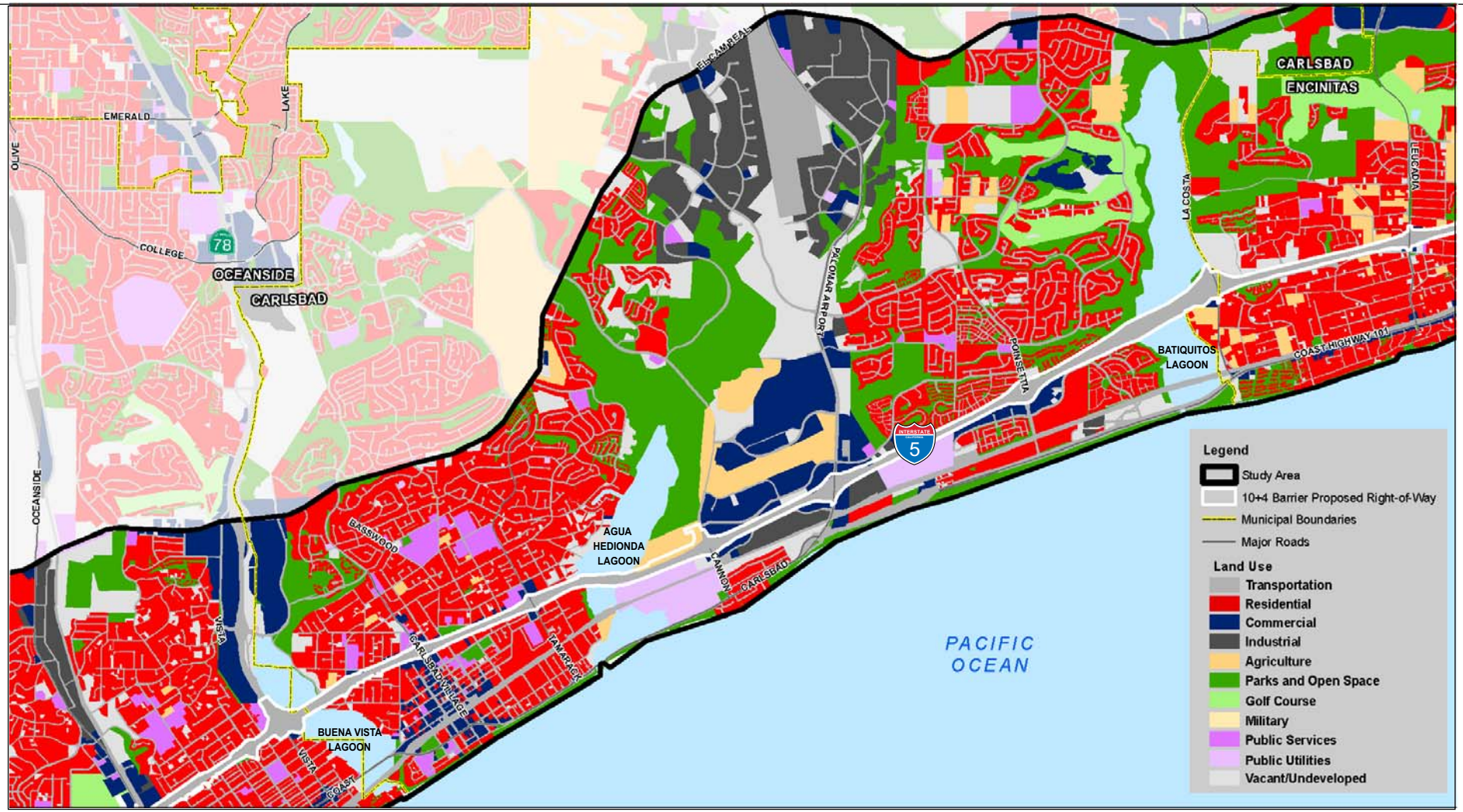
Vacant lands, shown as light grey in *Figure 3-1.6*, are located in the eastern parts of Carlsbad and are generally associated with areas surrounding the airport and industrial center. Much of this land is designated open space, planned industrial, and low-density residential (0 to 0.61 du/ha [0 to 1.5 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, nonresidential 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



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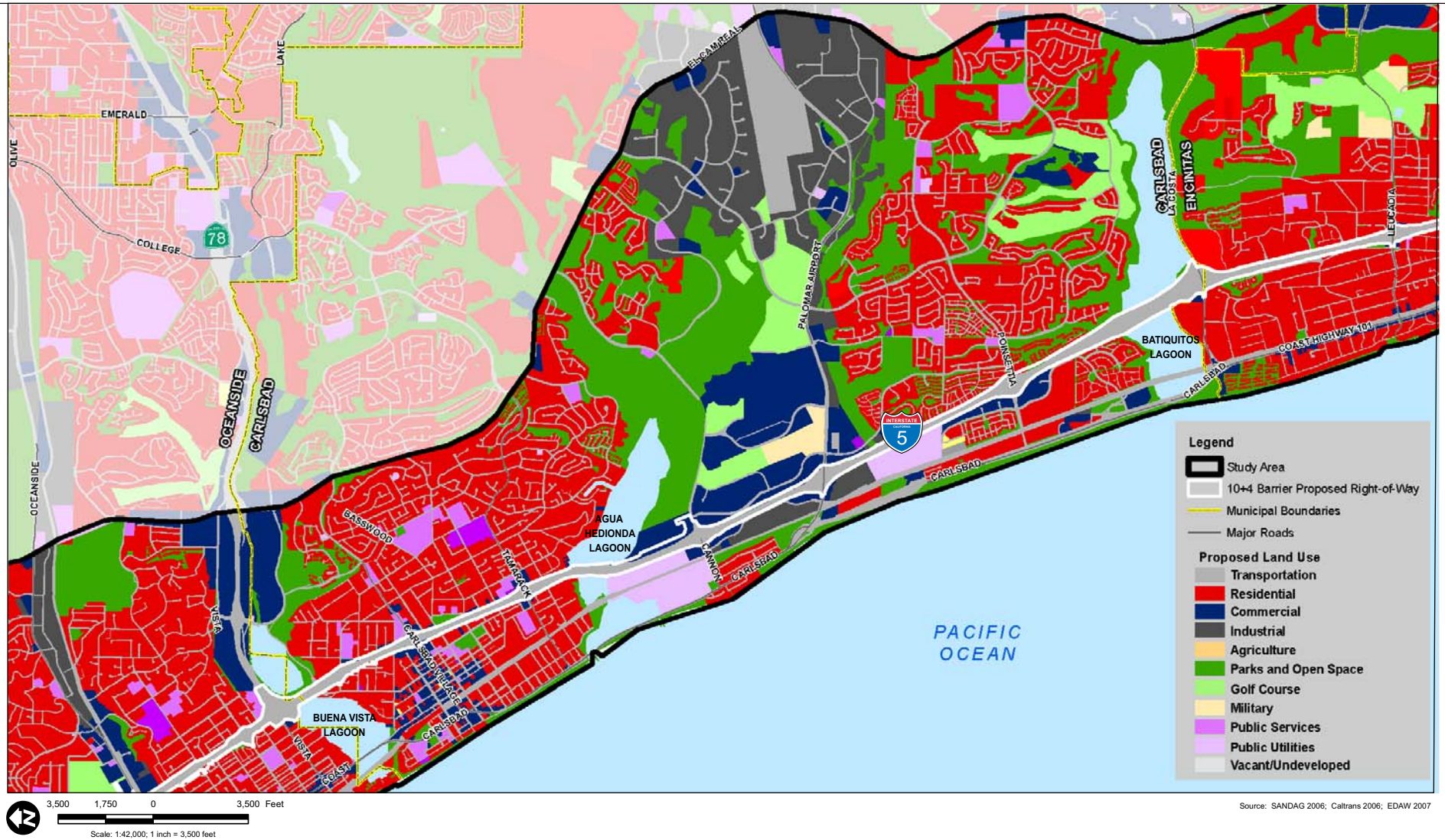
Source: SANDAG 2006; Caltrans 2006; EDAW 2007

Figure 3-1.6 Carlsbad Existing Land Use



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Scale: 1:42,000; 1 inch = 3,500 feet

Source: SANDAG 2006; Caltrans 2006; EDAW 2007

Figure 3-1.7 Carlsbad Proposed Land Use

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 no proposed/planned projects (representing land use changes) located near the proposed project within Carlsbad. As previously mentioned, there is the Carlsbad Energy Center and the Carlsbad Desalination 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 total population of 161,026 and overall land area 109.19 km squared (42.16 mi squared). *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 0.4 to 17.4 du/ha (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 0.4 to 8.5 du/ha (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 17.4 and 2.4 du/ha (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 grey 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 (6.1 du/ha [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 (1.4 du/ha [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 2.4 du/ha (5.9 du/ac) and estate B residential with a maximum density of 1.4 du/ha (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

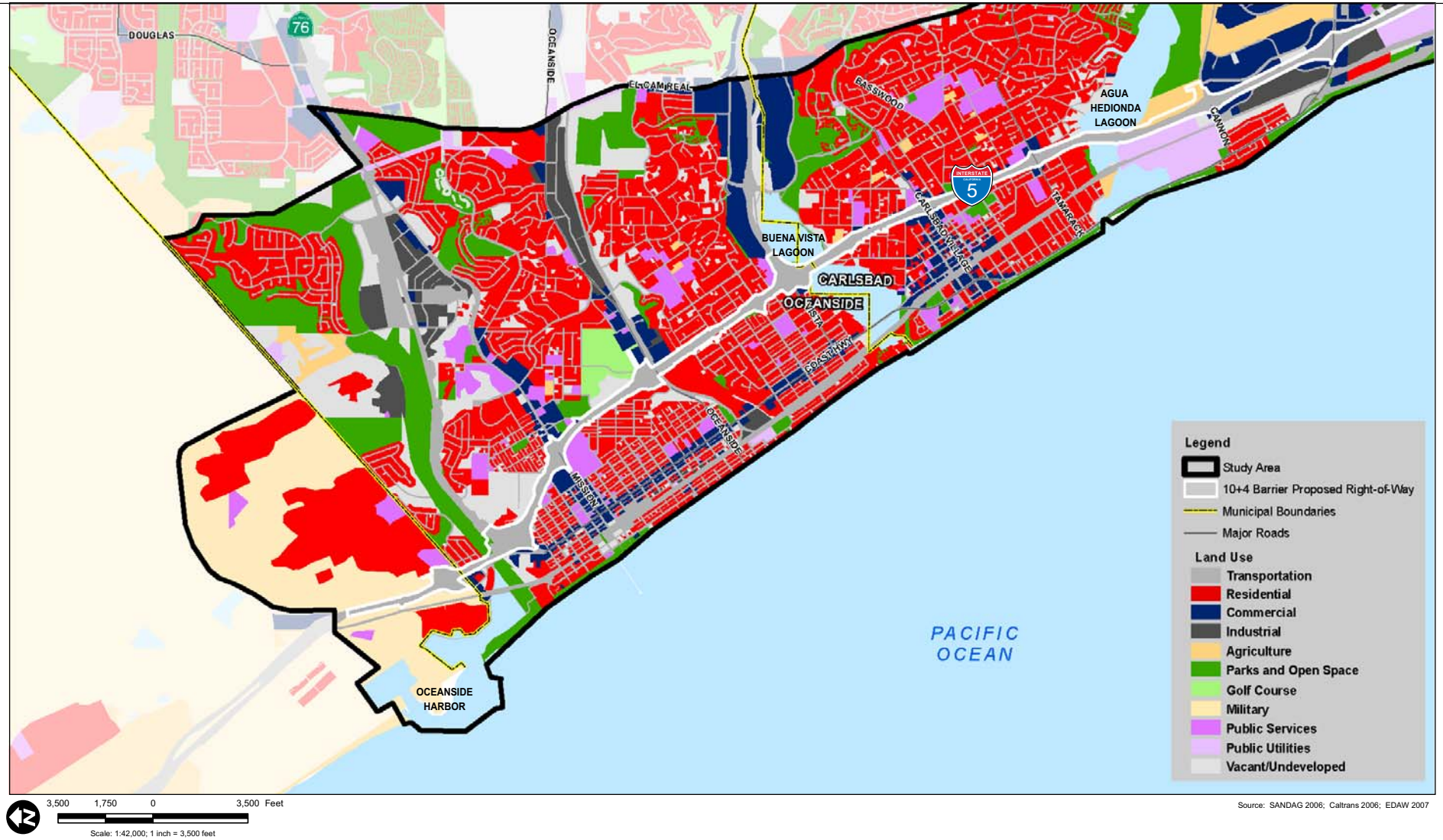
Since 1970, Oceanside's population has continued to increase at a faster pace than the larger San Diego region. During the 1970s and 1980s, the population of Oceanside grew by 82 percent and 67 percent, respectively (City of Oceanside 2002). By 1995, approximately 75 percent (8,159 ha [20,162 ac]) of the land in Oceanside was developed. About 10 percent (2,567 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 (1,722 ha [4,255 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 1994-2004 as 7 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 no proposed/planned projects (representing land use changes) located near the proposed project within Oceanside.

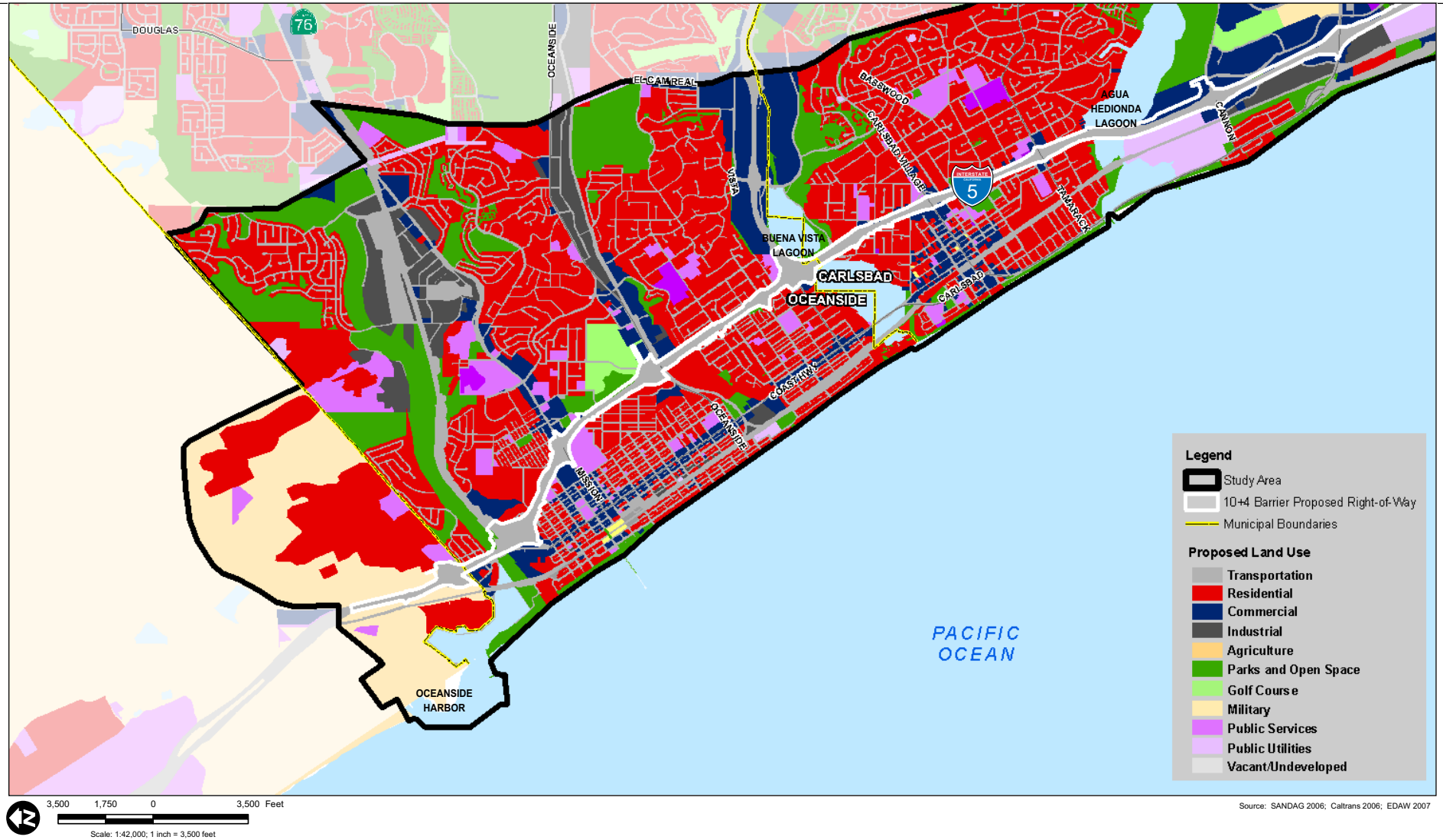


3,500 1,750 0 3,500 Feet

Scale: 1:42,000; 1 inch = 3,500 feet

Source: SANDAG 2006; Caltrans 2006; EDAW 2007

Figure 3-1.8 Oceanside Existing Land Use



3,500 1,750 0 3,500 Feet

Scale: 1:42,000; 1 inch = 3,500 feet

Source: SANDAG 2006; Caltrans 2006; EDAW 2007

Figure 3-1.9 Oceanside Proposed Land Use

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 Transportation 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 would potentially 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*, 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.

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 is therefore not anticipated to alter development trends in the area.

Future Land Uses
Future land uses adjacent to I-5 include the Sorrento Valley Road Reuse Project, which would vacate the Sorrento Valley Road between approximately Carmel Mountain Road and Carmel Valley Road and implementation of either the “Pedestrian Trail/Multi-Use Path Option” or the “Park Road/Multi-Use Path Option.” Operational impacts related to implementation of the proposed project are not likely to occur since the proposed project would not acquire any land to be used by the Sorrento Valley Road Reuse Project. Furthermore, implementation of the proposed project would improve circulation along I-5 and reduce traffic congestion on the roadways surrounding the Sorrento Valley Road Reuse Project. Therefore, implementation of the proposed project would not adversely affect the Sorrento Valley Road Reuse Project.

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 Village 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 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. There are no future planned projects within the project corridor that would be affected by the proposed project; therefore, no effects on future Del Mar land uses are anticipated.

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. 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 the city and no future projects have been identified in Solana Beach. There are no future planned projects within the project corridor that would be affected by the proposed project; therefore, no effects on future Solana Beach land uses are anticipated.

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*, the proposed project would directly affect a portion of Unique Farmland used for greenhouse and nursery operations. The proposed project would also convert 7.5 ha (18.5 ac) of the total 12.3 ha (30.5 ac) prime farmland currently being farmed east of I-5 and north of Manchester to transportation uses. These encroachments would not preclude the continuation of agricultural activities at the nursery. Additionally, 4.9 ha (12 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

Planned land uses adjacent to I-5 include the Hall Property Community Park, which was formerly a greenhouse operation located immediately adjacent to the west side of I-5 north of MacKinnon Drive. 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 the Hall Property Community Park.

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 further back from the freeway within their 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

No planned future land uses along the corridor would be affected by implementation of the proposed project. While the strawberry fields that would be partially affected are designated for future travel and recreational uses, no specific project has been proposed for that site. The proposed project would only affect the western edge of the property, and the unaffected portion of the parcel could still be developed. Therefore, no effects on future Carlsbad land uses are anticipated.

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. There are no future planned projects within the project corridor that would be affected by the proposed project; therefore, no effects on future Oceanside land uses are anticipated.

10+4 with Barrier

As discussed above implementation of the 10+4 with 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 with Buffer

10+4 with Buffer is a narrower right-of-way alignment than 10+4 with Barrier, impacts would be slightly reduced for the majority of the existing and proposed resources. Implementation of the 10+4 with 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 with Barrier

8+4 with Barrier is similar right-of-way alignment to 10+4 with Buffer. As such, would have slightly reduced impacts for the majority of the existing and proposed resources compared to the 10+4 with Barrier. Implementation of the 8+4 with 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 with Buffer

8+4 with 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 with 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. 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, 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.

3.1.2.1 Affected Environment

San Diego Association of Governments 2030 RTP and 2008 RTIP

SANDAG's Regional Comprehensive Plan (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.

San Diego Regional Transportation Plan: Pathways for the Future (2030 RTP) prepared by SANDAG, lays out a regional transportation system to enable current and future planning efforts. As part of the RCP, the RTP identifies specific transportation needs that over the next 25 years would enhance the land use-transportation connection in development within the San Diego region. The proposed project is an integral part of the RTP.

The 2008 Regional Transportation Improvement Program (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 2008 RTIP aims to reduce transportation-related air pollution in an effort to attain federal and state air quality standards for the San Diego region.

Natural Communities Conservation Plans: MSCP Subarea Plan and MHCP

The project crosses two regional habitat conservation planning areas: the City of San Diego's Multiple Species Conservation Program Subarea Plan (MSCP Subarea Plan) and the Draft Multiple Habitat Conservation Program (MHCP), encompassing the seven incorporated cities in northwestern San Diego County. Both regional plans covering the project area are approved but the subsidiary plans for the cities of Encinitas and Oceanside are undergoing review and are 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 Draft 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 Game (CDFG) (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 City of Carlsbad Subarea Plan has been approved, while the cities of Encinitas and Oceanside issued draft Subarea Plans in 2001. These plans are 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. Due to its small size and build-out conditions, the City of Solana Beach is exempt from preparing a subarea plan.

Coastal Zone Management Act

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 if they were consistent with the state's management plan.

California has developed a coastal zone management plan and has enacted its own law, the California Coastal Act of 1976, to protect the coastline. The policies established by the California Coastal Act are similar to those for the CZMA; they 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 and is delegated federal authority under the CZMA.

Just as the federal CZMA delegates power to coastal states to develop their own coastal management plans, the California Coastal Act delegates power to local governments (15 coastal counties and 58 cities) to enact their own local coastal programs (LCPs). LCPs determine the short- and long-term use of coastal resources in their jurisdiction consistent with the California 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 California Coastal Act, which are combined to create the General Plan and LCP Land Use Plan (LUP) for each city. The City of San Diego and Carlsbad have developed separate LCPs, while the City of Solana Beach has not developed an 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 that would supersede the need to acquire individual permits from each affected jurisdiction. Another means would be permitting through local jurisdictions and/or the CCC for the individual construction stages of the project.

In coordination with the Coastal Commission staff, SANDAG and Caltrans have prepared the Public Works Plan/Transportation and Resource Enhancement Program (PWP/TREP) to recommend measures to achieve consistency with the CMZA, California Coastal Act, and the LCPs.

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 Process Guide and General Plan are currently being updated with the City of San Diego General Plan Update. A public review draft of the plan was circulated in October 2006. The General Plan Update 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 Update utilizes 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 of Section 3-1*.

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 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. Policies at the community plan level are most relevant to the proposed project since the Process Guide and General Plan was developed for the City through 1995, and the General Plan Update is currently in draft form. The planning area locations for each community plan are shown in *Figure 3-1.1* of Section 3-1. The Resource Management Element also encourages the preservation of agricultural land in the city, although not as a hindrance 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).

La Jolla Community Plan

The overall goals of the La Jolla 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 overall goals of the University 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 overall goals of the Torrey Pines 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 overall goals of the Torrey Hills 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 areas 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 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

The overall goals of the Carmel Valley (North City West) community plan include the following: establish a physical, social, 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. The Neighborhood 3 Precise Plan 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.

City of Del Mar Community Plan

The City of Del Mar 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 of Section 3.1.* 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 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 of Section 3-1.* 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).

Although a large portion of Solana Beach is located within the California Coastal Zone, Solana Beach has not yet developed an LCP outlining issues and policies related specifically to the requirements of the California Coastal Act. 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 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 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 of Section 3-1*. 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 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 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 (1994) 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 of Section 3-1.* 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. 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-acre 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 a 1,100 acre segment of the Carlsbad Coastal Zone, including the 9.71 ha (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).

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 of Section 3-1.* 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 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 trips. 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* (found at the end of this section).

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 a 445 ha (1,100-ac) segment of the Carlsbad Coastal Zone, including the 93 ha (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 445 ha (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 since the proposed project would not be affected by any aspects of the management plans.

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.

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. However, 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* (found at the end of this section).

San Diego Association of Governments 2030 RTP and 2008 RTIP

The proposed project is included in 2030 RTP. The project is identified in the 2008 RTIP in Chapter 3, on page 29, as the Interstate 5 – HOV Managed Lanes (MPO ID: CAL09) with the following description: "From La Jolla Village Dr. to Harbor Dr. – construct HOV/Managed Lanes on I-5 undercrossing" (SANDAG 2007b). The 2008 RTIP was approved on November 17, 2008, by the U.S. Department of Transportation (USDOT).

On July 25, 2008, the SANDAG Board adopted the 2008 RTIP. On November 17, 2008, the USDOT made a finding of conformity for the 2008 RTIP and a conformity redetermination for the 2030.

The proposed alternatives are included under three scenarios in Appendix A, The Plans, of the 2030 RTP. Appendix A of the 2030 RTP contains the projects included in the air quality analysis (SANDAG 2004a). In *Table A.1,* on page 171, the proposed project is included as part of a project to improve I-5, between SR-56 and Vandegrift Boulevard, from eight general-purpose lanes to eight general-purpose lanes with four managed lanes. Managed lanes include HOV lanes and Value Pricing lanes (SANDAG 2004a). In *Table A.5*, on page 181, the project is included as parts of two projects, with the first improving I-5, between SR-56 and Leucadia Boulevard, from eight general-purpose lanes to ten general-purpose lanes with four managed lanes, and the second improving I-5, between Leucadia Boulevard and Vandegrift Boulevard, from eight general-purpose lanes to eight general-purpose lanes with four managed lanes (SANDAG 2004a). In *Table A.10*, the project is included as portions of two projects, with the first improving I-5, between SR-56 and Palomar Airport Road, from eight general-purpose lanes to ten general-purpose lanes with four managed lanes, and the second improving I-5, between Palomar Airport Road and SR-76, from eight general-purpose lanes to eight general-purpose lanes with four managed lanes (SANDAG 2004a).

As shown, the proposed project is included in SANDAG's 2008 RTIP, as amended, and SANDAG's 2030 RTP. Both of 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 Multiple Species Conservation Program (MSCP) Subarea Plan 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 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 Circulation Element of the 1979 City of San Diego Process Guide and General Plan, 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. Se *Section 3.17 Natural Communities* for further information.

Individual jurisdictions implement their portion 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]). Encinitas and Oceanside have prepared public review draft subarea plans, 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 plans are minimized, where feasible. Potential impacts to areas within the MHPA and appropriate mitigation measures would be discussed in *Section 3-17.22* of the Draft EIR/EIS. 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. Furthermore, Caltrans would coordinate with the City and/or wildlife agencies as required to ensure that potential impacts to HMP species or habitat are minimized to the maximum extent practicable and mitigated.

Coastal Zone Management Act

The PWP/TREP 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 Coastal Commission the necessary information for a consistency determination for the project. A Coastal Commission staff member assigned fulltime for this project has attended the bi-monthly 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 Coastal Zone Management Act sections; 30233, 30240, 30241, 30241.5, and 30242.

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. Policies at the community plan level are most relevant to the proposed project, since the Process Guide and General Plan was developed for the City in 1979, and the General Plan Update is currently in draft form. 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* (found at the end of this section).

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 Draft 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 would coordinate with the City and/or wildlife agencies as required to ensure that potential impacts to natural resources were minimized and/or mitigated to the maximum extent practicable. 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* (found at the end of this section).

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 Draft 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. 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 would coordinate with the City and/or wildlife agencies as required to ensure that potential impacts to natural resources were minimized and/or mitigated to the maximum extent practicable. As discussed in Section 3-3 of this Draft 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* (found at the end of this section).

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 Draft 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 would coordinate with the City and/or wildlife agencies as required to ensure that potential impacts to natural resources were minimized and/or mitigated to the maximum extent practicable. 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).

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 Draft 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 alternative's consistency with those policies is provided in *Table 3.1.1* (found at the end of this section).

San Dieguito River Park Concept Plan

Implementation of the proposed project would result 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 would coordinate with the City and/or wildlife agencies as required to ensure that potential impacts to biological resources at San Dieguito Lagoon were minimized and/or mitigated to the maximum extent practicable.

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 would coordinate with the City and/or wildlife agencies as required to ensure that potential impacts to biological resources at the San Elijo Lagoon Ecological Reserve were minimized and/or mitigated to the maximum extent practicable.

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 would coordinate with the City and/or wildlife agencies as required to ensure that potential impacts to biological resources at Agua Hedionda Lagoon were minimized and/or mitigated to the maximum extent practicable.

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 Circulation Element of the City of 1979 San Diego Process Guide and 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 *Section 3-17.22* of the Draft EIR/EIS. The proposed project's consistency with the Carlsbad HMP is evaluated below.	All four alternatives would be generally consistent. There are potential biological impacts that would be mitigated. No Build Alternative would be consistent.

Relevant Key Goals	Project Considerations	Project Consistency
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. **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.	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 would coordinate with the appropriate wildlife agencies as required to ensure that potential impacts to HMP species or habitat were minimized and/or mitigated to the maximum extent practicable.	All four 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 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 Bus Rapid Transit service. The project is consistent with the region's 2030 RTP.	All four alternatives would be consistent and would exceed plan goals. No Build Alternative would be consistent.

Relevant Key Goals	Project Considerations	Project Consistency
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 would coordinate with the wildlife agencies as required to ensure that potential impacts to HMP species or habitat were minimized and/or mitigated to the maximum extent practicable.	All four 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 Draft EIR/EIS.	All four 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 alternatives would be consistent. No Build Alternative would be consistent.
Coastal Zone Policies ***Open Space and Resource Management*** (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 Carmel Valley Restoration and Enhancement Project, unless such development is first authorized by the California Coastal Commission. 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 will be utilized during construction and other appropriate BMPs.	All four alternatives would be consistent. No Build Alternative would be consistent.
La Jolla Community Plan		
No relevant goals or policies.		

Relevant Key Goals	Project Considerations	Project Consistency
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 would coordinate with the City and/or wildlife agencies as required to ensure that potential impacts to environmentally sensitive habitats were minimized and mitigated to the maximum extent practicable. Nonetheless, the proposed project would result in permanent loss of less than a .5 ha 1.2 ac) and within the San Dieguito River Park. Potential impacts to the unique ecosystems of the Torrey Pines, plant communities, and wildlife habitat and related mitigation measures are described in *Section 3-17.22* of the Draft 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 paleontological and archaeological resources. Potential impacts to paleontological and archaeological resources and appropriate mitigation measures are described in *Section 3-12.4* of the Draft EIR/EIS.	All four 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 would coordinate with the City and/or wildlife agencies as required to ensure that potential impacts to environmentally sensitive habitats were minimized and mitigated to the maximum extent practicable. Potential impacts to the unique ecosystems of the Torrey Pines, plant communities, and wildlife habitat and related mitigation measures are described in *Sections 3-17.22* of the Draft EIR/EIS. 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 Bus Rapid Transit service. The project is consistent with the region's 2030 RTP. In addition, the proposed project would have the potential to impact important paleontological and archaeological resources.	All four alternatives would be consistent. No Build Alternative is potentially inconsistent due to reduced opportunity for HOV/Managed Lanes users.

Relevant Key Goals	Project Considerations	Project Consistency
University Community Plan		
Overall Urban Design Goals (1) Improve accessibility and use relationships within the community by establishing well-defined, multi-modal 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 Bus Rapid Transit service. The project is consistent with the region's 2030 RTP. Proposed HOV lanes would improve accessibility and enhance multi-modal 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 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 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 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 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 on the community's circulation system.	All four 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 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 convert any park or recreational opportunities to other uses. 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 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 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.

Relevant Key Goals	Project Considerations	Project Consistency
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 Draft 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 MCAS Miramar.	All four 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 Draft 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 *Section 3-12.4* of the Draft EIR/EIS.	All four 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 view points. (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 would coordinate with the City and/or wildlife agencies as required to ensure that potential impacts to biological resources were minimized and/or mitigated to the maximum extent practicable.	All four 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 Bus Rapid Transit service. The project is consistent with the region's 2030 RTP.	All four alternatives would be consistent. No Build Alternative would be consistent.
City of Solana Beach General Plan		
Land Use 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 with Barrier Alternative would result in the loss of six residential units but would not adversely affect the overall land use distribution within Solana Beach.	All four alternatives would be consistent. No Build Alternative would be consistent.

Relevant Key Goals	Project Considerations	Project Consistency
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 with 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.	All four 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 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 Bus Rapid Transit service. The project is consistent with the region's 2030 RTP.	All four 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 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 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 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 would coordinate with the City and/or wildlife agencies as required to ensure that potential impacts to natural resources were minimized to the maximum extent practicable. The proposed project would have the potential to impact cultural resources. Implementation of the proposed project would have the potential to impact existing viewsheds. Potential impacts to existing viewsheds and appropriate mitigation measures are described in *Section 3.7-4* of the Draft EIR/EIS. The proposed alternatives would not convert park or recreational opportunities to other uses.	All four alternatives would be consistent. No Build Alternative would be consistent.
Economic Development 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.	All four alternatives would be consistent. No Build Alternative would be consistent.

Relevant Key Goals	Project Considerations	Project Consistency
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 would coordinate with the City and/or wildlife agencies as required to ensure that potential impacts to natural resources were minimized and/or mitigated to the maximum extent practicable.	All four 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 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 Bus Rapid Transit service. The project is consistent with the region's 2030 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 alternatives would be consistent. No Build Alternative is potentially inconsistent due to reduced opportunity for HOV/Managed Lanes users.

Relevant Key Goals	Project Considerations	Project Consistency
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); 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 when ever 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 alternations 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.	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. Furthermore, Caltrans would coordinate with the City and/or wildlife agencies as required to ensure that potential impacts to natural resources were minimized and/or mitigated to the maximum extent practicable. 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 Draft 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. Caltrans would coordinate with the City and/or wildlife agencies as required to ensure that potential impacts to natural resources were minimized and/or mitigated to the maximum extent practicable. 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.	All four alternatives are potentially inconsistent. No Build Alternative would be consistent.
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 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.
City of Carlsbad General Plan		
Land Use Element **Environmental Goal:** 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 would coordinate with the wildlife agencies as required to ensure that potential impacts to natural resources were minimized and mitigated to the maximum extent practicable.	All four alternatives would be consistent. No Build Alternative would be consistent.

Relevant Key Goals	Project Considerations	Project Consistency
Circulation Element ***Streets and Traffic Control*** **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). ***Scenic Roadways*** **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). ***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.	. 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 Bus Rapid Transit service. The project is consistent with the region's 2030 RTP. In addition, the proposed project would enhance include community enhancement features designed to create pedestrian linkages throughout the community.	All four alternatives would be consistent. No Build Alternative is potentially inconsistent due to reduced opportunity for HOV/Managed Lanes users.
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 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 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 would coordinate with the wildlife agencies as required to ensure that potential impacts to biological resources were minimized and mitigated to the maximum extent practicable. 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 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 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 alternatives would be consistent. No Build Alternative would be consistent.

Relevant Key Goals	Project Considerations	Project Consistency
Oceanside General Plan		
Land Use Element **1.14 Noise Control:** 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 alternatives would be consistent. No Build Alternative would be consistent.
Circulation Element **Goals:** (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 alternatives would be consistent. No Build Alternative is potentially inconsistent due to reduced opportunity for HOV/Managed Lanes users.
Recreational Trails Element **Mission Statement:** 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 alternatives would be consistent.
Noise Element **Goal:** 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 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 **Goal:** 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 would coordinate with the wildlife agencies as required to ensure that potential impacts to biological resources were minimized and/or mitigated to the maximum extent practicable.	All four alternatives would be consistent. No Build Alternative would be consistent.
Appendix B – Local Coastal Program **Policies:** (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 alternatives would be consistent. No Build Alternative would be consistent.
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 would coordinate with the wildlife agencies as required to ensure that potential impacts to environmental resources were 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 *Section 3-3*, and *3-17.22* of the Draft EIR/EIS.	All four alternatives would be consistent. No Build Alternative would be consistent.

Relevant Key Goals	Project Considerations	Project Consistency
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 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 would coordinate with the City and/or wildlife agencies as required to ensure that potential impacts to biological resources at San Elijo Lagoon Ecological Reserve were minimized and/or mitigated to the maximum extent practicable.	All four 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 CCA 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 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 would coordinate with the wildlife agencies as required to ensure that potential impacts to biological resources at Agua Hedionda Lagoon were minimized and/or mitigated to the maximum extent practicable.	All four alternatives would be consistent. No Build Alternative would be consistent.

Relevant Key Goals	Project Considerations	Project Consistency
California Coastal Act		
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 Department of Fish and Game, 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.	The existing location of I-5 necessitate the proposed improvements occur in areas containing wetlands. As the proposed public facility improvements appear to be incidental public services, fill of wetlands would be allowed under Section 30233(a)(4). Alternatives: Section 30233 allows wetland fill 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 3.21* describes all compensatory mitigation measures.	The four build alternatives are consistent. However, the proposed project 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.

Relevant Key Goals	Project Considerations	Project Consistency
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 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 could also potentially result in indirect impacts to ESHA and special-status species.	The four build alternatives are inconsistent. However, the proposed project 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.
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.	The proposed project improvements would affect a maximum of approximately 26 acres of Prime Farmland and Non-Prime Farmland, areas identified as unique farmland, and lands currently in agricultural production. 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 Build Alternatives are consistent. In addition, potential measures for consistency include: • possible purchase of agricultural lands within the Coastal Zone for agricultural production, agricultural improvement that would aid in continuing agricultural production within the Coastal Zone; • investing in an agricultural land holding, operation, conservation easement or project in San Diego County that has been identified as a high priority project by the Agricultural Commissioner's Office or the San Diego County Farm Bureau; • committing to specific activities such as school and community gardens, farm to school programs, and/or endowments to programs of study in agricultural sciences in the Coastal Zone; or • coordinating with the County of San Diego to establish a fund to offset loss of Williamson Act subvention funds from the state for a specified year, which would be used to assist the county in supporting agricultural resources and offsetting the lack of state subvention funds for the Williamson Act.

Relevant Key Goals	Project Considerations	Project Consistency
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: 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. 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.	The proposed project improvements would affect a maximum of approximately 26 acres of Prime Farmland and Non-Prime Farmland, areas identified as unique farmland, and lands currently in agricultural production.	The Build Alternatives are inconsistent. The No Build is consistent. Potential measures to achieve consistency with build alternatives includes: • possible purchase of agricultural lands within the Coastal Zone for agricultural production, agricultural improvement that would aid in continuing agricultural production within the Coastal Zone; • investing in an agricultural land holding, operation, conservation easement or project in San Diego County that has been identified as a high priority project by the Agricultural Commissioner's Office or the San Diego County Farm Bureau; • Committing to specific activities such as school and community gardens, farm to school programs, and/or endowments to programs of study in agricultural sciences in the Coastal Zone; or • coordinating with the County of San Diego to establish a fund to offset loss of Williamson Act subvention funds from the state for a specified year, which would be used to assist the county in supporting agricultural resources and offsetting the lack of state subvention funds for the Williamson Act.

Relevant Key Goals	Project Considerations	Project Consistency
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 26 acres 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.	The Build Alternatives are consistent. In addition, potential measures for consistency include: • possible purchase of agricultural lands within the Coastal Zone for agricultural production, agricultural • improvement that would aid in continuing agricultural production within the Coastal Zone; • investing in an agricultural land holding, operation, conservation easement or project in San Diego County that has been identified as a high priority project by the Agricultural Commissioner's Office or the San Diego County Farm Bureau; • Committing to specific activities such as school and community gardens, farm to school programs, and/or endowments to programs of study in agricultural sciences in the Coastal Zone; or • coordinating with the County of San Diego to establish a fund to offset loss of Williamson Act subvention funds from the state for a specified year, which would be used to assist the county in supporting agricultural resources and offsetting the lack of state subvention funds for the Williamson Act.

As shown above, the proposed project would be potentially inconsistent with several community and general plans due to encroachment into open space and preserve areas. Implementation of the proposed project could conflict with the Torrey Pines Community Plan Resource Management and Open Space Element because it would convert land within the San Dieguito River Park to transportation uses. 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.

While the proposed project has the potential to be inconsistent with several community and general plan element policies, these inconsistencies are not considered to be adverse. The proposed project involves the expansion of an existing designated major transportation corridor and has been designed to minimize impacts 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.

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 2008 RTIP, as amended, and SANDAG's 2030 RTP – 2008. 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 use.

As discussed previously, the PWP/TREP recommends measures to achieve consistency with the CMZA, California Coastal Act, and the LCPs. The TREP/PWP 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.

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 § 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 U.S.C. 303, 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. Four of these resources have minor, direct impacts by the proposed project.

N·O·R·T·H C·O·A·S·T
INTERSTATE 5 CORRIDOR

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

3 1.5 0 3 Miles

Scale: 1:190,080; 1 inch = 3 mile(s)

Figure 3-1.10
Park and Recreational Facilities

San Dieguito River Park
The San Dieguito River Park (SDRP) is located within the cities of San Diego and Del Mar, and stretches 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. The SDRP is administered by the San Dieguito River Valley Regional Open Space Park Joint Powers Authority (JPA), who 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 planned to be integrated by a corridor of walking, equestrian, and bicycle trails that would extend from the Pacific Ocean to Volcan Mountain.

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. The Coastal Area of the SDRP encompasses approximately 178 ha (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 81 ha (200 ac) of estuarine open water and wetland habitat.

Access to the Coastal Area of the SDRP for recreational uses is currently very limited. Public access to the majority of the park is prohibited as wetlands restoration is underway. Access is currently limited to one short trail, the Riverpath Del Mar, located near the Del Mar Public Works Yard, along Jimmy Durante Boulevard.

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 336 ha (830 ac) lagoon is primarily a shallow-water estuary fed by a 199 km squared (77 mi squared) 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, coastal sage scrub, and mixed chaparral. The habitat supports a variety of plant and wildlife species.

The San Elijo Lagoon Ecological Reserve includes over 8 km (5 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 1.6 km (1 mi) loop trail.

Paul Ecke Sports Park and YMCA
The Paul Ecke Sports Park and YMCA, located in Encinitas, is an approximately 3.8-ha (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 a.m. to 11 p.m. The western edge of the park abuts the existing Caltrans right-of-way.

Hall Property Community Park
Hall Property 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 Environmental Impact Report (EIR) was certified by the City in 2008 (EDAW 2008). The City of Encinitas purchased the approximately 18 ha (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.

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. Therefore, no acquisition or use of lands planned for the Hall Property Community Park would be required.

Agua Hedionda Lagoon and CDFG Reserve
Agua Hedionda Lagoon, located in Carlsbad, is an approximately 162 ha (400 ac), human-made water body that was constructed in 1954 (Busch Gardens 2006). 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 CDFG, is located at the lagoon, as is a commercial mussel growing facility.

CDFG manages a 75 ha (186 ac) Ecological Reserve consisting of wetlands located at the eastern end of the lagoon.

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. The proposed project would not interfere with existing trails, or planned trails. The visual character of the park would be unchanged; the coastal area of the SDRP is already bisected by the I-5. The additional lanes constructed as part of the *I-5 NCC Project* would not substantially alter views. Increases in noise levels would not be noticeable to park users. Areas of natural vegetation disturbed through construction would be restored with native plant species. It is not expected that the use of 0.46 ha (1.14 ac) of the SDRP would not impact any of the activities, features, or attributes of the resource.

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 not be measurably altered by the freeway improvements. The very small quantity of vegetation removed 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. It is not expected that the use of up to 0.05 ha (0.13 ac) of Reserve land would not impact any of the activities, features, or attributes of the Reserve.

Paul Ecke Sports Park and YMCA
Implementation of any of the I-5 NCC build alternatives would not result in impacts to the park property that is usable for any of the park activities. Access to existing park and the visual character would be unaffected. Increases in traffic-related noise would not be noticeable to park users. The proposed project use of 0.20 ha (.57 ac) Park land on the existing manufactured slope below the Park adjacent to the freeway of would not adversely affect the primary function of the sports park.

Agua Hedionda Lagoon
Implementation of the proposed project would not impede the ability of the lagoon to recreation of boating, water skiing, and canoeing. Nor would it effect the 75-ha (186-ac) CDFG Ecological Reserve. Public and private access to the lagoon would not be affected. The proposed project would not interfere with existing trails, or planned trails. The visual character of the lagoon would be unchanged; the use and 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 Areas of natural vegetation disturbed through construction would be restored with native plant species. It is not expected that the use of 0.90 ha (2.22 ac) of the lagoon would not impact any of the activities, features, or attributes of the resource.

Center City Golf Course
The proposed project would result in the use of 0.39 ha (0.95 ac) of publicly owned land (*Table 3.1.2*). Of this land, 0.03 ha (0.07 ac) is located at the southern edge of the golf course northwest of the Ralph's shopping center. This piece of land is located at the edge of the golf course and does not serve as a portion of any of the holes or fairways. The remaining 0.36 ha (0.88 ac) of land is located adjacent to I-5 along the western edge of the Center City Golf Course property. Additionally, this area is downhill from the golf course and approximately 91 to 305 m (300 to 1,000 ft) away from the closest holes and fairways. Implementation of any of the proposed alternatives would not adversely affect the primary function of the golf course.

Community Enhancements
Community enhancement projects as project features were listed in *Section 2.2.2 Common Design Features of the Build Alternatives.* The community improvement projects that were agreed to have consideration did not have additional impacts for the *I-5 NCC Project* and tended to be trails, park and ride enhancements, streetscape enhancements, etc. The community enhancement projects would occur if the following conditions were met: existing plans with the proposed projects; *I-5 NCC Project* construction segment was at the location of the community enhancement; and future formal cooperative agreements between Caltrans and each city, where Caltrans would build these features and the cities would be responsible for their maintenance. See *Figures 2-2.14a-ao Project Features Maps*. Implementation of community enhancements would require modification of less than .04 ha (0.10 ac) within each resource.

3.1.3.4 Avoidance, Minimization, and/or Mitigation Measures

The proposed project would not result in any adverse impacts, since the function of the recreational facilities remain. No mitigation measures are required. However, 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 coastal sage scrub and nonnative 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. Caltrans would continue refining the proposed project design to further reduce the direct impacts to the individual facilities. Caltrans would coordinate this effort with the local jurisdiction property owners.

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 Community Impact Assessment (CIA), October 2007 and the Barrio Carlsbad Community Cohesion Report, June 2008. These separate technical studies were prepared for the proposed project and are incorporated to this document by reference.

3.2.1 Regulatory Setting

The Council on Environmental Quality (CEQ) regulations, which implement the National Environmental Policy Act (NEPA) of 1969, requires 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 CFR 1508.8, refer to these consequences as indirect impacts. Indirect impacts may include changes in land use, economic vitality, and population density, which are all elements of growth.

The California Environmental Quality Act (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 than are typical farther inland. 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 included San Diego, Del Mar, Solana Beach, Encinitas, Carlsbad, and Oceanside, is considered to be nearly developed 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 hectares (acres) in each of the six jurisdictions and the proportion of that land slated for residential development. Both Oceanside and Carlsbad, which are similar in total area, have an estimated 13 percent of available developable land. 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 6 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 Hectares (Acres) as of 2004

Jurisdiction	Total Ha (Ac)	Remaining Developable Land	Proportion Planned Residential
Oceanside	10,917 (26,978)	1,414 ha (3,493 ac) 13%	549 ha (1,357 ac) 39%
Carlsbad	10,132 (25,037)	1,363 ha (3,368 ac) 13%	767, ha(1,895 ac) 54%
Encinitas	5,064 (12,513)	341 ha (843 ac) 7%	261 ha (644 ac) 76%
Solana Beach	881 (2,178)	17 ha (42 ac) 2%	14 ha (34 ac) 81%
Del Mar	463 (1,143)	21 ha (52 ac) 4%	18 ha (44 ac) 85%
San Diego	88,750 (219,305)	5,310 ha (13,121 ac) 6%	2,020 ha (4,991 ac) 38%
Total	116,208 (287,154)	8,466 ha (20,919 ac) 7%	3,628 ha (8,965 ac) 43%

Source: SANDAG Data Warehouse 2007

Population forecasts published by SANDAG through 2030 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 62 percent over the 30-year period from 2000 to 2030. Carlsbad, San Diego, and Oceanside are expected to experience the most growth, with 62, 35, and 29 percent, respectively. Del Mar and Solana Beach, which are the smallest in area, have the lowest projected population growth at 17 and 21 percent, respectively. In comparison to the general population growth trends for the county as a whole, which is forecast to grow by 42 percent, all jurisdictions in the study area with the exception of Carlsbad are expected to grow at a slower pace. Increased growth in Carlsbad is anticipated due in part to the amount of available developable land and due to its increasing economic growth. The majority of Carlsbad is inland from the coast on what is considered the urbanizing fringe.

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

City	2000	2006	2010	2020	2030	Percent Change 2000-2030
Oceanside	161,029	175,171	186,785	196,482	207,237	29%
Carlsbad	78,247	97,720	109,611	119,095	127,046	62%
Encinitas	58,014	59,037	65,358	68,030	73,170	26%
Solana Beach	12,979	13,327	13,807	14,839	15,761	21%
Del Mar	4,689	4,524	4,661	5,138	5,497	17%
San Diego	1,223,400	1,310,199	1,365,130	1,514,336	1,656,257	35%
County of San Diego	2,813,833	3,066,820	3,245,279	3,635,855	3,984,753	42%

Source: SANDAG 2007c

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 4 years. The forecasts are based on General and Community Plans of each of the region's 19 jurisdictions. The 2030 Regional Growth Forecast Update was accepted for review and use by SANDAG on September 8, 2006. 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 2030 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

Overall goals for growth within San Diego are outlined in the Guidelines for Future Development. Goal 1 is to manage the growth of the region through adequate and timely public facilities to serve the additional population. In addition, San Diego strives to develop an effective "development management system" that would monitor the distribution and timing of growth in relation to environmental, physical, and public facility and service performance goals.

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 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. 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, 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.

3.2.2 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 forecast for the year 2030. 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 a moderate 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 design year of 2030. 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 20-year 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 a moderate 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.

3.2.3 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

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 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 Wiliamson 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.

3.3.2 Affected Environment

This section is based on the 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-mile mile 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 zero 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 zero 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 as resulting 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 those areas 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 3-3.1,* 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 of 1979 addresses agricultural resources within the Conservation Element. While it states goal "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

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

A large amount of land within Encinitas is devoted toward some form of agricultural production, much 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 (CDC 2004).

As shown in *Figure 3-3.2*, 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 as residential 2.01 to 3.00 du/ac. Weidners' Gardens and Samia Rose Topiary are also designated Unique Farmland. They are located adjacent to the east side of I-5 north of Leucadia Boulevard. North of and adjacent to Leucadia Boulevard east of I-5 are the Leucadia Nursery and Emerald M. Growers, both of which are designated as Unique Farmland. 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 mile east of I-5 south of Puebla Street. Sunshine Gardens, a nursery and greenhouse operation designated as Unique Farmland, is located 0.25 mile 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 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 hectares (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 3-3.2*, 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 mile 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 mile east of I-5 between Legoland and the Carlsbad Company Stores. The Flower Fields cover approximately 133.5 ha (330 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 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

The protection and value of agricultural land in Oceanside are discussed in the Land Use and Environmental Resource Management Elements of the 20102 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.

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.

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.

3.3.3 Environmental Consequences

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 would result in encroachment that consists of 0.8 ha (2 ac) of edge impacts along the existing I-5 corridor and 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 alternatives include the proposed transit facility and DAR at Manchester Avenue, which would affect active agricultural fields east of and adjacent to I-5. The proposed transit facility would encroach into Prime agricultural land that is actively farmed. The Prime Farmland totals approximately 12.3 ha (30.5 ac). The proposed facility would affect the western portion of the agricultural land on approximately 7.5 ha (18.5 ac). 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 Caltrans and the land owner would occur to determine the possibility of continuing agricultural operations. 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 important 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 with Barrier Alternative would directly impact an estimated 6.5 ha (16.08 ac) of agricultural land within Carlsbad, 5.7 ha (13.99 ac) of which are prime and 0.8 ha (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 for 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 with Barrier

The FMMP impact rating for the 10+4 with Barrier Alternative is 101.73. 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 with Barrier Alternative would impact a total of 10.92 ha (27 ac) of farmlands and agricultural lands.

10+4 with Buffer

Throughout the six municipalities, the 10+4 with Buffer Alternative would impact a total of 10.11 ha (25 ac) of farmlands and agricultural lands. As depicted in *Table 3.3.1*, the NRCS has given a Farmland Conversion Impact rating of 101.76 to the 10+4 with Buffer Alternative. This rating is less than the 160-point threshold established to determine if further evaluation of adverse effects is necessary, and is not considered an adverse effect.

8+4 with Barrier

Throughout the six municipalities, the 8+4 with Barrier Alternative would impact a total of 10.52 (26 ac) of farmlands and agricultural lands. As depicted in *Table 3.3.1*, the Farmland Conversion Impact rating for the 8+4 with Barrier Alternative is 101.74, less than the 160-point threshold established for further evaluation for adverse effects. No adverse impacts to farmlands would occur.

8+4 with Buffer

Throughout the six municipalities, the 8+4 with Buffer Alternative would impact a total of 9.71 ha (24 ac) of farmlands and agricultural lands. As depicted in *Table 3.3.1*, the Farmland Conversion Impact rating for the 8+4 Buffer Alternative, as determined by the NRCS, is 101.81. This rating is below the 160-point threshold for further determining adverse effects; therefore, this alternative is not considered an adverse effect.

No Build Alternative

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

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 with Barrier	10.92 ha (27 ac)	1%	101.73*
10+4 with Buffer	10.11 ha (25 ac)	1%	101.76*
8+4 with Barrier	10.52 (26 ac)	1%	101.74*
8+4 with Buffer	9.71 ha (24 ac)	1%	101.81*

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

The total farmland conversion impact rating for the proposed build alternatives ranges from 101.73 to 101.81 (*Table 3.3.1*), and all four alternatives are less than the 160-point threshold established for further evaluation for adverse effects. Therefore, effects on farmlands under the FMMP for the four alternatives are not considered adverse. Impacts to existing farmlands that would occur within each community are discussed in more detail in those individual sections. No Williamson Act contract lands would be affected by the proposed project.

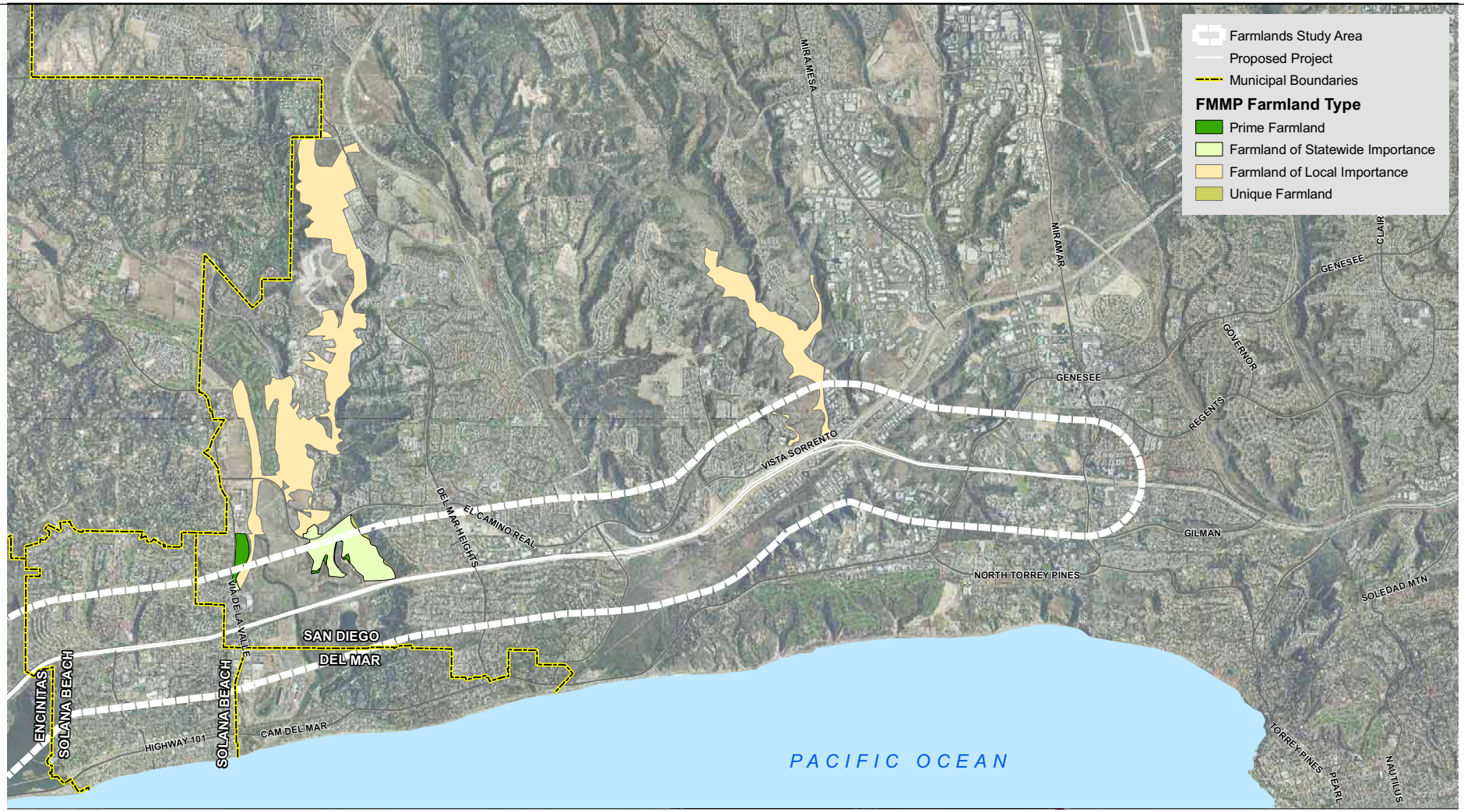
3.3.4 Avoidance, Minimization, and/or Mitigation Measures

Designs of the 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 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 project alternatives followed the existing I-5 alignment to avoid and/or minimize impacts to farmlands and agricultural lands.

Source: AirPhotoUSA 2006; SanGIS 2006; FMMP 2004, 2006

Scale: 1:72,000; 1 inch = 6,000 feet

Figure 3-3.1 Important Farmlands - North



Source: AirPhotoUSA 2006; SanGIS 2006; FMMP 2004

4,500 2,250 0 4,500 Feet

Scale: 1:54,000; 1 inch = 4,500 feet

Figure 3-3.2 **Important Farmlands - South**

3.4 Community Impacts

This section is based largely on the October 2007 Community Impact Assessment (CIA), a separate technical study prepared for the proposed project and incorporated by reference. This section discusses whether the proposed project would have impacts to communities and includes:

- Community Character and Cohesion;
- Relocations; and
- Environmental Justice.

3.4.1 Community Character and Cohesion

3.4.1.1 Regulatory Setting

The NEPA, established that the federal government use all practicable means to ensure for all Americans safe, healthful, productive, and aesthetically and culturally pleasing surroundings [42 U.S.C. 4331(b)(2)]. FHWA in its implementation of NEPA [23 U.S.C. 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

This section is based largely on the October 2007 CIA and June 2008 Barrio Carlsbad Community Cohesion Report, separate technical studies that were prepared for the proposed project and are incorporated by reference. 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 and 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 document, a brief summary of community land uses is included here. Primary land uses in the city portion of 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 University 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.

University 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 can also contribute 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 not directly impacted by the project and 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 "Village 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 Pla*n *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 that 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 third 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 own homes. Along the coastline the 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 whom 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 Way and Tamarack Avenue as seen on *Figure 2-2.14ag.*

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 is also 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 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 and 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 with 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 would also 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 times appropriate when traffic volumes would likely be lower. Any disruptions and impacts related to construction activities would be temporary.

10+4 with Barrier

City of San Diego

The proposed project would include four community enhancement features within the City of San Diego, including a trail connection at Los Peñasquitos Creek, a pedestrian and bicycle trail connection at Carmel Valley Road, and a pedestrian overpass connection north of Del Mar Heights Road. 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 with 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 5 km squared (two mi squared) 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 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 San Elijo Lagoon Ecological Reserve would be a beneficial impact to community character. According to Section *3.7 Visual/Aesthetics*, 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 incrementally allow for 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 with 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 include a pedestrian bridge and trail at Manchester Avenue, improvements to Villa Cardiff Drive, 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, and a pedestrian overpass and trail connection at Union Street. 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 with 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,* relocating displaced residents may be difficult as the availability of apartments within Carlsbad with similar rental rates is not adequate. 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, similar to the proposed trail at Batiquitos Lagoon and the two proposed trails at Agua Hedionda Lagoon, would enhance pedestrian access to important community recreational facilities. 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. 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. *Figure 3-4.1* 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 the construction of the community enhancement features, which includes the construction of a park at California Street, pedestrian streetscape enhancements along Oceanside Boulevard, enhancements to the Division Street overpass, an enhanced pedestrian overpass connection on Mission Avenue (which would connect to Oceanside High School), an enhanced pedestrian overpass connection on Bush Street, the construction of a pedestrian underpass improvements at the San Luis Rey River, and a regional gateway feature at Harbor Drive. 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 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. It would also result in the removal of some parking on Pio Pico Drive, but would not affect the recreational facilities within the park. The proposed project would also impact a portion of the Center City Golf Course, an 18-hole public golf course, but would not affect any of the activities, features, or attributes of the facility. 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 with Buffer

While this project alternative would impact slightly less area, the CIA study area for the municipalities remains the same since community character 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 with 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*, 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 at Holiday Park and a portion of the Center City Golf Course 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 with Barrier

The impacts to community character and cohesion for this project alternative are similar to the 10+4 with Buffer 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, the impact would be less than significant.

8+4 with Buffer

The impacts to community character and cohesion for this project alternative are similar to the 10+4 with Buffer Alternative. The overall right-of-way required for the project is less than that discussed under the 10+4 with Buffer Alternative, but because community character and cohesion are analyzed at a community scale, the differences in impacts are not discernable. Therefore, no impacts to community character or cohesion are anticipated with this alternative.

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 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 Draft EIR/EIS may also serve to minimize impacts to the community. Such issue areas with additional measures include, but are not limited to the 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 from each local agency to maintain them in perpetuity.

Construction-Related Measures
The following measures would help to minimize impacts to communities during construction activities:

- Preparation of a Traffic Management Plan (TMP) 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.

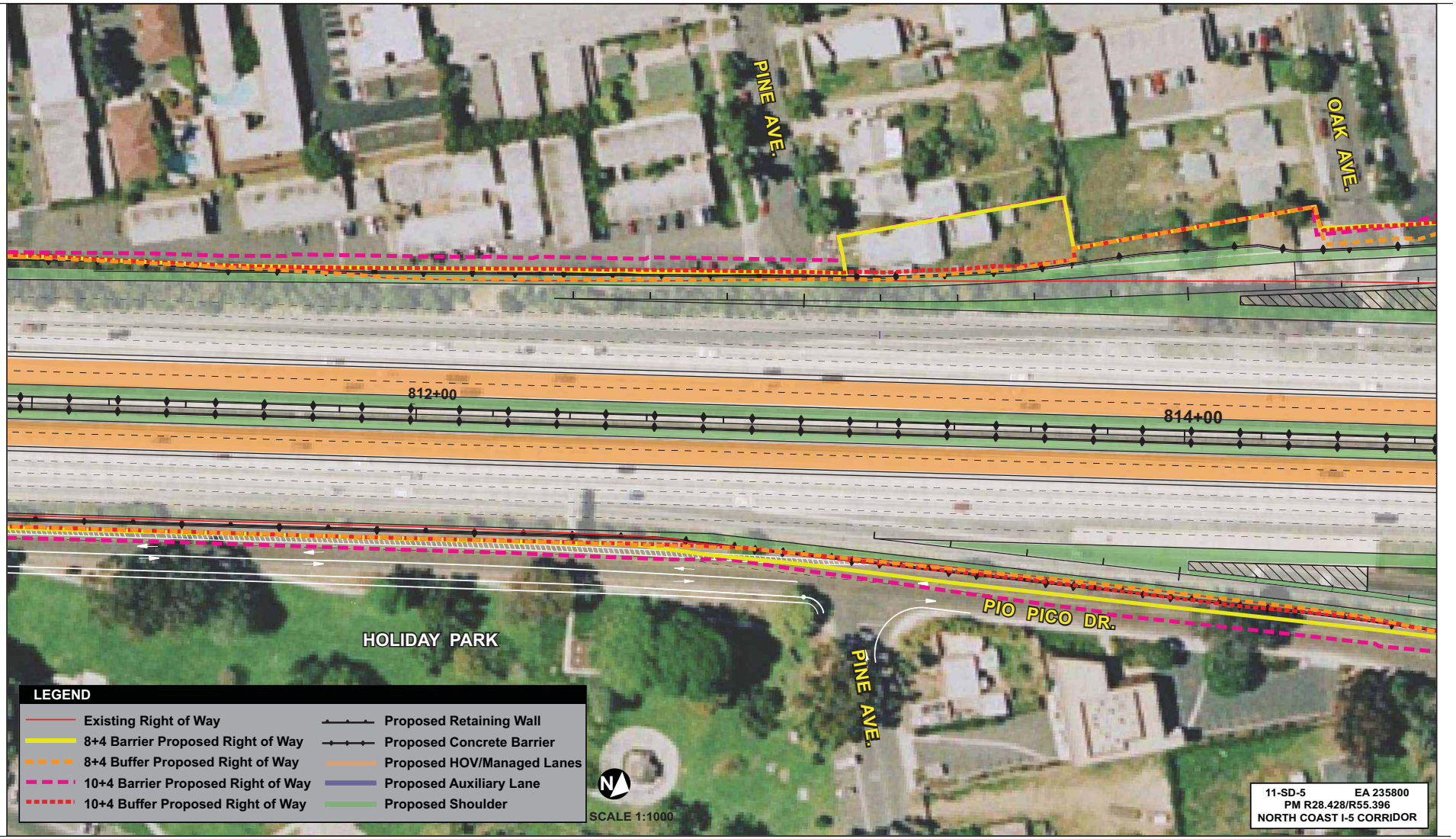


Figure 3-4.1 Build Alternatives Comparison

3.4.2 Relocations

3.4.2.1 Regulatory Setting

This section is based on the Draft Relocation Impact Report (DRIR), a separate technical study that was prepared for the proposed project and is incorporated by reference.

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 U.S.C. 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 largely upon the Community Impact Assessment, October 2007 and Barrio Carlsbad Community Cohesion Report, June 2008, separate technical studies that were prepared for the proposed project and are 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 are only likely to 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 all project alternatives would 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 with Barrier

Relocation impacts associated with the 10+4 with 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 relocation impacts would occur with the 10+4 with 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, and therefore no relocations would occur.

Table 3.4.1: Relocation Associated with the10+4 with Barrier Alternative

Relocated Units	Solana Beach	Encinitas	Carlsbad	Oceanside	Total
Single-Family Residence	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 with Barrier Alternative would result in the displacement of six condominiums in Solana Beach within the Eden Gardens community. Additionally, the 10+4 with Barrier Alternative would result in the displacement of two single-family residences in Old Encinitas and one commercial business in Leucadia. Adequate relocation opportunities have been 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 with Barrier Alternative would displace a 47-unit apartment complex and one triplex within Carlsbad, which can be seen in *Figure 3-4.1* that 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 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 with 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.

The 10+4 with 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 one single-family unit in East Side Capistrano. One of the single-family residential units in South Oceanside displaced by the 10+4 with 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 Last Resort Housing 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 with Barrier Alternative. Therefore, relocation impacts are not anticipated to be adverse.

10+4 with Buffer

Relocation impacts associated with the 10+4 with Buffer Alternative are shown in *Table 3.4.2*. As described in the DRIR, the 10+4 with 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 with Buffer Alternative

Relocated Units	Solana Beach	Encinitas	Carlsbad	Oceanside	Total
Single-Family Residence	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 with Buffer Alternative would result in the displacement of one single-family residence in Old Encinitas. Adequate relocation opportunities have been 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 with 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 with Buffer Alternative would also displace seven of the nine commercial businesses in northern Carlsbad displaced by the 10+4 with 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 Act of 1970, as amended.

Relocation impacts within Oceanside would be identical to those identified for the 10+4 with 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 Last Resort Housing 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 with Buffer Alternative. Therefore, relocation impacts are not anticipated to be adverse.

8+4 with Barrier

Relocation impacts associated with the 8+4 with Barrier Alternative are shown in *Table 3.4.3*. As described in the DRIR, the 8+4 with 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 with Barrier Alternative

Relocated Units	Solana Beach	Encinitas	Carlsbad	Oceanside	Total
Single-Family Residence	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	73
Total Residential Units	0	1	59	44	104
Businesses	0	1	7	3	11

The 8+4 with Barrier Alternative would result in the displacement of one single-family residence in Old Encinitas and one commercial business in Leucadia. Adequate relocation opportunities have been 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 with 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 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 Last Resort Housing Program payments to relocate those displaced.

The 8+4 with Barrier Alternative would also displace seven of the nine commercial businesses in northern Carlsbad displaced by the 10+4 with 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 with 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 Last Resort Housing 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 with Barrier Alternative. Therefore, relocation impacts are not anticipated to be adverse.

8+4 with Buffer

Relocation impacts associated with the 8+4 with Buffer Alternative are shown in *Table 3.7.4*. As described in the DRIR, the 8+4 with 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 Solana Beach, or Encinitas, and no adverse relocation effects would occur.

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

Relocated Units	Solana Beach	Encinitas	Carlsbad	Oceanside	Total
Single-Family Residence	0	0	3 SFRs	13 SFRs	16
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	0	26 units	26
Total Residential Units	0	0	6	44	50
Businesses	0	0	7	3	10

The 8+4 with Buffer Alternative would displace three single-family residences and one triplex in Carlsbad. Adequate relocation opportunities have been determined to exist for these single-family residences and triplex. The 8+4 with Buffer Alternative would also displace seven of the nine commercial businesses in northern Carlsbad displaced by the 10+4 with 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 with 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 Last Resort Housing 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 relocation program would be implemented to ensure adequate treatment for those directly impacted by the 8+4 with 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 Last Resort Housing (LRH) Program options, including LRH payments.

3.4.3 Environmental Justice

3.4.3.1 Regulatory Setting

All projects involving a federal action (funding, permit, or land) must comply with Executive Order (E.O.) 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations,* signed by President Clinton on February 11, 1994. This E.O. 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 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 is 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 Community Impact Assessment, October 2007 and Barrio Carlsbad Community Cohesion Report, June 2008, 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 affectd 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 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 (Council on Environmental Quality'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 E.O. 12898. Environmental and community impacts are then analyzed to determine if those low-income and/or minority populations are disproportionately affected by the proposed project. *Figures 3-4.1* and *3-4.2* illustrate the racial and ethnic composition of potentially affected census block groups within each jurisdiction in the CIA study area, and *Tables 3-4.5* and *3-4.6* provide a comparison with each jurisdiction as a whole and the County of San Diego.

[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, 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.

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 3.4.5*. 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 is therefore considered an area of potential Environmental Justice concern. As illustrated in *Figure 3-4.3*, this block group 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 3.4.5*. 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 3.4.5*. 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 3-8-1*, 173.04.1 is located adjacent 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 1.3 km (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 3.4.5*. 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 1.3 km (0.5 mi) west of I-5. Therefore, four block groups exhibited a total minority percentage meaningfully greater within Encinitas.

Table 3.4.5: 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

Table 3.4.6: 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

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 3.4.5*, the entirety of Carlsbad within the CIA study area had a total minority percentage of 23.4 percent. The total minority percentagefor 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 1.3 km (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 3.4.5*, 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 3-8-2*, 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 1.3 km (0.5 mi) from I-5. These 17 block groups exhibit total minority percentages meaningfully greater within Oceanside.

Low Income Populations in the Study Area

City of San Diego

Table 3.4.6 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. 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. 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, three 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 Dietgo 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 1.3 km (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 exhibiting meaningfully greater populations living in poverty within San Diego.

Del Mar

Table 3.4.6 illustrates the economic indicators including median household income, per capita income, and proportion of people living below the poverty level within Del Mar, the CIA study area, and the entirety of San Diego County in 1999. 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 is not considered to contain any low-income populations within the meaning of this analysis.

Solana Beach

Table 3.4.6 illustrates economic indicators including the median household income, per capita income, and proportion of individuals living in poverty within the CIA study area of Solana Beach, the City of Solana Beach, and San Diego County in 1999. The proportions of individuals who were living in poverty ranged from 1.3 percent to 27.9 percent. 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

Table 3.4.6 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 Encinitas, the city of Encinitas, and San Diego County in 1999. The proportions of individuals living in poverty range from 0.0 percent to 27.2 percent. 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 mile 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 to the city as a whole.

Carlsbad
Table 3.4.6 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 Carlsbad, the city of Carlsbad, and San Diego County in 1999. The proportions of individuals living in poverty range from 0.7 percent to 40.2 percent. 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
Table 3.4.6 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 Oceanside, the City of Oceanside, and San Diego County in 1999. 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%) when compared to other block groups. Therefore, nine block groups exhibited meaningfully greater populations living below poverty levels within Oceanside.

Minority and 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 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.

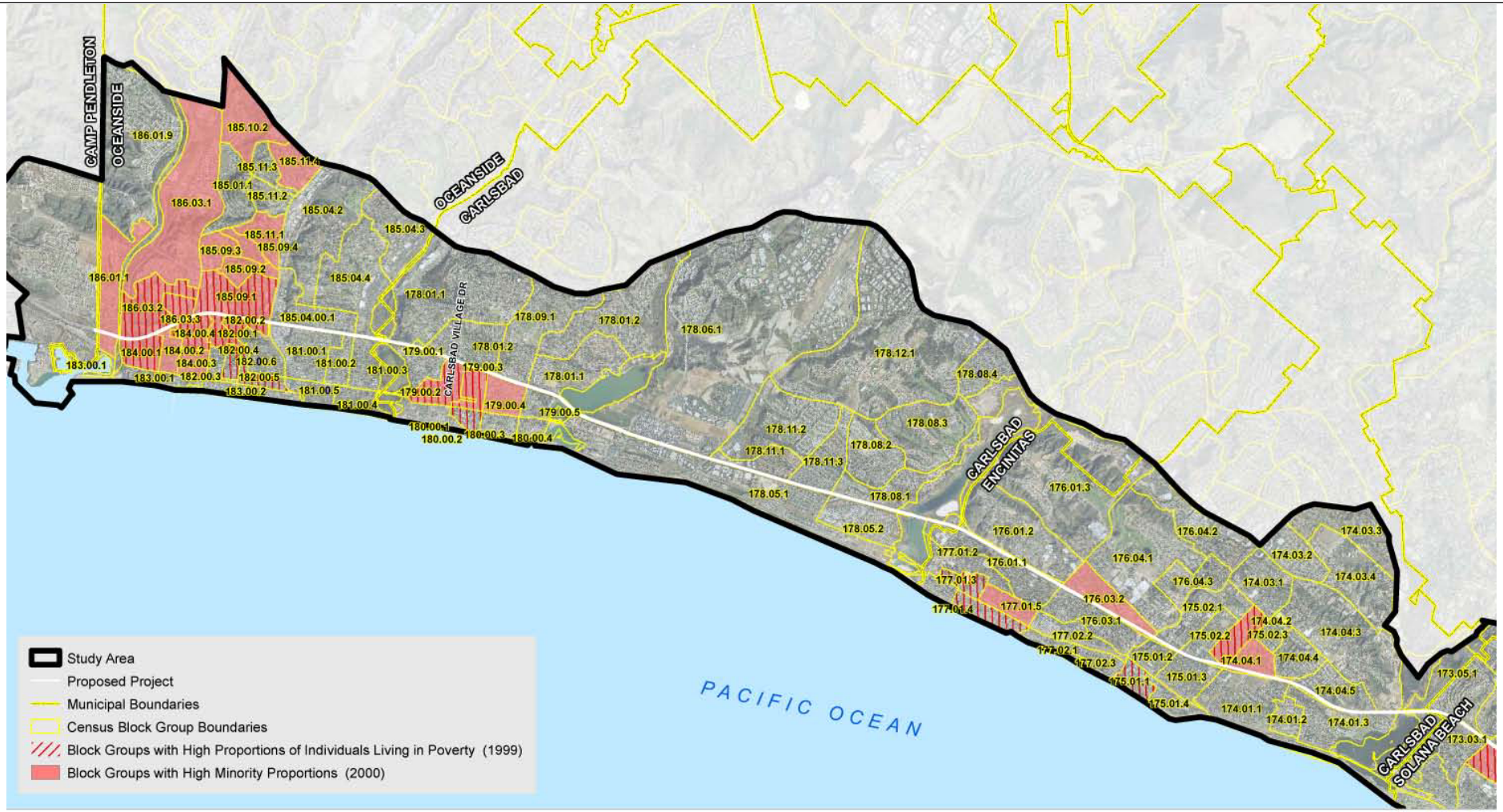
3.4.3.3 Environmental Consequences

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 *Sections 3.7*. These impacts are not localized, but occur throughout the project corridor.

In total, there are 12 block groups that have populations of meaning fully greater populations of minority and low-income individuals. 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, the impacts do not disproportionately affect minority or low-income populations in the project area. The impacts associated with construction and operation of the proposed project are generally not isolated to communities or areas with minority 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 minority populations, nor are these impacts expected to be experienced to a greater degree by minority populations or low-income populations.

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

The proposed project, particularly as it encompasses a range of community enhancement features that if implemented would generally serve to alleviate some of the impediments to fluid social interaction currently present in the region surrounding the I-5 North Coast corridor. This would occur through the creation of more efficient connections between neighborhoods both east and west of I-5, and by providing 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 or minority populations. However, specific encroachments required through right-of-way expansion along the corridor may affect isolated low-income or minority populations. Specific differences between each of the alternatives are described below.

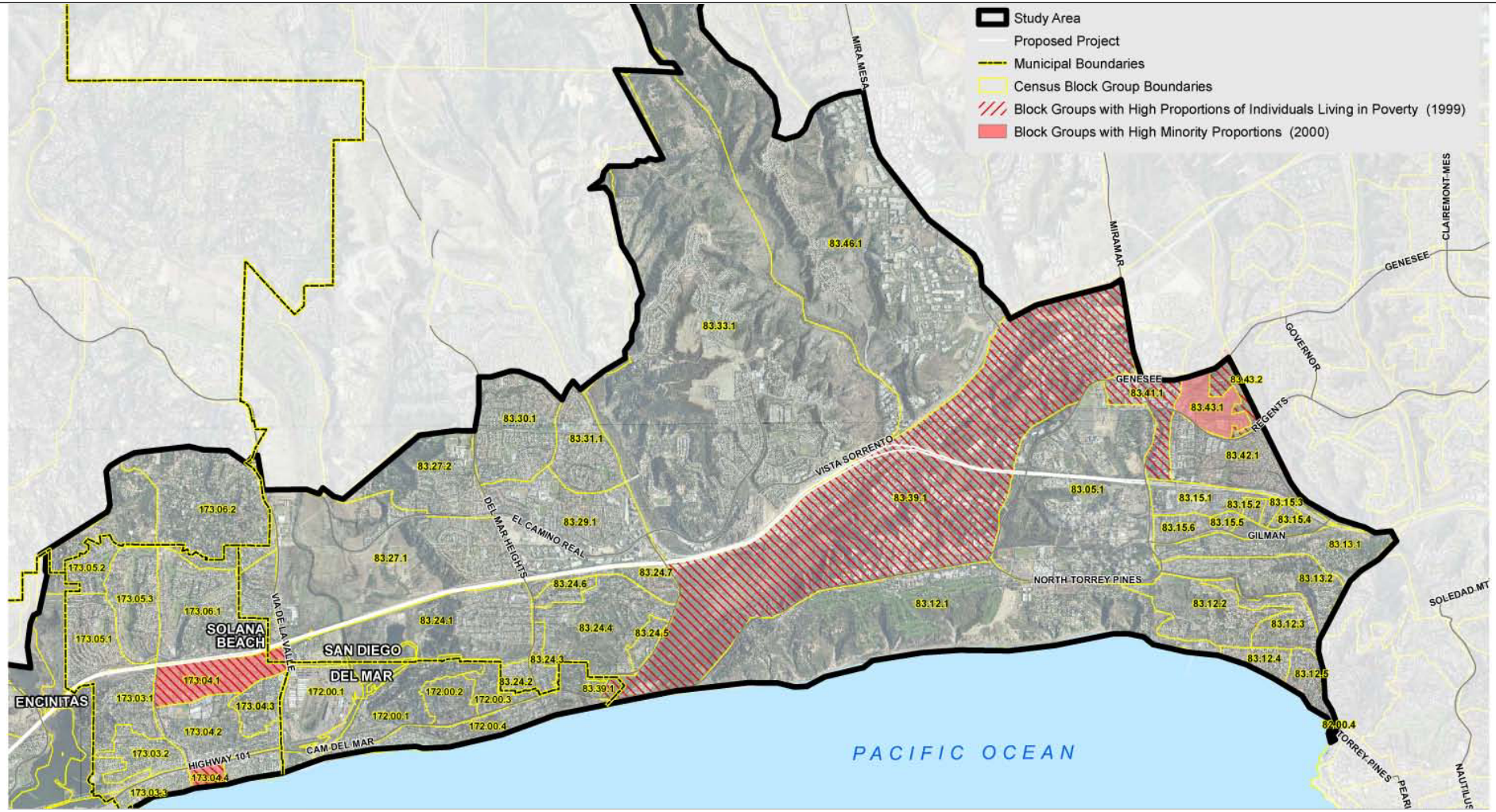


Source: AirPhotoUSA 2006; SanGIS 2006; US Census 2000

6,000 3,000 0 6,000 Feet

Scale: 1:72,000; 1 inch = 6,000 feet

Figure 3-4.2 Block Groups Containing Populations of Potential Environmental Justice Concern - North



Source: AirPhotoUSA 2006; SanGIS 2006; US Census 2000

6,000 3,000 0 6,000 Feet

Scale: 1:72,000; 1 inch = 6,000 feet

Figure 3-4.3 Block Groups Containing Populations of Potential Environmental Justice Concern - South

Value Pricing

As discussed in *Chapter 2*, this project includes Value Pricing where excess capacity in the managed lanes would be sold to Single Occupancy Vehicles (SOV), allowing SOV to use the lanes for all build alternatives. The Value Pricing program would entail the implementation of tolls to these 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 high occupancy vehicles (vanpools and carpools) so as to promote more person movement 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 direct access ramps (DARs) connecting to transit facilities and local streets. In keeping with regional policy which 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 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 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 toward 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 below:

- Managed lanes with value pricing provide an effective new alternative for moving people in the I-5 Corridor, and decrease travel time for transit and HOV users
- New capacity eases 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 maximize corridor capacity
- Needed

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 the I-5 was a positive proposal, while others felt the project was not fair or the best use of space or funds.

- There was no clear preference voiced by either group for direct access ramps or slip access and egress points. A wide range of perspectives were 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 direct access ramps are safer and easier because they don't 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 direct access ramps did not justify traveling further or paying a higher toll. The results from this discussion favor providing direct access ramps 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 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 single occupancy vehicles 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 in the differences in discussion between the two groups. The 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 a park and ride lots to capture alternative mode commuters. The intercept survey respondents believe that a fee schedule set by time of day would encourage carpooling at 34 percent, 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 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, the proposed HOV/Managed Lanes with the inclusion of the values pricing program, perceptions surveyed indicate that the project would not cause disproportionately high and adverse effects on any minority or low-income populations as discussed in E.O. 12898 regarding environmental justice. In addition, the travel time resulting from the build alternatives would be beneficial to users of both managed and general-purpose lanes.

10+4 with Barrier

The 10+4 with 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 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 Last Resort Housing 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 block group containing the apartment complex that would be displaced by the 10+4 with Barrier alternative 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 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 with Barrier alternative in an area with greater proportions of minorities and individuals living in poverty would be considered a disproportionate impact.

10+4 with Buffer

This project 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.

8+4 with Barrier

The 8+4 with 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 with Barrier alternative. Generalized impacts along the remainder of the corridor would be similar to those described above and would not be considered a disproportionate Environmental Justice impact.

8+4 with Buffer

This project 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 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 or low-income populations have been identified that would be disproportionately impacted.

3.4.3.4 Avoidance, Minimization, and/or Mitigation Measures

Implementation of the 10+4 with Buffer, and 8+4 with Buffer alternatives would avoid impacts to the low-income and 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 has 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.

Impacts of the 10+4 with Barrier alternative to the low-income and minority populations of the 47-unit apartment complex in Barrio Carlsbad may not be fully mitigable. This may create a disproportionate impact to this community. Prior to the approval of the final environmental document, an updated Relocation Impact Report would be prepared to address housing availability to determine if this impact can be minimized or avoided under this alternative, should if be identified as the preferred alternative.

3.5 Utilities and Emergency Services

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.

The following utility providers are located within the project limits: Gas and electric is provided by San Diego Gas and Electric (SDG&E). Water is supplied by the City of San Diego Water Department, San Dieguito Water District, City of Encinitas Water District, Santa Fe Irrigation District, City of Carlsbad Municipal Water District (Olivenhain Municipal Water District 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, Carlsbad Municipal Water District, 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 there are cable lines, telephone lines, and fiber optic lines that allow multiple carriers to operate.

Emergency Services

California Highway Patrol (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. 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. The relocations would occur within existing utility easements, wherever possible, and would not create any additional environmental impacts.

There are several electrical utilities greater than 50kv that would require relocation with the implementation of the project, as follows; eight relocations for 10+4 with 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 are minor relocations, such as relocating to housing within a bridge or relocating into non-sensitive or previously disturbed areas.

The project currently proposes to avoid four high-voltage transmission towers and one distribution pole associated with the Encina Power Station located at eh 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 20 m (65 ft) further 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 on-going and would continue to do so throughout the project design process.

None of the proposed project alternatives would require 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, and both the poles (west side and east side) would be eliminated. No environmental impacts are anticipated
2	Via De La Valle Between NB offramp & HOV/Managed lanes	91035	TL 667	69	For all build alternatives, the transmission pole may be protected in place or be relocated 20 m (65.6 ft) to the east. No environmental impacts are anticipated
3	Between Via De La Val & Lomas Santa Fe	22406	TL 660	69	For 10+4 Barrier only, the transmission pole would move to east on the south-west 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 Avenue	24513	TL 660	69	The transmission pole is within the 10+4 Barrier project area only and is not impacted.
6	Between Manchester & Birmingham	24515	TL 660	69	The transmission pole is within the 10+4 Barrier /Buffer and 8+4 Barrier project areas and is not impacted.
7	South of Birmingham	24517	TL 660	69	The transmission pole is within the 10+4 Barrier /Buffer and 8+4 Barrier project areas and is not impacted.
8	North of Cannon Street	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 transmission towers relocation become necessary, all the four structures on west side would be relocated 20 m (65.6 ft) to the west within the existing unpaved lot. No environmental impacts are anticipated
9	North of Cannon Street	124590	TL 23003 & 13807	230 & 138	
10	North of Cannon Street	220564	TL 13804 &13806	138 & 138	
11	North of Cannon Street	124530	TL 13802 & 13803	138 & 138	
12	South of 76 Interchange	123637	TL 697	69	For all build alternatives, the pole would be relocated 20 m (65.6ft) 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 Environmentally Sensitive Areas (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, as 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 have compliance with all applicable solid waste regulations.

3.6 Traffic & Transportation / Pedestrian & Bicycle Facilities

3.6.1 Regulatory Setting

Caltrans and FHWA, directs 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). It further directs 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 U.S. Department of Transportation (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 U.S.C. 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

- Freeway Operations Report. November 2008. Prepared by Caltrans District 11
- Direct Access Ramps/Local Circulation System Impact Study, Technical Report No. 1, Area of Influence Analysis. Draft, August 2004
- Direct Access Ramps/Local Circulation System Impact Study, Technical Report No. 2, Existing Conditions Data Collection. Draft, August 2004
- Direct Access Ramps/Local Circulation System Impact Study, Technical Report No. 3, Traffic Analysis Methodologies and Standards. Draft, July 2004
- February 2008 Location Hydraulic Studies
- 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, 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 Revised November 2008

3.6.2.1 Traffic & 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 – As explained in Chapter 1, *Level of Service* (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 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

Traffic operations for the year 2006 were used to determine existing conditions of the I-5 North Coast corridor. Traffic forecasting determines where freeway capacity within the proposed project limits needs to be increased in the future. It determines how much capacity is needed, and what modifications to the existing roadway facilities can be done to improve traffic operations within the corridor. After the baseline existing conditions were established, the SANDAG Series 10 Transportation Model was utilized to produce future year 2030 traffic forecasting volumes for the four Build alternatives, and the no-build scenario. There was no difference in LOS between the buffer and barrier-separated versions of the same alternative. There was also no difference in LOS whether the forecasted traffic alternative contains DARs or not.

The previously listed technical reports for traffic analysis contain 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.

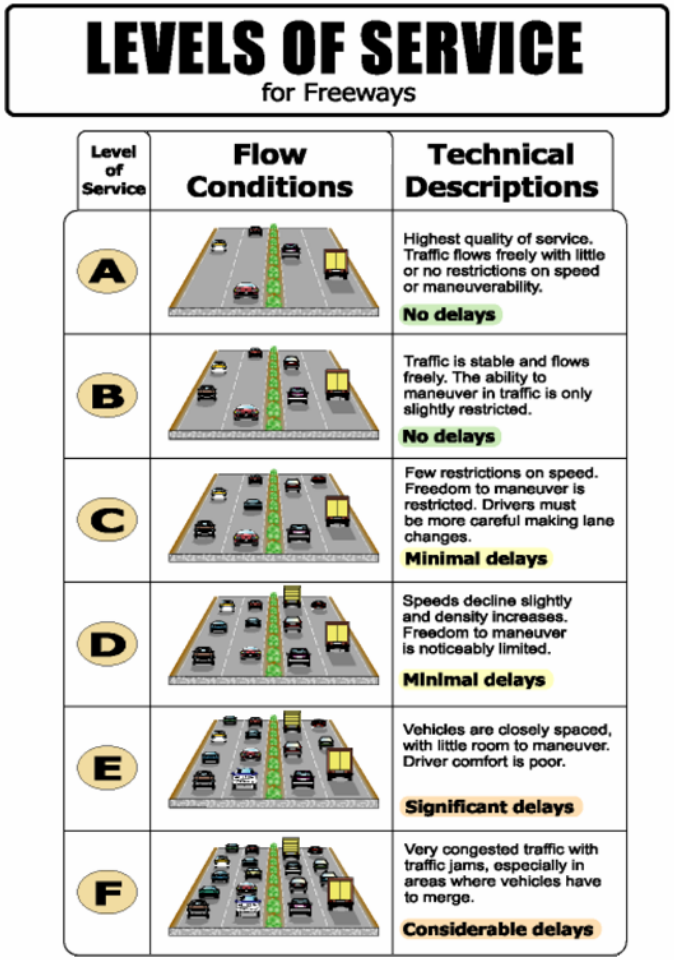


Figure 3-6.1: Level of Service

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 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 ten (10) general-purpose lanes (south of SR-78) on I-5 plus four (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 ten (10) general-purpose lanes (south of SR 78) on I-5 plus four (4) HOV/Managed lanes. DAR connections to HOV/Managed lanes are 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 (8) general-purpose lanes on I-5 plus four (4) HOV/managed lanes. DAR locations are the same as the 10+4 with Barrier/Buffer alternatives and DAR scenario.
5. *10+4 with DARs (Year 2015).* This scenario is identical to the Year 2030. 10+4 with Barrier/Buffer alternatives and DAR scenario, but the forecast horizon year is 2015.

Typically regional traffic forecast models are updated every three to four years to reflect such changes in assumptions as future land use, planned infrastructure, and modal mix. Because of the complexity of the I-5 NCC project, the model used as the basis for the I-5 studies has been updated since traffic studies were initiated. The forecasts presented in this Draft EIR/EIS and the associated technical studies are based on the Region's Series 10 model, whereas the current model is referred to as Series 11. As the model forecasts forms the basis for the project scope and performance analysis presented in this Draft EIR/EIS, its important to establish that the I-5 demand estimates (traffic volumes) are not significantly different between series 10 and series 11.

One of the most meaningful ways of comparing model outputs is to look at screenlines. Screenlines are often used in traffic analyses to determine how much volume is entering or exiting a particular area as they capture all of the traffic that moves across a real or perceived barrier (e.g., a lagoon that has limited crossings). With that in mind, screenlines were developed that captured the regional travel demand patterns within the I-5 north coast corridor. The traffic volumes were compared on these screenlines from both versions of the model for the I-5 No Project Build and I-5 Project Build (10+4) conditions. Overall traffic for all screenlines is within 10 percent. A similar check was done by comparing the forecasted Vehicle Miles Traveled (VMT) in the corridor between each of the models. Similarly, the comparison for the Build scenario shows VMT estimates to be within 10 percent of each other. The comparison of traffic volumes and VMT clearly shows that the differences between the two versions of the model is not materially different.

Average Daily Traffic

ADT has increased along the I-5 corridor and would continue to due so without a project (No Build). The 2030 No Build shows less demand than the 2030-year build alternatives, because freeway demand is shifted to routes parallel to I-5 (*Table3-6.1).*

Travel Time
The existing average travel time during free-flow conditions to travel the project area in the northbound or southbound direction is about 24 minutes, with an average speed of approximately 107 kilometer per hour (kph) (67 miles per hour [mph]) (*Table 3.6.1).* The existing southbound average AM peak travel time is between 31 and 44 minutes and the PM peak travel time is between 27 and 32 minutes (*Table 3.6.2*). The existing northbound travel time for the AM peak period is between 24 and 25 minutes. The PM 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 97 kph (60 mph) and the reference speed for the delay associated with bottlenecks. Manchester Avenue has been identified as both and AM and PM peak bottleneck in the southbound direction in 2006 causing an estimated 4,700 hours of delay. In the northbound direction, bottlenecks have been identified at Lomas Santa Fe Drive and Cannon Road, both in the PM peak. Combined, these two locations cause 3,500 hours of delay. Future delay is included within *Total Delay* in *Section 3-6.3.*

Duration of Congestion
On weekdays, the current duration of congestion in the northbound direction is 0 hours in the AM and 5 hours in the PM peak hours. In the southbound direction the duration of congestion is approximately 5 hours in the AM peak hours, and no congestion the PM peak hours (*Table 3.6.2*).

Weekend Congestion
Motorists traveling I-5 in the project area are experiencing an increase in weekend congestion. The weekend trips on I-5 are more recreational in nature and include a high percentage of carpools. The weekend trips include regional residents seeking access to the beach or ocean, interregional trips and local resident trips. During weekend peak periods, approximately 60 percent of the vehicles within the project limits are using the HOV Lanes. The percentages of those vehicles are typically higher, 55-65 percent, during peak travel times mid-day southbound on Saturday, and northbound on Sunday.

LOS
The northbound and southbound directional LOS for both the AM and PM peak hours are summarized in *Tables 3-6.5* and *3-6.*6, respectively. LOS is based on the forecasted traffic volumes, which did not make distinctions for barrier versus buffer or DAR variations.

HOV/Managed Lanes
At the time this traffic study was written, I-5 had one 9.65-km (6-mile) 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 on November 16-18, 2004 at the Del Mar Heights Road overcrossing indicated that the average peak-hour morning and afternoon HOV lane traffic volumes are 473 and 1,280 vehicles, respectively. The collected field data indicate that more than 90 percent of the vehicles using this HOV lane in both the AM and PM 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 3.6.7* and *3.6.8*.

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 buspool 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 at: Sorrento Valley Road, De Mar; Birmingham (off Villa Cardiff Drive), Encinitas; Calle Magdalena, Encinitas; La Costa, Carlsbad; Moreno Street, Oceanside; and Maxson Street, Oceanside.

3.6.2.2 Pedestrian & Bicycle Facilities Existing Facilities

Generally, pedestrian facilities usually include sidewalks, handicapped-access curb ramps, crosswalks, paths, improved lighting, and other similar facilities applicable for pedestrian use. Bicyclists utilize some of these pedestrian facilities when appropriate, and also use three designated classes of bikeways. They are: the Class I Bicycle Path, the Class II Bicycle Lane, and the Class III Bicycle Route. All are collectively identified as bikeways.

More specifically, a Class I Bicycle Path is a completely separate bikeway generally used by, both, bicycle riders and pedestrians. A Class II Bicycle Lane is an area alongside a vehicle travel lane, generally a road shoulder, that has a solid white stripe painted between the bike lane and the vehicle travel way. Signs along the bike lane would indicate “Bike Lane,” and bicycle stencils would be painted on the bikeway surface. A Class III Bicycle Route is a shared facility where a bicycle rider shares the same roadway with motorized traffic. A bike route is also designated by a “Bike Route” sign, and is often used where sufficient roadway width is not available for a bicycle lane, and/or when on-street parking cannot be removed to gain the additional roadway width needed.

Pedestrian and bicycle access is offered primarily from local streets that pass over or under I-5. There are a total of 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. Some bicycle access is also 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 “Bike”- Centennial 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 1448 km (900 mi) in length, and has been a major attractor of 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 user.

In the San Diego Region, there is relatively convenient access to this bikeway. The SR-56 Class I Bicycle Path, which terminates just east of I-5 in Carmel Valley, has an almost-direct link to the coast, via El Camino Real to Carmel Valley Road, and then to Coast Highway 101. This coast route also serves the communities of Del Mar and La Jolla. At the conclusion of this 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 have been painted on the shoulders and Class III Bicycle Routes would have been signed to accommodate users to the coast route.

Local communities that lie on the coast have coordinated 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 common goals and principles of the various local communities General Plans is detailed in *Section 3-2.1* subheading *Bicycle and Pedestrian Plans.*

The AMTRAK interregional rail service, as well as the COASTER, the regional commuter rail service); accommodate bicycles on their respective systems. All busses in the region, specifically North San Diego County Transit System (NCTD) and Metropolitan Transit System (MTS), respectively are equipped to carry bicycles as well. In summary, the southern California coastline is reasonably well-equipped to accommodate non-motorized travel modes. A number of 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 facilities that are either currently existing today, are planned for future construction, or are proposed to be developed. All would affect how the current network functions through the I-5 North Coast Project corridor.

Pedestrian and Bicycle

- Voigt Drive includes a Class II bike facility.
- I-5 freeway shoulders are opened to bicycle travel between Genesee Avenue and Sorrento Valley Road/Roselle Street.
- 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 for bicycles and pedestrians.
- Carmel Mountain Road 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 Interstate 15) and terminates just east of I-5 in Carmel Valley. Carmel Valley Road is used to access the coast from this bikeway.
- The Coastal Rail Trail, currently in the developmental phase, is proposed to begin in Sorrento Valley near Roselle Street and terminate in the University City area.
- The Coastal Rail Trail that would predominately lie within the railroad right-of-way between Oceanside and San Diego. The Coastal Rail Trail is in various stages of planning and completion throughout the various municipalities in Coastal North County. (Solana Beach's section is finished, Carlsbad and Oceanside have several sections built and are planning others (and encountering constrained areas), while Encinitas, Del Mar have constraints that have delayed even the planning phases).
- Del Mar Height Road includes a Class III bike facility as it crosses the freeway otherwise it includes a Class II bike facility.
- Via De La Valle includes a Class III bike facility.
- Lomas Santa Fe includes a Class II bike facility as it crosses the freeway otherwise it includes a Class II bike facility.
- Encinitas Boulevard includes a Class II bike facility.
- Leucadia Boulevard includes a Class II bike facility.
- La Costa Avenue includes a Class II bike facility.
- Poinsettia Lane includes a Class II bike facility.
- Cannon Road a Class II bike facility.
- 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 along 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 River, beginning from 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.

3.6.3 Environmental Consequences

3.6.3.1 Traffic & Transportation

Average Daily Traffic

ADT as seen in *Table 3.6.1* shows an increase in the amount of traffic for each alternative.

Table 3.6.1: Average Daily Traffic (ADT)

Location		2006 ADT	2030 ADT (No Build)	2030 8+4 Barrier/Buffer	2030 10+4 Barrier/Buffer
From	To				
La Jolla Village Drive	Genesee Ave	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	203,600	326,940	342,950	354,250
Encinitas Blvd	Leucadia Blvd	190,500	294,300	315,150	326,850
Palomar Airport Road	Cannon Road	188,500	290,100	309,850	320,350
SR-78	Oceanside Blvd	192,900	303,800	319,150	323,300
Mission Ave	SR-76	156,800	246,500	258,000	259,200

Travel Time

The No Build Alternative average travel time northbound in 2030 during peak hours is forecast 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 forecast to be between 53 and 54 minutes in the morning and between 49 and 48 minutes in the afternoon (*Table 3.6.2*). The average peak travel time for northbound 10+4 with Barrier/Buffer alternatives decreases to between 25 and 27 minutes in the morning and between 30 and 36 minutes in the afternoon in 2030. The southbound 10+4 with 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. The average peak travel time for northbound 8+4 with Barrier/Buffer alternatives

decreases 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 decreases to between 36 and 47 minutes in the morning and between 29 and 30 minutes in the afternoon.

Total Delay

The total weekday delay for the 2006 existing conditions in the northbound and southbound directions are 3,500 and 4,700 vehicle hours respectively. In the year 2030-No Build alternative, the predicted total weekday delay in the northbound direction would be 13,700 vehicle hours. The total weekday delay for the southbound direction No Build alternative would be 14,000 vehicle hours. In the year 2030, the 10+4 alternatives, the year 2030 delay for the northbound direction would be 600 vehicle hours. Southbound 10+4 with Barrier/Buffer alternatives delay in year 2030 would be 3,700 vehicle hours. For the northbound delay for the 8+4 with Barrier/Buffer alternatives would be 9,600 vehicle hours. The southbound delay for the 8+4 with Barrier/Buffer alternatives would be 8,000 hours. (*Table 3.6.2).*

Table 3.6.2: Total Delay, Congested Hours, and Travel Time

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	6.0	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 3.5 hours in the AM peak hours and 6 hours in the PM peak hours. In 2030, the duration of congestion in the southbound direction is forecasted in the No Build to be 6 hours in the AM peak hours, and 7 hours in the PM peak hours. The 10+4 with Barrier/Buffer alternatives has no congestion northbound in the AM and 2.5 hours in the PM peak hours, while southbound is 5 hours for AM and 2 hours for PM peak hours. 8+4 with Barrier/Buffer Alternatives has no congestion northbound in the AM and 6 hours in the PM peak hours, while southbound is 5.5 hours for AM and 2 hours for PM peak hours. (*Tables 3-6.3 and 3-6.4).*

Table 3.6.3: 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	18:00	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 3.6.4: 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	6:0	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*	14:00	6:00	2

* Congestion would continue through the AM and PM hours.
* The PM peak hours are from 12:00 to 1:00 and 4:00 to 7:00.

LOS

The No Build Alternative for year 2030, the northbound traffic conditions in the AM 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 PM peak hour exhibit a LOS rating of F. The majority of the southbound traffic conditions exhibit LOS ratings of F in the AM and PM peak hours (*Tables 3-6.5 and 3-6.6*).

The 10+4 with Barrier/Buffer alternatives for year 2030, the northbound traffic conditions in the AM 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 PM peak hour exhibit a LOS rating of D. The majority of the southbound traffic conditions exhibit LOS ratings of D with the exception of a few LOS ratings of F in the AM and PM peak hours. The LOS ratings in the AM and PM 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 3-6.5 and 3-6.6).*

In the Year 2030 8+4 with Barrier/Buffer alternatives, the northbound traffic conditions in the AM peak hour generally exhibit a LOS rating of D while majority of the PM peak hour exhibit a LOS rating of F (Del Mar Heights Road to SR-78). The southbound AM and PM 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 3-6.5* and *3-6.6*).

With the 8+4 with Barrier/Buffer alternatives, the corridor would degrade in the AM and PM peak hours when compared to the existing conditions; however the AM and PM peak hour conditions would have a better level of service when compared to the year 2030 No Build scenario. (*Tables 3-6.5* and *3-6.6*).

Table 3.6.5: 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	D	F	E	F	D	F	E	F
Lomas Santa Fe	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 Blvd	D	E	E	E	D	E	D	F
Encinitas Blvd	Leucadia Blvd	D	F	E	F	D	E	D	F
Leucadia Blvd	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
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 Blvd	C	C	E	E	E	F	D	E
Oceanside Blvd	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 3.6.6: 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 Blvd	C	C	E	E	D	E	D	D
Oceanside Blvd	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 Blvd	E	D	F	F	E	D	F	E
Leucadia Blvd	Encinitas Blvd	F	D	F	F	E	D	F	E
Encinitas Blvd	Santa Fe Drive	E	D	E	F	D	D	E	E
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	F	E	F	F	F	E	F	F
Lomas Santa Fe	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

Weekend Use

There is an influx of midday traffic on weekends. Average travel times on Saturday and Sunday using recent 2003-2006 average travel times on the I-5 within the project area revealed that the weekend does not contain a morning time peak period. This lack of a 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. However there is a notable travel trend on Saturday in the southbound direction and on Sunday in the northbound direction. There is an increase travel time period from 9:00 am to 8:00 pm and on Sunday the increased travel time period is from 1:00 pm to 8:00 pm. Saturday southbound peak average travel time occurs between 12:00 pm and 1:00 pm, while Sunday northbound average peak travel time occurs between 5:00 pm and 6:00 pm. 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 PM peak hour and lower during the AM peak hour. In contrast, the demand volume in the southbound direction is lower during the PM peak hour and higher during the AM peak hour. The HOV percentages are typically higher (13-23 percent) during the midday and the off-peak periods. (Source: San Diego Regional Vehicle Occupancy and Classification Study – 2000 [Revised June 2002], SANDAG, June 2002). This percentage is anticipated to increase approximately 2-7 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 60 percent of the vehicles within the project limits are HOV. The percentages of those vehicles are typically higher, 55-65 percent, during peak travel times mid-day southbound on Saturday, and northbound on Sunday *(Tables 1.3.6* and *1.3.7).*

Tables 3-6.7 and *3-6.8* below provide a brief summary of peak hour HOV traffic volumes through each of the five cities traversed by the Project.

Table 3.6.7: 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 SR-78	X	X	X	X	1,500	1,280	1,600	1,530
I-5 / I-805 Merge	Carmel Valley Road	300	1,100	1,920	1,620	1,880	2,450	2,000	2,540
Carmel Valley Road	Santa Fe Drive	300	1,100	1,580	1,230	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

Table 3.6.8: 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	2,050	1,880	2,410	2330
Lomas Santa Fe	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

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). 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 the development of regional bus rapid transit (BRT) service within the I-5 corridor. Over 30 DAR locations were identified throughout the corridor for further consideration, the interchanges at over capacity in *Table 3.6.9*.

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 screened based on the following criteria:

- 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 community support

The remaining DAR sites were 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

Table 3.6.9: Current Intersections At or Over Capacity

Direct Access Ramp	Local Jurisdiction	Number of Intersections At or Over Capacity
Oceanside Boulevard	City of Oceanside	2
Cannon Road	City of Carlsbad	6
Manchester Avenue	City of Encinitas	2
Voigt Drive	City of San Diego	5
Total		**15**

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 AM and PM 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 six AM peak and 17 PM peak exceedances in the northbound direction and 16 AM peak and eight PM peak exceedances in the southbound direction. In the 2030 No Build, there would be 20 AM peak and 20 PM peak exceedances in the each 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 vphvl.

Accident Analysis

The number of accidents and accident rates for July 2004 through June 2007 from the California Highway Patrol (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 are persistent drop in speed between two locations on the freeway as seen through increased travel time due to duration of bottleneck and queue length. There can be a number of causes, a visual distraction, an incident, a 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 PM peak period near Carmel Valley Road, Via de la Valle, Lomas Santa Fe and smaller bottlenecks near Leucadia Boulevard and Cannon Road. In the southbound direct there are bottlenecks during the AM peak near Via del la Valle, Manchester Avenue, and Birmingham Drive. In the PM peak the southbound direction has bottle necks at Birmingham Drive, Manchester Ave, and Oceanside Boulevard. The No build bottlenecks would increase in duration and queue length. The northbound direction for AM peak would now include bottlenecks at La Jolla Village Drive and Del mar Heights Road. The northbound PM peak would include bottlenecks near Del Mar Height Road and Oceanside Boulevard. The southbound AM peak would include bottlenecks near Via de la Valle, Tamarack Avenue and Manchester Avenue. The southbound PM 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 time was developed from weaving results.

On and Offramps

Table *3.6.9* 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 AM or PM peak traffic hour. Most on and offramps in the project area would be widened. HOV lanes would be created at most onramps. Caltrans is also working with local cities to improve intersections under their control.

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 3.6.10* describes the proposed interchange improvements.

Table 3.6.10: Proposed Interchange Improvements

Interchange	ID	Location	Proposed Lane Geometry Modifications
Del Mar Heights Road	F1	I-5 SB Ramps / Del Mar Heights Rd	Ramp adjustments to remove free right turn capabilities
	F2	I-5 NB Ramps / Del Mar Heights Rd	Convert NB left/through/right lane to a shared through right turn lane, add a second left turn lane (creating dual right and dual lefts)
Via De La Valle	G2	I-5 SB Ramps / Via De La Valle	Ramp adjustments to remove free right turn capabilities
	G3	I-5 NB Ramps / Via De La Valle	Ramp adjustments to remove free right turn capabilities
Manchester Avenue	I1	I-5 SB Ramps / Manchester Avenue	Ramp adjustment to remove free right turn capabilities
Encinitas Boulevard	L2	I-5 SB Ramps / Encinitas Blvd	Addition of an exclusive SB left turn-lane (creating dual left turn-lanes)
			Addition of an exclusive SB right turn-lane (creating dual right turn-lanes)
Palomar Airport Road	P2	I-5 SB Ramps / Palomar Airport Rd	Ramp adjustments to remove free right turn capabilities, addition of a WB right turn-lane (creating dual right turn lanes)
Tamarack Drive	R3	I-5 SB Ramps / Tamarack Ave	Addition of a WB left turn-lane (creating dual lefts)
	R4	I-5 NB Ramps/ Tamarack Ave	Addition of a NB right turn-lane (creating dual right turn lanes)

Interchange	ID	Location	Proposed Lane Geometry Modifications
Carlsbad Village Drive	S1	I-5 SB Ramps / Carlsbad Village Dr	Convert the SB shared left/through/right lane to a shared right/though lane, add an exclusive SB left turn lane (creating a single left-turn lane and dual right-turn lanes)
	S2	I-5 NB Ramps/ Carlsbad Village Dr	NB left turn-lane separated, right turn-lane converted to a shared left/through/right lane
Oceanside Boulevard	X1	I-5 SB Ramps / Oceanside Blvd	Convert SB through/right turn-lane into two separate lanes
Mission Avenue	Y1	I-5 SB Ramps / Mission Ave	Remove EB to SB on-ramp, add dual EB left turn-lanes, convert southbound through/left to an exclusive left turn-lane (creating dual lefts), convert the exclusive southbound right turn-lane to a shared through right turn-lane.
	Y2	I-5 NB Ramps/ Mission Ave	Remove NB to EB free right turn-lane, add a second EB left turn lane (creating dual lefts), add SB dual left turn lanes.
SR-76		I-5 NB Ramps / SR-76	Ramp adjustments to remove free right turn capabilities, addition of a second NB left-turn lane (creating dual lefts)
Harbor Drive	AA1	I-5 SB Ramps / Harbor Dr	Ramp adjustments to remove free right turn capabilities
			Convert outside westbound through lane into an exclusive right-turn lane
			Convert inside westbound through lane into a shared through/right-turn lane
	AA2	I-5 NB On-Ramps / Harbor Dr	Re-alignment of NB 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 northbound shared through/right-turn lane into an exclusive through lane, eliminating the northbound right turn movement.

Managed Lanes/Value Pricing Concept

The 4 HOV/managed lanes (two in each direction) proposed to be located in the median of the 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 Single Occupancy Vehicles (SOV) 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, financial, and feasibility of HOV/managed lanes between the cities of La Jolla and Oceanside. Specifically, 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 was also 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 3.6.11 is a summary of the estimated HOV/managed lane revenue for the proposed 2030-year 8+4 with Barrier/Buffer alternatives and 10+4 with Barrier/Buffer alternatives. A higher toll rate is anticipated at the south end of the Project due to the larger traffic demand.

Table 3.6.11: 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 Ave	$2.076	$1.154
North of Encinitas Blvd	$2.421	$1.478
South of Palomar Airport Rd	$1.203	$0.837
North of Carlsbad Village Dr	$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

ADT would increase. The increase of congestion on I-5 congestion for local circulation would increase as motorists seek alternative routes. For peak conditions the northbound travel time would increase to 35 in the AM and 120 min in the PM; while the southbound travel time would increase to 90 in the AM and 120 in the PM. During congested times and bottlenecks total delay to the motoring public would be 35,000 hours northbound and 80,000 hours southbound. The duration of congestion northbound would last 4.5 hours for AM peak and 9 hours for PM peak. The southbound duration of congestion would increase to 5.5 hours during the AM peak and 10 hours for the PM peak. The LOS would mostly be F, forced flow, heavy congestion, long queues from behind break down points with stop and go traffic. Even the HOV/Managed Lanes would be congested. Freeway interchanges and ramps would experience back up from traffic entering I-5 (*Tables 3.6.3,* 3.6.*6 and 3.6.7*).

10+4 with Barrier/Buffer Alternatives

ADT would increase as would capacity to accommodate the amount of vehicles. Therefore, peak hour northbound travel time would be 25 min in the AM and 30 min in the PM. The southbound travel time would decrease to 35 min in the AM and 30 in the PM. 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 200 hours northbound and 3,700 hours southbound. This would maintain or improve existing conditions. The duration of congestion northbound would be 0 hours for AM peak and 3 hours for PM peak; while southbound congestion would last 5 hours in the AM and 3 hours in the PM. The LOS would mostly be C and D, stable and approaching unstable flow with heavier volumes and reduced freedom to maneuver. Even the HOV/Managed Lanes volumes would reach northbound up to 2,300 AM

peak and 2,180 PM peak at La Costa Avenue; and southbound up to 2,800 AM peak and 2,430 PM peak 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 (*Tables 3.6.3, 3.6.6,* and *3.6.7*).

8+4 with Barrier/Buffer Alternatives

ADT would increase as would capacity to accommodate the amount of vehicles. Therefore, peak travel time in the northbound direction would be 26 min in the AM and 65 min in the PM. The southbound travel time would be 63 min in the AM and 37 in the PM. 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 14,500 hours northbound and 20,200 hours southbound. The duration of congestion northbound would be 0 hours for AM and 7 hours for PM. The southbound congestion would last 5.5 hours for AM and 7 hours for PM. The LOS would mostly be D with LOS F during peak hours. LOS D 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 1,900 AM peak and 1,280 PM peak at Lomas Santa Fe Drive and La Jolla Village Drive, 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 $19,739 (*Tables 3.6.3, 3.6.6,* and *3.6.7).*

Construction Impacts

For construction and funding purpose *I-5 NCC Project* would be broken into three stages. As described in *Section 2.2.6 Phased Construction.* During construction, detours would be required for nighttime work, bridge work, and where there are closed ramps and structures.

3.6.3.2 Pedestrian & Bicycle Facilities

The following facilities, some form the community 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 would be responsible for their maintenance.

Pedestrian and Bicycle Enhancement Facilities

- Los Peñasquitos Creek Trail Connection, San Diego
- 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
- Pedestrian Overpass North of Del Mar Heights Road, San Diego
- Villa De LA Valle would include sidewalks and a Class II bike facility
- Streetscape Enhancements on Ida Avenue, Solana Beach
- Manchester Avenue would include sidewalks and a Class II bike facility
- Manchester Avenue Pedestrian Bridge and Trail, Encinitas
- Encinitas Avenue would include enhanced sidewalks and widen the existing Class II bike facility
- Villa Cardiff Drive Improvements, Encinitas
- Birmingham Avenue would include sidewalks and a Class II bike facility
- MacKinnon Avenue would include sidewalks and a Class II bike facility
- Hall Property Park Trail Connecting to Santa Fe Drive, Encinitas
- Santa Fe Drive would include sidewalks and the existing Class II bike facility
- Trail Connecting Santa Fe Drive to Requeza Street with Wetland Revegetation, Encinitas
- Union Street Pedestrian Overpass and Trail Connection with Wetland Revegetation, Encinitas
- Park and Ride Enhancement at La Costa Avenue, Carlsbad
- Trail on East Side of I-5 at Batiquitos Lagoon, Carlsbad
- Trail on West Side of I-5 at Agua Hedionda Lagoon, Carlsbad
- Trail on East Side of I-5 at Agua Hedionda Lagoon, Carlsbad
- Streetscape Enhancements on Chestnut Avenue, Carlsbad
- Cassidy Street would include sidewalks and a Class II bike facility
- 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, Oceanside
- Parking/Staging Area for recreation at SR-76, Oceanside
- Pedestrian Underpass Improvements at San Luis Rey River, Oceanside
- Regional Gateway Feature at Harbor Drive, Oceanside

10+4 with 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 with 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 area for bike lanes and sidewalks connect or improve many existing pedestrian and bike facilities that are currently constrained. In addition, the enhancement opportunities, if implemented, would create connections, improve trailheads, and enhance existing facilities.

8+4 with Barrier/Buffer Alternatives

Circulation for pedestrians and bicyclists would improve some of the existing bridges spanning I-5 would be replaced as part of the 8+4 with 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 create connections, improve trailheads, and enhance existing facilities.

No Build Alternative

Circulation of the pedestrian and bicyclist would continue as existing with some improvements from planned projects.

3.6.4 Avoidance, Minimization, and/or Mitigation Measures

3.6.4.1 Traffic & 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 a 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
- Webpage

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
- California Highway Patrol 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 & Bicycle Facilities

During construction of transportation facilities, particularly construction of new facilities, the 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 also include components for pedestrians and bicyclists along with consideration for the motoring public. As well as 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

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 U.S.C. 4331(b)(2)]. To further emphasize this point, the FHWA in its implementation of NEPA [23 U.S.C. 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 Public Resources Code Section 21001(b)].

3.7.2 Affected Environment

This section in based upon the Visual Impact Study revised April 2009, which is incorporated by reference. These studies present the results of the Hydrologic Engineering Centers River Analysis System (HEC-RAS) modeling for the floodplains identified below.

Project Setting

The I-5 north coast freeway corridor 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 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 noise walls are, in a large part, absent from much of the corridor. An exception to this is at Lomas Santa Fe 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. 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, 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 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.

Assessment Methodology

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 three criteria: vividness, intactness, and unity. These relationships correlate 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.

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

FHWA guidelines state: "The objectivity of evaluation processes can sometimes be an issue. Two principle 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.

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.
>
> **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.

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 ground cover 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 further 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.

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

This unit has moderate to high levels of existing visual quality. The views of Torrey Pines State Reserve and beach, Los Peñasquitos Lagoon, and a 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.

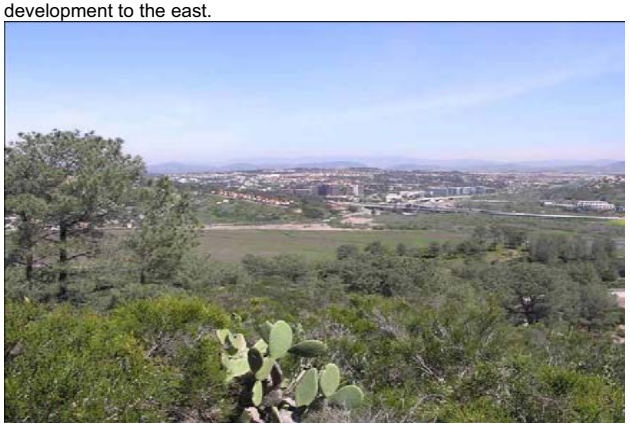


Figure 3-7.7: A distant view of I-5 from Torrey Pines State Reserve

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 outweighs the scale of built forms and gives 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 (*Figures 3-7.12 and 3-7.13*). 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 ocean and Del Mar Racetrack from southbound I-5

Figure 3-7.13: 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 3-7.14 and 3-7.15*). 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 forms an urbanized contrast.

Figure 3-7.14: Distant view to eastern foothills from northbound I-5, south of Manchester Avenue

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 3-7.15: 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 3-7.16, 3-7.17, and 3-7.18*). 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.

Figure 3-7.16: A view of I-5 looking south.

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 3-7.17: Looking southwest from the Birmingham Drive overcrossing

Figure 3-7.18: 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 3-7.19, 3-7.20, and 3-7.21*). 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 3-7.19: Wetland vegetation buffers the adjacent community from I-5

Figure 3-7.20: Northbound I-5, looking north toward Requeza Street overcrossing

Figure 3-7.21: 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 3-7.22 and 3-7.23*). Interspersed throughout are commercial greenhouses which contribute to the unit's distinctive character. Large groves of mature trees are the primary visual element. On the freeway, median oleanders complement the scene by reducing the scale of the freeway by half, suggesting the visual character of a parkway. This unit epitomizes the visual character associated with historic north coast hillside neighborhoods. Overall visual quality for this landscape unit is moderately high.

Figure 3-7.22: Looking west from southbound I-5, a residential area at Orpheus Street

Figure 3-7.23: 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 (*Figures 3-7.24 and 3-7.25*). 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 3-724. and 3-7.25*).

Figure 3-7.24: Batiquitos Lagoon as seen from southbound I-5

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 3-7.25: 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 3-7.26, 3-7.27 and 3-7.28*). Despite the high number of manufactured landscape elements, ornamental landscaping plays 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 provides a buffer for adjacent development, and screens views of an industrial area from the freeway. Overall visual quality is moderately low.

Figure 3-7.26: Commercial development bordering southbound I-5

Figure 3-7.27: Commercial development bordering southbound I-5

Figure 3-7.28: 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 3-7.29 and 3-7.30*). 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 3-7.29: A view of Agua Hedionda Lagoon from northbound I-5

Figure 3-7.30: 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 3-7.31 and 3-7.32*). 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 3-7.31: A view of Pine Street looking west to the freeway and ocean

Figure 3-7.32: 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 3-7.33 and 3-7.34*). 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.

Figure 3-7.33: View of I-5 at Buena Vista Lagoon, looking

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 serves 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 3-7.34: 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 3-7.35 and 3-7.36*). These two scale 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.

Figure 3-7.35: Mature freeway landscaping establishes the parkway character of the viewshed

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 3-7.36: 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 3-7.37 and 3-7.38*). 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 noise barriers and urban development beyond the right-of-way reduce vividness, intactness and unity to moderate levels.

Figure 3-7.37: Freeway landscaping provides a visual buffer and improves visual quality of the landscape unit

Figure 3-7.38: 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 3-7.39 and 3-7.40*). 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.

Figure 3-7.39: A view of I-5 from the San Luis Rey River bike trail

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 3-7.40: 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, Caltrans District Landscape Architect 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
- Northbound lanes between Lomas Santa Fe 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 space associated with them offer relief from views of urban development, and also serve as view corridors from freeway to foothills.

This scenic resource exists 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 Drive 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.

Viewer Response

Viewer response is composed of viewer sensitivity and viewer exposure under the viewer response heading.

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 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 28-mile project. During periods of free flow travel, the project can be traversed in less than 40 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, one recreational area, 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 midground 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:

> *The Department 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, 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 Coastal Commission. The Commission 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 Coastal Act.

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 principle 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 insure 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 1.8 m (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

A *Visual Impact Assessment* (Caltrans District 11, April 2009) was prepared for this project and can be referred to for additional details. The process used in the *Visual Impact Assessment* 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
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.

P*redict 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 with Buffer Alternative has been assessed in this study and the comparative impacts of other build alternatives have been interpolated. This 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 3.7 m [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 noise walls 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 3-7.41* depicts the locations of 17 key views along the corridor.

Key view photo simulations depict the 10+4 Buffer Alternative. 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 3-7.41: Key View Map

Figure 3-7.42: Key View #1 - Voigt Drive: Existing view looking south

Figure 3-7.43: Key View #1 - Voigt Drive: Proposed view looking south

Key View #1 – Voigt Drive DAR

Orientation
La Jolla Hills Landscape Unit in San Diego, southbound I-5 between Genesee Drive and La Jolla Village Drive interchanges, looking south to Voigt Drive overcrossing (*Figure 3-7.42)*.

Proposed Project Features
DAR structures, overcrossing widening, Voigt Drive widening and modifications, freeway improvements, retaining walls up to 14 m (46 ft) in height, loss of most existing freeway landscaping including median oleanders (*Figure 3-7.43*).

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, and 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 3-7.44: Key View #2 - I-5 at Del Mar Heights Road: Existing view looking north

Figure 3-7.45: Key View #2 - I-5 at Del Mar Heights Road: Proposed view looking north

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 3-7.44*).

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 1,100 m (3,600 ft) in length and 10-12 m (33-40 ft) in height, with the majority of the wall being 9-10 m (30-33 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. In this key view location, the freeway surface would increase to almost twice its existing width (*Figure 3-7.45*).

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 would also 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 midground views of the walls. Some local residents would be able to view the freeway from their rear yards. Duration of views would vary from less than one minute to several minutes. 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 3-7.46: Key View #3 - Ida Avenue: Existing view looking north

Figure 3-7.47: Key View #3 - Ida Avenue: 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 3-7.46*).

Proposed Project Features
Freeway improvements would require a large retaining wall along Ida Avenue. The wall would be up to 9 m (30 ft) tall and 396 m (1,300 ft) long. It would incorporate a 3.6 m (12 ft) noise wall that would bring its total maximum height up to 12.8 m (42 ft). The retaining wall surface would be battered and both walls would incorporate architectural treatment similar to that found in the Lomas Santa Fe 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 3-7.47*).

Change to Visual Quality/Character
The proposed retaining wall 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. 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.

Resulting Visual Impact
Change to visual quality would be moderately high, change to visual quality would be high, and viewer response to proposed changes would be moderately high. The visual impact would therefore be moderately high.

Figure 3-7.48: Key View #4 - I-5 at Ida Avenue: Existing view looking southwest

Figure 3-7.49: Key View #4 - I-5 at Ida Avenue: Proposed view looking southwest

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 interchanges, looking southwest (*Figure 3-7.48*).

Proposed Project Features
Freeway improvements would add three lanes to the west of the existing shoulder and a noise wall 3.6 m (12 ft) in height. An integral concrete safety barrier has been recommended at the edge of the proposed roadway.

Change to Visual Quality/Character
The overhead utility lines would be buried. The proposed noise wall would block existing scenic views of the ocean and racetrack, confining views to the freeway foreground and mid-ground. This would result in a high level of change in visual quality and remove public access to a high quality visual resource. The open, parkway character of the existing freeway would be changed to that of a large, urban freeway whose visual enclosure is provided by a tall foreground wall. This would contrast severely with existing visual character and likely would be perceived as adverse by the public.

Viewer Response
More than 100,000 viewers per day would be affected by the proposed changes, and would have short duration views. Distant views of the ocean would be replaced by foreground views of the proposed wall. There could be a high level of awareness by viewers to the proposed changes. Viewer response would be moderately high.

Resulting Visual Impact
Change to visual quality and character would be high. Viewer response to those changes could likely be moderately high. The visual impact would be high.

Figure 3-7.50: Key View #5 - I-5 at Manchester Avenue: Existing view looking north

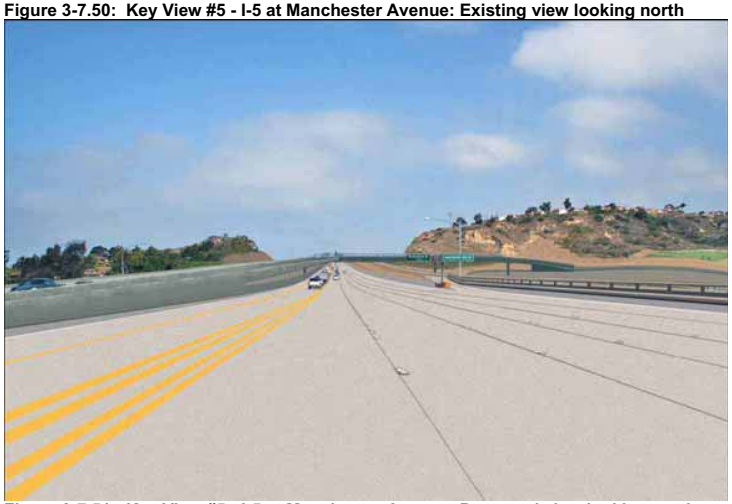


Figure 3-7.51: Key View #5 - I-5 at Manchester Avenue: Proposed view looking north

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 3-7.50*).

Proposed Project Features
A DAR facility would be located just north of the interchange loop ramp. It would consist of two ramps rising from the median and meeting at an overcrossing structure that would span only the northbound lanes. Each ramp would be supported by a retaining wall until it reaches a height of 4.6 m (15 ft). At that point it would become a bridge structure supported on columns. Here the paved freeway footprint would be at its widest as additional DAR entry and exit lanes are added to those already proposed 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 median to a proposed transit center located on existing agricultural fields behind the gas station, and connect to Manchester Avenue east of the station. The transit center would provide a bus platform and parking for 400 cars. It would be situated below the level of the existing ground plane to minimize its visibility (*Figure 3-7.51*).

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 form 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.

Figure 3-7.52: Key View #6 - Devonshire Drive in Encinitas: Existing view looking north

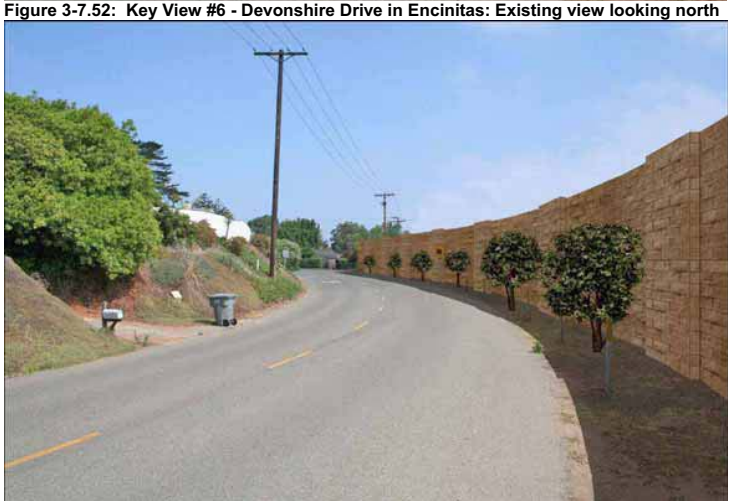


Figure 3-7.53: Key View #6 - Devonshire Drive in Encinitas: Proposed view looking north

Key View #6 – Devonshire Drive in Encinitas

Orientation
Encinitas Upland Landscape Unit in Encinitas, Devonshire Drive near Requeza Street, looking north (*Figure 3-7.52*).

Proposed Project Features
A noise wall 4.9 m (16 ft) in height is proposed to be located at the freeway right-of-way. It would be approximately 290 m (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 3-7.53*).

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 moderate.

Figure 3-7.54: Key View #7 - I-5 at Encinitas Boulevard: Existing view looking north

Figure 3-7.55: Key View #7 - I-5 at Encinitas Boulevard: Proposed view looking north

Key view #7 – I-5 at Encinitas Boulevard

Orientation

Encinitas Upland Landscape Unit, in Encinitas, northbound I-5 at Encinitas Boulevard interchange, looking north (*Figure 3-7.54*).

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 12.2 m (40 ft) in height near the northbound onramp, and be approximately 1067 m (3500 feet) in length. A second retaining/noise wall of similar height and length is proposed on the existing landscaped slope adjacent to the southbound onramp. 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 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 noise wall located near the southbound offramp would be visible in the key view. Freeway improvements would also occur in the existing median, new concrete safety barriers would be constructed, and existing oleanders would be preserved in place (*Figure 3-7.55*).

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 3-7.56: Key View #8 - Union Street in Encinitas: Existing view looking east at I-5

Figure 3-7.57: Key View #8 - Union Street in Encinitas: Proposed view looking east at I-5

Key View #8 – Union Street in Encinitas

Orientation
Leucadia Hills Landscape Unit in Encinitas, on Union Street west of I-5, looking east (*Figure 3-7.56*).

Proposed Project Features
A freeway pedestrian overcrossing (POC) at Union Street was recommended by the City of Encinitas to achieve their 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 noise walls would be located near the existing rights-of-way and would be visible from the park (*Figure 3-7.57*).

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 3-7.58: Key View #9 - I-5 Near Union Street: Existing view looking south

Figure 3-7.59: Key View #9 - I-5 Near Union Street: Proposed view looking south

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 3-7.58*).

Proposed Project Features
Three lanes of widening would occur, and a proposed noise wall 1.2 km (0.75mi) in length and 4.9 m (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 3-7.59*).

Change to Visual Quality/Character
The proposed noise wall 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 3-7.60: Key View #10 - Union Street in Encinitas: Existing view looking southeast

Figure 3-7.61: Key View #10 - Union Street in Encinitas: Proposed view looking southeast

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 3-7.60*).

Proposed Project Features
A retaining wall 1.8 m (6 ft) in height with a noise wall 4.9 m (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 noise wall would be 9.1 m (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 3-7.61*).

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 3-7.62: Key View #11 - Orpheus Avenue in Encinitas: Existing view looking north

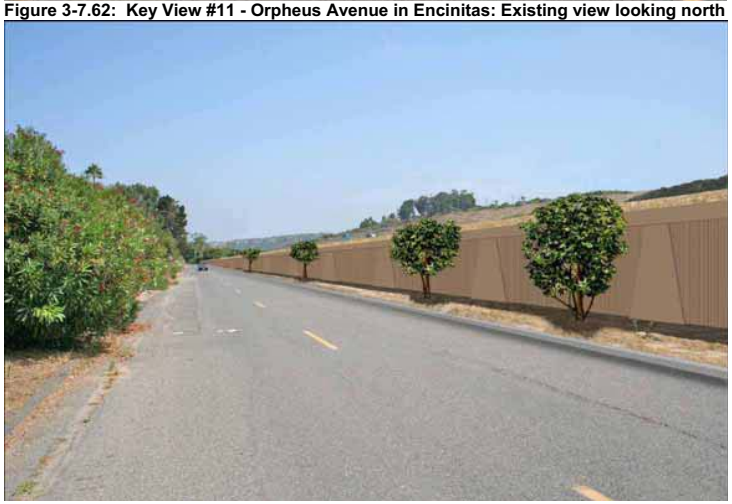


Figure 3-7.63: Key View #11 - Orpheus Avenue in Encinitas: Proposed view looking north

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 3-7.62*).

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 1.8-2.4 m (6-8 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 3-7.63*).

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 3-7.64: Key View #12 - I-5 at Carlsbad Village Drive: Existing view looking north

Figure 3-7.65: Key View #12 - I-5 at Carlsbad Village Drive: 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 3-7.64*).

Proposed Project Features
Freeway improvements would result in the permanent loss of all freeway planting adjacent to the outside shoulder. A noise wall 3.6m-4.9 m (12ft-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 noise wall. This condition would exist the length of Carlsbad Village between Tamarack overcrossing and Las Flores overcrossing, with the exception of the area between gore points at Carlsbad Village Drive undercrossing (*Figure 3-7.65*).

Change to Visual Quality/Character
The proposed noise wall 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 noise wall 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.

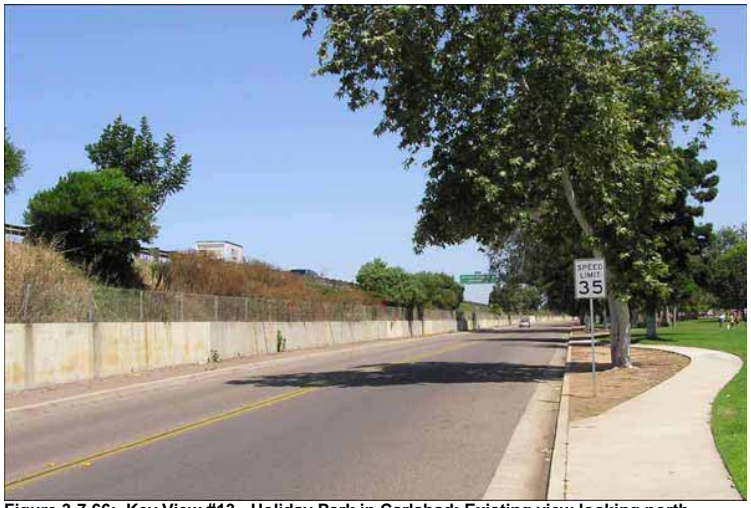


Figure 3-7.66: Key View #13 - Holiday Park in Carlsbad: Existing view looking north

Figure 3-7.67: Key View #13 - Holiday Park in Carlsbad: Proposed view looking north

Figure 3-7.68: Key View #13A - Holiday Park in Carlsbad: Existing view looking southwest

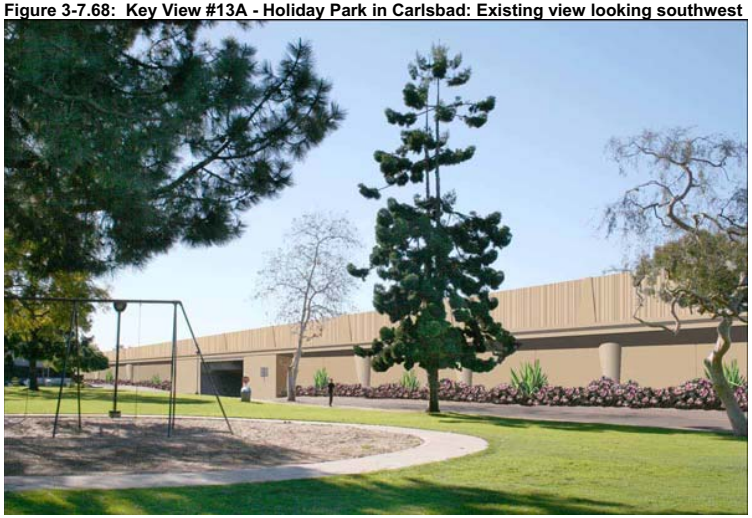


Figure 3-7.69: Key View #13A - Holiday Park in Carlsbad: Proposed view looking southwest

Key View #13 & 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 3-7.66, 3-7.69*).

Proposed Project Features
Freeway improvements would require Pio Pico Drive to be narrowed 3 m (10 ft) in width. A retaining wall would run the length of Pio Pico Drive from Tamarack Avenue to Carlsbad Village Drive, and be from 3.6-7.6 m (12-25 ft) in height adjacent to the park. A soundwall 3.6-4.9 m (12-16 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 noise wall would only have minimal architectural detailing due to the space constraints (*Figures 3-7.70 – 3-7.72*).

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 hundreds of meters (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 3-7.70: Key View #14 - I-5 at Carlsbad Village Drive: Existing view looking north

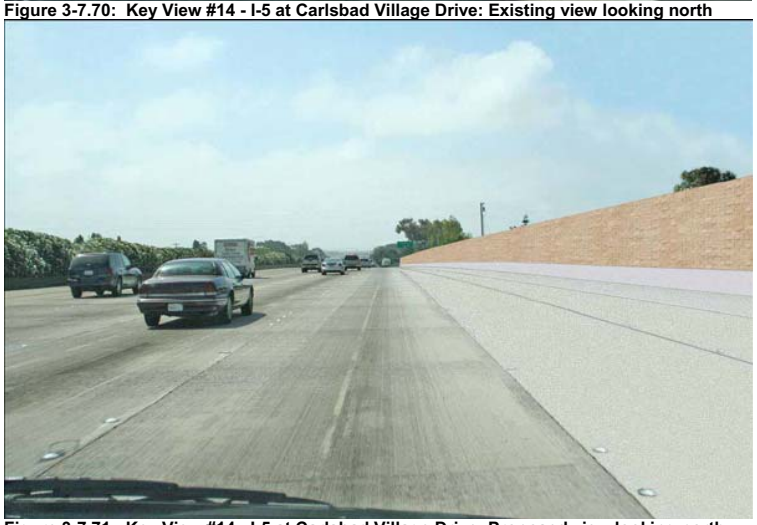


Figure 3-7.71: Key View #14 - I-5 at Carlsbad Village Drive: Proposed view looking north

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 3-7.70*).

Proposed Project Features
Freeway improvements would result in the permanent loss of all freeway planting adjacent to the outside shoulder. A noise wall 3.6-4.9 m (12-16 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 noise wall. This condition would exist the length of Carlsbad Village between Tamarack overcrossing and Las Flores 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 offramps (*Figure 3-7.71*).

Change to Visual Quality/Character
The proposed noise wall 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, disorientation, 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 3-7.72: Key View #15 - Pine Street in Carlsbad: Existing view adjacent to (west of) I-5

Figure 3-7.73: Key View #15 - Pine Street in Carlsbad: Proposed view adjacent to (west of) I-5

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 3-7.72).

Proposed Project Features

Freeway improvements would require a retaining wall of approximately 6 m (20 ft) in height in this area. The proposed wall would be located approximately 1.8 m (6 ft) closer to the apartment buildings than the existing wall, placing it 4.9 m (16 ft) from the nearest residence. A noise wall of 3.6-4.9 m (12-16 ft) would be placed on top of the retaining wall. The combined walls would be 9.8-11 m (32-36 ft) in height and their length would extend to the limits of the viewshed. Existing freeway landscaping would be permanently removed (Figure 3-7.73).

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 3.6 m (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 914 m (3000 ft) in length, and the noise wall would be about 1280 m (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 3-7.74: Key View #16 - I-5 at Oceanside Boulevard DAR: Existing view looking south

Figure 3-7.75: Key View #16 - I-5 at Oceanside Boulevard DAR: Proposed view looking south

Key View #16 – I-5 at Oceanside Boulevard DAR

Orientation

Oceanside Gateway Landscape Unit in Oceanside, I-5 southbound between Oceanside Boulevard and Mission Avenue interchanges, looking south (*Figure 3-7.74*).

Proposed Project Features

The Oceanside Boulevard DAR would require a wider footprint and the removal of median oleanders to accommodate transition lanes and shoulders. Improvements would remove existing landscape slopes. Retaining walls up to 12.2 m (40 ft) in height in cut sections of the roadway would be located near the existing right-of-way and additional space at the base of the walls for landscaping would not be available. A noise wall 3.6 m (12 ft) in height would be located at the top of the retaining wall on the southbound side of the freeway. DAR ramp retaining walls and ramp structures would be located in the median. The DAR overcrossing structure would bridge the northbound lanes of the freeway only. It and the DAR access road would require large retaining walls to avoid impacting the existing municipal golf course to the north and shopping center to the south (*Figure 3-7.75).*

Change to Visual Quality/Character

The proposed project would greatly increase the size of the freeway and introduce large scale built forms that are normally associated with large urban core areas. Permanent loss of skyline trees and freeway landscaping would increase change to the visual environment. The change would be incompatible with the visual character of the adjacent surroundings. Visual unity, intactness, and vividness would be reduced to low levels. The change to existing visual character would be high.

Viewer Response

Hundreds of thousands of freeway travelers each day would view the project, for several seconds. Thousands of residents, local street users, and recreational area users would view the project for minutes to hours at a time.

Resulting Visual Impact

Change to visual quality and character would be high. Viewer response would be high. The visual impact would be high.

Figure 3-7.76: Key View #16 - I-5 at Oceanside Boulevard DAR: Existing view looking west

Figure 3-7.77: Key View #17 - I-5 at Oceanside Boulevard DAR: Proposed view looking west

Key View #17 – Mission Avenue Interchange

Orientation
Oceanside Gateway Landscape Unit in Oceanside, Mission Avenue at I-5, looking west (*Figure 3-7.76*).

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 4.6 m (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 3-7.77*).

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 visual impact.

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. One existing ocean view from the freeway would be permanently lost. The high degree of visual change caused by the project would remain despite the implementation of measures proposed in this assessment. *Figure 3-7.78* summarily depicts the visual impacts along the project corridor. 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 the ocean and other views would be obstructed by noise walls in several locations, isolating travelers from scenic resources. The most adverse loss of view would be the obstruction of an existing ocean view (Key View #4) in Solana Beach. 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, 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 20 m (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 be done 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 over 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 pronounced at Manchester Avenue DAR (Key View 5) and Cannon Road DAR where large transportation complexes would impact agricultural fields and adversely affect views of scenic coastal lagoons.

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 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 as do 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 they would have foreground views of features such as concrete retaining walls, noise walls, and drainage ditches. Paved maintenance roads, bio-swales, 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 shifts 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 rip-rap slopes, concrete headwalls, standpipes, and chain link fencing, could potentially be a non-compatible visual element in many community entry points, and further reduce available landscape area.

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
The following DARs would remove median oleanders at Voigt Drive, Manchester Avenue, and Oceanside Boulevard.

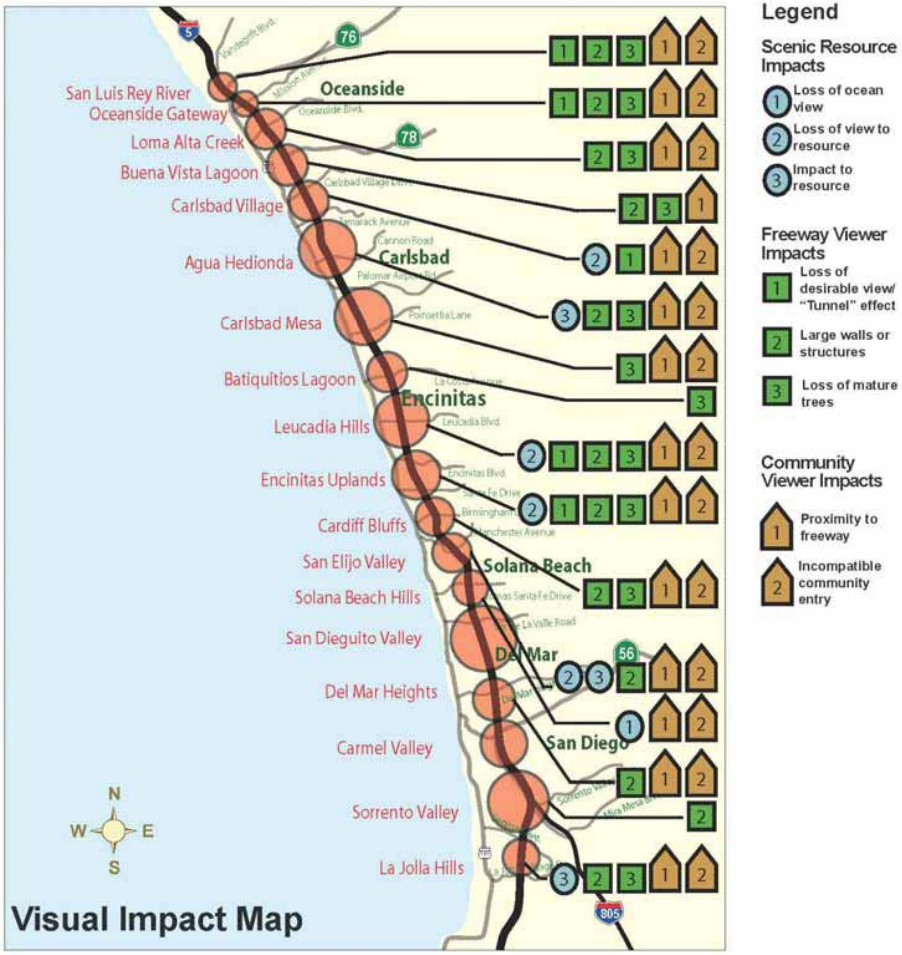


Figure 3-7.78: Visual Impact Summary Map

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 the *Section 3.15 Noise)*. Transparent panels could be incorporated in the barriers to avoid view impacts should residents agree to maintenance. The use of transparent panels in noise walls 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 technical study, noise barriers 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 3-7.79* 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 be completely obscured by a noise wall 3-3.6 m (10-12 ft) in height proposed at the edge of freeway shoulder. The impact is depicted and assessed in Key View #4.

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 in Key View #9.

Loss of views to agricultural fields

Direct impacts to agricultural fields would occur at Manchester Avenue and Cannon Road DAR locations. A transit center with access road, parking for 400 cars, and bus platform is proposed at the Manchester Avenue DAR. Retaining walls needed to support a proposed DAR access road at Cannon Road would also obstruct most freeway views of existing agricultural land.

Loss of views to Carlsbad Village

Existing views of Carlsbad Village and Holiday Park would be obscured by a soundwall 3.6 m (12 ft) in height placed at the edge of freeway shoulder. The impact is depicted and assessed in Key View #12.

Loss of Oleanders

Median oleanders would be permanently removed at the following DAR locations; Voigt Drive, Manchester Avenue, and Oceanside Boulevard.

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 noise walls 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.

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 Landscape Architect (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, a set of corridor design guidelines would be developed under the direction of the DLA. The guidelines would supplement the mitigation requirements found in this assessment. It would contain detailed architectural and landscape mitigation guidance that reflect comments received during public outreach meetings with interested community groups, city staff members, regulatory agencies, and the general public. The guidelines would include that all landscaped areas have underground automatic sprinkler system.

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 corridor design guidelines would guide 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 corridor design guidelines, apply those requirements to actual design features in specific locations, and submit proposals to the project design team. The team would then develop design solutions that are considered to be reasonable, that achieve team consensus, and can in turn be implemented. The DLA would also provide technical assistance during construction and perform mitigation monitoring of all visual mitigation requirements.

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 overall visual impact of each mitigated build alternative would remain high.

Figure 3-7.79: Scenic Resource Impacts Map

Sound Barriers

Soundwall landscape buffers

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.

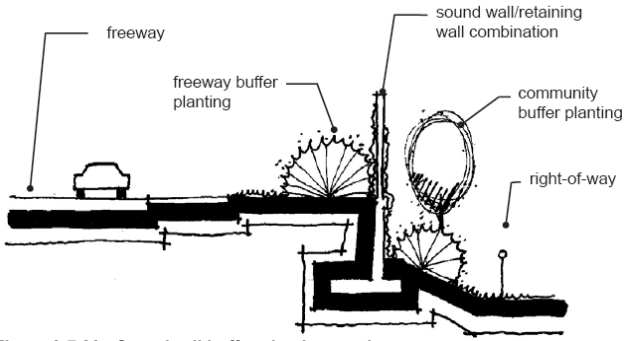


Figure 3-7.80: Soundwall buffer planting section

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.

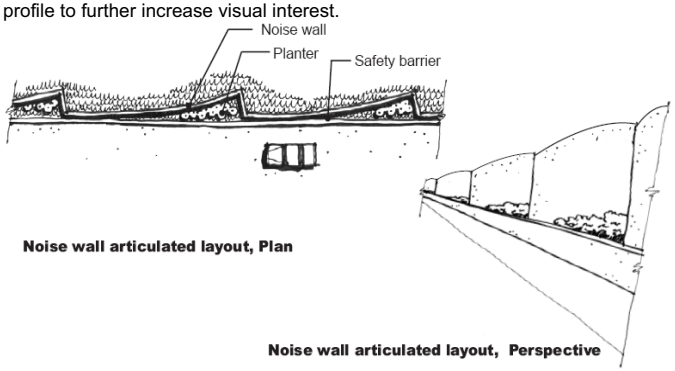


Figure 3-7.81: Soundwall articulated layout/varied profile

Soundwall planting pockets

Where right-of-way is too narrow to employ the configurations listed above, a minimum 1.5 m (5 ft) wide planting area should be provided between the back of the barrier and the face of wall.

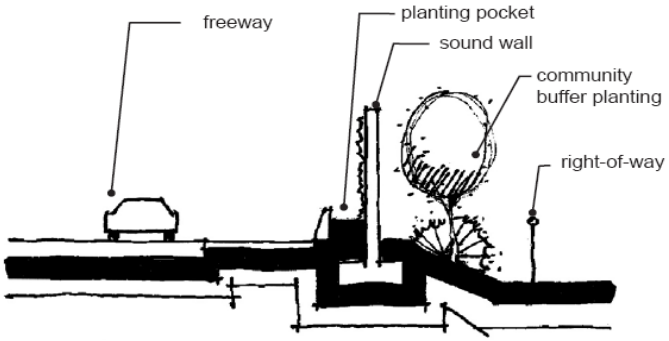


Figure 3-7.82: Soundwall planting pocket section

Soundwall landscape buffers

Noise barriers should consist of landscaped berms wherever possible. Landscaped berms are the preferred visual mitigation for noise barriers and are most visually compatible with most land uses adjacent to the freeway.

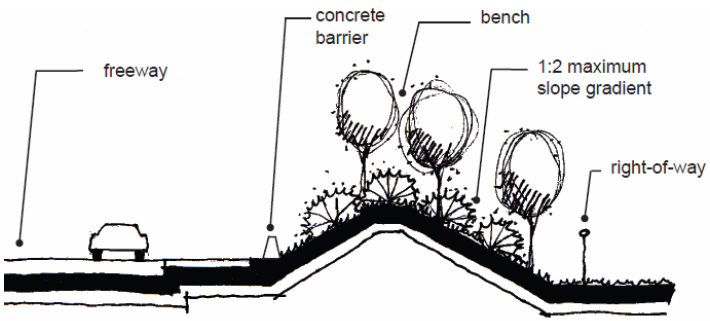


Figure 3-7.83: Berm in fill section

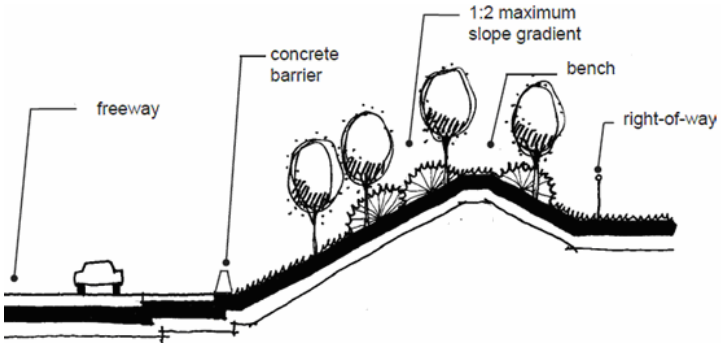


Figure 3-7.84: Berm in cut section

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.

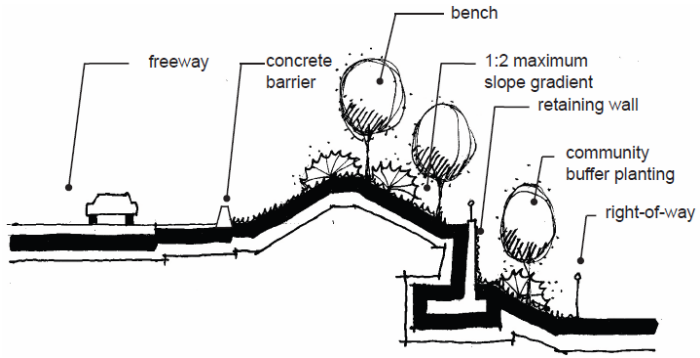


Figure 3-7.85: Noise berm/retaining wall section

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 on the freeway side that is 1.8m (6 ft.) high (minimum). This size berm should allow enough space to provide screening shrubs in front of the wall.

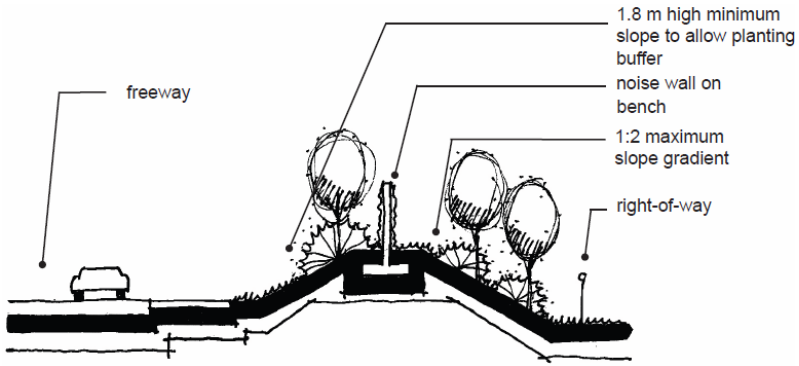


Figure 3-7.86: Noise berm/ noise wall combination section

In areas too narrow to place a planting pocket, the soundwall would be recessed behind the face of barrier at a sufficient distance to allow architectural features to be included on the face of the soundwall. Placing a soundwall directly on top of a concrete barrier would be avoided if at all possible.

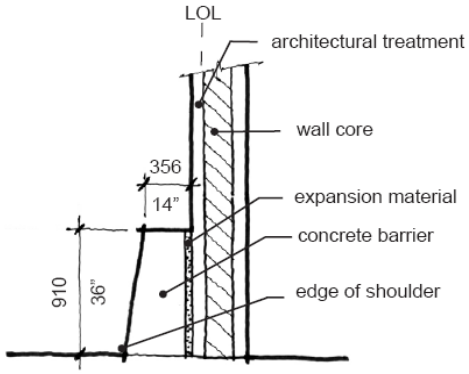


Figure 3-7.87: Soundwall setback section

In areas where space for architectural detailing does not exist, vertical concrete safety barriers would be considered. Vertical barriers add 302 mm (12 in) of additional width in which architectural elements such as pilasters and wall caps can be included.

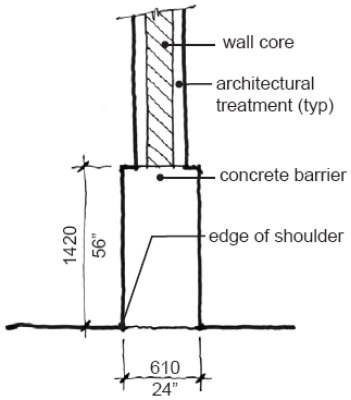


Figure 3-7.88: Vertical concrete safety barrier section

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 the receptors substantially reduces the height of walls to achieve "line of sight" noise reductions.

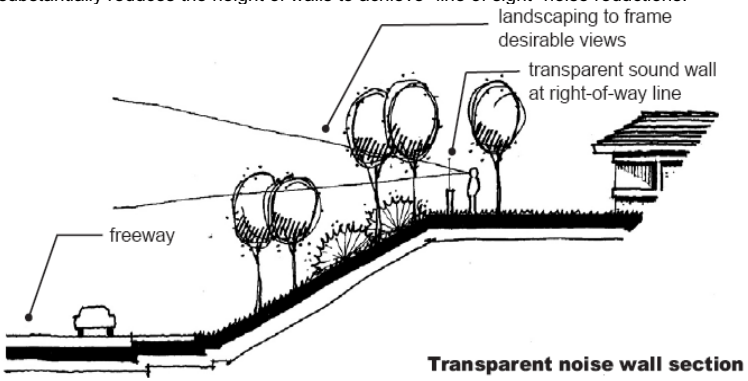


Figure 3-7.89: Transparent soundwall section

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.

Noise walls 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

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.

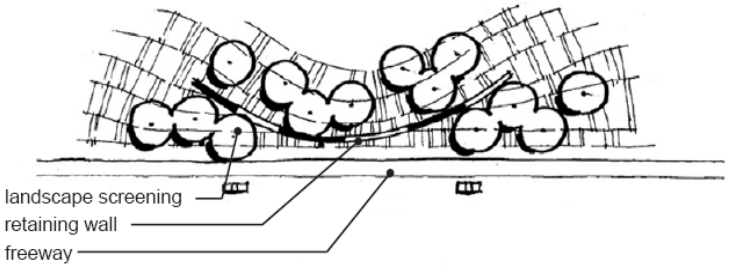


Figure 3-7.90: Terrain contoured wall in cut section (Plan View)

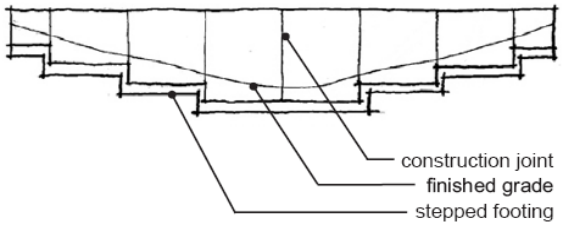


Figure 3-7.91: Terrain contoured wall in cut section (Elevation View)

Terraced retaining walls

Where site conditions are favorable, retaining walls over 6 m (19.7 ft) in height would be divided into separate structures sufficiently offset from one another to create a planting area between the two.

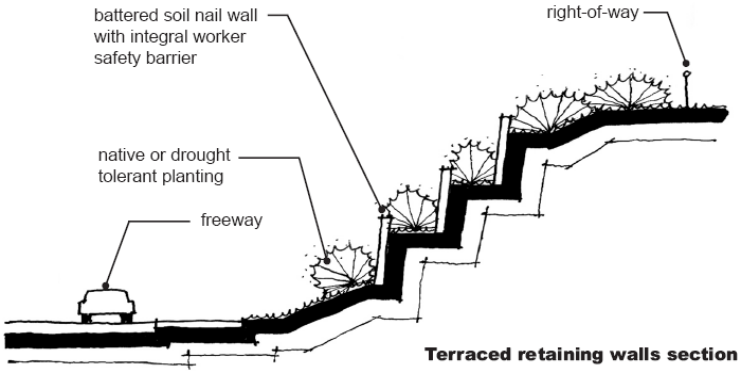


Figure 3-7.92: Terraced retaining walls section

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.

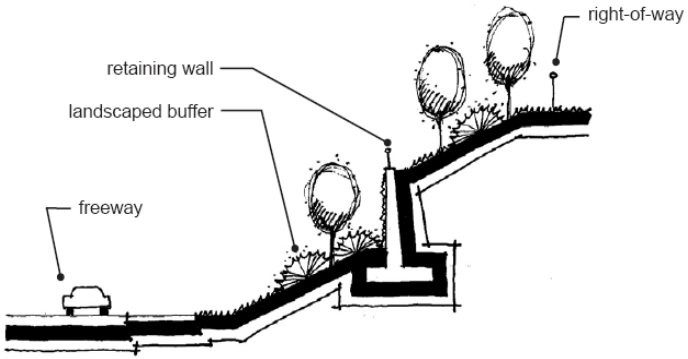


Figure 3-7.93: Mid-slope retaining wall section

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.

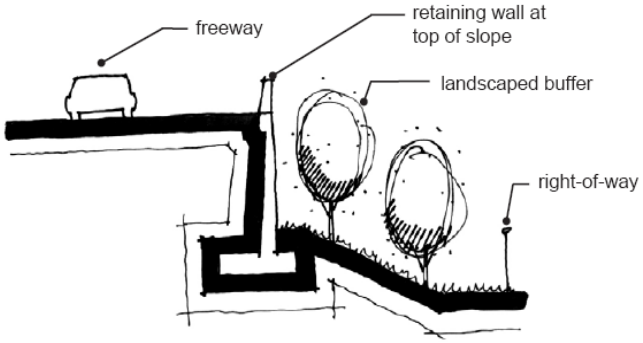


Figure 3-7.94: Top-of-slope retaining wall section

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.

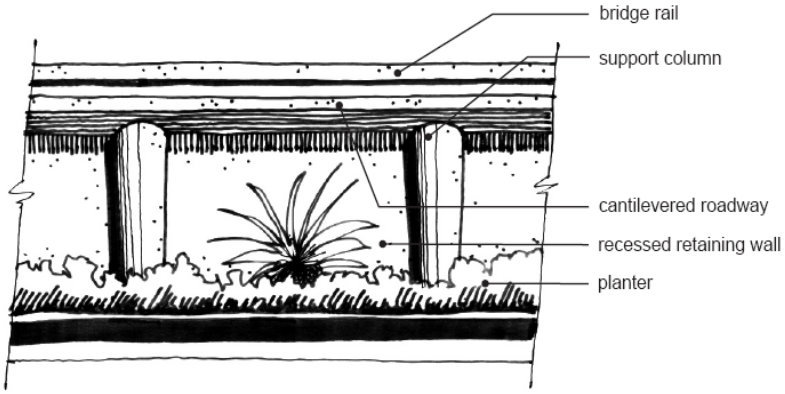


Figure 3-7.95: Viaduct retaining wall (Elevation View)

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 1.5 m (5 ft) wide planting pocket.

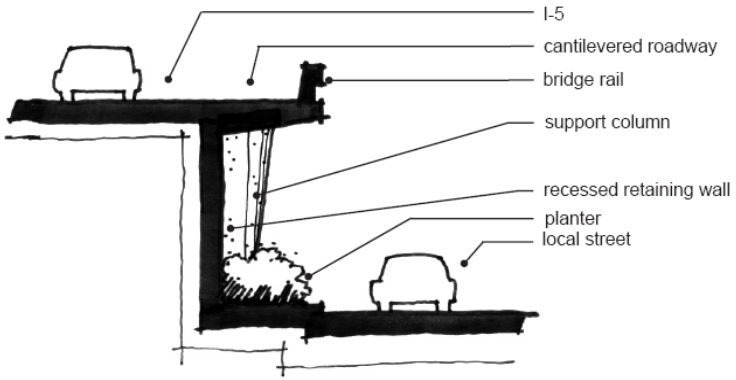


Figure 3-7.96: Viaduct retaining wall (Section View)

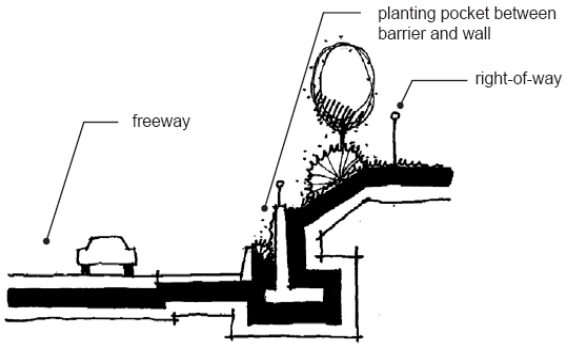


Figure 3-7.97: Retaining wall/planting pocket section

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.

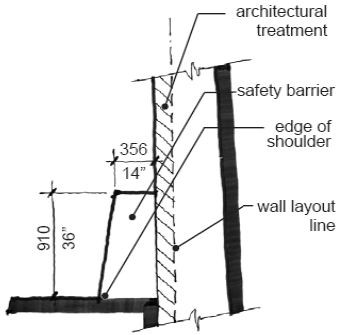


Figure 3-7.98: Barrier setback section

Vertical concrete safety barriers

In areas where space for architectural detailing does not exist, vertical concrete safety barriers would be considered. Vertical barriers add 301 mm (12in) of additional width in which architectural elements such as mechanically stabilized earth wall panel relief, pilasters, and wall caps can be included.

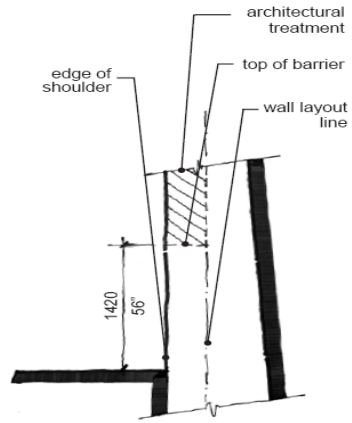


Figure 3-7.99: Vertical concrete safety barrier section

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.

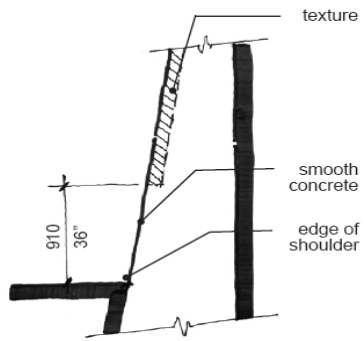


Figure 3-7.100: Battered wall face section

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 would be contained in the corridor design guidelines.

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.

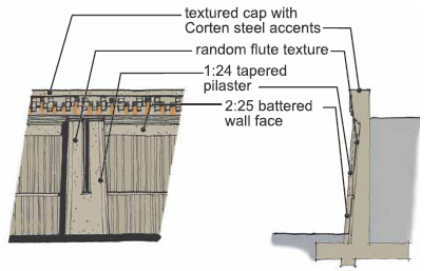


Figure 3-7.101: Southbound/Northbound cut wall, elevation & section

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, enhanced surface texture.

Figure 3-7.102: An MSE wall with a 4 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 shall 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 Direct Access Ramp (DAR) Structures
Bridge type selection and all other structure design would be consistent with these mitigation measures and the design themes contained in the corridor design guidelines. Some mitigation features may be new or non-standard and require approvals or design exceptions. Design feasibility studies would be performed during development of corridor design guidelines.

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 be 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 3-7.103: An example of a short seat abutment

Figure 3-7.104: 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 1.8 m (6 ft) minimum width on a two lane structures with a curb to curb width of 9.8 m (32 ft) or less. On wider streets, both sidewalks would be a minimum of 3 m (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/or 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 3 m (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 1.2 m (4 ft) should be provided for Class 3 facilities.

Figure 3-7.105: A wider sidewalk would enable these pedestrians to walk side by side.

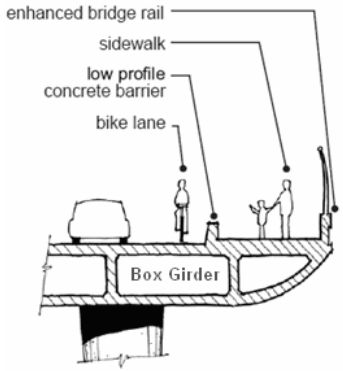


Figure 3-7.106: Sidewalk barrier separation section

Figure 3-7.107: 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.

Pedestrian sidewalks 3 m (10 ft) in width (minimum) would be provided at undercrossings on both sides of the street wherever possible. Wherever possible, 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. A minimum shoulder width of 1.2 m (4 ft) would be provided for Class 3 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 3-7.108: Encinitas Boulevard undercrossing pedestrian and bicycle access could be improved

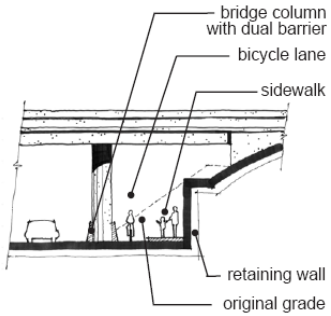


Figure 3-7.109: Undercrossings-pedestrian sidewalks and bicycle lanes section

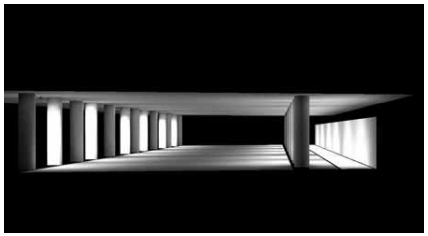


Figure 3-7.110: A lighting concept for Lomas Santa Fe Drive undercrossing integrates function and aesthetics

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 3-7.111: Type 80 bridge rail

Pedestrian Overcrossings
Pedestrian overcrossings would be a minimum of 4.6 m (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 3-7.112: Seating, lighting and community identity elements enhance this pedestrian overcrossing entry

DAR Structures
DAR retaining walls would have a 4.6 m (15 ft) maximum height allowing approximately 3 m (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 4.6 m (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. A minimum shoulder width of 1.2 m (4 ft) would be provided for Class 3 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. 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.

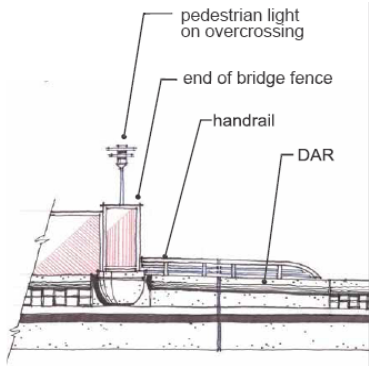


Figure 3-7.113: DAR (Elevation View)

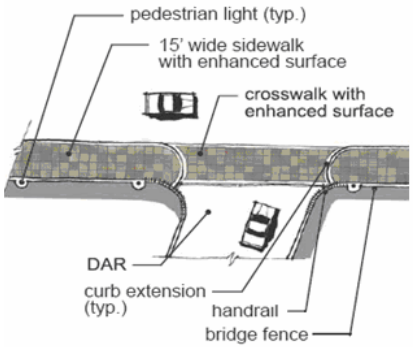


Figure 3-7.114: DAR (Plan View)

Freeway Interchanges

Interchanges are locations in which the large scale, high speed, high volume, restricted access realm of the automobile intersect the human scale, multi-modal, 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 would be developed as part of the corridor design guidelines.

Figure 3-7.115: A sidewalk along an I-15 freeway offramp becomes a pedestrian realm with the inclusion of human scale street amenities

Figure 3-7.116: 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 would be developed as part of the corridor design guidelines.

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 3 m (10 ft) from free 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 deemphasize 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 corridor design guidelines. 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, bio-swales 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 would be addressed in the corridor design guidelines. 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 3 m (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 1.8 m (6 ft) from the back of curb to create a landscaped parkway.

Figure 3-7.117: Concept sketch for a BRT station proposed along the I-15 corridor

Interpretive Element at the Vista Point Overlook

As part of the Archaeological Treatment Plan to mitigate for potential impacts to prehistoric cultural resources, an interpretive element is proposed at the Vista Point Overlook, along southbound I-5, just north of Manchester Avenue. Specific design and actual content of these elements have not been decided, however the concept be at ground-level (so as to not compromise the viewshed), and would incorporate a bench design.

Freeway Landscape

Corridor landscaping

The corridor design guidelines would contain a landscape concept plan for the project. In general, freeway landscaping would be consistent with the character of adjacent community landscape. In communities that are characterized by ornamental landscaping, freeway landscaping that includes drought tolerant ornamental trees, shrubs, and groundcover would be installed. In less developed areas of the corridor, landscaping with drought tolerant ornamental and native trees and shrubs would be planted. Areas adjacent to native habitat would receive native landscaping. Landscape planting would be designed in consultation with the District Biologist. Landscaped areas would receive underground automatic irrigation system. Reclaimed water would be used wherever possible.

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 0.6 m (2 ft) between barrier and wall, and 1.8 m (6 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 free 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 certain 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. 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 shall be graded 1:2 or flatter 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 would be detailed in the corridor design guidelines.

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 corridor design guidelines that includes 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 9.5 mm (3/8in).

Gore paving would incorporate enhanced materials consistent with corridor design themes found in the corridor design guidelines.

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.

Bio-swales 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.

3.8.1 Regulatory Setting

"Cultural Resources" as used in this document refers to all historical and archaeological resources, regardless of significance. Laws and regulations dealing with cultural resources include:

The National Historic Preservation Act of 1966, as amended, (NHPA) sets forth national policy and procedures regarding historic properties, which are defined as districts, sites, buildings, structures, and objects included in or eligible for the National Register of Historic Places (NRHP). Criteria for evaluation for inclusion in the NRHP encompass the property's quality of significance in American history, architecture, archaeology, engineering, and culture that possess integrity of location, design, setting, materials, workmanship, feeling, and association and (a) that are associated with events that have made a significant contribution to the broad patterns of our history; or (b) that are associated with the lives of persons significant in our past; or (c) that embody distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distingishable entity whose components may lack individual distinction, or (d) that have yielded, or may be likely to yield, information important in prehistory or history.

Section 106 of 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 delegating certain responsibilities to Caltrans.

The Archaeological Resources Protection Act (ARPA) applies when a project may involve archaeological resources located on federal or tribal land. ARPA requires that a permit be obtained before excavation of an archaeological resource on such land can take place.

Historic properties may also be covered under Section 4(f) of the U.S. DOT 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 the 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 the Department 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 State Historic Preservation Officer (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)
- Archaeological Survey Reports (ASRs [Original] ASR (2002)
- Supplemental ASR (December 2006)
- Second Addendum ASR (July 2008)
- Third Addendum ASR (July 2008)

Historic Resource Evaluation Reports (HRER) for historic structures:
- [Original] HRER (July 2005)
- First Addendum HRER (August 2006)

A Memorandum of Agreement (MOA) is in preparation that would complete the Section 106 process and be signed and executed prior to the Final EIR/EIS. The MOA would define the roles and responsibilities of the agencies involved in the undertaking, and provide opportunities for concurring parties to be signatories to the document. The MOA would outline how adverse effects and potential adverse effects to historic properties/historical resources would be addressed prior to completion of construction.

The above studies served to identify and evaluate cultural resources located within the project Area of Potential Effects (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 would be adversely impacted by the proposed build alternatives; and an ESA action plan designed to prevent direct or indirect impacts to cultural resources located adjacent to, but outside project construction activities. 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. Based on these efforts, 27 archaeological sites and 76 built environment resources over 50 years old were identified within or immediately adjacent to the APE.

The 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 project effects to eligible resources; and (5) propose methods to resolve adverse effects to eligible resources. 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 Stipulations (IX.B, X.A., X.B.2., X.C.1, and X.C.2.) of its intent to move forward in the Section 106 process, which would be the resolution of impacts to affected historic properties. On December 4, 2007, the Finding of Effect Package (FOE) was sent to FHWA, SHPO, 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 36 CFR 800.5 (a)(1), 800.6 (a) and 800.6 (b)(1) and Stipulation XI of the PA. On March 17, 2008, SHPO's letter answered FHWA and copied Caltrans that they agreed that the treatment of historic properties in the FOE was reasonable (*Figure 5-4.1)*.

The project APE for cultural resources was developed in consultation between the Project Archaeologist, Project Manager, and Project Engineers, with continuous input from Design and other Environmental functional units. The 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.

Archaeological Sites

As noted above, Caltrans notified the SHPO in accordance with PA Stipulations of its intent to move forward in the Section 106 process. Therefore, the SHPO did not formally concur in the eligibility recommendations presented in the HPSR. Caltrans had asked the SHPO to concur in the following:

- Ten archaeological sites are not eligible for the NRHP/CRHR: CA-SDI-4553, SDI-6831, SDI-7296, SDI-12120, SDI-13484, SDI-15678, SDI-15679, SDI-15680, SDI-15685, and SDI-17673;
- Forty-eight architectural properties over 50 years old are not eligible for the NRHP;
- Four archaeological sites are eligible for the NRHP/CRHR: CA-SDI-603, SDI-628, SDI-12670, and SDI-17928;
- Three architectural resources are eligible for the NRHP/CRHR: 767 Orpheus Avenue, 636 Leucadia Boulevard, and 510-514 La Costa Avenue; and
- In accordance with PA Stipulation VIII.C.3, seven archaeological sites are considered eligible for the NRHP/CRHR for the purposes of the current undertaking only: CA-SDI-10965, SDI-16637, SDI-16638H, SDI-16639, SDI-17960, SDI-17672, and SDI-17907H.

Because the SHPO did not concur, all recommendations are considered applicable to the current undertaking, only. This means that if any of these resources were to become involved in another future Caltrans project, the recommendations on eligibility would have to be revisited with the SHPO again.

Therefore, for the purposes of the undertaking only, 11 archaeological sites are considered eligible for the NRHP/CRHR. Nine of these sites, CA-SDI-603, SDI-628, SDI-10965, SDI-16637, SDI-16638H, SDI-16639, SDI-17672, SDI-17907H, and SDI-17960, would not be directly affected by the undertaking, as they fall outside the project's Area of Direct Impacts (ADI).

- CA-SDI-603 was recorded in 1929 as a large site with midden, shell, charcoal, lithics, and ceramics. Excavations occurred from 1958-1961 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 period, and patterns of paleo-environmental change associated with Batiquitos Lagoon.
- CA-SDI-628 was initially recorded in 1929. Portions outside of the present APE were tested in 1994, and areas within the APE were tested in 2002. Despite severe impacts to the majority of the site through development to the west and 1960s highway construction to the east, the remaining site area within the right-of-way/APE appears to be eligible for the NRHP/CRHR under Criterion D for the same reasons as CA-SDI-603.
- CA-SDI-10965 was initially recorded in 1929. Portions of the site outside of the APE were excavated in 1983-1984, while testing within the APE was done in 2002. Portions within the APE 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 within the ADI does not contribute to the significance of this site.
- 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. Because the resource is located within a proposed biological mitigation area where no ground disturbance will take place, the site was not evaluated for its NRHP/CRHR eligibility.
- 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. The portion of the site extending into the ADI was tested in 2006, and appears to be a diffuse surface scatter of shell, with some lithics, that appears to be redeposited by erosion. The larger remaining portion of the site is outside the ADI.
- CA-SDI-17672 was recorded in 2005 as a moderately dense scatter of marine shell and flaked lithics. In response to potential concerns about this site, the portion outside the existing highway right-of-way was removed from the project APE; however, the portion within the right-of-way was tested. That area is a highly disturbed diffuse scatter of shell from a secondary deposit. Based on these findings the site was subsequently determined to be outside of, but adjacent to the APE.
- 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. Due to the possibility of the presence of additional inhumations within Caltrans right-of-way, where original ground still exists, no highway work is proposed for this area.
- CA-SDI-17960 was recorded in 2006. At the time, it was recorded it contained 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. Because the site is outside the ADI, no testing was undertaken.

The following two prehistoric archaeological sites, CA-SDI-12670 and CA-SDI-17928, would be directly affected by the undertaking.

- CA-SDI-12670 was initially recorded in 1929. Excavations at various portions of the site occurred in 1960-1961, 1984-1985, 1996, and 2000. Testing within the APE and right-of-way was conducted in 2002, where a remnant portion of the once large shell midden dating from the beginning of the middle Holocene period (ca. 4500-6000 years B.P.) was identified. Large portions of the site have been severely impacted by development to the west and highway construction to the east; however, the site area within the right-of-way appears to retain integrity and appears to be eligible for the NRHP/CRHR under Criterion D, i.e., for its research potential to contribute important information concerning chronology, the organization of human coastal exploitation during the middle Holocene period, and to the patterns of paleo-environmental, climate and vegetation, and change associated with Batiquitos Lagoon.
- 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 appears to be eligible for the NRHP/CRHR under Criterion D for its research potential. Radiocarbon dates performed suggest that further investigations have the potential to shed light on the chronology of changing subsistence strategies during the Early and Middle Holocene (ca. 8000-4500 years B.P.).

The remaining sites inside the APE, CA-SDI-4553, SDI-6831, SDI-7296, SDI-12120, SDI-13484, SDI-15678, SDI-15679, SDI-15680, SDI-15685, and 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)

Three built environment resources are presumed to be eligible for listing in both the NRHP/ CRHR for the purposes of this undertaking only:

- 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.
- 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.
- 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. A 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 a 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.

Build Alternatives

Archaeological Sites

Of the archaeological sites located within the APE deemed eligible for the NRHP/CRHR, only two, CA-SDI-12670 and CA-SDI-17928, would be adversely affected due to soundwall construction. Adverse effects would result from soundwall construction, should they be built. Proposed wall locations would only impact a very small portion of each site, and those impacts would occur at site peripheries where previous disturbances at both locations have occurred, and have somewhat compromised the integrity of the deposits present there.

These two sites are not Section 4(f) resources because they have been deemed eligible only for their potential to provide information important in prehistory. Specifically, that means they were deemed eligible based on Criterion D, at the local level of significance, in accordance with 36 CFR 63. It also assumes that through retrieval of the information from the affected site areas, i.e., data recovery, and then analyzing, documenting, and curating the archaeological materials, impacts to the resource would be mitigated. It also assumes that nothing would be found in the affected site areas that would require preservation in place. The Adverse Effect finding necessitated the preparation of the FOE, and ultimately the MOA would serve to establish how and by whom the mitigation measures would be implemented.

The other nine eligible sites, CA-SDI-603, -628, -10965, -116637, -16638H, -16639, -17960, -17672, and -17907H, would not be adversely affected because they occur outside the project's ADI. In accordance with PA Stipulations X.B.2(ii) and X.B.2(iii), the Section 106 finding for these sites would be No Adverse Effect, with the use of a standard condition that enables Caltrans to set up an ESA to protect the sites from direct or indirect project-related impacts. Since the sites were determined early on to be avoidable from all construction-related impacts, they were not tested to determine their formal NRHP/CRHR eligibility. Caltrans could make a determination of eligibility without testing in accordance with Section 106 PA Stipulation X.B.2.a(ii).

Built Environment Resources

None of the three built environment resources determined eligible within the APE would be adversely affected by the undertaking. 636 Leucadia Boulevard is located outside the APE and would not be affected. 510-514 La Costa Avenue and 767 Orpheus Avenue would not be adversely affected. Small right-of-way sliver takes at the perimeter of each property are required to construct the project and/or build a soundwall. The evaluations of the properties results in determining which elements within each property boundary contribute to the significance. This might include various buildings, landscaping, walls, pools, and other features. The sliver takes required for this project to not affect any of the qualities that make these properties significant, as no buildings, landscaping, or other contributing features are impacted. For Section 106 purposes, this type of affect is called a No Adverse Effect, because the qualities that make the resource significant would not be adversely affected.

For Section 4(f) purposes, only 510-514 La Costa Avenue and 767 Orpheus Avenue would require a Section 4(f) finding, which for the purposes of this undertaking is proposed as a *de minimis* and detailed in *Appendix A: Section 4(f) De Minimis Impact Evaluations for the I-5 NCC Project*. The use is proposed as *de minimis* under 4(f) because the small sliver takes to the properties would not result in a adverse effect or diminish the qualities or character defining features that qualify these resources for the NRHP/CRHR. The SHPO was notified in a letter July 2, 2007 that a *de minimis* finding is being proposed.

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

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 for cultural resources fell out as the project was redesigned to avoid them. Additional efforts to avoid causing indirect impacts to eligible archaeological sites would include archaeological and Native American monitoring and establishment of ESAs around the sites. ESAs would be marked on the construction contract Plans, and would be called out in the contract Specifications. A letter would be sent to the Resident Engineer's file, along with a copy of the ESA Action Plan. The Action Plan would identify the individuals involved, and their roles and responsibilities for implementing the plan. The construction contract would also 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 would occur, Section 106 consultation with the SHPO would be reopened, if appropriate.

Caltrans would undertake data recovery excavations to salvage data from those portions of CA-SDI-12670 and CA-SDI-17928 to be impacted. Native American monitors would be present during excavations. The collections would be handled in accordance with professional archaeological standards and only qualified personnel would be utilized. The archaeological materials would be analyzed using a variety of specialists and techniques, and then reported upon in final data recovery reports. The artifacts would then be curated in perpetuity at the San Diego Archaeological Center, located in the San Pasqual Valley. The reports would be properly disseminated to local, regional, and state repositories. Information gained from the data recoveries would also be incorporated in an interpretive public display proposed for the San Elijo Scenic Overlook. The overlook would teach a passersby about Native American regional culture and why Caltrans considers impacts to cultural resources as part of the environmental process it follows.

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 Public Resources Code Section 5097.98, if the remains are thought to be Native American, the Coroner would notify the Native American Heritage Commission (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.

Built Environment Resources
For the two NRHP/CRHR eligible historic properties identified within the Built Environment APE, 510-514 La Costa Avenue and 767 Orpheus Avenue, project design changes were made that avoided adverse effects to the resources by reducing impacts to an absolute minimum. Therefore, no mitigation measures are required.

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)

3.9.1 Regulatory Setting

Executive Order 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 Federal Highway Administration 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

This section in based upon the February 2008 and February 2009 Location Hydraulic Studies, which are incorporated by reference. These studies present the results of the Hydrologic Engineering Centers River Analysis System (HEC-RAS) modeling for the floodplains identified below.

Four lagoons, four creeks and two rivers 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:

- **Soledad Canyon Creek** – FEMA **Zone AE** Floodway
- **Los Peñasquitos Creek** – FEMA **Zone AE** Floodway
- **Carmel Valley 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 Federal Emergency Management Agency (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 4.8 km (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 259 square km (100 square mi). Soledad Canyon Creek is fed by Carroll Canyon Creek, which originates southeast of the Miramar Reservoir, in the City of San Diego in the neighborhood of Scripps Miramar Ranch 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 0.8 km (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 is 1.55 km squared (0.6 mi squared) and is identified as an impaired water body on the California 303(d) list for sedimentation. 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 Valley Creek, Los Peñasquitos Creek, Carroll Canyon Creek and Soledad Canyon Creek. The creeks accumulate storm water runoff from continuing residential and commercial development but typically remain 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 Hydrologic Engineering Center River Analysis System (HEC-RAS v.3.1.3) and aerial topography. The area of analysis ranges from approximately 1,219.2 m (4,000 ft) upstream to 335.3 m (1,100 ft) downstream of the I-5 crossing. In this region, 189.7 cubic meter per second (cms) (6,700 cubic ft per second [cfs]) flows from Carroll Canyon Creek into the upstream boundary of Soledad Canyon Creek and is joined with the flows from the Los Peñasquitos creek after the I-5 crossing for a total 100-year flow of 552.2 cms (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 1.7 m/s (5.5 ft/s) to 4.5 m/s (14.8 ft/s). The structures located in the creek's overbanks would be inundated by 0.6 m (2 ft) to 2.7 m (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 440 km squared (170 mi squared) 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 884 m (2,900 ft) above mean sea level 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 174 square km (67 square mi) including portions of the cities San Diego, Poway, and Del Mar. The watershed is highly urbanized with a population of approximately 400,000 residents. The creek discharges to a 1.6 square km (0.6 square mi) lagoon that is identified as an impaired water body on the California 303(d) list for sedimentation. 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 Valley 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 Valley Creek, located within the Los Peñasquitos Lagoon watershed basin and covers a watershed area of 440 sq km (170 sq mi). The watershed 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. Elevations within the watershed range from 884 m (2,900 ft) above mean sea level in the upper watershed to mean sea level.

The 40.7 sq km (15.7 sq 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 Valley Creek is slightly incised within its upper reaches. Material eroded from the Carmel Valley network is deposited downstream in gradients as the drainage approaches the lagoon. Runoff from Carmel Valley 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 Valley Creek model begins upstream of the El Camino Real Bridge crossing. After the crossing, the creek opens up into a heavily vegetated plain over 213-m (700-ft) wide and 427-m (1,400-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 12.2 m (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 122 m (440 ft) long pedestrian bridge with 13 pier rows in the floodplain.

The final bridge of interest was the Carmel Valley 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 320 m (1,050 ft) west of the connector bridge, the model terminates, as Carmel Valley Creek ties into Soledad Canyon Creek.

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 896 square km (346 square mi), including portions of the cities of Del Mar, Escondido, Poway, San Diego, 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 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 89 km (55 mi) long 324 square km (125 square mi) San Dieguito River Park, the 0.6 square km (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 1981 m (6,500 ft) upstream to 457 m (1,500 ft) downstream of the I-5 Bridge. In this region, 1,212 cms (42,800 cfs) of water passes through the opening beneath the interstate bridge from a 1524 m (5,000 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 2.7 m (9 ft) to –1.2 m (-4 ft) (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 located in a coastal wetland between the cities of Encinitas and Solana Beach, and is approximately 32 km (20 mi) north of the City of San Diego. The existing watershed of the San Elijo Lagoon is composed of 199 square km (77 square mi) and is fed by two main water sources Escondido Creek and San Elijo Creek, also know as the Orilla Creek. It has been determined that these creeks generate a 100-year discharge of 659 cms (23,255 cfs). In the late 1870s, the 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 largely decreased the amount of tidal flow exchange the lagoon experiences. Dikes, railroads, and highways have all been built within the wetlands that 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 the 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 ranges from 0.4 km (0.25 mi) to 0.8 km (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 North County Transit District 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 located in the City of Encinitas, CA and is approximately 1.160 m (3,800 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 8.8 square km (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 122 m (400 ft) to sea level.

Since the Cottonwood Creek watershed is not distinctly identified within the RWQCB San Diego Basin Plan, there are currently no designated beneficial uses for the watershed. The beneficial uses that could pertain to the Cottonwood Creek watershed are: Agricultural, Contact Recreation, Non-contact Recreation, Warm Water Habitat, and Wildlife Habitat.

The area of analysis ranges from approximately 60 m (200 ft) upstream to 275 m (900 ft) downstream of the I-5 crossing. In this region, Cottonwood Creek would experience a peak flow of 47.3 cms (1670 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' Concrete Arch culvert for 217.3 m (713 ft), then transitions to a 6' x 8' Double Box culvert for 165.8 m (544 ft) and finally transitions again to a 7' X 4' Triple Box Culvert for 35.4 m (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 28.6 m (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 10' Concrete Arch culvert 418.5 m (1373 ft) long. 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 located in a coastal wetland between the cities of Carlsbad and Encinitas includes the 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 the 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 the Batiquitos Lagoon.

The existing floodplain was analyzed using HEC-RAS v.3.1.3 and aerial topography. The area of analysis ranges from approximately 1,676 m (5,500 ft) upstream to 1158 m (3,800 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 305 m (1,000 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 located in the City of Carlsbad, south of the Palomar Airport Road interchange in the Las Encinas Canyon includes Encinas Creek watershed and is within the Carlsbad Watershed that covers 10.7 square km (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 4.8 km (3 mi). It then crosses Paseo Del Norte and under Interstate 5 before entering a concrete lined channel. Prior to emptying into the Pacific Ocean the creek enters a natural basin located between South Carlsbad Blvd. (Coast Highway 101) and the NCTD rail line.

Encinas Creek has been found to have limited beneficial uses other than non-contact recreation and wildlife habitat preservation and viewing. At the project site, there is little disturbance to the creek's floodplain boundary.

The existing floodplain was analyzed using HEC-RAS v.3.1.3 and the project topography. The area of analysis ranges from approximately 111 m (364 ft) upstream to 44 m (144 ft) downstream of the current I-5 crossing. The peak flow for Encinas Creek at the I-5 crossing is approximately 53.2 cms (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 Triple 10' x 5' 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 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 543.9 km squared (210 mi squared). 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.

The 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 located in the Carlsbad Watershed. The majority of the lagoon is owned and maintained by Encina Power, owners of a 900-megawatt power plant located on the outer segment of the lagoon. The entire 161.9-ha (400-ac) lagoon, created in 1954, was completely re-dredged in 1998 to an average depth of 2.4 to 3.4 m (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: a white seabass research facility jointly managed by Hubbs/Seaworld, the California Department of Fish and Game (CDFG) and a commercial mussel growing facility. In 2000, CDFG acquired 0.75 square km (186 ac) of wetland located at the eastern end of the lagoon for an Ecological Reserve. The Agua Hedionda Lagoon Foundation opened a 353 square m (3,800 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 remain 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 coastal sage scrub 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 1,052 m (3,450 ft) upstream to 1021 m (3,350 ft) downstream of the I-5 crossing. In this region, 279 cms (9,850 cfs) passes from a 610 m (2,000 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 again into the middle lagoon before the flow is again constricted under the railroad crossing. The flow opens up into Agua Hedionda's outer lagoon before the final constriction under Carlsbad Boulevard. Once past Carlsbad Boulevard, Agua Hedionda Lagoon discharges 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 located in a coastal wetland between the cities of Carlsbad and Oceanside and is approximately 60 km (37 mi) north of the City of San Diego. The Buena Vista Lagoon is located within the Carlsbad Watershed, which covers a watershed area of 544 square km (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. However, artisan springs provide for 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. However, 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 Audobon 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 1006 m (3,300 ft) upstream to 1402 m (4,600 ft) downstream of the I-5 crossing. During a 100-year storm event, 241 cms (8,500 cfs) would flow from a 457 m (1,500 ft) wide channel through the opening beneath the I-5 Bridge. Channel bottom elevations range from below 2.1 (7 ft) to 2.1 (7 ft) using the North American Vertical Datum of 1988 (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 610 m (2,000 ft). Other major constrictions occur downstream at the Carlsbad Boulevard and the 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, panels 753, effective date January 19, 2001, and 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 located in the City of Oceanside in the northwestern region of San Diego County includes the Loma Alta Creek watershed. The Loma Alta Creek watershed is located within the Carlsbad Watershed and includes 25.4 sq km (9.8 square mi) in area. The Loma Alta Creek forms the western portion of the northern border of the Carlsbad Hydrologic Unit. The watershed extends inland approximately 11.7 km (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 dominated by 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. Interstate 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 732 m (2,400 ft) upstream to 1,067 m (3,500 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, lies 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 located on the northern border of the City of Oceanside in the northwestern region of San Diego County includes the San Luis Rey River watershed. The San Luis Rey River watershed is composed of 1,445 square km (558 square mi), which 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 80 km (50 mi) long by 26 km (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 uses 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 975 m (3,200 ft) upstream to 762 m (2,500 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 130 m (425 ft) to 209 m (685 ft). Within the project limits, the channel bottom elevations range from 0.7 m (2.2 ft) to 2 m (6.7 ft) (NAVD 88). West of Pacific Street, the San Luis Rey River opens and outlets into the Pacific Ocean. Currently, 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 is also currently being rebuilt approximately 152 m (500 ft) east of its current location. This would open up the mouth of the San Luis Rey River and eliminate major back flow effects from current conditions. The Pacific Street Bridge currently under construction was assumed as existing for the effective model.

3.9.3 Environmental Consequences

There are no encroachments parallel to the direction of water flow, also called, longitudinal encroachments, associated with the proposed improvements to these twelve water crossings included in the *I-5 NCC Project* area.

Build Alternatives

The build alternatives are similar and combined here for analysis of hydrology and floodplains.

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 built well above the water surface elevation of the 100-year storm.

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 1,100 m (3,609 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. The two proposed bridge bents would be located on either side of the Los Peñasquitos Creek floodplain boundary.

Carmel Valley Creek

The proposed improvements require that the existing I-5 bridge be widened approximately 1.8 m (6 ft) to the west. To accommodate the improvements, ten additional 0.5 m (1.5 ft) columns would be added in the floodplain, one in each of the existing rows of columns. The existing Sorrento Valley Road Culvert is also proposed to be replaced with a 135 m (443 ft) long pedestrian bridge with 39 columns in thirteen rows of piers. Each row would contain three 0.5 m (1.5 ft) piers. The bridge deck would be elevated above the 100-year flood level. This replacement bridge would relieve the existing constriction of the creek, at the existing Sorrento Valley Road Culvert.

San Dieguito River

The improvements proposed for the I-5 bridge would included widening each side by approximately 12 m (39 ft) on each side.

San Elijo Lagoon

The proposed replacement of the I-5 Bridge over the San Elijo Lagoon requires that the bridge be widened 6.1 m (20 ft) and lengthened to 80 m (262 ft). The existing I-5 structure consists of two bridges spaced 6.6 m (21.5 ft) apart. Both the left bridge and right bridge contain 18 columns in three rows. To accommodate the proposed improvements 21 new 1.2 m (4 ft) diameter columns would be added, seven in each row.

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 1.6 m (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 ponding area.

Batiquitos Lagoon

The replacement of the existing I-5 Bridge would require that the bridge be widened 9.4 m (31 ft) on each side to a total width of 69 m (226 ft). The proposed bridge would be 75 m (246 ft) long, lengthening it 4.4 m (14.5 ft) at each end. The existing structures consist of two bridges 66 m (217 ft) long with a total width of 50 m (164 ft). Currently, columns are 0.9 m (3 ft) in diameter. To accommodate the widening, the columns diameters would be increased to 1.2 m (4 ft).

Encinas Creek

The proposed improvements would require the freeway to be widened approximately 15 m (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. This 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

The replacement for the I-5 bridge would increase the bridge width from 48 m (158 ft) to 77 m (252.9 ft). The proposed bridge would be 52 m (170.6 ft) long, which is 6 m (20 ft) shorter than existing conditions. Additionally, the existing six rows of 0.5 m (1.5 ft) diameter columns would be replaced with two rows of 1.2 m (4 ft) diameter columns.

Buena Vista Lagoon

The replacement of the existing I-5 Bridge would be widened from the existing 56 m to 79 m (184 ft to 259.4 ft). The proposed bridge would also be 4.4 m (14.4 ft longer) on each end for a total length of 40 m (131.2 ft). Additional changes would include relocation of the two rows of 2-ft piers. The proposed rows of 2–ft columns would be set 3.8 m (12.5 ft) further apart creating a wider channel under the bridge.

Loma Alta Creek

The existing I-5 structure consists of two bridges, one over Loma Alta Creek and the other spanning Oceanside Boulevard. The Loma Alta Creek Bridge is 42 m (139 ft) long and the Oceanside Boulevard Bridge is 59 m (193 ft) long. Both bridges have a width of 52 m (169 ft). The proposed improvements to both I-5 Bridges require that the bridges be widened 18 m (60 ft), 9 m (30 ft) on each side, to a total width of 70 m (229 ft). The widening of both bridges would include the addition of 17additional columns to the floodplain.

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 within a range of 2.3 m (7.5 ft) to 8.1 m (26.6 ft) to the east. The existing I-5 structure consists of two bridges spaced 7.3 m (24 ft) apart. 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 also 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 2.4 m (8 ft) downstream.

No Build

Implementation of the No Build Alternative would not result in 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 the Soledad Canyon Creek, I-5 HOV/Managed Lanes Connector would cause a negligible increase 0.012 m (0.04 ft) 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
The Los Peñasquitos Creek, the I-5 HOV/Managed Lanes freeway-to-freeway connector bridge would entirely span the floodplain in this area of the project and therefore, would not affect the floodplain boundary or the water surface elevations.

Carmel Valley 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 the water surface elevation. The replacement of the Sorrento Valley Road Culvert would remove an existing constriction point in the Carmel Valley Creek and lower the base floodplain by approximately 1.3 m (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 m every 5000 m (or 1 ft every 5000 ft). Because of these pond-like conditions, the bridge widening would uniformly raise the floodplain upstream by a small amount (0.08 m or 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 610 m (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 widening would increase the upstream water surface elevation 0.09 m (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.

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 the water surface elevation. The replacement of the Batiquitos Lagoon Bridge would reduce an existing constriction point in the lagoon and lower the base floodplain by approximately 0.21 m (0.7 ft) upstream of the I-5 bridge.

Encinas Creek
The additional fill into the existing ponding area (floodplain boundary) would increase the water surface elevation at the new extended inlet location 0.07 m (0.22 ft). This increase would perpetuate proportionally upstream for 88 m (288 ft) where the water surface elevation 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 increase 0.03 m (0.1 ft) to water surface elevations upstream. There would be no significant increase to the area of the flood boundary and no increase in flooding resulting 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. The replacement of the Buena Vista Creek Bridge would widen the existing constriction point in the lagoon and lower the base floodplain by approximately 0.12 m (0.4 ft) upstream of the I-5 Bridge.

Loma Alta Creek
Within the Loma Alta Creek floodplain the widening 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 widened I-5 bridges would increase 0.01 m (0.04 ft).

San Luis Rey River
The 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 0.009 m (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.

Soledad Canyon Creek
The HEC-RAS model for this project was developed from the I-5 freeway-to-freeway connector APS that spans 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 Valley Creek
The HEC-RAS model for this project was developed from the I-5 Carmel Valley 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 may require updating during the design phase. Based on the impacts to the Carmel Valley 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 replacement I-5 bridge would cause a decrease to flood water elevations upstream. 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 may 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 Ave UC, dated January 2005. The replacement bridge APS was not available and the bridge modeled matches the dimensions of the widen APS, except for a longer bridge span by 7 m (24 ft). The floodplain model may require updating during the design phase, as the final bridge length is determined in cooperation with the County of San Diego and the San Elijo Lagoon Conservancy, and collectively their San Elijo Lagoon Enhancement Plan project report.

Within the 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 3-m (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 stormwater elevation upstream of I-5 would reach of 28 m (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 the Batiquitos Lagoon, the replacement I-5 bridge would cause a decrease 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 may require updating during the design phase.

Encinas Creek
The HEC-RAS model for this creek was developed and based on the existing and proposed topographical information available. 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 however 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 the 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 may 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 the 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. The floodplain model may 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 would cause a slight increase to flood water elevations upstream. The 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. The floodplain model may 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 same limits as current conditions allow both upstream and downstream of the proposed widening. Since the I-5 pier wall extension causes 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.

Support of Incompatible Floodplain Development

The proposed bridges do not support 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 alternatives. Access to the facility would be controlled, and the freeway would cross any rivers on structures above the base floodplain elevation.

3.9.4 Avoidance, Minimization and/or Mitigation Measures

Build Alternatives

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. 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 Valley 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 barrier or fences to protect sensitive areas
- Employing BMPs to control erosion and runoff
- Designating Environmentally Sensitive Areas (ESAs) in order 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.

Table 3.9.1: 100-Year Floodplain Impacts Comparison

Evaluation Criteria	Measured Parameter	No Build	10+4 w/Barrier				10+4 w/Buffer				8+4 w/Barrier				8+4 w/Buffer			
Total Project Impacts to FEMA 100-year floodplains	Hectares / Acres	none	**13.9 / 34.3**				**11.6 / 28.8**				**12.5 / 30.9**				**10.1 / 24.9**			
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
	Hectares / Acres	none	**3.1 / 7.6**	**4.8 / 11.9**	**5.9 / 14.7**	**0.1 / 0.2**	**2.3 / 5.7**	**4.7 / 11.7**	**4.6 / 11.3**	**0.1 / 0.2**	**2.9 / 7.3**	**4.6 / 11.3**	**4.9 / 12.2**	**0.1 / 0.2**	**2.4 / 6.1**	**3.5 / 8.7**	**4.0 / 10.0**	**0.1 / 0.2**
Individual Floodplain Impacts																		
Soledad Canyon Creek	Hectares / Acres	none	0.35 / 0.87	0	0.03 / 0.08	0.01 / 0.02	SAME WIDENING & IMPACTS FOR ALL ALTERNATIVES				SAME WIDENING & IMPACTS FOR ALL ALTERNATIVES				SAME WIDENING & IMPACTS FOR ALL ALTERNATIVES			
Los Peñasquitos Creek	Hectares / Acres	none	0.08 / 0.21	0	0	0												
Carmel Valley Creek	Hectares / Acres	none	0.04 / 0.11	0.12 / 0.30	0	0.00 / 0.01												
San Dieguito River	Hectares / Acres	none	0.65 / 1.60	1.15 / 2.85	1.90 / 4.69	0.02 / 0.04	0.41 / 1.01	1.01 / 2.50	1.34 / 3.31	0.01 / 0.03	0.58 / 1.44	1.01 / 2.52	1.34 / 3.42	0.01 / 0.04	0.47 / 1.15	0.55 / 1.36	1.30 / 3.21	0.01 / 0.03
San Elijo Lagoon	Hectares / Acres	none	0.78 / 1.93	1.79 / 4.42	1.26 / 3.12	40.5 / 0.01	4.6 / 1.14	2.01 / 4.97	0.55 1.37	0.00 / 0.01	7.2 / 1.79	1.76 / 4.36	0.67 / 1.65	0.00 / 0.01	0.51 / 1.26	1.80 / 4.44	0.30 / 0.74	0.00 / 0.01
Cottonwood Creek	Hectares / 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	Hectares / Acres	none	0.22 / 0.55	5.4 / 1.33	1.33 / 3.28	0.00 / 0.01	0.14 / 0.34	0.53 / 1.31	1.26 / 3.12	0.00 / 0.01	0.23 / 0.57	0.57 / 1.42	1.33 / 3.29	0.00 / 0.01	0.17 / 0.42	0.21 / 0.52	1.25 / 3.08	0.00 / 0.01
Encinas Creek	Hectares / Acres	none	n/a	0.07 / 0.18	/ 0.24	n/a	n/a	/ 0.12	/ 0.21	n/a	n/a	0.05 / 0.12	0.07 / 0.18	n/a	n/a	0	0.11 / 0.26	n/a
Agua Hedionda Lagoon	Hectares / Acres	none	0.38 / 0.93	0.61 / 1.51	0.72 / 1.78	0.00 / 0.01	0.25 / 0.63	0.48 / 1.19	0.64 / 1.59	0.00 / 0.01	0.36 / 0.88	0.52 / 1.29	0.83 / 2.04	0.00 / 0.01	0.26 / 0.65	0.33 / 0.81	0.44 / 1.09	0.00 / 0.01
Buena Vista Lagoon	Hectares / Acres	none	0.09 / 0.22	0.29 / 0.72	0.41 / 1.01	0.00 / 0.01	0.08 / 0.21	0.29 / 0.72	0.44 / 1.08	0.00 / 0.01	0.09 / 0.22	0.29 / 0.72	0.41 / 1.01	0.00 / 0.01	0.08 / 0.21	0.29 / 0.72	0.41 / 1.01	0.00 / 0.01
Loma Alta Creek	Hectares / Acres	none	.019 / 0.48	0.22 / 0.55	0.18 / 0.45	0.00 / 0.01	SAME WIDENING & IMPACTS FOR ALL ALTERNATIVES				SAME WIDENING & IMPACTS FOR ALL ALTERNATIVES				SAME WIDENING & IMPACTS FOR ALL ALTERNATIVES			
San Luis Rey River	Hectares / Acres	none	0.28 / 0.69	0	0.02 / 0.05	0.02 / 0.06												

The 100-Yr floodplain impact acreage identified in the table is a measure of the four impacts identified that fall within the 100-Yr floodplain shape files that reside in Caltrans District 11 G:\gisdata\fema\shape directory.
These measured impacts include the four proposed widening alternatives and Direct Access Ramps (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" is the additional roadway hinge and fill slope area within the floodplain limits. (Footprint impact)
"Bridge Columns" is the additional bridge column (cross-sectional) area within the floodplain limits. (Waterway impact)
These 100-Yr 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 result from the impacts themselves.

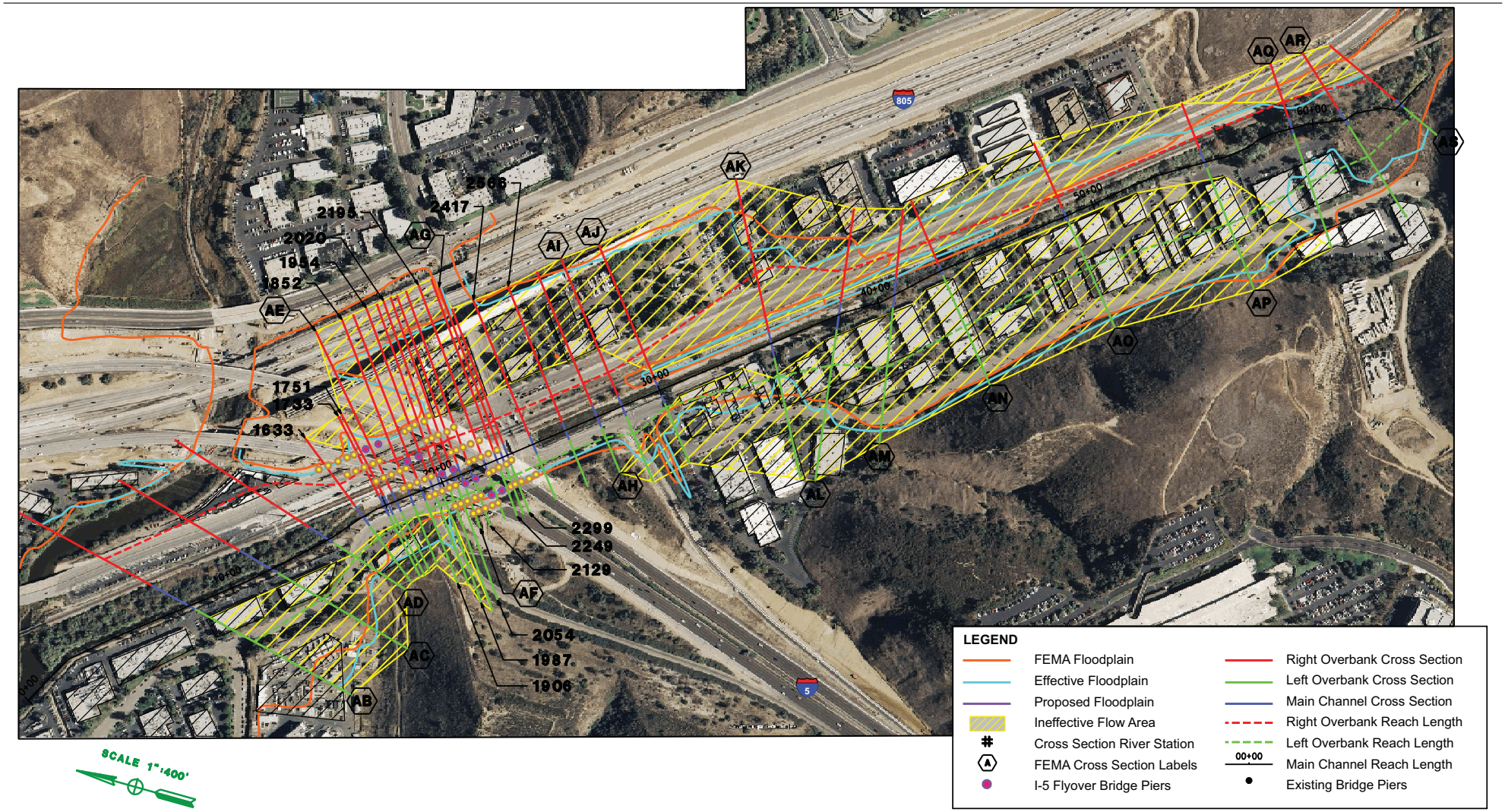


Figure 3-9.1 Soledad Canyon Creek Floodplain within the project area

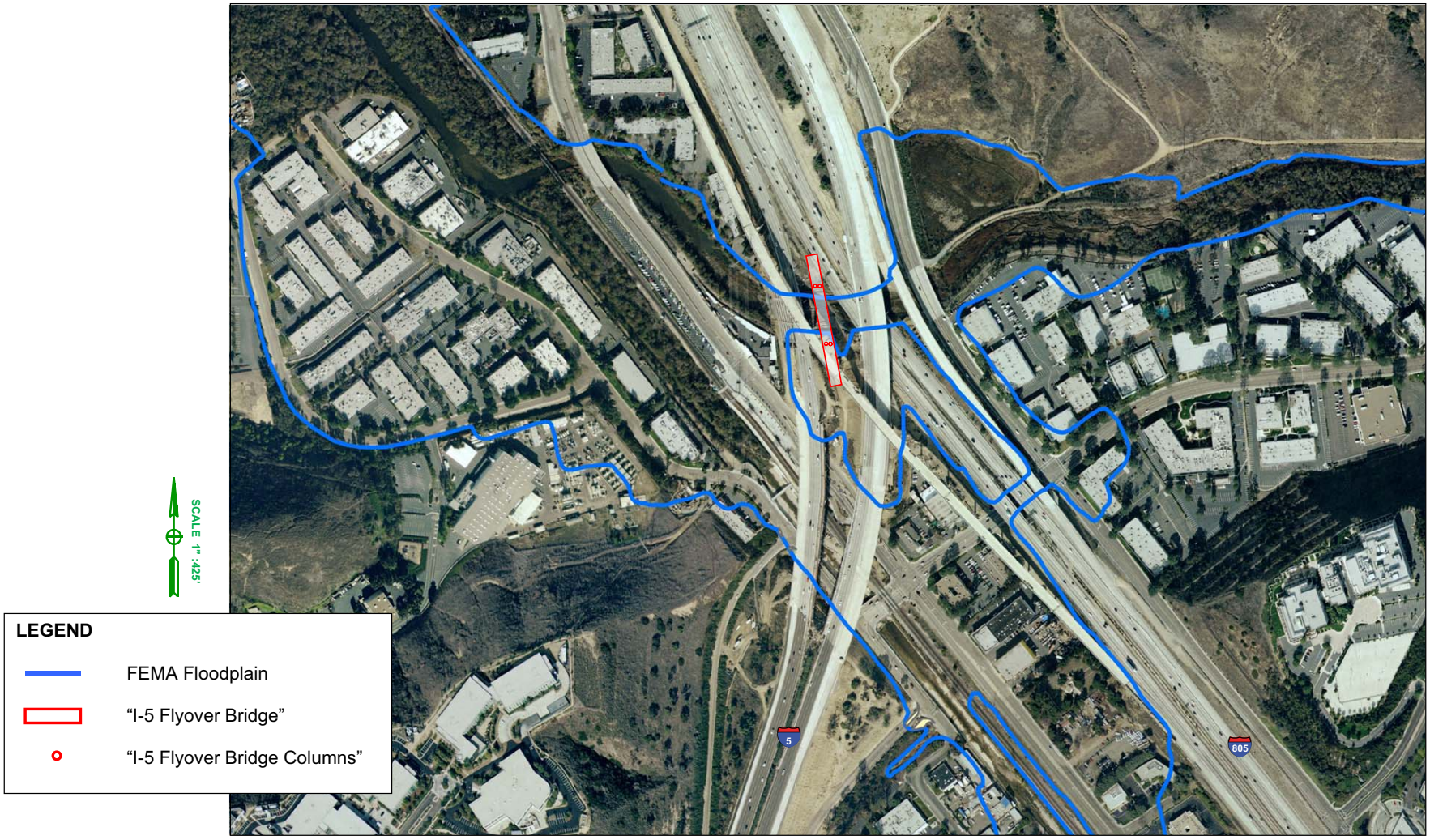


Figure 3-9.2 Los Penasqitos Creek Floodplain within the project area

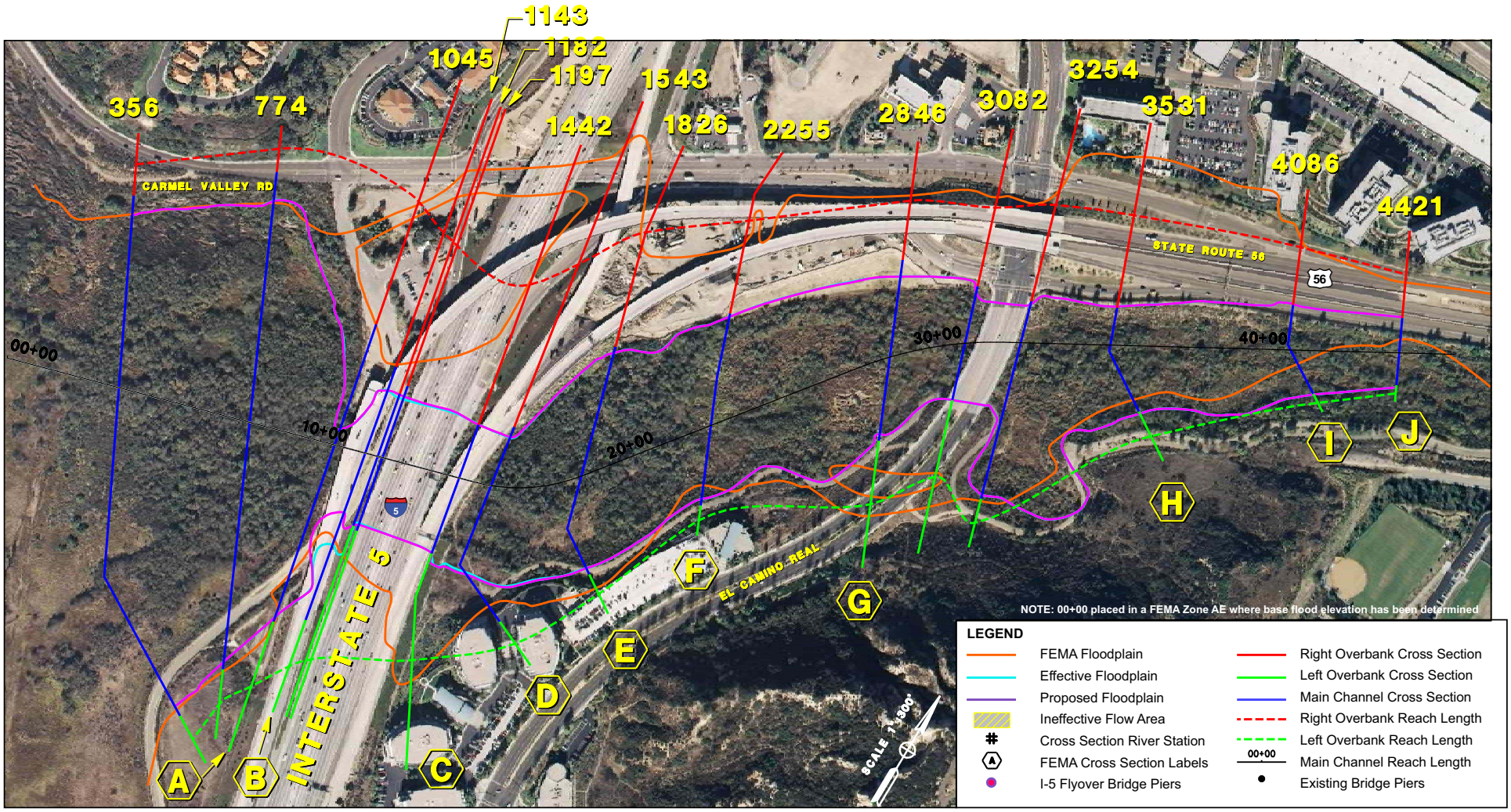


Figure 3-9.3 Carmel Valley Creek Floodplain within the project area

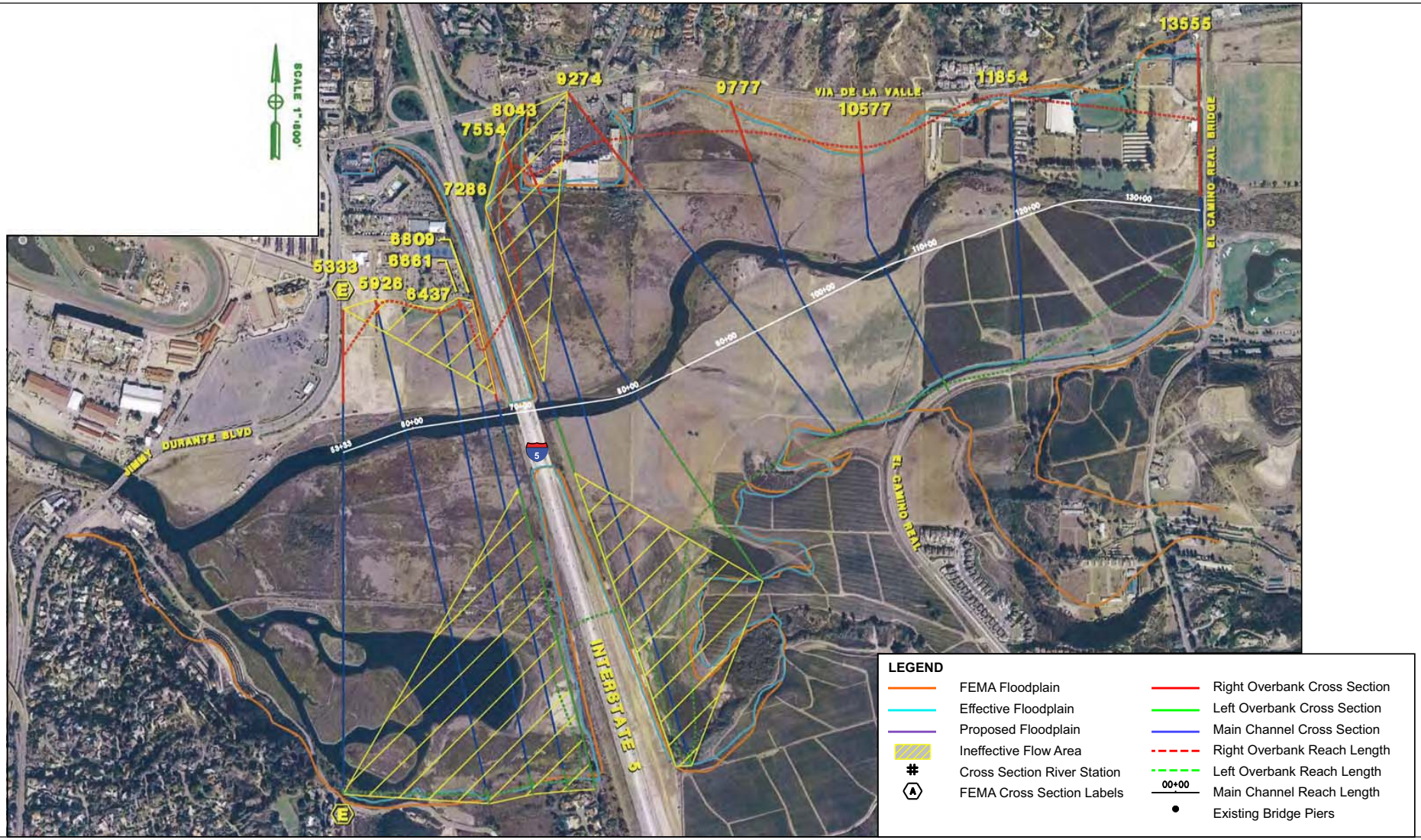


Figure 3-9.4 San Dieguito Lagoon Floodplain within the project area

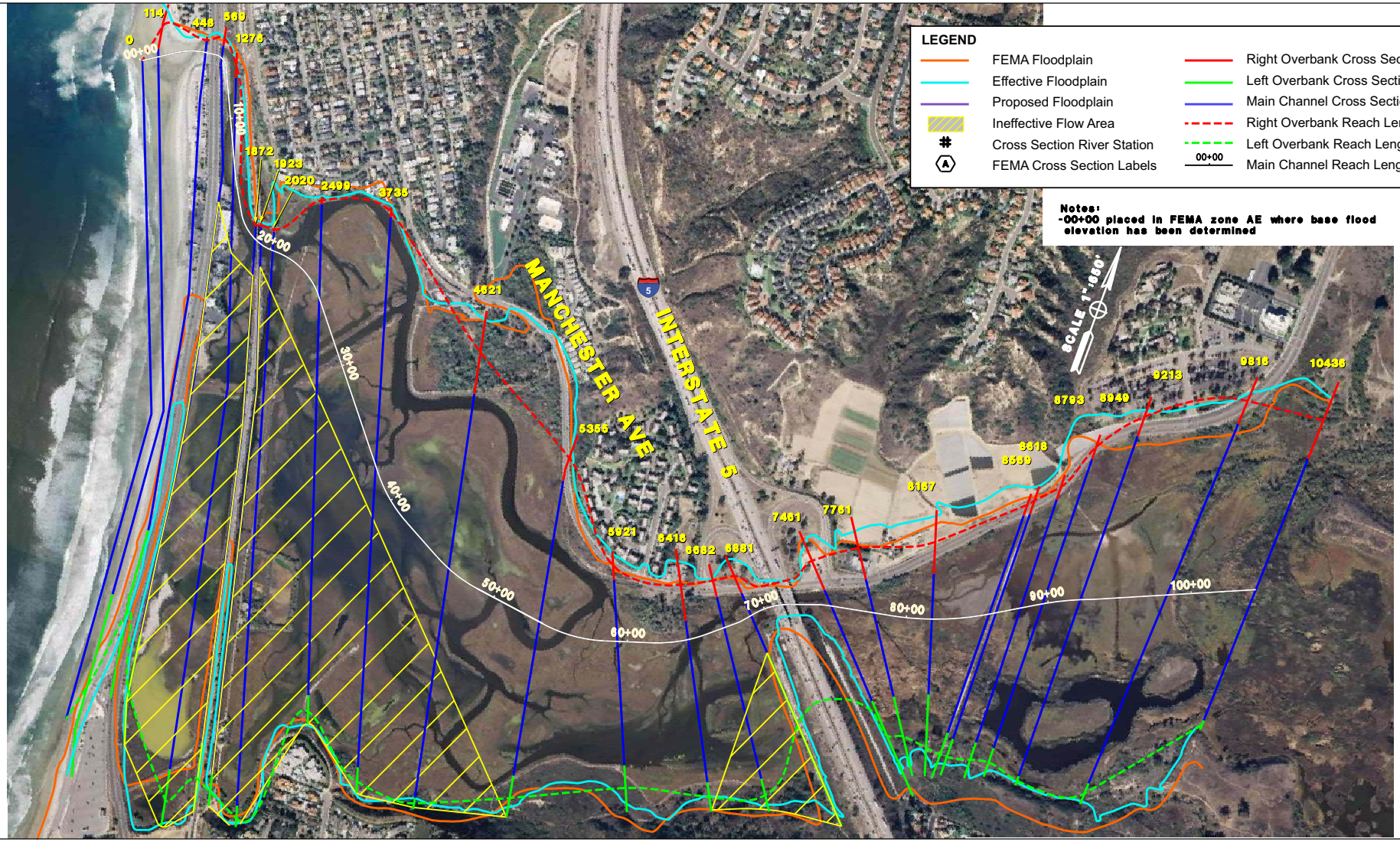


Figure 3-9.5 San Elijo Lagoon Floodplain within the project area

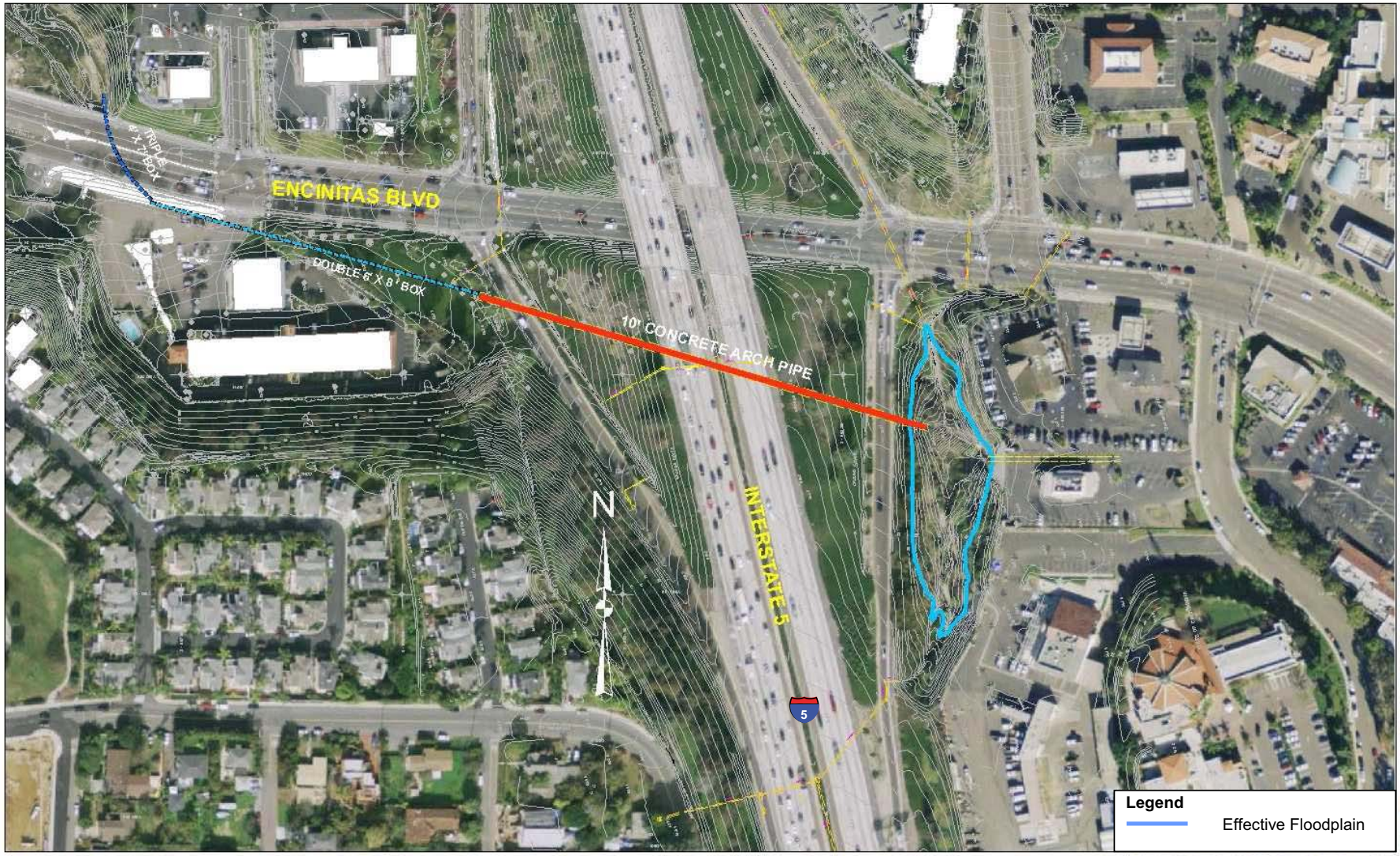
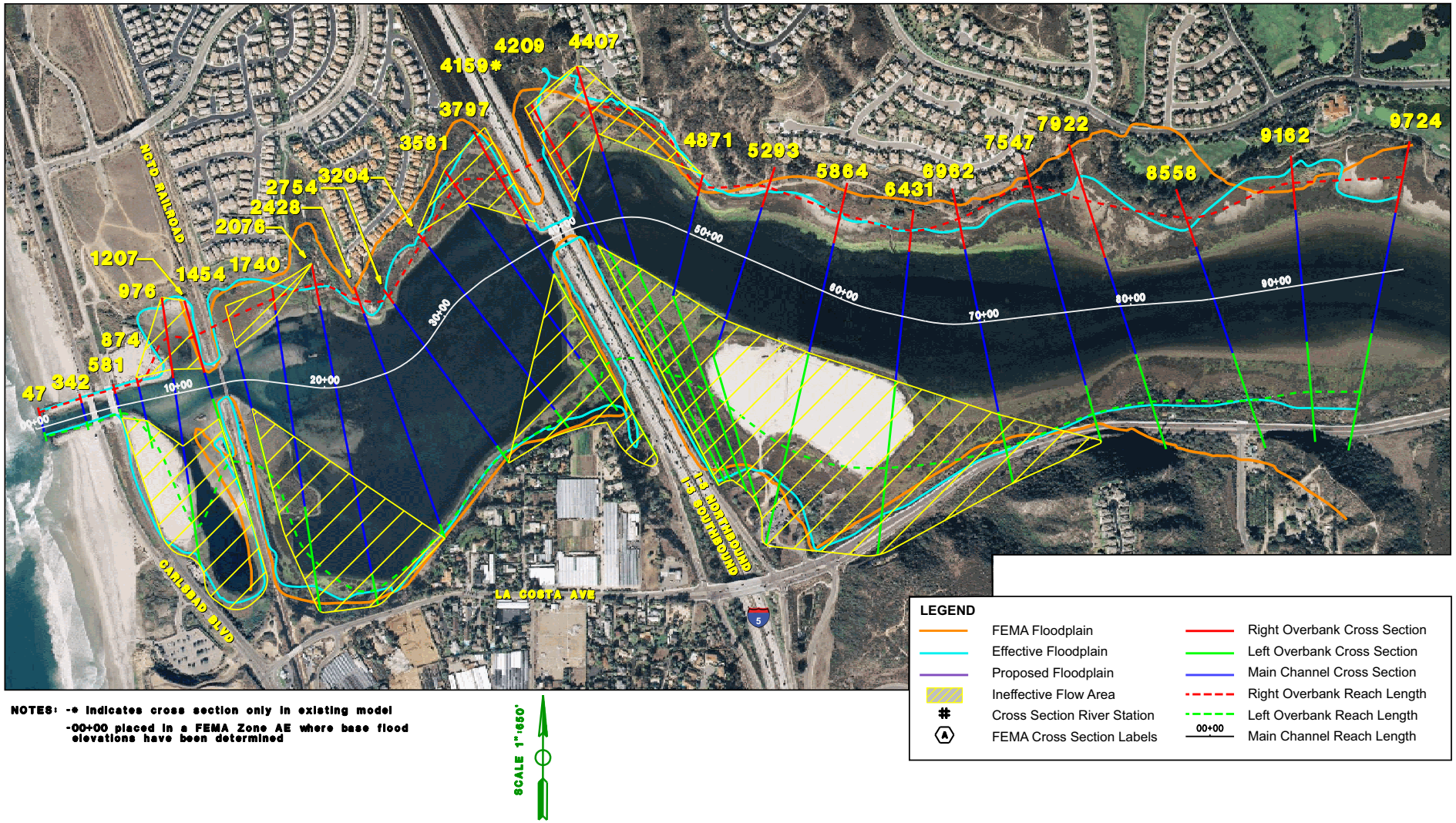


Figure 3-9.6 Cottonwood Creek Floodplain within the project area



NOTES: -* indicates cross section only in existing model
-00+00 placed in a FEMA Zone AE where base flood elevations have been determined

Figure 3-9.7 Batiquitos Lagoon Floodplain within the Project Area

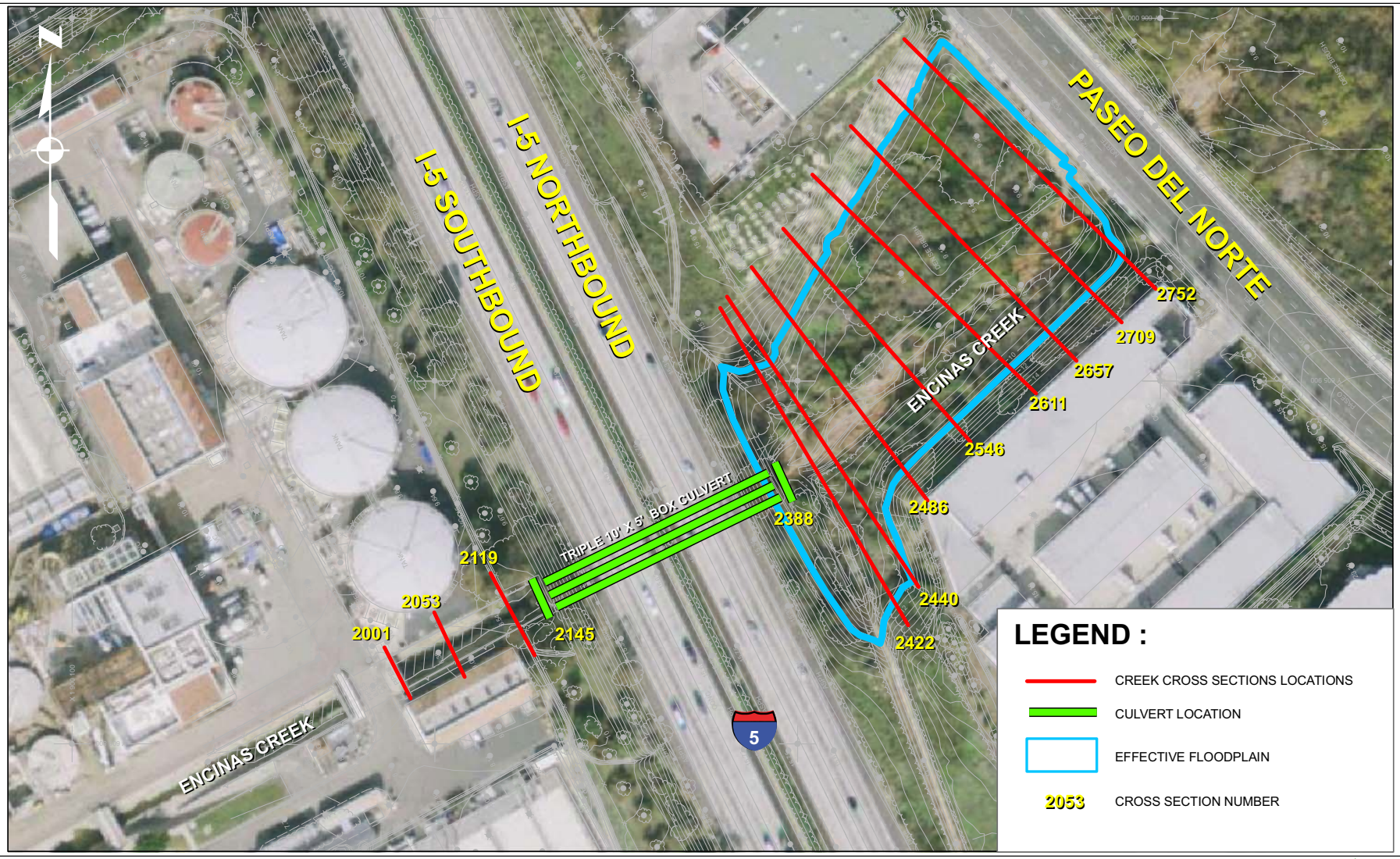


Figure 3-9.8 Encinas Creek Floodplain within the project area

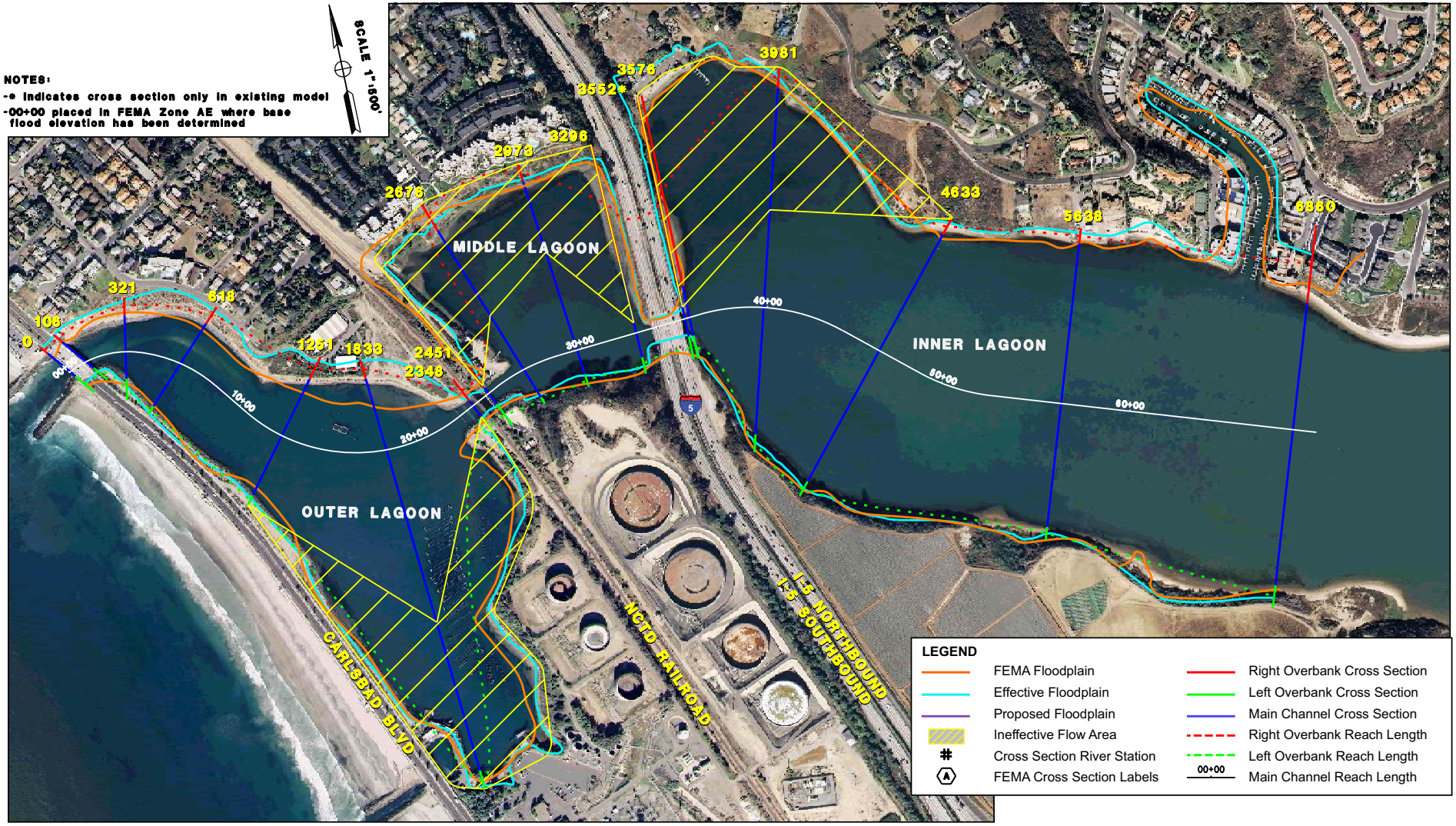


Figure 3-9.9 Agua Hedionda Lagoon Floodplain within the project area

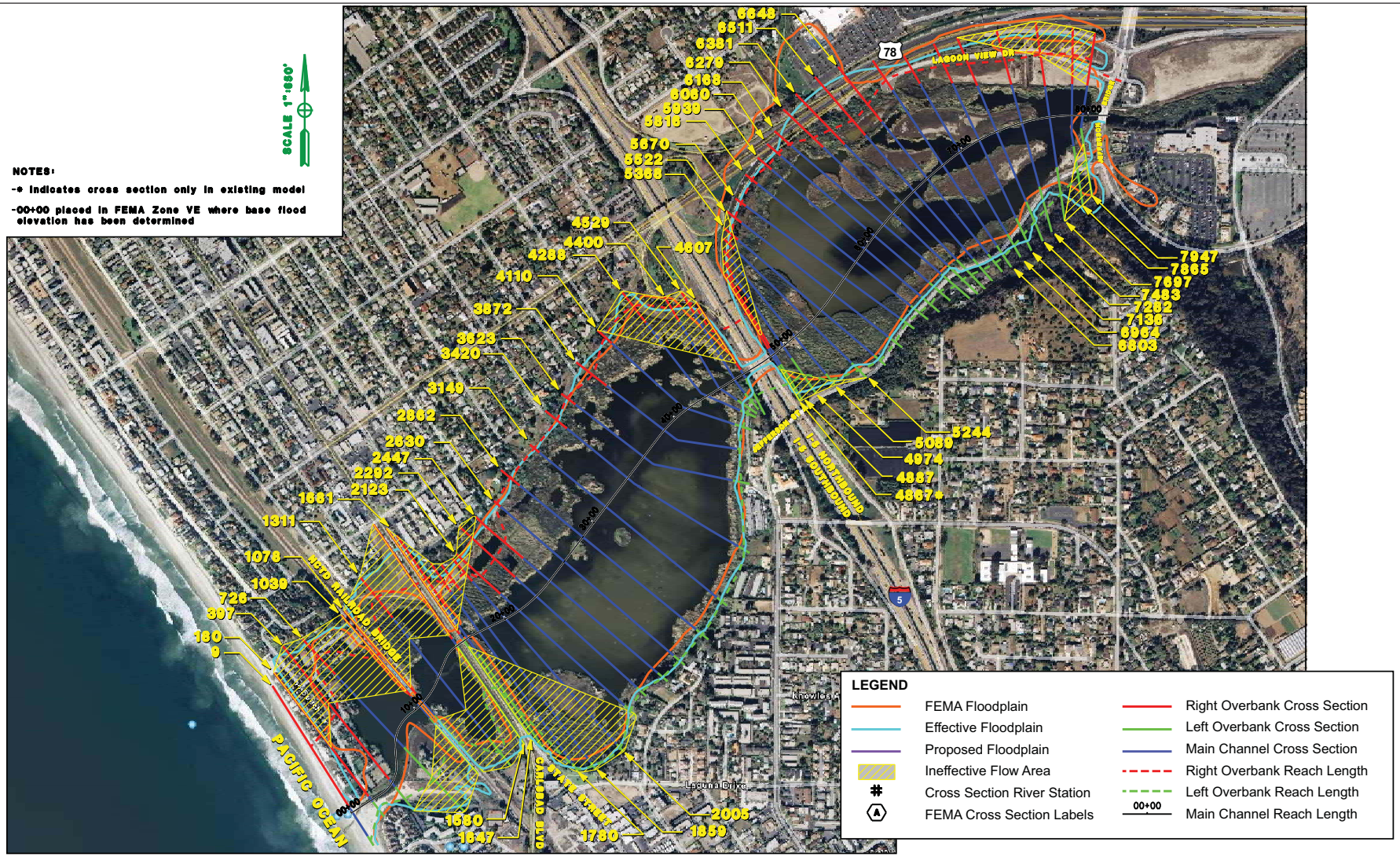
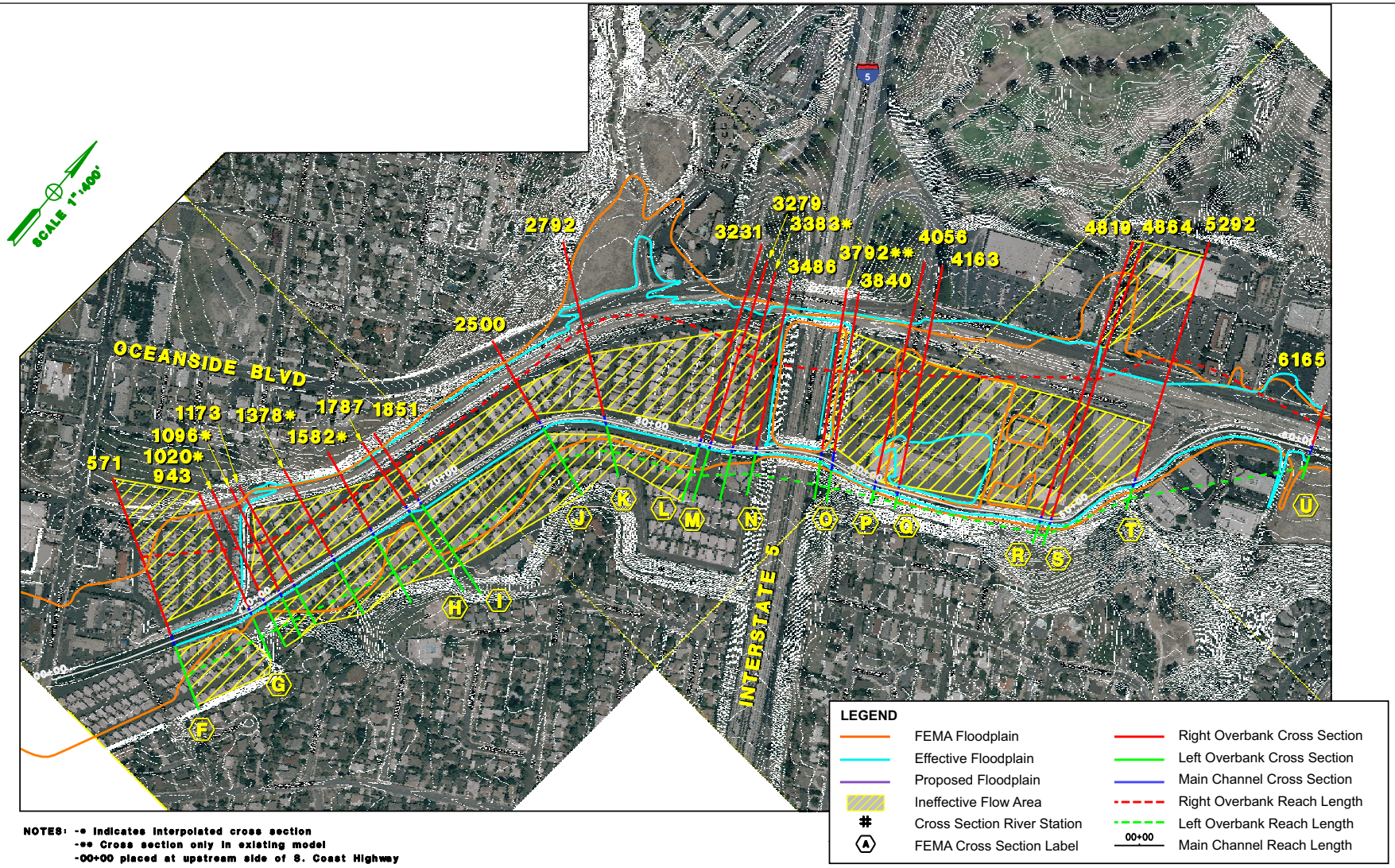
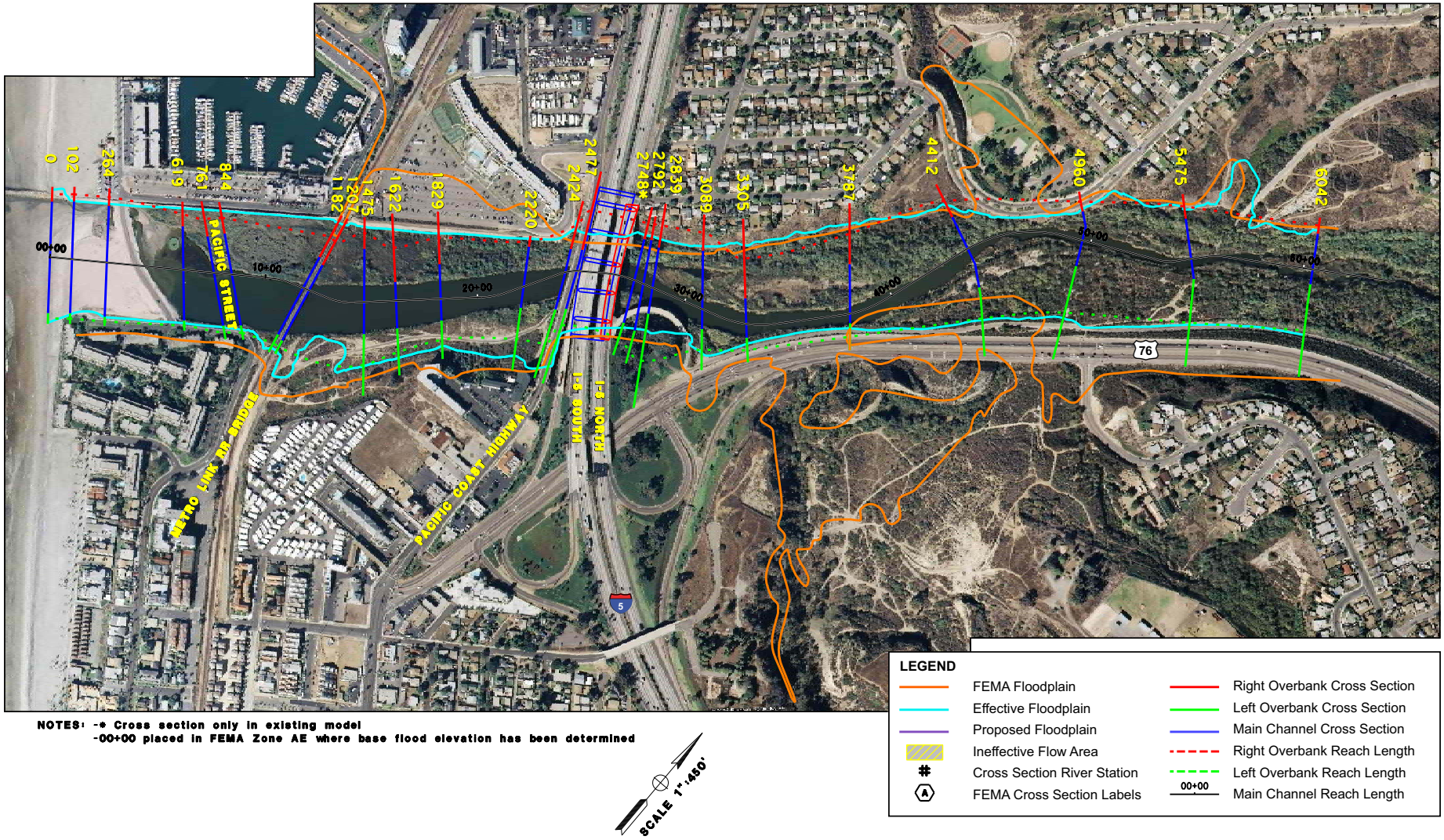


Figure 3-9.10 Buena Vista Lagoon Floodplain within the project area



NOTES: -* Indicates interpolated cross section
-** Cross section only in existing model
-00+00 placed at upstream side of S. Coast Highway

Figure 3-9.11 Loma Alta Lagoon Floodplain within the project area



NOTES: -* Cross section only in existing model
-00+00 placed in FEMA Zone AE where base flood elevation has been determined

Figure 3-9.12 San Luis Rey River Floodplain within the project area

3.10 Water Quality and Storm Water Runoff

3.10.1 Regulatory Setting

Federal Requirements: Clean Water Act

In 1972, the Federal Water Pollution Control Act was amended, making the discharge of pollutants to the waters of the United States from any point source unlawful, unless the discharge is in compliance with a National Pollutant Discharge Elimination System (NPDES) permit. The Federal Water Pollution Control Act was subsequently amended in 1977, and was renamed the Clean Water Act (CWA). The CWA, as amended in 1987, directed that storm water discharges are point source discharges. The 1987 CWA amendment established a framework for regulating municipal and industrial storm water discharges under the NDPES program. Important CWA sections are as follows:

- Sections 303 and 304 provide for water quality standards, criteria, and guidelines.
- Section 401 requires an applicant for any federal project that proposes an activity, which may result in a discharge to waters of the United States to obtain certification from the State that the discharge will comply with other provisions of the act.
- Section 402 establishes the NPDES, a permitting system for the discharges (except for dredge or fill material) into waters of the United States. Regional Water Quality Control Boards (RWQCB) administer this permitting program in California. Section 402(p) establishes addresses storm water and non-storm water discharges.
- Section 404 establishes a permit program for the discharge of dredge or fill material into waters of the United States. This permit program is administered by the U.S. Army Corps of Engineers (ACOE).

The objective of the CWA is “to restore and maintain the chemical, physical, and biological integrity of the Nation’s waters.”

State Requirements: Porter-Cologne Water Quality Control Act (California Water Code)

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 otherwise) to land or surface waters that may impair beneficial uses for surface and/or groundwater of the state.

The State Water Resources Control Board (SWRCB) and RWQCBs are responsible for establishing the water quality standards (objectives) required by the CWA, and regulating discharges to ensure that the objectives are met. Details regarding water quality standards in a project area are contained in the applicable RWQCB Basin Plan. States designate beneficial uses for all water body segments, and then set criteria necessary to protect these uses. Consequently, the water quality standards developed for particular water segments are based on the designated use and vary depending on such use. In addition, each state identifies waters failing to meet standards for specific pollutants, which are 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 controls, the CWA requires establishing Total Maximum Daily Loads (TMDLs). TMDLs establish 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, water pollution control, and water quality functions throughout the state. RWCQBs are responsible for protecting beneficial uses of water resources within their regional jurisdiction using planning, permitting, and enforcement authorities to meet this responsibility.

- **NPDES Program**
  The SWRCB adopted Caltrans Statewide NPDES Permit (Order No. 99-06-DWQ) on July 15, 1999. This permit covers all Department rights-of-way, properties, facilities, and activities in the State. NPDES permits establish a 5-year permitting time frame. NPDES permit requirements remain active until a new permit has been adopted.

In compliance with the permit, the Department 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 the Department 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 Best Management Practices (BMPs). The proposed Project will be programmed to follow the guidelines and procedures outlined in the 2003 SWMP to address storm water runoff or any subsequent SWMP version draft and approved.

- **Municipal Separate Storm Sewer System Program**
  The U.S. EPA defines a Municipal Separate Storm Sewer System (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. As part of the NPDES program, U.S. EPA initiated a program requiring that entities having MS4s apply to their local RWQCBs for storm water discharge permits. The program proceeded through two phases. Under Phase I, the program initiated permit requirements for designated municipalities with populations of 100,000 or greater. Phase II expanded the program to municipalities with populations less than 100,000.

- **Construction Activity Permitting**
  Section H.2, Construction Program Management of the Department’s NPDES permit states: “The Construction Management Program shall be in compliance with requirement of the NPDES General Permit for Construction Activities (Construction General Permit)”. Construction General Permit (Order No. 2009-009-DWQ, adopted on September 2, 2009, will become effective on July 1, 2010. The permit will regulate storm water discharges from construction sites that result in a DSA of 1 acre 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 acre must comply with the provisions of the General Construction Permit.

The newly adopted permit separates projects into Risk Levels 1 – 3. 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. Risk levels are determined during the design phase and are based on potential erosion and transport to receiving waters. Applicants are required to develop and implement an effective Storm Water Pollution Prevention Plan (SWPP).

Caltrans Statewide NPDES Permit requires the Department to submit a Notice of Construction (NOC) to the RWCB to obtain coverage under the Construction General Permit. Upon project completion, a Notice of Completion of Construction (NOCC) is required to suspend coverage. This process will continue to apply to Department projects until a new Caltrans Statewide NPDES Permit is adopted by the SWRCB. An NOC or equivalent form will be submitted to the RWQCB at least 30 days prior to construction if the associated DSA is 1 acre or more. In accordance with the Department's Standard Specifications, a Water Pollution Control Plan (WPCP) is used for projects with DSA less than 1-acre.

During the construction phase, compliance with the permit and the Department's Standard Special Conditions requires appropriate selection and deployment of both structural and non-structural BMPs. These BMPs must achieve performance standards of Best Available Technology economically achievable/Best Conventional Pollutant Control Technology (BAT/BCT) to reduce or eliminate storm water pollution.

3.10.2 Affected Environment

The water quality analysis is based upon the July 2009 Water Quality Report, as a separate technical study prepared for this project.

The project area parallels the coastline throughout San Diego County and resides entirely within the coastal region of the San Diego Basin and 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 22º C (71º F) to a low of 13º C (56º F) (SANDAG GIS 2005). The annual precipitation along the project corridor averages from 300 to 330 mm (12 to 13 in). The vast majority of rainfall occurs between November and March with most of the annual precipitation falling during a few storms in close proximity to each other. Rainfall patterns are subject to extreme variations from year to year with periodic long-term wet and dry cycles.

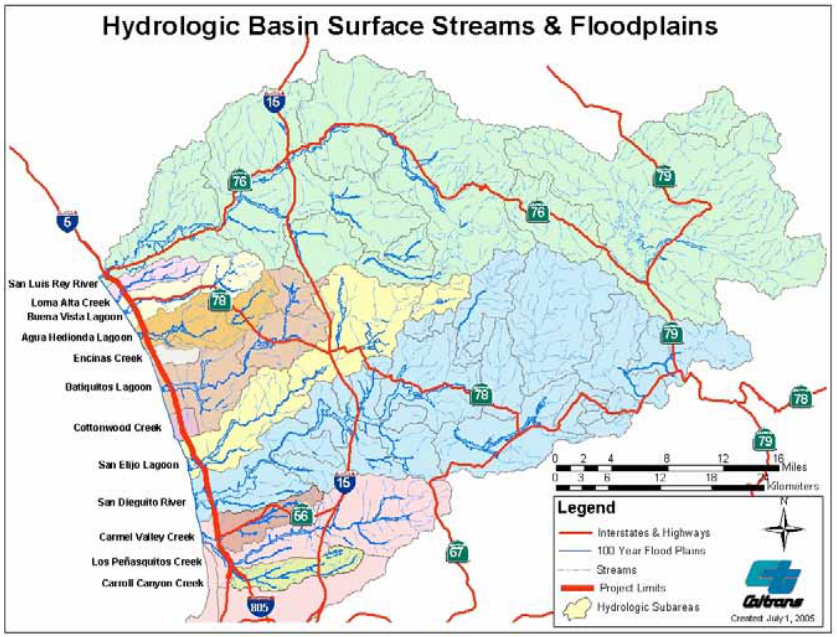


Figure 3-10.1: Surface Streams and Floodplains within the Project Limits

3.10.2.1 Hydrologic Units

The project limits cross four of the eleven Hydrologic Unit (HU) within the San Diego RWQCB Basin, which are: San Luis Rey, Carlsbad, San Dieguito, and Los Peñasquitos (*Figure 3-10.2*). The San Diego RWQCB Region encompasses most of San Diego County, parts of southwestern Riverside county and southwestern Orange County. The region is divided into 11 major hydrologic units, 54 hydrologic areas (Has) and 147 hydrologic sub areas (HSA). Hydrologic units are the entire watershed of one or more streams; hydrologic areas are major tributaries and/or major groundwater basins within the hydrologic unit; and hydrologic sub areas are major subdivisions of hydrologic areas include both water bearing and non-water bearing formation (San Diego Basin Plan, 1994).

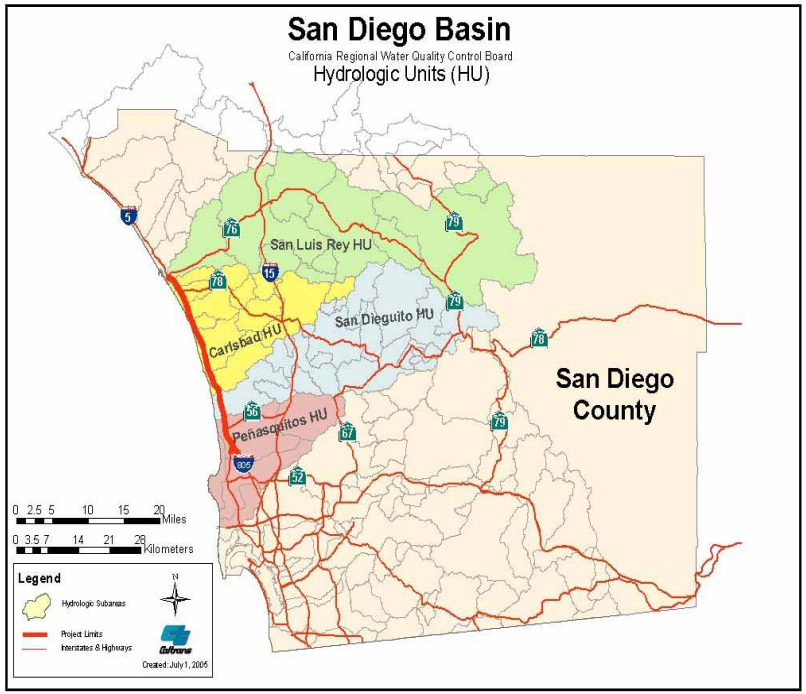


Figure 3-10.2: Hydrologic Units within the I-5 NCC project

San Luis Rey Hydrologic Unit (903.00)

The San Luis Rey watershed is the largest of the four Hydrologic Units within the project limits at approximately 1456 km squared (562 mi squared), and is the least developed. It is, however, expected to increase in 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 63 million m^3 (51,000 acre-ft) and somewhat affects the upstream flows.

Carlsbad Hydrologic Unit (904.00)

The Carlsbad hydrologic units totals approximately 548 km squared (212 mi squared) and is expected to continue developing from the current 56 percent of the watershed to an estimated 70 percent by the year 2015. This hydrologic units 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 Hydrologic Unit; 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-5/78 interchange. All four of the Lagoon crossings and Loma Alta Creek are bridge structures. Cottonwood Creek crosses under the freeway in a 3.05-meter (10-foot) concrete arch culvert south of Encinitas Boulevard and Encinas Creek crosses the corridor in a triple 3.05 x 1.5 meter (10 ft x 5 ft) concrete box culvert south of Palomar Airport Road.

San Dieguito Hydrologic Unit (905.00)

The entire 896 km squared (346 mi squared) that comprise the San Dieguito Hydrologic Unit drains into the San Dieguito River that crosses under a bridge south of Via de la Valle. The Hydrologic Unit is expected to increase in developed area from approximately 26 percent currently to 38 percent by 2015.

Los Peñasquitos Hydrologic Unit (906.00)

This project begins near the middle of the Los Peñasquitos hydrologic units and crosses Carroll Canyon Creek just south of the I-5/805 interchange, Los Peñasquitos Creek at the I-5/805 interchange and Carmel Valley Creek near the I-5/56 interchange. All of these I-5 crossings are bridge structures, although Carmel Valley Creek currently drains through a triple 3.66 m by 3.05 m (12 ft x 10ft) concrete box culvert under Sorrento Valley Road immediately downstream of the bridge. Approximately 231 of the 420 km squared (89 of the 162 mi squared) that make up the Los Peñasquitos Hydrologic Unit drain through the project limits. The developed area in this Hydrologic Unit 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. The monitoring has various objectives including ensuring compliance with the 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 & Characterization Studies to analyze the pollutants coming of 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 the higher the impervious areas tends to increase some pollutants and decrease others in their concentration.

3.10.2.3 Beneficial Uses

As defined in the San Diego RWQCB Basin Plan (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 the water quality and quantity is suitable to allow the uses to be attained.

While "Potential" designation is established by a variety of reasons including plans are proposed to put the water to a future use; potential exists to put the water to a future use; the public desires to put the water to future use; 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); or 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 below defines the existing and potential beneficial uses as outlined in the Water Quality Control Plan for the San Diego Basin (9) for the 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	Includes uses of water that support inland saline water ecosystems including,

Beneficial Use Definitions		
	Water Habitat	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).
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 Unit	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	*	+	+				+	+			+		+	+	

+ Existing Beneficial Use
x Potential Beneficial Use
* Excepted from Municipal

Table 3.10.3: Beneficial Uses for coastal Surface Waters

Water Body Name	Hydrologic Unit	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	905.61			+	+		+	+	+	+	+		+	+		
Agua Hedionda Lagoon	904.31	+		+	+	+	+	+	+	+	+	+	+	+		+
Buena Vista Lagoon	904.21			+	+		+	x	+	+	+				+	
Loma Alta Slough	904.10			+	+			+	+	+	+					
Mouth of San Luis Rey River	903.11			+	+				+	+	+		+			

+ Existing Beneficial Use
x Potential Beneficial Use
* Excepted from Municipal

Table 3.10.4: Beneficial Uses for Ground Waters

Water Body Name	Hydrologic Unit	MUN	AGR	IND	PRO	GWR	FRS	GWR
Encinas Creek	904.40	*						

+ Existing Beneficial Use
x Potential Beneficial Use
* Excepted from Municipal

3.10.2.4 Section 303(d) of the Clean Water Act & 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" (List).

As part of Caltrans runoff characterization studies, we identified 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), which include sediment, metals (total and dissolved zinc, lead and copper), nitrogen, phosphorus and general metals. Below is a table listing the 303(d) receiving water bodies within the project limits and the TDCs associated with them.

Table 3.10.5: Project Area CWA Section 303(d) List of Water Quality Limited Segments & TDCs

303(d) Impaired Water Body	HSA	Constituents of Concern	TDCs
Los Peñasquitos Creek	906.10	Phosphate & Total Dissolved Solids	Phosphate & Total Dissolved Solids
Los Peñasquitos Lagoon	906.10	Sedimentation Siltation	Sedimentation Siltation
Soledad Canyon Creek	906.10	Sediment Toxicity	N/A*
Pacific Ocean Shoreline/ San Dieguito HU	905.11	Indicator Bacteria	N/A*
San Elijo Lagoon	904.61	Indicator Bacteria, Sedimentation Siltation & Eutrophic	Sedimentation/ Siltation
Agua Hedionda Lagoon	904.31	Indicator Bacteria & Sedimentation/Siltation	Sedimentation/ Siltation
Buena Vista Lagoon	904.21	Indicator Bacteria, Sedimentation Siltation & Nutrients	Sedimentation/Siltation, Nutrients
Loma Alta Slough	904.10	Indicator Bacteria & Eutrophic	N/A*
Pacific Ocean Shoreline/ San Luis Rey HU	903.11	Indicator Bacteria	N/A*
San Luis Rey River	903.11	Chloride & Total Dissolved Solids	N/A*

Source: http://www.waterboards.ca.gov/tmdl/docs/303dlists2006/approved/r9_06_303d_reqtmdls.pdf
http://www.stormwater.water-programs.com/wqpt/CoPM.asp?CO=SD&RTE=5

* Not determined to be a constituent found within Caltrans' storm water runoff monitoring program

3.10.2.5 Total Maximum Daily Loads (TMDLs)

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, EPA, and the SDRWQCB to develop TMDLs for Los Peñasquitos Lagoon. *Table 3.10.6* lists the water bodies addressed in this order and the responsible stakeholders. All the water bodies listed in this TMDL are within project limits except the Santa Margarita Lagoon and Famosa Slough and Channel.

Table 3.10.6: List of Water Bodies Addressed in TMDLs & Responsible Stakeholders

Water Body	(HSA)	Responsible Stakeholders: Municipalities and Military Facilities	Responsible Stakeholders: Counties, State Agencies, and other Facilities
Santa Margarita Lagoon	902.1	Camp Pendleton	San Diego County
		Fallbrook Naval Weapons Station	Riverside Co. Flood Control and Water Conservation District
		Murrieta	Caltrans
		Temecula	
Loma Alta Slough and Ocean shoreline	904.1	Oceanside	San Diego County
		Vista	Caltrans
Buena Vista Lagoon and Ocean Shoreline	904.2	Carlsbad	San Diego County
		Oceanside	Caltrans
		Vista	
Agua Hedionda Lagoon and lower Agua Hedionda Creek	904.3	Carlsbad	San Diego County
		Oceanside	Caltrans
		San Marcos	
		Vista	
San Elijo Lagoon and Ocean Shoreline	904.6	Encinitas	San Diego County
		Escondido	Caltrans
		Solana Beach	City of Escondido Hale Ave. Resource Recovery Facility
		San Marcos	
Los Peñasquitos	906.1	Del Mar	
		Poway	San Diego County
		San Diego	Caltrans
Famosa Slough and Channel	907.1	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 Army Corps of Engineers under the Harbors and Rivers Act of 1899. The San Luis Ray River and the Agua Hedionda Lagoon are under consideration for permitting by the Coast Guard, and San Elijo Lagoon, San Dieguito Lagoon, Buena Vista Lagoon, and Batiquitos Lagoon by the Army Corps of Engineers. Permits may be required for work conducted at crossings of these waterways; however, current conditions restrict vessel use in these waterways, from none to small vessels, such as, canoes and kayaks. The 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 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 segment of the River channelized is 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 vessels. Immediately upstream of the I-5 Bridge vegetation is overgrown and the river is not navigable with the exception possibly by kayaks or canoes.

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 with a culvert for the river outlet across the river. Pacific Street was built in the 1980s. 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 miles 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 for its history. There is currently little or no use of the river by any vessels. Immediately upstream of the I-5 Bridge, vegetation is overgrown and the river is not navigable with the exception of possibly, by kayaks or canoes.

Agua Hedionda Lagoon

Agua Hedionda Lagoon is located in the City of Carlsbad and is approximately 35 miles 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.

Approximately 60 years ago, three lagoon basins were built in between the structures to provide retention basins for the cooler water required for operation of the Encina Power Plant. The majority of the lagoon is owned and maintained by Encina Power, owners of a 900-megawatt power plant located on the outer segment of the lagoon. The entire 161.9-ha (400-ac) lagoon, created in 1954, was completely re-dredged in 1998 to an average depth of 2.4 to 3.4 m (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 the Pacific highway to the west and the railroad bridge to the east, provides the cooling water to the power plant and 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 kayaks are used by the camp. The eastern basin extends east of I-5 for approximately 1 mile 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 allows active use, such as boating, water skiing and wake boarding, personal watercraft use, sailing, windsurfing and fishing.

Even though there are small recreational vessels allowed in the basins, there are no vessels traveling up stream, or under the bridges, due to historic hydrologic siltation, infiltration of plant species creating the lagoon, and human activity in the area.

San Elijo Lagoon

San Elijo Lagoon is a large shallow lagoon 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 Coast Highway bridge over San Elijo Lagoon is less than 200 feet from the Pacific Ocean. This bridge over the narrow channel also has a low clearance. The main channel then winds to the south east until it turns east and flows under a railroad bridge approximately 300 feet 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 miles from the Pacific Ocean. Only small water craft such as kayaks and canoes could navigate this lagoon. The mouth frequently closes and the channel is narrow and not very deep 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 some large areas of open water. The mouth of the lagoon is subject to closure by sand accumulation at the mouth. Dredging is often required to open the mouth. Camino Del Mar crosses San Dieguito Lagoon approximately 350 feet from the Pacific Ocean. There is a railroad trestle approximately 750 feet further upstream from the Pacific Coast Highway crossing. There is a third crossing of the main channel approximately 0.5 miles from the mouth of the lagoon. The Interstate 5 (I-5) bridge is approximately 1.3 miles from the mouth of the lagoon. Only small watercraft could navigate this river. Kayaks or canoes could navigate the lagoon channel; however, 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 the mouth of the lagoon that has been in place since 1948. A new concrete weir and reinforced channel was built in 1972 at the mouth. Therefore, no vessels can access the lagoon from the Pacific Ocean. Buena Vista Lagoon is primarily a freshwater lagoon. Carlsbad Boulevard crosses the lagoon approximately 500 feet east of the tidal weir and the railroad crosses the lagoon less than 500 feet from the Carlsbad Boulevard bridge. The I-5 bridge is over 0.8 miles from the tidal weir. The lagoon is a reserve and no vessels are allowed within the lagoon with those used for exception of 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 to San Marcos Creek and Encinitas Creek. 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 mitigation for a project by the Port of Los Angeles. The restoration project constructed a new tidal inlet and bridge over Carlsbad Boulevard that is approximately 400 feet from the Pacific Ocean. A second railroad bridge crosses the lagoon over 700 feet further to the east of the Carlsbad Boulevard bridge. Several nesting islands for endangered birds were also constructed in the lagoon. The lagoon is an Ecological Reserve. The only motorized vessels within the lagoon are dredges that remove sediment from the lagoon and small craft for scientific monitoring of the lagoon. Only small personal water craft or small motorized boats can navigate through the bridges over the lagoon.

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 as well as construction 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, PCC 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, mineralized organic matter in soil, fertilizers runoff, nitrite from automobile exhausts, atmospheric deposition, emulsifiers and surfactants; pesticides; metals (dissolved and particulate) from combustion products of fossil fuels, wearing of break pads and corrosion.

Table 3.10.7 below lists the hydrologic areas/subareas that would be potentially impacted by the proposed *I-5 NCC Project*. Each of the hydrologic areas or sub-areas is compared to the area of existing Caltrans right-of-way within the I-5 project limits. The maximum Caltrans tributary area to any of the hydrologic areas/subareas is less than two percent.

Table 3.10.7: Existing I-5 Contribution to the Watershed within the project limits

Hydrologic Area/Sub Area Name	HA/HSA Number	HA/HSA Ha (ac)	Existing I-5 Tributary Area Ha (ac)*	Existing I-5 Contribution to HA/HSA (%)
Miramar Reservoir HA	906.10	13,336.39 (32,594.8)	134.4 (332.1)	1.02%
Miramar HA	906.40	10,491.11 (25924.0)	116.5 (288)	1.10%
Rancho Santa Fe HSA	905.11	9,150.18 (22,610.5)	89.5 (221.1)	0.98%
San Elijo HSA	904.61	8,85.73 (20,721.5)	73.4 (181.44)	0.88%
Batiquitos HSA	904.51	7,211.28 (17,819.4)	133.7 (330.4)	1.85%
Encinas HA	904.40	1,210.58 (2,991.4)	18.9 (46.8)	1.56%
Los Monos HSA	904.31	4,817.56 (11,904.4)	38.6 (95.4)	0.8%
El Salto HSA	904.21	3,025.60 (7,476.4)	54.1 (133.6)	1.79%
Loma Alta HA	904.10	2,104.21 (5,199.6)	16.3 (40.4)	0.78%
Mission HSA	903.11	12,112.29 (29,930.0)	45.9 (113.5)	0.38%

* Source: sangis/landuse/right_of_way.shp

Build Alternatives

The Build Alternatives would retrofit the I-5 North corridor with treatment BMPs to the Maximum Extent Practicable (MEP). They would require analyzing the entirety of the I-5 NCC from a water quality perspective in relation to the impaired receiving water bodies. It would provide for a more comprehensive approach to analyze the hydrology of the entire project area for treatment BMP implementation and consequently assisting Caltrans in meeting the TMDL requirements that would be set by the San Diego RWQCB in the near future. *Table 3.10.8* below *Comparison of existing and proposed pavement areas between the Build Alternatives* shows the difference of additional pavement areas between each of the Build alternatives. Alternative 10+4 with Barrier has the highest percentage of additional impervious area, followed by the 8+4 with Barrier while Alternative 8+4 with Buffer has the lowest percentage of additional impervious area followed by 10+4 with buffer.

To assess potential short term impacts of each of the build alternatives, *Table 3.10.9 Temporary Disturbed Soil Areas for the Build Alternatives* presented below shows the approximate temporary disturbed soil areas for each of the alternatives. All disturbed soil areas 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 Ha (ac)	Proposed Additional Impervious Area Ha (ac)	Total Impervious Areas Ha (ac)	Percentage of Additional Impervious Areas (%)
8+4 with Barrier	161 (398)	166 (410)	327 (808)	103
8+4 with Buffer	161 (398)	126 (311)	287 (709)	78
10+4 with Barrier	161 (398)	174 (430)	335 (828)	108
10+4 with Buffer	161 (398)	148 (366)	309 (764)	92

No negative impacts to the six designated “navigable” waterways are predicted with construction of the proposed project. Existing planned uses would be maintained. At some locations, navigability may be improved due to project design elevating the existing structures to above current elevations. This could result in better access in the respective waterways for planned uses to continue.

Table 3.10.9: Temporary Disturbed Soil Areas (DSAs) for the Build Alternatives*

HU Name	HA/HAS		10+4 Alternatives		8+4 Alternatives	
	Number	Area Acres (ha)	Buffer DSA Acres (ha)	Barrier DSA Acres (ha)	Buffer DSA Acres (ha)	Barrier DSA Acres (ha)
Los Peñasquitos HU	906.40	26,277.3 (10,634.1)	86.1 (34.9)	86.5 (35.0)	86.5 (35.0)	86.5 (35.0)
	906.10	32,594.8 (13,190.7)	384.5 (155.6)	385.2 (155.9)	386.2 (156.3)	385.2 (155.9)
San Dieguito HU	905.11	22,610.5 (9,150.2)	196.3 (79.4)	185.0 (74.9)	199.2 (80.6)	185.2 (74.9)
Carlsbad HU	904.61	20,732.6 (8,390.2)	193.2 (78.2)	185.8 (75.2)	188.8 (76.4)	181.8 (73.6)
	904.51	17,820 (7,211.5)	289.4 (117.1)	282.2 (114.2)	293.7 (118.9)	274.7 (111.2)
	904.40	29,98.6 (1,213.5)	52.5 (21.3)	51.0 (20.7)	52.5 (21.3)	49.8 (20.2)
	904.31	11,904.5 (4,817.6)	114.6 (46.4)	108.9 (44.1)	115.2 (46.6)	107.9 (43.7)
	904.21	7,476.4 (3,025.6)	128.3 (51.9)	126.6 (51.2)	129.8 (52.5)	124.6 (50.4)
	904.10	5,199.7 (2,104.2)	49.8 (20.1)	49.8 (20.1)	49.8 (20.1)	49.8 (20.1)
San Luis HU	903.11	29,931.3 (12,112.8)	110.1 (44.6)	110.7 (44.8)	110.8 (44.8)	110.7 (44.8)
Total DSA For Each Alternative			**1,571.7 (636.1)**	**1,604.8 (649.4)**	**1,556.1 (629.7)**	**1,612.4 (652.5)**

* Disturbed soil areas are approximate and were based on the total temporary and permanent biological impact assessment of the various alternatives (March 2007).

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 congestions issues at various locations. Similar to the Build Alternatives, this alternative would require implementing BMPs to address potential pollutants during the construction and operation of the highway.

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.

3.10.4 Avoidance, Minimization and/or Mitigation Measures

BMPs would be implemented to address potential water quality impacts during the planning and design, construction, and operational (maintenance) stages. The Statewide Storm Water Management Plan (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 BMPs, Treatment BMPs and Maintenance BMPs.

Table 3.10.10: BMP Categories and Description

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	Division 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 on-going for the life of the facility and they have to be in accordance with the 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.

Design Pollution Prevention BMPs (Category IB)

Design Pollution Prevention (DPP) BMPs are standard technology-based, non-treatment controls selected to reduce pollutant discharges to the maximum extent practicable. 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 3.10.11 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 gets 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 minimal. Other DPP BMPs would be implemented as appropriate for the project.

Table 3.10.11: Design Pollution Prevention BMPs (MEP Based), Category IB

Design Pollution Prevention BMPs
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

Construction BMPs (Category II)

It will 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, during construction to reduce the potential for short-term impacts. These temporary control practices are consistent with the BMPs and control practices required under the State of California NPDES General Permit for Storm Water Discharges Associated with Construction Activity, and are intended to achieve compliance with the requirements of the 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. More information on the various type of BMPs covered under each one of these categories are found in Caltrans Construction Site BMPs Manual.

Table 3.10.12: 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 below 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 maximum extent practicable.

Table 3.10.13 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 some of the treatment BMPs are shown on the Project Features Maps (*Figures 2-2.14a-ao*). 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 addition, in areas where treatment BMPs can not be incorporated due to above mentioned reasons, 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 the vegetation within the corridor and any specific requirements by local entities.

Existing Treatment BMPs within the I-5 North Coast Project Area

Litigation between Caltrans and the Natural Resources Defense Council (NRDC), 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). The following are the treatment BMPs that were constructed within District 11 on the I-5 corridor as part of the BMP Retrofit Pilot Program.

Table 3.10.14 Existing Treatment BMPs within the I-5 North Coast Project Area

BMP type	**Location**	**Tributary area (Impervious + Pervious) Ha (Ac)**	**Impervious Area Percentage**
Detention Devices	I-5 at Manchester Avenue I-5/SR-56	1.94 (4.8) 2.14 (5.3)	56% 69%
Wet Basin	I-5/La Costa	1.7 (4.2)	48%
Media Filters (Austin Sand)	La Costa Park & Ride SR-78 & I-5 Park & Ride	1.1 (2.7) 0.3 (0.7)	56% 80%
Biofiltration System (Swale)	I-5 & Palomar Airport Rd.	0.92 (2.3)	90%

Source: BMP Retrofit program Final Report (CTSW--RT-01-050)

Minimization measures would be implemented during construction at crossings over six designated “navigable” waterways. Minimization measures at waterways can typically be, but 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 or conducting pre-construction surveys for presence/absence of sensitive species; restricting equipment, material storage and staging to disturbed areas; designing project to avoid/reduce stormwater impacts where feasible, otherwise, control sediment with silt fencing, gravel bags, hay bales and fiber rolls; controlling of fugitive dust, restriction changing oil and/or refueling to designated areas, constructing velocity dissipation structures at drainage outlets; during night time construction, all lighting shall be directed to the construction area; temporary diversion of water around the work area by use of sandbags or gravel dams, or cofferdams.

3.11 Geology / Soils/ Seismic/ Topography

3.11.1 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 or funded projects. (e.g., Antiquities Act of 1906 [16 USC 431-433], Federal-Aid Highway Act of 1956 [23 USC 305]). Under California law, paleontological resources are protected by the California Environmental Quality Act.

3.11.2 Affected Environment

Caltrans Office of Geotechnical Design South 2 (OGDS2) prepared a *Preliminary Geotechnical Report* for the proposed project. 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 can be referenced for further details.

Existing Topography

In the project limits, I-5 runs roughly parallel to the coast within just a few kilometers. 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 conduct ephemeral streams and perennial rivers and streams west to the ocean. Terrace elevations are typically 100 m (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.

Interstate 5 traverses lagoons, mesas, small canyons, and arroyos in a series of through-cuts and fill embankments. Natural slopes along the corridor demonstrate 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 bald 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 (vertical to horizontal) and are up to 45 m (148 ft) high. The cut slopes primarily expose Torrey Sandstone of Eocene age and are relatively 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 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 bald and display a “badlands” type surface indicating erosional instability. Other slopes in indurated sandstone have a smooth appearance and remain relatively bare of vegetation even after several decades.

Existing fill slopes vary in thickness along the travel way. Fill slope angles are typically 1:2 or flatter; however, 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 mesa. Embankment material, therefore, is similar in composition to material forming cut slopes. Archived Log 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 proposed 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 formation, 2) artificial fills, and 3) unconsolidated lagoonal alluvium.

Formation

The natural and cut slopes along the project alignment are primarily composed of Torrey Sandstone and Delmar Formation. 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 is porous and permeable, and therefore susceptible to erosion. 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. These 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 4 to 24 m (13.1 to 78.7 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 and appear to be 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 ranges in depth up to 40 m (132 ft). 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 2 to 3 m (6 to 9 ft) of settlement of the finished embankment were recorded. The overlying fills have acted to densify and strengthen the alluvial soils, however, 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.

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, Elsinor, and Rose Canyon Fault Zones. Additionally, a complex system of northwest trending faults 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 at 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 7 km (4 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, gas, and telecommunications facilities.

Existing Human-Made, and Natural Features of Engineering and Construction Significance
The human-made and natural features of engineering and construction significance along the proposed I-5 project consist of the following:

Overcrossings:
- Del Mar Heights Road
- Via De La Valle
- Birmingham Drive
- MacKinnon Avenue
- Requeza Street
- Leucadia Boulevard
- La Costa Avenue
- Poinsettia Lane
- Palomar Airport Road
- Cannon Road
- Chinquapin Avenue
- Tamarack Avenue
- Las Floras Drive
- 78/5 Separation
- Cassidy Street
- California Street
- Oceanside OH
- Brooks Street
- Fourth Street
- Camp Del Mar
- Fallbrook Way OH
- Stuart OH
- Fallbrook OH

Undercrossing:
- Via De La Valle
- Lomas Santa Fe
- Manchester Avenue
- Santa Fe Drive
- Encinitas Boulevard
- Chestnut Avenue
- Elm Avenue
- Mission Avenue
- I-5/SR-76 Separation
- Camp Pendleton
- 78/5 Separation
- Cassidy Street
- California Street
- Oceanside OH
- Brooks Street
- Fourth Street
- Camp Del Mar
- Fallbrook Way OH
- Stuart OH
- Fallbrook OH

Lagoons and Rivers (Embankment Fills and Bridges):
- San Dieguito River/Lagoon
- San Elijo Lagoon
- Batiquitos Lagoon
- Aqua Hedionda Lagoon
- Buena Vista Lagoon
- San Luis Rey River

Major Cut:

- Del Mar Heights area
- North of Lomas Santa Fe
- North of Manchester Avenue
- Leucadia Boulevard area

Major Culverts:

- 78 inch Reinforced Concrete Pipe (RCP) - need location
- 66 inch RCP
- 84 inch RCP

Existing Retaining Walls:

- Del Mar Heights Road NB/SB onramps (Type 1, vertical wall with spread footing)
- Encinitas Boulevard NB onramp (concrete crib wall)
- Tamarack Avenue NB/SB onramps (concrete crib wall/Type1, vertical wall with spread footing)
- NB connector I-5/SR-78 (Type 1, vertical wall, with spread footing)
- Mission Avenue SB offramp (Type 1, vertical wall, with spread footing)
- Leucadia Boulevard SB onramp (Type 1, vertical wall, with spread footing)

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 proposed project.

Caltrans standards require that the stability of permanent cut slopes be evaluated for 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, however, slightly steeper slopes up to 1:1.75 may be appropriate where favorable soil conditions exist and relatively small slope heights of 5 m (16 ft) or less are proposed. It should be noted that slopes steeper than 1:2 are difficult to landscape and maintain.

Embankment Stability

Much 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 shoulders of existing embankment fill. It is anticipated that the majority of soil needed to construct fills would be derived from cuts in nearby formational strata. These strata yield soils well suited for roadway embankment.

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 is also a function of the stability of the underlying soil in response to additional fill. Adverse conditions, such as weak (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 formation, 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. However, embankment settlement from the proposed loads may have 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 at Encinitas, between Manchester Avenue onramp and Birmingham Drive offramp. Rainwater infiltration and the irrigation of the residential complex at the top of the slope contribute to the groundwater seepage throughout the year.

In areas adjacent to the Lagoons depth to groundwater is anticipated to be shallow, with groundwater being 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 at or below the water table to collapse.

Subsurface Soil Conditions

The formations within the project limits and the fill material derived from cuts in those formations generally provide good subgrade for roadways and retaining walls. However, the soft lagoonal deposits 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 the sedimentary deposits. These materials shrink and swell in response to changing soil moisture. Shrink and swell 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 Rose Canyon Fault establishes the potential for the area to be impacted by a major seismic event. The Rose Canyon Fault displaces Holocene sediment and is therefore 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. 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 15 m (49 ft) from the surface and where the soils are 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 9 m (30 ft) high, have helped to densify the native soils beneath, thereby lowering the liquefaction potential. In addition, they would help to contain liquefied soil during a seismic event.

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 potentially located above soft lagoon and river alluvium would likely necessitate ground improvements for the foundation soil. Such improvements might generate a larger impact footprint, increase project costs and may 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 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 offside by appropriate erosion-reducing devices.
- Where groundwater is present, subsurface drainage devices would be installed.

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 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 not be left unprotected throughout the wet season. Concentrated flows would not be allowed on slopes.
- Concentrated flows would not be allowed on slopes.
- Appropriate construction scheduling, soil trackifers, geosynthetic mats, and plastic sheeting are some of the techniques that may be used to avert excessive slope erosion.

3.12 Paleontology

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 or funded projects (e.g., Antiquities Act of 1906 [16 USC 431-433], Federal-Aid Highway Act of 1935 [20 USC 78]). Under California law, paleontological resources are protected by CEQA, the California Administrative Code, Title 14, Section 4306 et seq., and Public Resources Code, Section 5097.5.

The Omnibus Public Land Management Act of 2009 establishes stronger penalties than previously required for nonpermitted removal of scientifically significant fossils from federal lands.

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, and 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 Peistocene-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 49-50 million years (Ma), and has produced important remains of terrestrial vertebrate fossils and is assigned a high paleontological resource sensitivity. Fossils from the Delmar Formation consist of well-preserved to poorly preserved remains of estuarine invertebrates (e.g., clams, oysters, and snails) and estuarine 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., crocodile) and terrestrial mammals (e.g., tillodont 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.

Torrey Sandstone Formation is considered to be early middle Eocene in age, approximately 48-49 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. 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.

Ardath Shale Formation was deposited at outer shelf depths on an ancient sea floor during the early middle Eocene, about 47-48 Ma. The Ardath Shale 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.

Scripps Formation is entirely of marine origin (continental shelf) and was deposited during the early middle Eocene, approximately 46-47 Ma. It is considered to be potentially fossiliferous almost everywhere it occurs. Most of the fossils known from this formation consist of remains of marine organisms including clams, snails, crabs, sharks, rays, and bony fishes. However, remains of fossil reptiles (e.g., crocodile and turtle) and land mammals (e.g., uintathere, brontothere, rhinoceros, and artiodactyl) have also been recovered from the formation. Well-preserved pieces of fossil wood 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 is broadly correlative with almost the entire middle Eocene stratigraphic sequence at San Diego (Pomerado Conglomerate to Ardath Shale), approximately 40-49 Ma. There are generally three recognized members of the Santiago Formation in the Encinitas-Carlsbad area, and can be referred to as “A,” “B,” and “C.”

> 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 Encinitas in the south, at least to the San Luis Rey River in the north. 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. Fossils collected from this member include remains of opossums, insectivores, primates, rodents, brontothere, rhinoceros, and uintathere. Also recovered from Member "B" deposits are remains of 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 have been discovered within these sedimentary deposits. These fossils suggest that these strata are younger than previously believed, and were deposited during the Oligocene Epoch. The discovery of fossil bone at numerous localities within these strata suggest 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 14-16 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 the formation, but 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 the late Pliocene to late Miocene in age (approximately 4-7 Ma). The San Mateo 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 whale, baleen whales, sea cow, fur seals, walrus, and sea otter. 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 0.5-1.5 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 remains 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 such as 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 sloth, dire wolf, tapir, horse, deer, camel, mastodon, and mammoth. 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 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 affect on paleontological resource sensitivity.

3.12.4 Avoidance, Minimization, and/or Mitigation Measures

Paleontological mitigation would be carried out primarily during the project's 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.

- 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 cleaned, repaired, 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 mitigation monitoring plan prepared by a qualified principal paleontologist.
- Paleontological Mitigation Monitoring Report (PMMR) –The mitigation monitoring report would document the results of the PMMP to include construction monitoring, fossil salvage laboratory preparation of salvaged specimens, curation of prepared specimens and storage of curated specimens.

3.13 Hazardous Waste / Materials

3.13.1 Regulatory Setting

Hazardous materials and hazardous wastes are regulated by many state and federal laws. These include not only specific statutes governing hazardous waste, but also a variety of laws regulating 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 clean up contaminated sites so that public health and welfare are not compromised. RCRA provides for "cradle to grave" regulation of hazardous wastes. 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, Executive Order 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.

Hazardous waste in California is regulated primarily under the authority of the federal Resource Conservation and Recovery Act of 1976, and the California Health and Safety Code. Other California laws that affect hazardous waste are specific to handling, storage, transportation, disposal, treatment, reduction, cleanup and emergency planning.

Worker health and safety and public safety are key issues when dealing with hazardous materials that may affect human health and the environment. Proper disposal of hazardous material is vital if it is disturbed 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, Lead Investigation on 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) dated 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, dated 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 Vandergrift Boulevard, San Diego California*. October 31, 2006.

These reports provided an evaluation of the potential hazardous waste/material concerns within the project study area. Specific methodology used for this analysis 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; and
- Subsurface evaluation where needed.

The study area included the project area by reviewing databases for a 0.8-km (0.5-mi) radius of the project area for potential hazardous material sites. This area, as with most of San Diego, was rural with an agricultural base. The corridor began transportation uses in the early 1900s. Several agricultural and nurseries still exist. Urban uses have developed including service stations located at intersections, landfills and potential for asbestos and lead in the bridges built for the I-5.

In particular, at Manchester Avenue there is a gasoline station on the east side and there is agricultural land northeast of Manchester Avenue with petroleum hydrocarbon impacts to soil and goundwater. The agricultural land has non-hazardous concentrations of pesticides in the soil. At Birmingham Drive, on the east and west side, are gasoline stations. Between Birmingham Drive and Palomar Airport Road there are nurseries with non-hazardous concentrations of pesticides in the soil. On the east side 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 goundwater. North of Cannon Road, on the east side of I-5 there is a strawberry field that 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 goundwater. On the southbound onramp at Carlsbad Village Drive, there is a gas station with petroleum hydrocarbon impacts to soil and goundwater. 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 build alternatives and the 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
- 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. Soil, as a whole, along and adjacent to the shoulders of I-5 is non-hazardous with respect to Aerial Deposited Lead (ADL). However, if excess soil from the shoulders is exported (since shoulder soil contains ADL), then further characterization would be necessary to evaluate proper disposal criteria.

Petroleum Hydrocarbons

Hazardous waste with respect to petroleum hydrocarbons concerns include service stations located at intersections. Petroleum hydrocarbons may be encountered in soil and groundwater at intersections during trenching to move utilities and during bridge reconstruction/widening at abutments and bents. Caltrans would comply with the NPDES permit for handling and disposal of groundwater for intersections. 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, 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
Del Mar Heights Rd OC	Low
San Dieguito River	Low
Via De La Valle UC	**Medium**
Lomas Santa Fe UC	Low
Manchester Ave UC	Low
Birmingham Dr OC	**Medium**
MacKinnon Ave OC	Low
Santa Fe Dr UC	Low
Encinitas Blvd UC	Low
Leucadia Blvd OC	Low
La Costa Ave OC	Low
Batiquitos Lagoon	Low
Poinsettia Lane OC	Low
Palomar Airport Rd OC	**High**
Cannon Rd UC	Low
Aqua Hedionda	Low
Chinquapin Ave OC	Low
Tamarack Ave OC	Low
Chestnut Ave UC	Low
Carlsbad Village Dr UC	**Medium**
Las Flores Dr OC	Low
Jefferson St OC	Low
Buena Vista Lagoon	Low
SR-78 / I-5 Sep Br # 57-270	Low
Cassidy St OC	Low
California St OC	Low
Loma Alta Creek	Low
Oceanside Blvd OH	**Medium**
Brooks St OC	**Medium**
Mission Ave OC	**Medium**
Fourth St / Bush St OC	Low
Neptune Way / 8th St OC	Low
I-5 / SR-76 UC	Low
San Luis Rey River	Low
Harbor Dr / Vandegrift / 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. They include the Olympus Street Landfill at the intersection of Piraeus Street and Olympus Street 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 contained 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 (Diphenyl Dichloro Ethane), DDT (Dichloro Diphenyl Trichlorethane) and DDD (Dichloro Diphenyl Dichloroethane) have been banned since the late 1970s, however concentrations of these pesticides and herbicides can remain in 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 onsite 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 as well as meet operational requirements of the roadway. Wherever possible, the proposed 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 avoidance at Carlsbad Village Drive would be considered. Agricultural land and nurseries soil may require reuse, or proper offsite disposal with further testing at Manchester Avenue, between Birmingham Drive and Palomar Airport Road, Cannon Road. Soils from landfills near Piraeus Street may be reused, or disposed as non-hazardous material at the appropriate landfill location; however, Maxson Street 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 takes 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 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 0.6 m (2 ft) is hazardous with regard to soluble ADL concentrations. This soil may be reused onsite 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 to service stations would be contained in the NPDES permit. However, 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, or semi-volatile organic compounds to evaluate the proper disposal method. Investigation near the Olympus and Maxson Street Landfill did not encounter wastes associated with the landfill. It is recommended that widening activities in the vicinity of the landfills be performed to the west, avoiding the landfills. 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 and nurseries is exported, further characterization for pesticide/herbicides would be warranted to evaluate the proper disposal method. Chemical spills along I-5 would be unknown, a contingency of would be written into the construction contract to deal with this potential hazardous waste issue. Proper handling and disposal measures would be carried out for asbestos, lead, and treated wood wastes.

Figure 3-13.1: Hazardous Materials for High and Medium Risk - North

Source: AirPhotoUSA 2006; SanGIS 2006; FMMP 2004

4,500 2,250 0 4,500 Feet

Scale: 1:54,000; 1 inch = 4,500 feet

Figure 3-13.2: Hazardous Materials for High and Medium Risk - South

3.14 Air Quality

3.14.1 Regulatory Setting

The Clean Air Act (CAA) as amended in 1990 is the federal law that governs air quality. Its counterpart in California is the California Clean Air Act of 1988. These laws 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). Standards have been established for six 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), lead (Pb), and sulfur dioxide (SO_2).

Under the 1990 CAA Amendments, the U.S. Department of Transportation (USDOT) cannot fund, authorize, or approve Federal actions to support programs or projects that are not first found to conform to State Implementation Plan for achieving the goals of the CAA requirements. Conformity with the CAA takes place on two levels—first, at the regional level and second, at the project level. The proposed project must conform at both levels to be approved.

The California Clean Air Act, established in 1988, provides a framework for air quality planning and other actions to meet the health-based State Ambient Air Quality Standards. Air quality standards established under the California Clean Air Act are more stringent than those set through the Federal Clean Air Act. Emission reductions from mobile sources (such as automobiles themselves) are the responsibility of the California Air Resources Board, while emission reductions from stationary sources and some uses of mobile sources are the responsibility of the air quality management and air pollution control districts.

Regional level conformity in California is concerned with how well the region is meeting the standards set for carbon monoxide (CO), nitrogen dioxide (NO_2), ozone (O_3), and particulate matter (PM). California is in attainment for the other criteria pollutants. At the regional level, Regional Transportation Plans (RTP) are developed that include all of the transportation projects planned for a region over a period of years, usually at least 20. Based on the projects included in the RTP, an air quality model is run to determine whether or not the implementation of those projects would conform to emission budgets or other tests showing that attainment requirements of the Clean Air Act are met. If the conformity analysis is successful, the regional planning organization, such as SANDAG for San Diego County and the appropriate federal agencies, such as the FHWA, make the determination that the RTP is in conformity with the State Implementation Plan for achieving the goals of the Clean Air Act. Otherwise, the projects in the RTP must be modified until conformity is attained. If the design and scope of the 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.

Conformity at the project-level also requires “hot spot” analysis if an area is “nonattainment” or “maintenance” for carbon monoxide (CO) and/or particulate matter. A region is a “nonattainment” area if one or more monitoring stations in the region fail to attain the relevant standard. Areas that were previously designated as nonattainment areas but have recently met the standard are called “maintenance” areas. “Hot spot” analysis is essentially the same, for technical purposes, as CO or particulate matter analysis performed for NEPA and CEQA purposes. Conformity does include some specific standards for projects that require a hot spot analysis. In general, projects must not cause the CO standard to be violated, and in “nonattainment” areas the project must not cause any increase in the number and severity of violations. If a known CO or particulate matter violation is located in the project vicinity, the project must include measures to reduce or eliminate the existing violation(s) as well.

3.14.2 Affected Environment

This section is based on the Draft Air Quality Technical Study prepared for the *I-5 NCC Project* in August 2007.

The proposed project is located in the San Diego Air Basin (SDAB), which is within with 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 22.86 to 35.56 centimeters (cm) (9 to 14 inches [in]) annually. The mean temperature is 16.77 degrees Celsius (°C) (62.2 degrees Fahrenheit [°F]), and the mean maximum and mean minimum temperatures are 24.27 °C and 9.16 °C (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 9.01-km/hr (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 2,000 ft above mean sea level (AMSL) during the months of May through October. However, during the remaining months (November through April), the temperature inversion is approximately 3,000 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 project is also included in SANDAG’s 2008 RTIP, page 29. The design concept and scope of the proposed project is consistent with the project description in the 2030 RTP, the 2008 RTIP and the assumptions in the SANDAG’s regional emissions analysis. The U.S. Department of Transportation (USDOT) made a finding of conformity for the 2008 RTIP and a conformity redetermination for the 2030 RTP on November 17, 2008. 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 CAA requires the adoption of national ambient air quality standards (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}, $PM_{2.5}$, and Pb. State standards have been established by the Air Resources Board (ARB), 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 federal CAA as either "attainment" or "nonattainment" for each of the criteria pollutants, and 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 has been designated as a "Basic" non-attainment area for the 8-hour O_3 standard. The SDAB is designated as a federal maintenance area for CO following its redsignation 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 non-attainment or maintenance and the number of violations within the past three years. State standards currently classify the SDAB area as a "serious-nonattainment" for O_3, and 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 San Diego Air Pollution Control District (SDAPCD). The SDAPCD air quality monitoring station that represents the project area, climate, and topography in the SDAB is the Del Mar-Mira Costa College monitoring station, located at 215 Ninth Street, Del Mar approximately 0.8 km (0.5 mile) east of I-5 in Del Mar. The station monitors O_3. As this station only records O_3, information from the 12th Avenue Downtown San Diego Monitoring Station was used because it is the nearest station that monitors all of the following pollutants: CO, SO_2, NO_2, O_3, PM_{10}, and $PM_{2.5}$.

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/m³)	-	Same as Primary Standard
	8-Hour	0.070 ppm (137 µg/m³)	0.075 ppm (147 µg/m³)	
Respirable Particulate Matter (PM_{10})	24-Hour	50 µg/m³	150 µg/m³	Same as Primary Standard
	Annual Arithmetic Mean	20 µg/m³	-	
Fine Particulate Matter ($PM_{2.5}$)	24-Hour	No Separate State Standard	35 µg/m³	Same as Primary Standard
	Annual Arithmetic Mean	12 µg/m³	15.0 µg/m³	
Carbon Monoxide (CO)	8-Hour	9.0 ppm (10 mg/m³)	9 ppm (10 mg/m³)	None
	1-Hour	20 ppm (23 mg/m³)	35 ppm (40 mg/m³)	
Nitrogen Dioxide (NO_2)	Annual Arithmetic Mean	0.030 ppm (57 µg/m³)	0.053 ppm (100 µg/m³)	Same as Primary Standard
	1-Hour	0.18 ppm (339 µg/m³)	-	
Sulfur Dioxide (SO_2)	Annual Arithmetic Mean	-	0.030 ppm (80 µg/m³)	-
	24-Hour	0.04 ppm (105 µg/m³)	0.14 ppm (365 µg/m³)	-
	3-Hour	-	-	0.5 ppm (1300 µg/m³)
	1-Hour	0.25 ppm (655 µg/m³)	-	-
Lead (Pb)[6]	30-Day Average	1.5 µg/m³	-	-
	Calendar Quarter	-	1.5 µg/m³	Same as Primary Standard
	Rolling 3-Month Average	-	0.15 µg/m³	
Hydrogen Sulfide (H_2S)	1-Hour	0.03 ppm (42 µg/m³)	No Federal Standards	
Sulfates (SO_4)	24-Hour	25 µg/m³		
Visibility Reducing Particles	8-Hour	In sufficient amount to produce an extinction coefficient of 0.23 per kilometer due to particles when the relative humidity is less than 70%.		
Vinyl Chloride[6]	24-Hour	0.01 ppm (26 µg/m³)		

1. California standards for ozone, carbon monoxide (except Lake Tahoe), sulfur dioxide (1 and 24 hour), nitrogen dioxide, suspended particulate matter—PM10, PM2.5, and visibility reducing particles, are values that are not to be exceeded. All others are not to be equaled or exceeded. California ambient air quality standards are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations.
2. National standards (other than ozone, particulate matter, and those based on annual averages or annual arithmetic mean) are not to be exceeded more than once a year. The ozone standard is attained when the fourth highest eight hour concentration in a year, averaged over three years, is equal to or less than the standard. For PM10, the 24 hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 µg/m3 is equal to or less than one. For PM2.5, 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 U.S. EPA 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 25°C and a reference pressure of 760 torr. Most measurements of air quality are to be corrected to a reference temperature of 25°C 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. Any equivalent procedure which can be shown to the satisfaction of the ARB to give equivalent results at or near the level of the air quality standard may be used.
5. National Primary Standards: The levels of air quality necessary, with an adequate margin of safety to protect the public health.
6. National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.
7. Reference method as described by the EPA. An "equivalent method" of measurement may be used but must have a "consistent relationship to the reference method" and must be approved by the EPA.
8. The ARB 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.
9. National lead standard, rolling 3-month average: final rule signed October 15, 2008.

Source: California Air Resources Board (11/17/08)

Table 3.14.2: Federal and State Criteria Pollutant Attainment Status for San Diego Air Basin

Pollutant	SDAB Attainment Status	
	Federal	State
Ozone – 1 hour	Attainment	Nonattainment
Ozone – 8 hour	Nonattainment - Basic	Nonattainment
Carbon Monoxide	Maintenance	Attainment
Nitrogen Dioxide	Attainment	Attainment
Sulfur Dioxide	Attainment	Attainment
PM_{10}	Attainment	Nonattainment
$PM_{2.5}$	Attainment	Nonattainment

Table 3.14.3: Federal Nonattainment and Attainment/Maintenance Pollutants in the SDAB

Pollutant	Federal Attainment Status	Exceedances in the Last 3 Years
O_3 – 8-hour	Nonattainment, Basic	3 in 2004, none in 2005, and none in 2006
CO	Maintenance	None

Source: Air Quality Data, California Air Resource Board (CARB), 2004, 2005 and 2006.
Note: ARB indicates that exceedances are not necessarily violations.

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 the proposed Project site are presented in *Table 3.14.4*.

Table 3.14.4: Sensitive Receptors

School	District	Street_Address	City	Distance (Ft)	Distance (M)
Preuss School UCSD	San Diego Unified	9500 Gilman Dr., Mc 0536	La Jolla	1708	520.6
Laurel Elementary	Oceanside Unified	1410 Laurel St.	Oceanside	2131	649.5
Oceanside High	Oceanside Unified	1 Pirates Cove	Oceanside	1151	350.8
Palmquist Elementary	Oceanside Unified	1999 California St.	Oceanside	2280	694.9
South Oceanside Elementary	Oceanside Unified	1806 South Horne St.	Oceanside	1512	460.9
Buena Vista Elementary	Carlsbad Unified	1330 Buena Vista Way	Carlsbad	800	243.8
Jefferson Elementary	Carlsbad Unified	3743 Jefferson St.	Carlsbad	743	226.5
Pacific Rim Elementary	Carlsbad Unified	1100 Camino De Las Ondas	Carlsbad	2558	779.7
Capri Elementary	Encinitas Union Elementary	941 Capri Rd.	Encinitas	2025	617.2
Paul Ecke-Central Elementary	Encinitas Union Elementary	185 Union St.	Encinitas	1992	607.2
North Coast Alternative High	San Dieguito Union High	684 Requeza	Encinitas	2445	745.2
Sunset High (Continuation)	San Dieguito Union High	684 Requeza St.	Encinitas	2483	756.8
San Dieguito High Academy	San Dieguito Union High	800 Santa Fe Dr.	Encinitas	1830	557.8
Solana Vista Elementary	Solana Beach Elementary	780 Santa Victoria Ave.	Solana Beach	2203	671.5
Skyline Elementary	Solana Beach Elementary	606 Lomas Santa Fe Dr.	Solana Beach	1388	423.1
Earl Warren Middle	San Dieguito Union High	155 Stevens St.	Solana Beach	1931	588.6
Solana Highlands Elementary	Solana Beach Elementary	3520 Long Run Dr.	San Diego	1462	445.6
Del Mar Hills Elementary	Del Mar Union Elementary	14085 Mango Dr.	Del Mar	431	131.4
Del Mar Heights Elementary	Del Mar Union Elementary	13555 Boquita Dr.	Del Mar	1826	556.6
Torrey Hills	Del Mar Union Elementary	10830 Calle Mar De Mariposa	San Diego	1481	451.4
Ada W. Harris Elementary	Cardiff Elementary	1508 Windsor Rd.	Cardiff-By-The-Sea	1066	324.9
Cardiff School District	Cardiff Elementary	1888 Montgomery Ave.	Cardiff-By-The-Sea	2435	742.2
Cardiff Elementary	Cardiff Elementary	1888 Montgomery Ave.	Cardiff-By-The-Sea	2592	790.0
Montessori Arts And Sciences Elementary	Carlsbad Unified	3016 Highland Drive	Carlsbad	1764	537.7
St. Patrick	Carlsbad Unified	3820 Pio Pico Drive	Carlsbad	187	57.0
Discovery Isle Child Development	Carlsbad Unified	6130 Paseo Del Norte	Carlsbad	556	169.5
Santa Fe Christian Schools	San Dieguito Union High	838 Academy Drive	Solana Beach	777	236.8
Santa Fe Montessori School	Solana Beach Elementary	1010 Solana Drive	Solana Beach	352	107.3
St. Mary Star Of The Sea Elementary	Oceanside Unified	515 Wisconsin Avenue	Oceanside	2613	796.4

School	District	Street_Address	City	Distance (Ft)	Distance (M)
Sanderling School	Cardiff Elementary	1401 Windsor Road	Cardiff-By-The-Sea	1673	509.9
Casa Montessori De Carlsbad	Carlsbad Unified	3470 Madison Street	Carlsbad	982	299.3
Cal Coast Academy	San Dieguito Union High	983 Lomas Santa Fe Drive, Suite F/G	Solana Beach	1173	357.5

Preschool_Name	Capacity	Street_Address	City	Distance (Ft)	Distance (M)
A Brighter Future Preschool & Cdc	136	3422 Tripp Court	San Diego	577	175.9
A Children's Garden - Leucadia	30	1421 Burgundy Road	Encinitas	1618	493.2
Back To The Basics Preschool	48	1759 Oceanside Boulevard	Oceanside	887	270.4
Balderrama Child Development Center	84	709 San Diego St	Oceanside	1491	454.5
Bright Horizons Family Solutions	151	3720 Arroyo Sorrento Road	San Diego	947	288.6
Carlsbad Children's Garden	38	2518 Jefferson Street	Carlsbad	848	258.5
Carlsbad Children's House	24	2606 Jefferson Street	Carlsbad	1130	344.4
Carlsbad Montessori School	71	740 Pine Avenue	Carlsbad	1197	364.8
Casa De Ninos Child Development Center	119	1718 Mission Avenue	Oceanside	1577	480.7
Casa Montessori De Carlsbad	49	3470 Madison Street	Carlsbad	1104	336.5
Childrens Learning Center	73	139 Canyon Drive	Oceanside	2633	802.5
Encinitas Migrant Cdc	52	1508 Windsor Road	Cardiff By The Sea	1179	359.4
Family Recovery Center - Child Development Center	15	1100 Sportfisher Drive	Oceanside	332	101.2
Friendly Daycare & Preschool Center	30	1836 Dixie Street	Oceanside	1720	524.3
Great Beginnings Preschool	87	511 Encinitas Blvd. #110	Encinitas	1415	431.3
Immanuel Lutheran Children's Learning Center	35	1900 So. Nevada Street	Oceanside	1937	590.4
International Cooperative Nursery School	24	9500 Gilman Drive, 0018-Ucsd	La Jolla	2189	667.2
Little Bears Tender Care	75	1828 Oceanside Blvd.	Oceanside	1462	445.6
Maac Project Head Start North Coast	60	1501 Kelly Street	Oceanside	150	45.7
Maac Project Head Start Oceanside 3	18	509 Sports Fisher	Oceanside	1672	509.6
Magdalena Ecke YMCA	128	200 Saxony Road	Encinitas	635	193.5
Megastar Childrens Christian Academy	27	3780 Pio Pico Drive	Carlsbad	98	29.9
Nha - Carlsbad Head Start	82	3368 Eureka Place	Carlsbad	216	65.8
Nha - Head Start By The Sea	80	777 Santa Fe Drive	Encinitas	1528	465.7
Nha Leucadia Head Start Center	60	616 Old Highway 101	Leucadia	2214	674.8
Nha St. Leo's Head Start Center	74	936 Genevieve Street	Solana Beach	226	68.9
Oceanside Child Development Center	136	Corner Of Horne & Center	Oceanside	1610	490.7

Preschool_Name	Capacity	Street_Address	City	Distance (Ft)	Distance (M)
OUSD Ditmar Elementary	26	1125 S. Ditmar	Oceanside	2276	693.7
OUSD-Laurel Elementary	30	1410 Laurel Street	Oceanside	2050	624.8
San Dieguito United Methodist Pre-School	67	170 Calle Magdalena	Encinitas	759	231.3
Sanderling School	18	1401 Windsor Road	Cardiff	1518	462.7
Sandy Hill Nursery School	34	1036 Solana Dr	Solana Beach	835	254.5
Santa Fe Christian Preschool	64	845 Santa Fe Drive	Encinitas	1912	582.8
Santa Fe Montessori School	144	1010 Solana Drive	Solana Beach	420	128.0
Smart Start Preschool	75	240 Birmingham Drive	Cardiff	2269	691.6
Solana Beach Community Preschool	28	524 Stevens Avenue	Solana Beach	1600	487.7
Solana Beach Presbyterian Preschool	135	120 Stevens Avenue	Solana Beach	1778	541.9
Sorrento Valley Children's Center	84	4050-A Sorrento Valley Blvd	San Diego	1424	434.0
Torrey Pines Montessori Center	12	2596 Carmel Valley Road	Del Mar	1919	584.9
Trump's Del Mar Hills Nursery School, Inc.	60	13692 Mango Drive	Del Mar	1259	383.7

Hospital	Street_Address	City	Distance (Ft)	Distance (M)
Thornton-Perlman Hospital	9300 Campus Point Dr	La Jolla	1105	336.8
Veterans Administration Hospital	3350 La Jolla Village Dr	San Diego	859	261.8
Scripps Memorial Hospital-La Jolla	9888 Genesee Av	La Jolla	858	261.5
Scripps Memorial Hospital-Encinitas	354 Santa Fe Dr	Encinitas	203	61.9
College/University	**Str_Address**	**City**	**Distance (Ft)**	**Distance (M)**
University Of California San Diego	La Jolla Village Dr & Gilman Dr	San Diego	895	272.8
National University-Carlsbad	705 Palomar Airport Rd	Carlsbad	759	231.3
Park_Name	**Park_Type**		**Distance (Ft)**	**Distance (M)**
Los Peñasquitos Canyon Preserve	Preserve	San Diego	949	289.3
Quail Botanical Gardens	Botanical Garden	Encinitas	1489	453.8
San Elijo Lagoon Ecological Reserve	Ecological Reserve	Solana Beach/ Encinitas	79	24.1

Nursing Homes	Capacity	Street_Address	City	Distance (Ft)	Distance (M)
George G. Glenner Family Center-Encinitas	30	335 Saxony Road	Encinitas	961	292.1

Carbon Monoxide (CO)

For the CO hotspot analysis, the procedure outlined in the Transportation Project-Level Carbon Monoxide Protocol, 1997 (CO Protocol) (ITS UC Davis, 1997) was used to perform a microscale air quality modeling using EMFAC2007 and CALINE4 (Caltrans, 1989). EMFAC2007 (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 1-hr average CO concentrations at selected intersections in the proposed Project limits.

The composite CO emission factors were calculated for the years 2020 and 2030 for SDAB. The EMFAC2007 SDAB default data were used for most variables including model years, vehicle classes, inspection and maintenance (I/M) program schedule, control technology, vehicle population and odometer accrual rates, vehicle miles traveled (VMT) and vehicle trips, and profiles of Reid Vapor Pressure (RVP), 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 ^{o}F for both the morning and evening peak hours as recommended by the CO protocol. The temperature was determined to be 44.0^{o}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 8-hour maximum CO concentration was calculated by applying a persistence factor of 0.7 to the predicted maximum 1-hr 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, in order to determine if the proposed project results in exceedances.

Table 3.14.5: Estimated CO Concentration Hotspot Modeling Results

Intersection	Existing		2030 No Build		2015 10+4		2030 10+4	
	AM	PM	AM	PM	AM	PM	AM	PM
1-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							
8-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 1-hour concentrations are based on maximum CO levels for the Beardsley Street Monitoring Station.
Eight-hour concentrations are estimated from 1-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 1-hour or 8-hour standards during the AM or PM 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 hotspot analysis show that the proposed project would not adversely impact the local air quality.

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). 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.

The PM guidance document describes a qualitative hot spot analysis method that does not involve dispersion modeling. This qualitative PM_{10} and $PM_{2.5}$ hot spot analysis method involves a more streamlined review of local factors such as local monitoring data near a proposed project location.

The PM_{10} and $PM_{2.5}$ hot spot analysis method in the March 2006 Guidance involves two steps: determining whether or not a project is a "project of concern" and, if it is a "project of concern" preparation of a qualitative (emission analysis only) but more detailed analysis of the project.

The PM Guidance defines the following types of projects as projects of air quality concern:

- New or expanded highway project that have a significant number of or significant increase in diesel vehicles;
- Projects affecting intersections that are Level-of-Service (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; and
- Projects in, or 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.

A significant volume for a new highway or expressway is defined as an annual average daily traffic (AADT) volume of 125,000 or more, and a significant number of diesel vehicles are defined as 8 percent or more of that total AADT. A significant increase in diesel truck traffic is normally considered to be approximately 10%.

The proposed improvements to the I-5 NCC Project would increase capacity. However, the existing diesel fuel truck percentage within the project limits is 6 percent of AADT, which is below the threshold of 8 percent. The proposed project would not result in an increase in the ratio of trucks to the volumes. Estimated horizon year (2030) truck AADT would remain at 6 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 through San Diego 12th Avenue monitoring station. The site indicates 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).

The proposed project is located in an attainment area for Federal PM_{10} and $PM_{2.5}$ standards, and in a nonattainment area of State PM_{10} and $PM_{2.5}$ standards. Based on screening using U.S. EPA PM Guidance, the proposed project is not a Project of Air Quality Concern because it does not meet the criteria due to relatively low total/truck AADT, truck percentage, and increase in truck volumes comparing the Build and No Build Alternatives. The proposed project is improving traffic operations by smoothing traffic flow. Therefore, the proposed project is in conformance for Federal PM10 and PM2.5 standards under 40 CFR 93.123(b)(1)(i) and (ii) and is unlikely to increase the frequency or severity of any existing exceedances regarding the non-attainment of state PM10 and PM2.5 standards.

In addition, PM_{10} and $PM_{2.5}$ concentrations in the SDAB show a general downward trend. *Table 3.15.6* shows the PM_{10} and $PM_{2.5}$ concentrations observed at the Beardsley Street monitoring station from 2005 to 2008, in comparison with federal and state standards.

Table 3.14.6: PM_{10} and $PM_{2.5}$ Trends at the San Diego 12th Avenue Monitoring Station

Pollutant	Averaging Time	Federal Primary Standards	California Air Quality Standards	Maximum Concentrations (µg/m^3)		
				2004	2005	2006
PM_{10}	24 hours	150 µg/m^3	50 µg/m^3	68.0	76.0	71.0
	National Annual	Revoked	20 µg/m^3	33.2	21.2	33.6
	State Annual	Revoked	20 µg/m^3	34.5	*	34.4
$PM_{2.5}$	24 hours	35 µg/m^3	none	42.9	32.3	63.3
	National Annual	15 µg/m^3	12 µg/m^3	13.8	*	13.1
	State Annual	15 µg/m^3	12 µg/m^3	*	*	13.1

* There were insufficient (or no) data available to determine the value.
Sources: CARB 2007d; SDAPCD 2007

The proposed project is located in an attainment area for federal PM_{10} and $PM_{2.5}$ standards, and in a nonattainment area of 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 is therefore 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 CAA requires the EPA 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 CAA Section 112, the EPA 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 EPA identified asbestos as a hazardous pollutant, and on April 6, 1973, first promulgated the asbestos NESHAP in 40 CFR 61. In 1990, a revised NESHAP regulation was promulgated by the EPA.

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 EPA 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 their 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 MSAT analysis, the FHWA's Interim Guidance on Air Toxic Analysis for NEPA Documents (MSAT Guidance) (USDOT 2006) was used. The proposed Project would add new or create significant capacity to I-5 north coast corridor with annual average daily traffic (AADT) greater than 150,000. Furthermore, the proposed project is located in proximity to populated areas and sensitive receptors. Consequently, as required by the MSAT guidance, a quantitative MSAT analysis is required.

There are no established regulatory concentration targets for the six priority MSATs. 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.

CT-EMFAC is a California specific transportation project-level analysis tool, designed to model criteria pollutants, Mobile Source Air Toxics (MSATs) and carbon dioxide using the latest version of the California Mobile Source Emission Inventory and Emission Factors model, EMFAC2007.

MSAT Analysis

Traffic activity data has been utilized in performing the MSAT analysis. Traffic activity data has been supplemented by available Caltrans data inventory systems for the base year values and also by Caltrans forecast modeling of the corridor for future year values. Emission factors for the six MSATs have been obtained for the San Diego Air Basin portion of San Diego County using CT-EMFAC 2007. Results of the MSAT analysis are tabulated in *Table 3.14.8, 3.14.9 and 3.14.11*. The traffic activity data have been supplemented by available Caltrans data inventory systems for the base year values and also by Caltrans forecast modeling of the corridor for future year values. These tables below show emission rates for the combined northbound and southbound traffic for each MSAT along the *I-5 NCC Project* area from south to north, by segment.

Table 3.14.7: 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 with Barrier	1,268,670	80,979	1,349,649	6,203,569	395,972	6,599,541	66.5
	8 + 4 with Barrier	1,241,187	7,9225	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 with barrier	1,468,049	93,705	1,561,754	7,178,348	458,192	7,636,540	54.7
	8 + 4 with Barrier	1,313,047	83,812	1,396,859	6,890,497	439,819	7,330,316	39.3

Source: Caltrans Traffic Data, VMT = vehicle miles traveled, MF = mixed-flow lane, HOV = high-occupancy vehicle lane MPH = miles per hour

Emission factors for the six MSATs and CO_2 have been obtained for the SDAB portion of San Diego County using CT-EMFAC 2007. Results of the analyses are tabulated in *Table 3.14.8* and *Table 3.14.9*. The analysis was refined to determine MSAT emission rates by segments of the I-5 corridor. *Table 3.14.10* shows the approximate segments for the northbound and southbound sides of the freeway. The segments are not equal length, varying from 0.60 km to 3.78 km (0.37 mi to 2.35 mi). *Table 3.14.10* also lists the segment extents and principle land uses near the freeway along each segment.

Table 3.14.8: 2015 Changes (Δ) in Total Project MSAT Emission Rates

Toxic Air Contaminant	Existing Emissions (g/day)	No Build Alternative	8+4 Alternative (8 MF + 2 HOV/ML)			10+4 Alternative (10 MF + 2 HOV/ML)		
		(g/day)	(g/day)	Δ% from Existing	Δ % from No Build	(g/day)	Δ% from Existing	Δ% from No Build
Diesel PM	44,648	28,795	31,221	-30	+8	32,925	-26	+14
Benzene	42,281	22,044	23,212	-45	+5	24,340	-42	+10
1,3-Butadiene	7,823	3,605	3,942	-50	+9	4,234	-46	+17
Acetaldehyde	11,149	5,813	6,189	-44	+6	6,554	-41	+13
Acrolein	1,775	816	894	-50	+10	960	-46	+17
Formaldehyde	34,295	17,316	18,586	-46	+7	19,767	-42	+14
Average Percent Change				**-44**	**+7.5**		**-40.5**	**+14**

Table 3.14.9: 2030 Changes (Δ) in Total Project MSAT Emission Rates

Toxic Air Contaminant	Existing Emissions (g/day)	No Build Alternative (g/day)	8+4 Alternative (8 MF + 2 HOV) (g/day)	Δ% from Existing	Δ% from No Build	10+4 Alternative (10 MF + 2 HOV) (g/day)	Δ% from Existing	Δ% from No Build
Diesel PM	44,648	21,040	23,255	-48	+11	24,898	-44	+18
Benzene	42,281	14,590	15,987	-62	+10	17,105	-59	+17
1,3-Butadiene	7,823	2,405	2,748	-65	+15	3,001	-62	+25
Acetaldehyde	11,149	3,685	3,987	-64	+8	4,255	-62	+15
Acrolein	1,775	543	622	-65	+15	680	-62	+26
Formaldehyde	34,295	11,161	12,300	-64	+10	4,255	-61	+19
				Average Percent Change	**-61**	**+11**	**-58**	**+20**

Table 3.14.10: Land Uses within I-5 Segments

Segment No.	Major Intersection	Principle 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 Vía de la Valle	Residential, Retail & Commercial
6	Vía de la Valle to Lomas Santa Fe Drive	Commercial & Industrial
7	Lomas Santa Fe Drive to Manchester Drive	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
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 Road	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

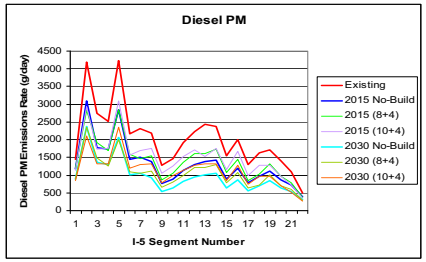


Figure 3-14.1: Changes in Diesel PM Emission

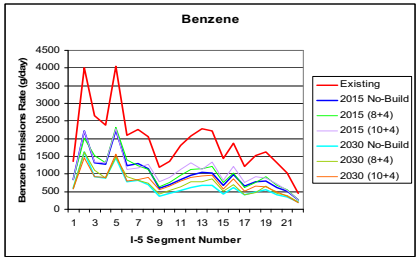


Figure 3-14.2: Changes in Benzene Emission

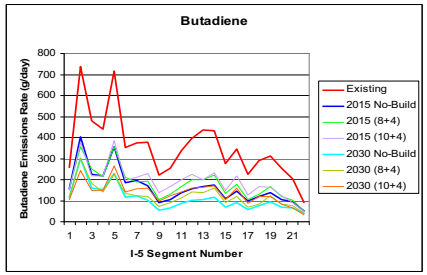


Figure 3-14.3: Changes in Butadiene Emission

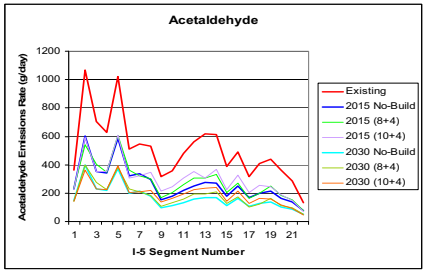


Figure 3-14.4: Changes in Acetaldehyde Emission

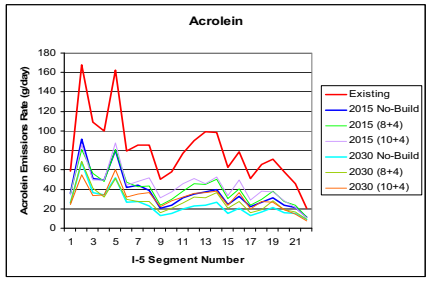


Figure 3-14.5: Changes in Acrolein Emission

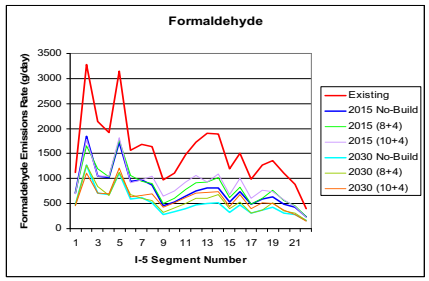


Figure 3-14.6: Changes in Formaldehyde Emission

MSAT Discussion of Results

The analysis indicates that a substantial decrease in MSAT emissions can be expected for the proposed alternatives from the base year (2006) levels through future year levels. This decrease is prevalent throughout the highest-priority MSATs and the analyzed alternatives, regardless of the difference in mainline configurations as depicted in the figures. This decrease is also consistent with the aforementioned EPA's 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 for this project as shown in *Table 3.14.7* and *3.14.9,* reductions in existing MSAT levels expected by 2030 are: 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 projected reductions are achieved while the total VMT for the Alternatives increase by approximately 32 to 37 percent in 2030 from the base year value depending on the alternative.

Differences of varying degrees are noted in the projected individual MSAT emissions. According to the results, all Build Alternatives are expected to reduce emissions of DPM well below the base year values, ranging from 26 to 30 percent less for the operational year (2015) and 44 to 48 percent less for the horizon year (2030).

Differences in MSAT emissions among the proposed alternatives is also noted in *Tables 3-14.7* and *3-14.8.* Although the No Build Alternative is expected to accommodate less traffic as indicated in *Table 3-14.6,* its MSAT emissions are expected to be greater than those of other Build Alternatives in both 2015 and 2035, The greater MSAT emission projected for the No Build Alternative, despite less traffic, are attributable to the congested traffic conditions and breakdown of travel speeds during peak periods.

Summary of Existing Credible Scientific Evidence Relevant to Evaluating Impacts of MSATs

Research into the health impacts of MSATs is ongoing. For different emission types, there are a variety of studies that show that some either are statistically associated with adverse health outcomes through epidemiological studies (frequently based on emissions levels found in occupational settings) or that animals demonstrate adverse health outcomes when exposed to large doses.

Exposure to toxics has been a focus of a number of EPA efforts. Most notably, the agency conducted the National Air Toxics Assessment (NATA) in 1996 to evaluate modeled estimates of human exposure applicable to the county level. While not intended for use as a measure of or benchmark for local exposure, the modeled estimates in the NATA database best illustrate the levels of various toxics when aggregated to a national or State level.

The EPA is in the process of assessing the risks of various kinds of exposures to these pollutants. The EPA Integrated Risk Information System (IRIS) is a database of human health effects that may result from exposure to various substances found in the environment. The IRIS database is located at http://www.epa.gov/iris. The following toxicity information for the six prioritized MSATs was taken from the IRIS database *Weight of Evidence Characterization* summaries. This information is taken verbatim from EPA's IRIS database and represents the Agency's most current evaluations of the potential hazards and toxicology of these chemicals or mixtures.

- **Benzene** is characterized as a known human carcinogen.
- The potential carcinogenicity of **acrolein** cannot be determined because the existing data are inadequate for an assessment of human carcinogenic potential for either the oral or inhalation route of exposure.
- **Formaldehyde** is a probable human carcinogen, based on limited evidence in humans, and sufficient evidence in animals.
- **1,3-butadiene** is characterized as carcinogenic to humans by inhalation.
- **Acetaldehyde** is a probable human carcinogen based on increased incidence of nasal tumors in male and female rats and laryngeal tumors in male and female hamsters after inhalation exposure.
- **Diesel exhaust** (DE) is likely to be carcinogenic to humans by inhalation from environmental exposures. Diesel exhaust as reviewed in this document is the combination of diesel particulate matter and diesel exhaust organic gases.
- **Diesel exhaust** also represents chronic respiratory effects, possibly the primary non-cancer hazard from MSATs. Prolonged exposures may impair pulmonary function and could produce symptoms, such as cough, phlegm, and chronic bronchitis. Exposure relationships have not been developed from these studies.

There have been other studies that address MSAT health impacts in proximity to roadways. The Health Effects Institute, a non-profit organization funded by EPA, FHWA, and industry, has undertaken a major series of studies to research near-roadway MSAT hot spots, the health implications of the entire mix of mobile source pollutants, and other topics. The final summary of the series is not expected for several years.

Some recent studies have reported that proximity to roadways is related to adverse health outcomes -- particularly respiratory problems (South Coast Air Quality Management District, Multiple Air Toxic Exposure Study-II (2000); Highway Health Hazards, The Sierra Club (2004) summarizing 24 Studies on the relationship between health and air quality); NEPA's Uncertainty in the Federal Legal Scheme Controlling Air Pollution from Motor Vehicles, Environmental Law Institute, 35 ELR 10273 (2005) with health studies cited therein).

Much of this research is not specific to MSATs, instead it surveys the full spectrum of both criteria and other pollutants.

In addition to the six criteria pollutants regulated by EPA, California also has set standards for visibility reducting particles, sulfates, hydrogen sulfide and vinyl chloride.

Regardless of the alternative chosen, emissions would likely be lower than present levels in the design year as a result of EPA's national control programs that are projected to reduce MSAT emissions by 57 to 87 percent between 2000 and 2020. Local conditions may differ from these national projections in terms of fleet mix and turnover, VMT growth rates, and local control measures. However, the magnitude of the EPA-projected reductions is so great (even after accounting for VMT growth) that MSAT emissions in the study area are likely to be lower in the future in nearly all cases.

Relevance of Unavailable or Incomplete Information to Evaluating Reasonably Foreseeable Significant Adverse Impacts on the Environment, and Evaluation of Impacts Based on Theoretical Approaches or Research Methods Generally Accepted in the Scientific Community

Because of the uncertainties outlined above, a quantitative assessment of the effects of air toxic emissions impacts on human health cannot be made at the project level. While available tools do allow us to reasonably predict relative emissions changes between alternatives for larger projects, the amount of MSAT emissions from each of the project alternatives and MSAT concentrations or exposures created by each of the project alternatives cannot be predicted with enough accuracy to be useful in estimating health impacts. (As noted above, the current emissions model is not capable of serving as a meaningful emissions analysis tool for smaller projects.) Therefore, the relevance of the unavailable or incomplete information is that it is not possible to make a determination of whether any of the alternatives would have "significant adverse impacts on the human environment."

Caltrans has provided a quantitative analysis of MSAT relative to the various alternatives and has acknowledged that some alternatives may result in increased exposure to MSAT emissions in certain locations, although the concentrations and duration of exposures are uncertain; because of this uncertainty, the health effects from these emissions cannot be estimated.

Construction Impacts

The principal criteria pollutants emitted during construction would be PM_{10} and $PM_{2.5}$. The source of the pollutants would be fugitive dust, such that the emission sources are not confined to stacks, vents or similar paths. Fugitive dust is typically 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 NO_X, ROG, and volatile organic compounds (VOC) emissions that would contribute to the formation of O_3, which is a regional nonattainment pollutant. During construction activities, including utility relocation, short-term degradation of air quality may occur due to the release of particulate emissions generated by the activities mentioned above. The effects of air quality resulting from utility relocation would be greatest during site preparation phase because most engine emissions are associated with the excavation, handling, and transportation of equipment to and from the site. These emissions would be temporary and limited to the immediate area surrounding the relocation site, and therefore would not adversely affect air quality.

Climate Change

Climate change is analyzed in *Chapter 4*. Neither EPA nor FHWA has promulgated explicit guidance or methodology to conduct project-level greenhouse gas analysis. As stated on 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, the 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 FHWA to lessen climate change impacts do correlate with efforts that the State has undertaken and is undertaking to deal with transportation and climate change; the strategies 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

Construction

Air Quality measures to minimize emissions for construction include:

Use low-emission onsite mobile construction equipment where feasible.
Maintain equipment in tune per manufacturer's specifications.
Retard diesel engine injection timing by two to four degrees unless not recommended by manufacturer (due to lower emission output in-place).
Use reformulated, low-emission diesel fuel.
Substitute electric and gasoline-powered equipment for diesel-powered equipment where feasible.
Use catalytic converters on gasoline-powered equipment.
Do not leave inactive construction equipment idling for prolonged periods.

It is recommended that the following measures would be incorporated into the project to minimize the emission of fugitive dust, PM_{10}, and $PM_{2.5}$ during construction:

SDAPCD Rule 51

- Minimize land disturbance.
- Use watering trucks to minimize dust; watering should be sufficient to confine dust plumes to the project work areas.
- Suspend grading and earth moving when wind gusts exceed 25 mph unless the soil is wet enough to prevent dust plumes.
- Cover trucks when hauling dirt.
- Stabilize the surface of dirt piles if not removed immediately.
- Limit vehicular paths on unpaved surfaces and stabilize any temporary roads.
- Minimize unnecessary vehicular and machinery activities.
- Sweep paved streets at least once per day where there is evidence of dirt that has been carried on to the roadway.
- Revegetate disturbed land, including vehicular paths created during construction to avoid future off-road vehicular activities.
- Remove unused material.

Additionally, it is recommended that the following measure be incorporated into the project to minimize exposure to diesel particulate emissions.

Caltrans Specification Section 10: Dust Control

- 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.

Diesel particulate emissions are of concern, as described above. While there is no formal guidance for impact analysis, potential adverse impacts would be increased if construction equipment and truck staging areas were to be located near schools, active recreation areas, or areas of higher population density. Thus, a measure to reduce this potential impact has been identified in SDAPCD Rule 51 and Caltrans Specification Section 10: Dust Control.

3.15 Noise

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 no build 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 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.

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
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

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.

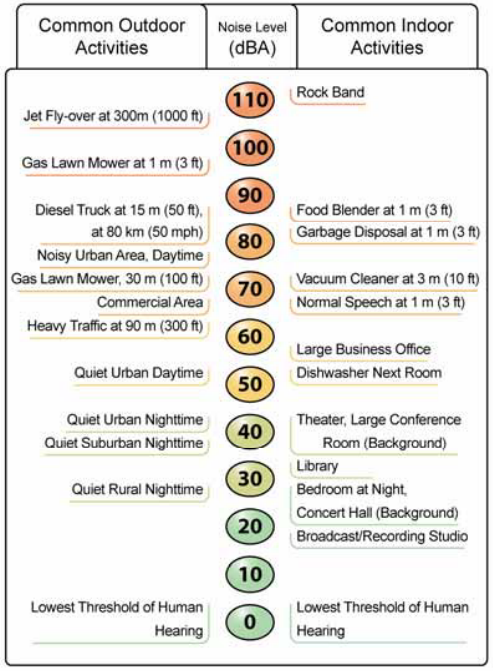


Figure 3-15.1: Typical A-Weighted Noise Levels

In accordance with the Department's *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.

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 in the project.

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.

The cost per benefited residence is made 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 was $48,000 per benefited residence. 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-Leq(h) or are 30 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 noise barriers that have an estimated construction cost that exceeds the reasonableness allowance or providing interior abatement in residential units. Unusual and extraordinary abatement proposed on a Federal-aid project is subject to approval by 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.

3.15.2 Affected Environment

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 with 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 Level of Service (LOS) C traffic volumes to obtain the worst-case noise scenario.

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 which include hotels/motels, restaurants, 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* below 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 Segmental Distribution

Segment No.	Major Intersection	Chapter 2 Figure No.
1	La Jolla Village Drive to Genesee Avenue	2-2.14a & 2-2.14b
2	Genesee Avenue to Carmel Mountain Road	2-2.14b – 2-2.14g
3	Carmel Mountain Road to Carmel Valley Road	2-2.14g & 2-2.14h
4	Carmel Valley Road to Del Mar Heights Road	2-2.14h – 2-2.14j
5	Del Mar Heights Road to Via de la Valle	2-2.14j – 2-2.14m
6	Via de la Valle to Lomas Santa Fe Drive	2-2.14m – 2-2.14o
7	Lomas Santa Fe Drive to Manchester Drive	2-2.14o & 2-2.14p
8	Manchester Avenue to Birmingham Drive	2-2.14p – 2-2.14r
9	Birmingham Drive to Santa Fe Drive	2-2.14r – 2-2.14t
10	Santa Fe Drive to Encinitas Boulevard	2-2.14t & 2-2.14u
11	Encinitas Boulevard to Leucadia Boulevard	2-2.14u – 2-2.14w
12	Leucadia Boulevard to La Costa Avenue	2-2.14w – 2-2.14y
13	La Costa Avenue to Poinsettia Lane	2-2.14y – 2-2.14aa
14	Poinsettia Lane to Palomar Airport Road	2-2.14aa – 2-2.14ac
15	Palomar Airport Road to Cannon Road	2-2.14ac & 2-2.14ad
16	Cannon Road to Tamarack Avenue	2-2.14ad – 2-2.14af
17	Tamarack Avenue to Carlsbad Village Road	2-2.14af & 2-2.14ag
18	Carlsbad Village Drive to Vista Way (SR-78)	2-2.14ag – 2-2.14ai

Segment No.	Major Intersection	Chapter 2 Figure No.
19	Vista Way (SR-78) to Oceanside Boulevard	2-2.14ai – 2-2.14aj
20	Oceanside Boulevard to Mission Avenue	2-2.14aj & 2-2.14ak
21	Mission Avenue to SR-76	2-2.14ak – 2-2.14al
22	SR-76 to Wire Mountain Road	2-2.14al & 2-2.14am

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 vehicles per hour per lane 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 levers 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 vehicles per hour per lane. 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 3-5 dBA 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 2.4 m (8 ft) up to 4.9 m (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 Repor*t recommends 82 soundwalls totaling a length of approximately 33 km (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 Noise Abatement Decision Report (*NADR*) (June 2007), was prepared to further evaluate the 82 recommended 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 this draft environmental document is circulated for public review. The final overall reasonableness decision would consider the reasonableness factors (a-j) 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 reasonableness 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 reasonableness 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, 30-m (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 this writing. 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* (*Figure 2-2.14a and 2-2.14b).* 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 1.7-m (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 S457 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 & 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]	Future Peak Hour Noise Levels, Leq(h), dBA[1,2]												Soundwall No. / Feasibility
			Future "No Build"	Project "Build" without Soundwall	Noise Prediction with Soundwall and Soundwall Insertion Loss (I.L.)										
					2.4 m (8 ft)		3.0 m (10 ft)		3.7 m (-2.14 ft)		4.3 m (14 ft)		4.9 m (16 ft)		
		Leq(h), dBA			Leq(h)	I.L.	Leq(h)	I.L.	Leq(h)	I.L.	Leq(h)	I.L.	Leq(h)	I.L.	
La Jolla Village Drive to Genesee Avenue - Southbound															
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 I	0	72	1	71	2	69	4	**68 K**	**5**	S457 / 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 – Northbound															
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 – Leq(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 Noise Abatement Criteria (NAC) of 67dBA 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 Rd/ Southbound	4.9 m (16 ft) / 359 m (1,178 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 insertion loss. *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 (*Figure 2-2.14b – 2-2.14g*). The following paragraphs describe the preliminary abatement decisions for Segment 2.

Soundwall S518: Soundwall S518 would be located private on 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 1.8-m (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 3.15.5*). Construction of soundwall S518 may be recommended if negotiations with property owners could result in reducing or eliminating easement costs required for construction. 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] Leq(h), dBA	Future Peak Hour Noise Levels, Leq(h), dBA[1,2]												Soundwall No. / Feasibility
			Future "No Build"	Project "Build" without Soundwall	Noise Prediction with Soundwall and Soundwall Insertion Loss (I.L.)										
					2.4 m (8 ft)		3.0 m (10 ft)		3.7 m (12 ft)		4.3 m (14 ft)		4.9 m (16 ft)		
					Leq(h)	I.L.	Leq(h)	I.L.	Leq(h)	I.L.	Leq(h)	I.L.	Leq(h)	I.L.	
Genesee Avenue to Carmel Mountain Road – Northbound															
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 – Leq(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 Noise Abatement Criteria (NAC) of 67dBA 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 / Northbound	3.0 m (10 ft) to 3.7 m (12 ft) / 427 m (1,401 ft)	$1,433,640	$1,140,000	Not Reasonable	Recommended

1 – Land Use: SFR – single-family residence; MFR – multi-family residence.
2 – Estimated construction cost includes cost of easements.

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 insertion loss. *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 2-2.14g and 2-2.14h*. The following paragraphs describe the preliminary abatement decisions for Segment 3.

Soundwall S526: Soundwall S526 would be located 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 1.8-m (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 1.8-meter (6-foot) 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 Levels[1] Leq(h), dBA	Future Peak Hour Noise Levels, Leq(h), dBA[1,2]												Soundwall No. / Feasibility
			Future "No Build"	Project "Build" without	Noise Prediction with Soundwall and Soundwall Insertion Loss										
					2.4 m (8 ft)		3.0 m (10 ft)		3.7 m (12 ft)		4.3 m (14 ft)		4.9 m (16 ft)		
					Leq(h)	I.L.	Leq(h)	I.L.	Leq(h)	I.L.	Leq(h)	I.L.	Leq(h)	I.L.	
Carmel Mountain Road to Carmel Valley Road – Northbound															
R3.1[W]	13777 Torrey View	59	62	62	--	--	--	--	--	--	--	--	--	--	--
R3.1A[W]	13763 Torrey View	62	65	65	--	--	--	--	--	--	--	--	--	--	--
R3.2[W]	13759 Torrey View	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	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	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	55	58	58 [N]	58	0	57	1	56	2	55	3	55	3	--
R3.6[W]	13707 Torrey View	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	60	63	64 [N]	62	2	61	3	60	4	60	4	59	5	--
R3.8[W]	13690 Torrey View	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	67	68	69 [A/E]	65[I]	4	63	6	61	8	**60[K]**	**9**	59	10	S526 / Feasible
R3.10[W]	13676 Torrey View	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	68	66	66 [A/E]	65[T]	1	63	3	62	4	**61[K]**	**5**	60	6	S526 / Feasible
R3.11[W]	13664 Torrey View	64	65	65 [N]	63	2	62	3	61	4	60	5	59	6	--
R3.12[W]	13654 Torrey View	63	64	65 [N]	63	2	61	4	60	5	59	6	58	7	--
R3.13[W]	13648 Torrey View	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	64	65	65 [N]	63	2	62	3	60	5	59	6	58	7	--

1 – Leq(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 Noise Abatement Criteria (NAC) of 67dBA 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 1.8 m (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 / Northbound	3.0 m (10 ft) to 4.3 m (14 ft) / 577 m (1,893 ft)	$2,004,741	$1,120,000	Not Reasonable	Not Recommended
S528	R3.13 – R3.14	2 SFR	Private Property / Northbound	3.0 m (10 ft) / 116 m (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.

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 dB insertion loss. *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 *Figure 2-2.14h – 2-2.14j*. 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 4 m (13 ft) higher than the proposed soundwall. Soundwall S541 would replace an existing 1.8- to 2.1-m (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 2.3 m (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)*. Construction of soundwall S543 may be recommended if negotiations with property owners could result in reducing or eliminating easement costs required for construction. 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 2.1-m (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 (SI) 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 ten 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 under 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 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 4.6-m (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] 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.): 2.4 m (8 ft) Leq(h)	I.L.	3.0 m (10 ft) Leq(h)	I.L.	3.7 m (12 ft) Leq(h)	I.L.	4.3 m (14 ft) Leq(h)	I.L.	4.9 m (16 ft) Leq(h)	I.L.	Soundwall No. / Feasibility
Carmel Valley Road to Del Mar Heights Road – Northbound															
R4.1	13538 Caminito Carmel Del Mar	68	71	72 A/E	72	0	71	1	71	1	71	1	71	1	Not Feasible
R4.2W	12943 Caminito Pointe Del Mar	69	72	72 A/E	70T	2	**67R**	**5**	65	7	63	9	62	10	S541 / Feasible
R4.3W	12943 Caminito Pointe Del Mar	70	73	73 A/E	73	0	72	1	71	2	71	2	70	3	Not Feasible
R4.4W	13933 Caminito Pointe Del Mar	67	70	71 A/E	69T	2	**66R**	**5**	64	7	62	9	61	10	S541 / Feasible
R4.5W	2784 Caminito San Marino	69	72	73 A/E	72T	1	71	2	69	4	**67R**	**6**	66	7	S543 / Feasible
R4.6WZ	2783 Caminito Cedros	65	68	69 A/E	--	--	--	--	--	--	--	--	67	2	--
R4.7W,Z	2766 Caminito San Pablo	63	66	67 A/E	--	--	--	--	--	--	--	--	67	0	--
R4.8W,Z	2777 Caminito El Dorado	62	65	66 A/E	--	--	--	--	--	--	--	--	65	1	--
R4.9W,Z	13080 Caminito Cristobal	68	67	67 A/E	--	--	--	--	--	--	66	1	67	0	--
R4.10W,Z	13110 Portofino Drive	66	65	66 A/E	66	0	65	1	65	1	65	1	65	1	Not Feasible
R4.11W	13131 Portofino Drive	74	74	75 A/E	74T	1	71	4	**68R**	**7**	66	9	65	10	S551 / Feasible
R4.12W	13163 Portofino Drive	72	72	73 A/E	72T	1	67	3	**68R**	**5**	67	6	65	8	S551 / Feasible
R4.13W	13231 Portofino Drive	69	69	69 A/E	68T	1	67	2	65	4	**64R**	**5**	64	5	S551 / Feasible
R4.14W	13303 Portofino Drive	69	69	70 A/E	69T	1	67	3	66	4	**65R**	**5**	64	6	S551 / Feasible
R4.15W	13333 Portifino Drive	68	69	69 A/E	69T	0	67	2	65	4	**64R**	**5**	64	5	S551 / Feasible
R4.16W	13363 Portofino Drive	68	69	70 A/E	69T	1	67	3	65	5	**64R**	**6**	63	7	S551 / Feasible
R4.17W	13395 Portofino Drive	67	68	69 A/E	68T	1	67	2	65	4	**64R**	**5**	63	6	S551 / Feasible
R4.18W	13451 Portofino Drive	67	68	69 A/E	68T	1	67	2	65	4	**64R**	**5**	63	6	S551 / Feasible
R4.19W	13505 Portofino Drive	68	69	70 A/E	69T	1	67	3	65	5	**64R**	**6**	63	7	S551 / Feasible
R4.20W	13555 Portofino Drive	68	69	69 A/E	68T	1	67	2	65	4	**64R**	**5**	63	6	S551 / Feasible
R4.21W	13603 Portofino Drive	68	69	69 A/E	68T	1	67	2	65	4	**64R**	**5**	63	6	S551 / Feasible
R4.22W	13651 Portofino Drive	67	68	69 A/E	68T	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	68T	3	**66R**	**5**	64	7	62	9	61	10	S557 / Feasible
R4.23	Casa Del Mar Apartments - Ruette Le Parc	77	77	78 A/E	73T	5	**71R**	**7**	69	9	66	12	65	13	S557 / Feasible
R4.24	Casa Del Mar Apartments - Ruette Le Parc	72	72	73 A/E	69T	4	**66R**	**7**	63	10	62	11	61	12	S557 / Feasible

1 – Leq(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 Noise Abatement Criteria (NAC) of 67dBA 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 3.3 to 4.6 m (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 / Southbound	3.0 m (10 ft) / 174 m (571 ft)	$586,292	$152,000	Not Reasonable	Not Recommended
S543	R4.5	6 MFR	Private Property / Southbound	4.3 m (14 ft) / 80 m (262 ft)	$324,382	$300,000	Not Reasonable	Recommended
S551	R4.11-R4.22	51 SFR	Private Property / Southbound	3.7 m (12 ft) to 4.3 m (14 ft) / 1,102 m (3,615 ft)	$4,462,391	$2,550,000	Not Reasonable	Recommended for SI[3] Only
S557	R4.22A, R4.23, and R4.24	10 MFR	Private Property / Southbound	3.0 m (10 ft) / 271 m (889 ft)	$828,681	$400,000	Not Reasonable	Recommended for SI[3] Only

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 insertion loss. *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 *Figure 2-2.14j – 2-2.14m*. 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 3.15.11).*

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 Elementary School, 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 3.15.11*).

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 Elementary School, represented by Receptors R5.5 and R5.6, and would be considered feasible (*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, construction of soundwall S565 would not be recommended.

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*). Construction of soundwall S567 may be recommended if negotiations with property owners could result in reducing or eliminating easement costs required for construction. 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. 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 (*Table 3.15.11*).

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 3.0 m (10 ft) 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] 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.): 2.4 m (8 ft) Leq(h)	2.4 m (8 ft) I.L.	3.0 m (10 ft) Leq(h)	3.0 m (10 ft) I.L.	3.7 m (12 ft) Leq(h)	3.7 m (12 ft) I.L.	4.3 m (14 ft) Leq(h)	4.3 m (14 ft) I.L.	4.9 m (16 ft) Leq(h)	4.9 m (16 ft) I.L.	Soundwall No./ Feasibility
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 K, I**	**6**	66	8	64	10	63	11	62	12	S561 / Feasible
R5.3 W	14085 Mango Dr - Del Mar Hills Elementary School 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 Dr - Del Mar Hills Elementary School	64	65	67 A/E	66	1	65	2	65	2	65	2	64	3	--
R5.5	14085 Mango Dr - Del Mar Hills Elementary School - 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 Dr - Del Mar Hills Elementary School - 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 K, I**	**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 K, I**	**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 I	3	69	4	**68 K**	**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 I	3	66	4	**65 K**	**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 I	3	64	4	64	4	**63 K**	**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	--	--	--	--	--	--	--	--	--	--	--
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 I	3	65	4	65	4	**64 K**	**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 K, I**	**6**	66	8	64	10	62	12	61	13	S568 / Feasible
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 I	4	69	5	**68 K**	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 – Leq(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 Noise Abatement Criteria (NAC) of 67dBA 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 / Southbound	2.4 m (8 ft) / 150 m (492 ft)	$407,215	$240,000	Not Reasonable	Not Recommended
S563	R5.3	1 SCH (3 Frontage Units)	School Property / Southbound	3.7 m (12 ft) / 97 m (318 ft)	$357,592	$144,000	Not Reasonable	Not Recommended
S565	R5.5 – R5.6	1 SCH (14 Frontage Units)	School Property / Southbound	3.0 m (10 ft) / 111 m (364 ft)	$344,879	$200,000	Not Reasonable	Not Recommended
S567	R5.7A, R5.8, R5.8A	7 SFR	R/W / Southbound	2.4 m (8 ft) / 140 m (459 ft)	$348,948	$336,000	Not Reasonable	Recommended
S568	R5.21 – R5.23	11 SFR	R/W and Private Property / Southbound	2.4 m (8 ft) to 4.3 m (14 ft) / 216 m (709 ft)	$675,865	$440,000	Not Reasonable	Not Recommended
S569	R5.9	3 SFR	R/W / Southbound	4.9 m (16 ft) / 77 m (253 ft)	$311,330	$138,000	Not Reasonable	Not Recommended
S573	R5.10 – 5.14	8 SFR	Shoulder / Southbound	3.7 m (12 ft to 4.3 m (14 ft) / 650 m (2,133 ft)	$1,396,532	$304,000	Not Reasonable	Not Recommended
S589	R5.24 – R5.26	3 REC (8 Frontage Units)	Shoulder / Southbound	3.7 m (12 ft) to 4.3 m (14 ft) / 562 m (1,844 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.

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 insertion loss. *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 *Figure 2-2.14m – 2-2.14o*. 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 ten 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, 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*).

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 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*). This soundwall, however, has the potential to block scenic coastal views for freeway motorists protected under the Coastal Act. For that reason, it may be found not reasonable to build during the coastal permitting process. The potential visual impacts are further discussed in Chapter 3.7. Soundwall S603 Option 1 would be preliminarily recommended, however, the Coastal Act and public input would be considered prior to rendering a final decision on this soundwall (*Table 3.15.14*).

<u>Soundwall S603 (Option 2):</u> 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

<u>Receptors R6.1 through R6.2:</u> 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*).

<u>Receptors R6.1A and R6.3</u>: 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*).

<u>Receptors R6.22 and R6.23:</u> 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 façade of the building.

<u>Receptors R6.24 and R6.25:</u> 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 3.9 meter (12.8 foot) high glass and block wall specifically designed to reduce traffic noise at this property. A 4.3 meter (14 foot) and 4.9 meter (16 foot) 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] Leq(h), dBA	Future Peak Hour Noise Levels, Leq(h), dBA[1,2]												Soundwall No./ Feasibility
			Future "No Build"	Project without Soundwall	Noise Prediction with Soundwall and Soundwall Insertion Loss										
					2.4 m (8 ft)		3.0 m (10 ft)		3.7 m (12 ft)		4.3 m (14 ft)		4.9 m (16 ft)		
					Leq(h)	I.L.	Leq(h)	I.L.	Leq(h)	I.L.	Leq(h)	I.L.	Leq(h)	I.L.	
Via de la Valle to Lomas Santa Fe Drive – Southbound															
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 / Feasible
R6.4	804 Ida Avenue	71	76	80 A/E	**73 K,I**	**7**	71	9	70	10	69	11	68	12	S603 / Feasible
R6.5	828 Ida Avenue	64	69	74 A/E	69	5	**68 R**	**6**	67	7	67	7	66	8	S603 / Feasible
R6.6*	708 Castro Street	61	69	69 A/E	66	3	65 T	4	**64 R**	**5**	63	6	63	6	S603 / Feasible
R6.7*	709 Ida Avenue	64	69	71 A/E	68 T	3	67	4	**66 R**	**5**	65	6	64	7	S603 / Feasible
R6.7A	635 Ida Avenue	64	69	68 A/E	65 I	3	64	4	**63 K**	**5**	63	5	62	6	S603 / 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 / Feasible
R6.9	865 Mola Vista Way	69	74	74 A/E	70 T	4	**68 K**	**6**	67	7	66	8	65	9	S603 / 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 / Feasible
R6.10	838 Academy - Santa Fe Christian School	75	73	76 A/E	71	5	**70 R,T**	**6**	69	7	68	8	67	9	S603 / Feasible
R6.11	838 Academy - Santa Fe Christian School	76	74	75 A/E	73	2	**70 R,T**	**5**	68	7	67	8	66	9	S603 / Feasible
Via de la Valle to Lomas Santa Fe Drive – Northbound															
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 I	3	69	4	**67 K**	**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	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 I	4	6	4	**67 K**	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 K,I**	**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
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 Dr - 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 Dr - 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 – Leq(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 Noise Abatement Criteria (NAC) of 67dBA 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] Leq(h), dBA	Future "No Build"	Project without Soundwall	Future Peak Hour Noise Levels, Leq(h), dBA[1,2] Noise Prediction with Soundwall and Soundwall Insertion Loss (I.L.) 2.4 m (8 ft) Leq(h)	I.L.	3.0 m (10 ft) Leq(h)	I.L.	3.7 m (12 ft) Leq(h)	I.L.	4.3 m (14 ft) Leq(h)	I.L.	4.9 m (16 ft) Leq(h)	I.L.	Soundwall No./ Feasibility
Via de la Valle to Lomas Santa Fe – Southbound															
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 – Northbound															
R6.17A	3355 Lower Ridge Road	72	71	72 A/E	69	3	68	4	**67 R,T**	**5**	66	6	65	7	S602 (Option 2) / Feasible
R6.17	3355 Lower Ridge Road	71	72	75 A/E	70	5	69 T	6	**68 R**	**7**	67	8	67	8	S602 (Option 2) / Feasible
R6.18	3295 Lower Ridge Road	69	71	73 A/E	70	3	70	3	69	4	68	5	**68 R,T**	**5**	S602 (Option 2) / Feasible
R6.19	13126 Windbreak Road	70	72	75 A/E	73	2	73	2	72	3	71	4	**70 K, I**	**5**	S602 (Option 2) / Feasible
R6.20	3404 Lady Hill Road	73	75	75 A/E	75 T	0	74	1	71	4	69	6	**68 R,4**	**7**	S602 (Option 2) / Feasible

1 – Leq(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 Noise Abatement Criteria (NAC) of 67dBA 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	Barrier 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, 10SFR	Shoulder and R/W / Northbound	3.7 m (12 ft) to 4.9 m (16 ft) / 887 m (2,877 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 / Southbound	2.4 m (8 ft) to 3.7 m (12 ft) / 1,048 m (3,439 ft)	$1,717,564	$2,024,000	Reasonable	Recommended
S602 Option 2	R6.17A, R6.17 – R6.20	6 SFR	Shoulder and R/W / Northbound	3.7 m (12 ft) to 4.9 (16 ft) / 120 m (1,509 ft)	$1,286,701	$252,000	Not Reasonable	Recommended for SI[3] Only
S603 Option 2	R6.9 and R6.9A	3 MFR	Private Property / Southbound	4.3 m (14 ft) to 4.9 m (16 ft) / 120 m (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

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 insertion loss. *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 *Figure 2-2.14o & 2-2.14p*. 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 3.7 m (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 3.0-m (10-ft) 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*). 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*). Abatement for these residences would be required. However, since this soundwall could potentially block scenic views to the San Elijo Lagoon for residences, Option 2 would be proposed.

Soundwall S622 (Option 2): Soundwall S622 option 2 would be a shorter wall located along the northbound side of I-5, south of Manchester. 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*). Additionally, Option 2 would eliminate the potentially severe visual impacts associated with Option 1. 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 3.15.16*). 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 3.15.115*). 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] Leq(h), dBA	Future "No Build"	Future Peak Hour Noise Levels, Leq(h), dBA[1,2] Project without Soundwall	Noise Prediction with Soundwall and Soundwall Insertion Loss (I.L.) 2.4 m (8 ft) Leq(h)	2.4 m (8 ft) I.L.	3.0 m (10 ft) Leq(h)	3.0 m (10 ft) I.L.	3.7 m (12 ft) Leq(h)	3.7 m (12 ft) I.L.	4.3 m (14 ft) Leq(h)	4.3 m (14 ft) I.L.	4.9 m (16 ft) Leq(h)	4.9 m (16 ft) I.L.	Soundwall No./
Lomas Santa Fe to Manchester Avenue - Southbound															
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 to Manchester Avenue – Northbound															
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
Lomas Santa Fe to Manchester Avenue - Southbound															
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[K]**	**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[T]	4	62	4	**61[R]**	**5**	61	5	61	5	S622 / Feasible
R7.21	757 Santa Rosita	72	70	72 A/E	69[T]	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[T]	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[T]	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[T]	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[T]	4	**65[R]**	5	64	6	64	6	S622 / Feasible
R7.28	733 Santa Florencia	68	68	70 A/E	66[T]	4	65	5	**64[R]**	6	64	6	64	6	S622 / Feasible
R7.29	717 Santa Florencia	68	68	68 A/E	64[T]	4	64	4	63	5	**63[R]**	**5**	63	5	S622 / Feasible
R7.30	810 Santa Inez	67	67	67 A/E	64[T]	3	63	4	63	4	**62[R]**	**5**	62	5	S622 / Feasible
R7.31	828 Santa Inez	68	68	70 A/E	65[T]	5	64	6	63	7	**63[R]**	**7**	62	8	S622 / Feasible
R7.32*	825 Santa Inez	68	67	68 A/E	64[T]	4	63	5	62	6	**62[R]**	**6**	60	8	S622 / Feasible

1 – Leq(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 Noise Abatement Criteria (NAC) of 67dBA 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] Leq(h), dBA	Future "No Build"	Future Peak Hour Noise Levels, Leq(h), dBA[1,2]: Project "Build" without Soundwall	Noise Prediction with Soundwall and Soundwall Insertion Loss (I.L.): 2.4 m (8 ft) Leq(h)	2.4 m (8 ft) I.L.	3.0 m (10 ft) Leq(h)	3.0 m (10 ft) I.L.	3.7 m (12 ft) Leq(h)	3.7 m (12 ft) I.L.	4.3 m (14 ft) Leq(h)	4.3 m (14 ft) I.L.	4.9 m (16 ft) Leq(h)	4.9 m (16 ft) I.L.	Soundwall No./ Feasibility
Lomas Santa Fe to Manchester Avenue - Southbound															
R7.23	825 Santa Florencia	73	73	76 A/E	74	2	73	3	72T	4	**71R**	**5**	69	7	S622 (Option 2) / Feasible
R7.24	809 Santa Florencia	74	74	76 A/E	74	2	73	3	**71R,T**	**5**	70	6	69	7	S622 (Option 2) / Feasible
R7.25	783 Santa Florencia	75	75	77 A/E	74	3	73	4	**72R,T**	**5**	71	6	70	7	S622 (Option 2) / Feasible
R7.26	771 Santa Florencia	74	74	76 A/E	72T	4	72T	6	**69R**	**7**	68	8	67	9	S622 (Option 2) / Feasible

1 – Leq(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 Noise Abatement Criteria (NAC) of 67dBA 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 / Northbound	2.4 m (8 ft) to 3.0 m (10 ft) / 152 m (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 / Northbound	3.0 m (10 ft) to 4.3 (14 ft) / 1,112 m (3,648 ft)	$2,261,800	$1,600,000	Not Reasonable	Not Recommended
S622 Option 2	R7.23 – R7.26	9SFR	R/W / Northbound	3.7 m (12 ft) to 4.3 m (14 ft) / 279 m (915 ft)	$706,752	$450,000	Not Reasonable	Recommended

1 – Land Use: SFR – single-family residence; MFR – multi-family residence.
2 – Estimated construction cost includes cost of easements.

SEGMENT 8 – Manchester Drive 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 insertion loss. *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 *Figure 2-2.14p – 2-2.14r*. 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 would therefore 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 45 m (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 30 m (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 18 m (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] Leq(h), dBA	Future "No Build"	Project without Soundwall	Future Peak Hour Noise Levels, Leq(h), dBA[1,2] Noise Prediction with Soundwall and Soundwall Insertion Loss (I.L.) 2.4 m (8 ft) Leq(h)	2.4 m (8 ft) I.L.	3.0 m (10 ft) Leq(h)	3.0 m (10 ft) I.L.	3.7 m (12 ft) Leq(h)	3.7 m (12 ft) I.L.	4.3 m (14 ft) Leq(h)	4.3 m (14 ft) I.L.	4.9 m (16 ft) Leq(h)	4.9 m (16 ft) I.L.	Soundwall No./ Feasibility
Manchester Avenue to Birmingham Drive - Southbound															
R8.1	2559 Manchester	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 T	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 T	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 T	4	**72 R**	**5**	70	7	S635 / Feasible
R8.7*	2433 Caminito Ocean Cove	57 N	69	68	67	1	67	1	66 T	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
R8.10M	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 – Northbound															
R8.13	3107 Manchester	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	S644 / Feasible
R8.23	1944 Playa Riviera Drive	79 A/E	76	79	77	2	75 T	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, I**	**5**	S644 / Feasible
R8.25	1914 Playa Riviera Drive	77 A/E	74	77	71 T	6	69 R	8	67	10	66	11	65	12	S646 / Feasible
R8.26	1884 Playa Riviera Drive	76 A/E	74	76	74 T	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 – Leq(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 Noise Abatement Criteria (NAC) of 67dBA 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 / Southbound	3.0 m (10 ft) to 3.7 m (12 ft)/ 231 m (758 ft)	$807,239	$1,056,000	Reasonable	Recommended
S633	R8.3, R8.4, and R8.5	1 SFR and 20 MFR	R/W / Southbound	3.7 m (12 ft) / 255 m (837ft)	$771,426	$1,092,000	Reasonable	Recommended
S635	R8.6	8 MFR	Shoulder / Southbound	4.3 m (14 ft) / 98 m (322 ft)	$346,323	$400,000	Reasonable	Recommended
S640	R8.18	2 SFR	R/W / Northbound	4.3 m (14 ft) / 128 m (420 ft)	$463,147	$92,000	Not Reasonable	Not Recommended
S647	R8.10A and R8.11	5 MFR	Shoulder / Southbound	4.3 m (14 ft) / 212 m (696 ft)	$293,478	$200,000	Not Reasonable	Not Recommended
S644 and S646	R8.23 – R8.26	12 SFR	R/W and Private Property / Northbound	3.7 m (12 ft) to 4.9 m (16 ft) / 106 m (348 ft) and 3.0 m (10 ft) / 181 m (594 ft)	$990,771	$624,000	Not Reasonable	Recommended

1 – Land Use: SFR – single-family residence; MFR – multi-family residence.
2 – Estimated construction cost includes cost of easements.

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 insertion loss. *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 *Figure 2-2.14r – 2-2.14t*. 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*). Construction of soundwall S652 may be recommended if negotiations with property owners could result in reducing or eliminating easement costs required for construction. 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 alternative 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, and no further abatement would be provided.

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*). No further abatement would be provided.

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 would also 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 onramp would not provide the required 5 dB noise reduction, and would therefore 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]	Future Peak Hour Noise Levels, Leq(h), dBA[1,2]												Soundwall No./ Feasibility
			Future "No Build"	Project "Build" without Soundwall	Noise Prediction with Soundwall and Soundwall Insertion Loss (I.L.)										
					2.4 m (8 ft)		3.0 m (10 ft)		3.7 m (12 ft)		4.3 m (14 ft)		4.9 m (16 ft)		
		Leq(h), dBA			Leq(h)	I.L.	Leq(h)	I.L.	Leq(h)	I.L.	Leq(h)	I.L.	Leq(h)	I.L.	
Birmingham Drive to Santa Fe Drive – Southbound															
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 I	7	**68 K**	**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 – Northbound															
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 K, I**	**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 I	3	71	4	**70 K**	**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 I	3	69	4	69	4	68	5	**68 K**	**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 I	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 I	4	**66 K**	**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 K**	**5**	67	7	66	8	S658 / Feasible

1 – Leq(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 Noise Abatement Criteria (NAC) of 67dBA 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 / Southbound	3.0 m (10 ft) / 216 m (709 ft)	$638,653	$216,000	Not Reasonable	Recommended for SI[3] Only
S652	R9.11 and R9.12	6 SFR	Property Line / Northbound	2.4 m (8 ft) / 124 m (407ft)	$339,956	$252,000	Not Reasonable	Recommended for SI[3] Only
S654 Option 1	R9.13 to R9.15	9 SFR	R/W / Northbound	3.7 m (12 ft) to 4.9 m (16 ft) / 327 m (1,073 ft)	$849,352	$360,000	Not Reasonable	Not Recommended
S654 Option 2	R9.13	1 SFR	Private Property / Northbound	3.0 m (10 ft) 57 m (187 ft)	$177,100	$42,000	Not Reasonable	Recommended
S658	R9.17 to R9.22	20 SFR	R/W and Shoulder / Northbound	2.4 m (8 ft) to 3.7 m (12 ft) / 651 m (2,136 ft)	$1,382,331	$1,040,000	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

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 insertion loss. *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 *Figure 2-2.14t & 2-2.14u*. 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*). Construction of soundwall S675 may be recommended if negotiations with property owners could result in reducing or eliminating easement costs required for construction. 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 alternative abatement would be provided only for the severely impacted receptor, R9.12.

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 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 3.15.22*).

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 (*Table 3.15.21*).

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 transparent walls 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] Leq(h), dBA	Future Peak Hour Noise Levels, Leq(h), dBA[1,2]: Future "No Build"	Project without Soundwall	Noise Prediction with Soundwall and Soundwall Insertion Loss: 2.4 m (8 ft) Leq(h)	2.4 m (8 ft) I.L.	3.0 m (10 ft) Leq(h)	3.0 m (10 ft) I.L.	3.7 m (12 ft) Leq(h)	3.7 m (12 ft) I.L.	4.3 m (14 ft) Leq(h)	4.3 m (14 ft) I.L.	4.9 m (16 ft) Leq(h)	4.9 m (16 ft) I.L.	Soundwall No. / Feasibility
Santa Fe Drive to Encinitas Boulevard – Southbound															
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	4	66	9	Not Feasible
R10.3B[K]	826 Devonshire Drive	67	66	68 A/E	65[I]	3	65	3	63	5	**63[K]**	**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[K,I]**	**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 – Northbound															
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 Community Church	76	75	77 A/E	74	3	73[I]	4	**72[K]**	**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*	8101-4 Regal Road - Regal Apts Playground	70	71	74 A/E	71	3	70	4	69[T]	5	**69[R]**	**5**	67	7	S670 / Feasible
R10.16*	Regal Apartments	66	67	70 A/E	69	1	69	1	68	2	67	3	66	4	Not Feasible
R10.17*	395 Requeza Street	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 – Leq(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 to account for attenuation provided by first-row buildings.
A/E – Approaches or Exceeds the Noise Abatement Criteria (NAC) of 67dBA 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 1.5 m (5 ft) high block wall and 1.9 m (6 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 / Southbound	3.7 (12 ft) to 4.3 m (14 ft) / 262 m (860 ft)	$555,708	$462,000	Not Reasonable	Recommended for SI[3] Only
S675	R10.5 – R10 8	18 SFR	R/W / Southbound	2.4 m (8 ft) to 3.0 m (10 ft) / 436 m (1,430ft)	$1,025,864	$972,000	Not Reasonable	Recommended
S664	R10.11 – R10.13	3 SFR, 8 MFR and SCH (3 Frontage Units)	R/W / Northbound	3.7 m (12 ft) to 4.3 m (14 ft) / 385 m (1,263 ft)	$1,171,232	$700,000	Not Reasonable	Recommended for SI[3] Only
S670	R10.14 and R10.15	2 REC (2 Frontage Units)	Shoulder / Northbound	4.3 m (14 ft) to 4.9 m (16 ft) / 371 m (1,217 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

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 insertion loss. *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 *Figure 2-2.14u – 2-2.14w*. 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*). Construction of soundwall S680 may be recommended if negotiations with property owners could result in reducing or eliminating easement costs required for construction. 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 (*Table 3.15.24*).

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 S646A would not be reasonable to construct due to the estimated construction cost exceeding the reasonable allowance (*Table 3.15.24*). However, S646A would be recommended in order to abate for the severely impacted receptor, R11.27 (*Table 3.15.24*).

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 eight single-family residences represented by Receptors R11.26 and R11.28 (*Table 3.15.23*). Soundwalls S686B and S686C would not be reasonable to construct due to the estimated construction cost exceeding the reasonable allowance (*Table 3.15.24*). Therefore, construction would not 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, 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 S686 has the potential to create a severe 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 would also 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]	Future "No Build"	Project "Build" without	Future Peak Hour Noise Levels, Leq(h), dBA[1,2]										Soundwall No. / Feasibility
					Noise Prediction with Soundwall and Soundwall Insertion Loss (I.L.)										
					2.4 m (8 ft)		3.0 m (10 ft)		3.7 m (12 ft)		4.3 m (14 ft)		4.9 m (16 ft)		
		Leq(h), dBA			Leq(h)	I.L.	Leq(h)	I.L.	Leq(h)	I.L.	Leq(h)	I.L.	Leq(h)	I.L.	
Encinitas Boulevard to Leucadia Boulevard – Southbound															
R11.1	469 Arroyo	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	S689 / Feasible
R11.5A	365 1/2 Ocean View Avenue, 1/2 A	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 – Leq(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 Noise Abatement Criteria (NAC) of 67dBA 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: Predicted Future Noise Levels and Soundwall Feasibility for Segment 11 (Cont'd)

Receptor No.	Site Address	Existing Noise Levels[1] Leq(h), dBA	Future Peak Hour Noise Levels, Leq(h), dBA[1,2]												Soundwall No. / Feasibility
			Future "No Build"	Project "Build" without	Noise Prediction with Soundwall and Soundwall Insertion										
					2.4 m (8 ft)		3.0 m (10 ft)		3.7 m (12 ft)		4.3 m (14		4.9 m (16		
					Leq(h)	I.L.	Leq(h)	I.L.	Leq(h)	I.L.	Leq(h)	I.L.	Leq(h)	I.L.	
Encinitas Boulevard to Leucadia Boulevard – Northbound															
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
R.11.28	Saxony Condominiums - Park	66	69	72 [A/E]	69[T]	3	**67[R]**	**5**	65	7	64	8	63	9	S686B/C / Feasible
R11.27	402 Carmel Creeper Place	70	73	77 [A/E]	**71[R,T]**	**6**	69	8	66	11	65	12	63	14	S686A / Feasible
R11.29	551 Union	69	72	75 [A/E]	72[I]	3	71	4	71	4	71	4	**70[K]**	**5**	S688 / Feasible
R11.30*	559 Union	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[K]**	**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[I]	3	70	5	69	6	**68[K]**	**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 – Leq(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 Noise Abatement Criteria (NAC) of 67dBA 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 2.7 m (9 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 / Northbound	2.4 m (8 ft) to 4.9 m (16 ft) / 664 m (2,178 ft)	$2,224,864	$1,596,000	Not Reasonable	Recommended
S686A	R11.27	1 Park (2 Frontage Units)	Private Property / Northbound	2.4 m (8 ft) / 110 m (361 ft)	$300,628	$84,000	Not Reasonable	Recommended
S686B & S686C	R11.26, R11.28	8 SFR	Private Property / Northbound	3.0 m (10 ft) / 154 m (505 ft)	$478,480	$320,000	Not Reasonable	Not Recommended
S688	R11.29	1 SFR	Shoulder / Northbound	4.9m (16 ft) / 135 m (443 ft)	$375,374	$50,000	Not Reasonable	Recommended for SI[3] Only
S689	R11.5A – R11.20	26 SFR	R/W and Shoulder / Southbound	3.7 m (12 ft) to 4.9 m (16 ft) / 1,297 m (4,225 ft)	$1,966,677	$1,456,000	Not Reasonable	Recommended
S692	R11.31 – R11.36	10 SFR and 1 Park (6 Frontage Units)	R/W and Shoulder / Northbound	3.7 m (12 ft) to 4.3 m (14 ft) / 542 m (1,778 ft)	$1,331,713	$864,000	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

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 insertion loss. *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 *Figure 2-2.14w – 2-2.14y*. 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, R12.14, 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, R12.9, R12.10, R12.11, R12.12A, R12.13, R12.15, R12.18, R12.20, R12.21, R12.23, R12.25, and R12.26 (*Table 3.15.26*). Receptors R12.5, R12.14, R12.16, and R12.19 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, R12.5, R12.14, R12.16, and R12.19, 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. A soundwall 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 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 2.1-m (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 1.8 to 2.1 m (6 to 7 ft) 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 20 to 25 m (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] Leq(h), dBA	Future Peak Hour Noise Levels, Leq(h), dBA[1,2]												Soundwall No. / Feasibility
			Future "No Build"	Project without Soundwall	Noise Prediction with Soundwall and Soundwall Insertion Loss										
					2.4 m (8 ft)		3.0 m (10 ft)		3.7 m (12 ft)		4.3 m (14 ft)		4.9 m (16 ft)		
					Leq(h)	I.L.	Leq(h)	I.L.	Leq(h)	I.L.	Leq(h)	I.L.	Leq(h)	I.L.	
Leucadia Boulevard to La Costa Avenue – Southbound															
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	S709 / 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	S709 / Feasible
R12.7	1214 Orpheus Avenue	72	73	76 A/E	75	1	75	1	74	2	**73 R,X,T**	**3**	72	4	S709 / 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 Glaucus Street East	68	69	71 A/E	71	0	71	0	71	0	70	1	70	1	Not Feasible
R12.11	520 Glaucus Street East	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	Not 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[K]**	**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**	S709 / Feasible

1 – Leq(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 Noise Abatement Criteria (NAC) of 67dBA 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: Predicted Future Noise Levels and Soundwall Feasibility for Segment 12 (Cont'd)

Receptor No.	Site Address	Existing Noise Levels[1] Leq(h), dBA	Future Peak Hour Noise Levels, Leq(h), dBA[1,2]												Soundwall No. / Feasibility
			Future "No Build"	Project without Soundwall	Noise Prediction with Soundwall and Soundwall Insertion Loss										
					2.4 m (8 ft)		3.0 m (10 ft)		3.7 m (12 ft)		4.3 m (14 ft)		4.9 m (16 ft)		
					Leq(h)	I.L.	Leq(h)	I.L.	Leq(h)	I.L.	Leq(h)	I.L.	Leq(h)	I.L.	
Leucadia Boulevard to La Costa Avenue – Southbound (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[I]	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 – Northbound															
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[I]	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 – Leq(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 Noise Abatement Criteria (NAC) of 67dBA 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 / Northbound	4.9 m (16 ft) / 175 m (574 ft)	$189,079	$48,000	Not Reasonable	Not Recommended
S706	R12.39	1 SFR	R/W / Northbound	4.9 m (16 ft) / 272 m (892 ft)	$292,802	$48,000	Not Reasonable	Not Recommended
S709	R12.5, R12.14, R12.14A, R12.16, R12.16A, R12.17, R12.19, R12.22, R12.24, and R12.26A	14 SFR and 11 MFR	Shoulder and R/W / Southbound	4.3 m (14 ft) and 4.9 m (16 ft) / 1,665 m (5,463 ft)	$4,686,290	$1,050,000	Not Reasonable	Recommended for SI[3] Only
S719	R12.29	1 SFR	R/W / Southbound	2.4 m (8 ft) / 111 m (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

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 insertion loss. *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 *Figure 2-2.14y – 2-2.14aa*. 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. No further abatement would be provided.

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*). Construction of soundwall S675 may be recommended if negotiations with property owners could result in reducing or eliminating easement costs required for construction. 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 3.15.27).

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 1.8-m (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, S736 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 1.8 m (6 ft) high property wall located on the top of a berm, approximately 10 to 20 m (33 to 66 ft) above than 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 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] Leq(h), dBA	Future Peak Hour Noise Levels, Leq(h), dBA[1,2]													Soundwall No. Feasibility
			Future "No Build"	Project without Soundwall	Noise Prediction with Soundwall and Soundwall Insertion Loss (I.L.)											
					2.4 m (8 ft)		3.0 m (10 ft)		3.7 m (12 ft)		4.3 m (14 ft)		4.9 m (16 ft)			
					Leq(h)	I.L.	Leq(h)	I.L.	Leq(h)	I.L.	Leq(h)	I.L.	Leq(h)	I.L.		
La Costa Avenue to Poinsettia Lane – Southbound																
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 T	1	64	3	**62 R**	**5**	60	7	58	9	S729 / Feasible	
R13.4	7534 Navigator Circle	64	65	68 A/E	64 T	4	**62 R**	**6**	61	7	59	9	58	10	S729 / Feasible	
R13.5	7522 Navigator Circle	66	67	70 A/E	67 T	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	56	58	61 N	--	--	--	--	--	--	--	--	--	--	--	
R13.13 W	7330 San Bartolo	66	68	71 A/E	67 T	4	66	5	65	6	**65 R**	**6**	64	7	S737/ Feasible	
R13.14 W	7320 San Bartolo	68	70	72 A/E	68 T	4	67	5	66	6	**65 R**	**7**	64	8	S737/ Feasible	
R13.15 W	7312 San Bartolo	65	67	70 A/E	67 T	3	66	4	65	5	**64 R**	**6**	64	6	S737/ Feasible	
R13.16 W	7306 San Bartolo	64	66	68 A/E	66 T	2	65	3	64	4	**63 R**	**5**	63	5	S737/ Feasible	
La Costa Avenue to Poinsettia Lane – Northbound																
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 T	4	**62 R**	**7**	60	9	58	11	57	12	S730 / Feasible	
R13.19	889 Piovana Court	66	66	67 A/E	63 T	4	**60 R**	**7**	58	9	56	11	56	11	S730 / Feasible	
R13.20A	880 Piovana Court	68	66	67 A/E	63 T	4	**60 R**	**7**	58	9	57	10	56	11	S730 / Feasible	
R13.20	880 Piovana Court	64	64	66 A/E	61 T	5	**60 R**	**6**	58	8	58	8	57	9	S730 / Feasible	
R13.21	7429 Linden Terrace	63	65	68 A/E	65 T	3	64	4	**63 R**	**5**	62	6	61	7	S736 / Feasible	
R13.21A	7429 Linden Terrace	67	69	71 A/E	67 T	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 T	2	67	4	**65 R**	**6**	64	7	63	8	S736 / Feasible	
R13.26 W	7103 Linden Terrace	68	69	71 A/E	69 T	2	67	4	**65 R**	**6**	63	8	63	8	S736 / Feasible	

1 – Leq(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 Noise Abatement Criteria (NAC) of 67dBA 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 / Southbound	2.4 m (8 ft) / 215 m (705 ft)	$587,592	$100,000	Not Reasonable	Recommended for SI[3] Only
S729	R13.3 – R13.5	12 SFR	Private Property / Southbound	3.0 m (10 ft) to 3.7 m (12 ft) / 184 m (604 ft)	$592,139	$456,000	Not Reasonable	Recommended
S730	R13.18 – R13.20A and R13.20	8 SFR	Private Property / Northbound	3.0 m (10 ft) / 248 m (814 ft)	$786,075	$288,000	Not Reasonable	Not Recommended
S736	R13.21 – R13.26	32 SFR and 46 MFR	Private Property / Northbound	2.4 m (8 ft) to 3.7 m (12 ft) / 111 m (364 ft)	$2,755,354	$3,276,000	Reasonable	Recommended
S737	R13.13 – R13.16	17 MH	R/W and Shoulder / Southbound	4.3 m (14 ft) / 444 m (1,457 ft)	$1,288,714	$850,000	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

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 insertion loss. *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 *Figure 2-2.14aa – 2-2.14ac*. 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, R14.21, 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 3.15.29*).

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 1.8-m (6-ft) property wall, and Receptors R14.4 through R14.6 are located behind an existing 2.7-m (9-ft) 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 R14.29 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 120 m (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 would therefore 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] Leq(h), dBA	Future Peak Hour Noise Levels, Leq(h), dBA[1,2]												Soundwall No. / Feasibility
			Future "No Build"	Project without Soundwall	Noise Prediction with Soundwall and Soundwall Insertion Loss (I.L.)										
					2.4 m (8 ft)		3.0 m (10 ft)		3.7 m (12 ft)		4.3 m (14 ft)		4.9 m (16 ft)		
					Leq(h)	I.L.	Leq(h)	I.L.	Leq(h)	I.L.	Leq(h)	I.L.	Leq(h)	I.L.	
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
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
R14.21W	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
R14.23W	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
R14.25W	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
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	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 – Leq(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 Noise Abatement Criteria (NAC) of 67dBA 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 / Northbound	3.7 m (12 ft) to 4.9 m (16 ft) / 1,461 m (4,793 ft)	$5,293,948	$4,784,000	Not Reasonable	Recommended

1 – Land Use: SFR – single-family residence; MFR – multi-family residence; MH – mobile home.
2 – Estimated construction cost includes cost of easements.

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 insertion loss. *Table 3.15.31* 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 *Figure 2-2.14ac & 2-2.14ad*. The following paragraphs describe the preliminary abatement decisions for Segment 15.

Soundwall S783: 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 that would be impacted by the proposed project where it would not be feasible to apply standard noise abatement techniques.

Table 3.15.31: Predicted Future Noise Levels and Soundwall Feasibility for Segment 15

Receptor No.	Site Address	Existing Levels[1] Leq(h), dBA	Future Peak Hour Noise Levels, Leq(h), dBA[1,2]													Soundwall No. / Feasibility
			Future "No Build"	Project "Build" without Soundwall	Noise Prediction with Soundwall and Barrier Insertion Loss (I.L.)											
					2.4 m (8 ft)		3.0 m (10 ft)		3.7 m (12 ft)		4.3 m (14 ft)		4.9 m (16 ft)			
					Leq(h)	I.L.	Leq(h)	I.L.	Leq(h)	I.L.	Leq(h)	I.L.	Leq(h)	I.L.		
Cannon Road – Southbound																
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 – Leq(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 Noise Abatement Criteria (NAC) of 67dBA 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 / Southbound	4.3 m (14 ft) / 120 m (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 insertion loss. *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 *Figure 2-2.14ad – 2-2.14af*. The following paragraphs describe the preliminary abatement decisions for Segment 16.

Soundwall S796: Soundwall S796 would be located on the shoulder along the northbound shoulder of I-5, just south 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*).

Soundwall S798: 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 two 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*).

Soundwall S799: 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*). No further abatement would be provided.

Soundwall S801: 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 three 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

There are no noise sensitive areas in Segment 15 that would be impacted by the proposed project where it would not be feasible to apply 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] Leq(h), dBA	Future Peak Hour Noise Levels, Leq(h), dBA[1,2]												Soundwall No. / Feasibility
			Future "No Build"	Project without Soundwall	Noise Prediction with Soundwall and Soundwall Insertion Loss (I.L.)										
					2.4 m (8 ft)		3.0 m (10 ft)		3.7 m (12 ft)		4.3 m (14 ft)		4.9 m (16 ft)		
					Leq(h)	I.L.	Leq(h)	I.L.	Leq(h)	I.L.	Leq(h)	I.L.	Leq(h)	I.L.	
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, I**	**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
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, I**	**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 – Leq(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 Noise Abatement Criteria (NAC) of 67dBA 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 / Northbound	4.3 m (14 ft) / 234 m (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 / Northbound	4.9 m (16 ft) and 2.4 m (8 ft) / 200 m (656 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 / Southbound	2.4 m (8 ft) and 3.0 m (10 ft) / 423 m (1,389 ft)	$1,261,796	$480,000	Not Reasonable	Recommended for SI[3] Only
S801	R16.8 – R16.10, and R16.13	3 SFR and 13 MFR	R/W / Southbound	2.4 m (8 ft) and 3.0 m (10 ft) / 222 m (733 ft)	$330,891	$672,000	Reasonable	Recommended
S802	R16.6 – R16.7	22 MFR	R/W / Northbound	2.4 m (8 ft) / 166 m (545 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

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 insertion loss. *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 *Figure 2-2.14af & 2-2.14ag*. 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 ten 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 daycare 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 soundwall would provide a feasible reduction in highway traffic noise for 28 single and 116 multi-family residences, represented by Receptors R17.17 through R17.20, and R17.22 through R17.34 (*Table 3.15.35*). 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 S810 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 to 3.0 m (10 ft).

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] Leq(h), dBA	Future Peak Hour Noise Levels, Leq(h), dBA[1,2]												Soundwall No. / Feasibility
			Future "No Build"	Project without Soundwall	Noise Prediction with Soundwall and Soundwall Insertion Loss (I.L.)										
					2.4 m (8 ft)		3.0 m (10 ft)		3.7 m (12 ft)		4.3 m (14 ft)		4.9 m (16 ft)		
					Leq(h)	I.L.	Leq(h)	I.L.	Leq(h)	I.L.	Leq(h)	I.L.	Leq(h)	I.L.	
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 Magndia 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 K**	**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 K**	**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 K**	**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 – Leq(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 Noise Abatement Criteria (NAC) of 67dBA 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: Predicted Future Noise Levels and Soundwall Feasibility for Segment 17 (Cont'd)

Receptor No.	Site Address	Existing Levels[1] Leq(h), dBA	Future Peak Hour Noise Levels, Leq(h), dBA[1,2]												Soundwall No. / Feasibility
			Future "No Build"	Project "Build" without Soundwall	Noise Prediction with Soundwall and Soundwall Insertion Loss (I.L.)										
					2.4 m (8 ft)		3.0 m (10 ft)		3.7 m (12 ft)		4.3 m (14 ft)		4.9 m (16 ft)		
					Leq(h)	I.L.	Leq(h)	I.L.	Leq(h)	I.L.	Leq(h)	I.L.	Leq(h)	I.L.	
R17.17	965 Oak Avenue	70	70	72 A/E	67T	5	**66R**	**6**	65	7	64	8	64	8	S811 / Feasible
R17.18*	951 Oak Avenue	70	70	73 A/E	69	4	**67R**	**6**	67	6	66	7	65	8	S811 / Feasible
R17.19	991 Pine - Whispering Pines	72	72	71 A/E	66T	5	66	5	65	6	65	6	**65R**	**6**	S811 / Feasible
R17.20*	3316 Harding Street	69	69	70 A/E	66	4	65	5	64	6	64	6	**64R**	**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	**61R**	**5**	S811 / Feasible
R17.23	3350 Harding Street	71	71	72 A/E	67	5	65T	7	65	7	64	8	**64R**	**8**	S811 / Feasible
R17.24*	3460 Harding Street	67	70	72 A/E	68	4	**67K**	**5**	65	7	64	8	64	8	S811 / Feasible
R17.25	945 Chestnut Avenue	70	73	74 A/E	68T	6	**67R**	**7**	66	8	65	9	65	9	S811 / Feasible
R17.26*	910 Palm Avenue	67	70	72 A/E	68	4	**67R**	**5**	66	6	65	7	64	8	S811 / Feasible
R17.27	930 Palm Avenue	67	70	72 A/E	68T	4	**67R**	**5**	65	7	65	7	64	8	S811 / Feasible
R17.28	3630 Harding Street	73	74	76 A/E	**69K**	**7**	68	8	67	9	66	10	65	11	S811 / Feasible
R17.29	930 Magnolia Avenue	72	73	76 A/E	**69R,T**	**7**	68	8	67	9	66	10	65	11	S811 / Feasible
R17.30*	3696 Harding Street	71	72	75 A/E	**70R**	**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	**69R,T**	**5**	67	7	66	8	S811 / Feasible
R17.32	3748 Harding Street	72	73	76 A/E	73	3	71T	5	**70K**	**6**	68	8	67	9	S811 / Feasible
R17.33	3736 Harding Street	72	72	75 A/E	71	4	69T	6	**68R**	**7**	67	8	66	9	S811 / Feasible
R17.34	3836 Harding Street	74	74	77 A/E	70T	7	68	9	**67K**	**10**	66	11	65	12	S811 / Feasible

1 – Leq(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 Noise Abatement Criteria (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 / Northbound	3.0 m (10 ft) to 4.9 m (16 ft) / 1,170 m (3,838 ft)	$1,178,176	$2,214,000	Reasonable	Recommended
S811	R17.17 – R17.20, R17.22 – R17.34	28 SFR and 116 MFR	Shoulder / Southbound	3.0 (10 ft)	$1,181,326	$7,776,000	Reasonable	Recommended

1 – Land Use: SFR – single-family residence; MFR – multi-family residence

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 insertion loss. *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 *Figure 2-2.14ag – 2-2.14ai*. 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 and R18.22, R18.24 and R18.25. The soundwall would be partially founded on a retaining wall, and would replace an existing 2.4-m (8-ft) 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.

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 freeway extends across the lagoon at a much lower elevation than the receptors (*Table 3.15.37*).

Receptors R18.26 and 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*). Receptor R18.26 represents the pool area at the Extended Stay America hotel located on the southbound side of I-5. The results of traffic noise modeling indicate that a soundwall would have little effect on this area behind the building due to substantial shielding provided by the structure of the hotel (*Table 3.15.37*).

Table 3.15.37: Predicted Future Noise Levels and Soundwall Feasibility for Segment 18

Receiver No.	Site Address	Existing Levels[1] Leq(h), dBA	Future Peak Hour Noise Levels, Leq(h), dBA[1,2]												Soundwall No. / Feasibility
			Future "No Build"	Project without	Noise Prediction with Barrier and Barrier Insertion Loss (I.L.)										
					2.4 m (8 ft)		3.0 m (10 ft)		3.7 m (12 ft)		4.3 m (14 ft)		4.9 m (16 ft)		
					Leq(h)	I.L.	Leq(h)	I.L.	Leq(h)	I.L.	Leq(h)	I.L.	Leq(h)	I.L.	
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
R18.10	2363 Jefferson Street	71	72	73 A/E	69	4	69	4	69	4	69	4	**68 R**	**5**	S829 Feasible
R18.11F	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 K**	**5**	S827 / Feasible
R18.14K	2415 Tuttle Street	62	64	66 A/E	64	2	64	2	64 T	2	63	3	63	3	Not Feasible
R18.15K	2435 Tuttle Street	63	65	67 A/E	64	3	64	3	63 T	4	**62 R**	**5**	62	5	S821 / Feasible
R18.16K	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
R18.18D	1111 Buena Vista Way	69	72	78 A/E	74 T	4	72	6	**70 R**	**8**	69	9	68	10	S821 / Feasible
R18.19D,K	2501 Davis Avenue	63	66	71 A/E	68	3	67	4	**66 K**	**5**	65	6	64	7	S821 / Feasible
R18.20D	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
R18.22D	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 Dr - Carlsbad Retirement	61	62	65 N	--	--	--	--	--	--	--	--	--	--	--
R18.24D	1088 Laguna Dr - Carlsbad Retirement	70	71	78 A/E	--	--	74	4	**73 R,T**	**5**	71	7	73	5	S821 / Feasible
R18.25D	1088 Laguna Dr - Carlsbad Retirement	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 – Leq(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 Noise Abatement Criteria (NAC) of 67dBA 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 Barriers 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 / Northbound	4.9 m (16 ft) / 673 m (2,208 ft)	$503,671	$48,000	Not Reasonable	Not Recommended
S821	R18.15-R18.20, R18.22, R18.24, and R18.25	17 SFR and 34 MFR	R/W to Shoulder / Southbound	3.6 m (12 ft) to 4.3 m (14 ft) / 673 m (2,083 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 / Northbound	4.9 m (16 ft) to 4.3 m (14 ft) / 664 m (2,178 ft)	$1,100,582	$1,064,000	Not Reasonable	Recommended
S826	R18.7A	1 SFR	R/W / Northbound	3.0 m (10 ft) / 132 m (433 ft)	$336,866	$50,000	Not Reasonable	Recommended
S827	R18.11 – R18.13	3 SFR	R/W / Southbound	4.9 m (16 ft) / 178 m (584 ft)	$647,845	$168,000	Not Reasonable	Recommended
S829	R18.10	1 SFR	R/W / Southbound	4.9 m (16 ft) / 67 m (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.

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 insertion loss. *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 *Figure 2-2.14ai – 2-2.14aj*. 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 2.1-m (7-ft) 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 R 19.7 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, R19.36, 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 R19.40 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 1.8-m (6 ft) 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 1.8-m (6-ft) 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, R19.4 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*). Construction of soundwall S846 may be recommended if negotiations with property owners could result in reducing or eliminating easement costs required for construction. 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 only 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 3.15-41*).

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 Levels[1] Leq(h), dBA	Future "No Build"	Project without Soundwall	Future Peak Hour Noise Levels, Leq(h), dBA[1,2] Noise Prediction with Soundwall and Soundwall Insertion Loss (I.L.) 2.4 m (8 ft) Leq(h)	2.4 m (8 ft) I.L.	3.0 m (10 ft) Leq(h)	3.0 m (10 ft) I.L.	3.7 m (12 ft) Leq(h)	3.7 m (12 ft) I.L.	4.3 m (14 ft) Leq(h)	4.3 m (14 ft) I.L.	4.9 m (16 ft) Leq(h)	4.9 m (16 ft) I.L.	Soundwall No. / Feasibility
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
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 – Leq(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 Noise Abatement Criteria (NAC) of 67dBA for Activity Category B receptors.
D – Project "Build" Without Barrier 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 exiting 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: Predicted Future Noise Levels and Soundwall Feasibility for Segment 19 (Cont'd)

Receptor No.	Site Address	Existing Levels[1] Leq(h), dBA	Future "No Build"	Project without Soundwall	Future Peak Hour Noise Levels, Leq(h), dBA[1,2] Noise Prediction with Soundwall and Soundwall Insertion Loss (I.L.) 2.4 m (8 ft) Leq(h)	I.L.	3.0 m (10 ft) Leq(h)	I.L.	3.7 m (12 ft) Leq(h)	I.L.	4.3 m (14 ft) Leq(h)	I.L.	4.9 m (16 ft) Leq(h)	I.L.	Soundwall No. Feasibility
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[K]**	**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[K]**	**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 – Leq(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 Noise Abatement Criteria (NAC) of 67dBA for Activity Category B receptors.
D – Project "Build" Without Barrier 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 exiting 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 / Southbound	3.0 m (10 ft) and 3.7 m (12 ft) / 448 m (1,470 ft)	$991,044	$928,000	Not Reasonable	Recommended
S836	R19.1 – R19.3	3 SFR	R/W to Shoulder / Northbound	4.3 m (14 ft) / 212 m (695 ft)	$411,945	$156,000	Not Reasonable	Recommended
S840	R19.16A – R19.8	12 SFR	R/W to Shoulder / Northbound	4.9 m (16 ft) / 424 m (1,390 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 / Southbound	3.0 m (10 ft) and 4.3 m (14 ft) / 674 m (2,213 ft)	$1,259,636	$1,188,000	Reasonable	Recommended
S845	R19.25 – R19.28	10 SFR	R/W to Private Property / Southbound	2.4 m (8 ft) / 385 m (1,264 ft)	$393,342	$540,000	Reasonable	Recommended
S846	R19.12 – R19.18	18 SFR	R/W to Private Property / Northbound	2.4 m (8 ft) to 3.7 m (12 ft) / 455 m (1,494 ft)	$1,347,601	$972,000	Reasonable	Recommended
S849	R19.20 – R19.24	20 MH Clubhouse (1 Frontage Unit)	Shoulder / Southbound	3.7 m (12 ft) and 4.3 m (14 ft) / 393 m (1,289 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 homes.
2 – Estimated construction cost includes cost of easements.

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 insertion loss. *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 *Figure 2-2.14aj & 2-2.14ak*. 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*). Soundwall S855 would not be reasonable to construct due to the estimated construction cost exceeding the reasonable allowance (Table 3.15.42). Therefore, construction of S855 would not be recommended (*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*). Receptors R20.2 and R20.3 are 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 (T*able 3.15.42*). However, S862 would be recommended to abate highway noise for the severely impacted receptors (*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 2.4-m (8-ft) 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*). The existing 2.4-m (8 ft) soundwall would be replaced as a project feature. Construction of S863 would not be recommended (*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 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 R20.18 through R20.20: 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 with the front yards overlooking the I-5. Also, Receptors R20.18 and R20.20 would 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 R20.19 would not achieve a 5 dB benefit from a soundwall because it is shielded by a single-family residential structure (*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 south bound offramp 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 NAR, 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] Leq(h), dBA	Future "No Build"	Project "Build" without Soundwall	Future Peak Hour Noise Levels, Leq(h), dBA[1,2] Noise Prediction with Soundwall and Soundwall Insertion Loss (I.L.) 2.4 m (8 ft) Leq(h)	2.4 m (8 ft) I.L.	3.0 m (10 ft) Leq(h)	3.0 m (10 ft) I.L.	3.7 m (12 ft) Leq(h)	3.7 m (12 ft) I.L.	4.3 m (14 ft) Leq(h)	4.3 m (14 ft) I.L.	4.9 m (16 ft) Leq(h)	4.9 m (16 ft) I.L.	Soundwall No. / Feasibility
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
R20.5	Oceanside High School - Parking Lot	72	72	73 A/E	70	3	69 T	4	**67 R**	**6**	66	7	65	8	S859 / 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	S859 / 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	S859 / Feasible
R20.8 W	302 Grant Street	73	73	74 A/E	--	--	73 T	1	71	3	70	4	**69 R**	**5**	S859 / Feasible
R20.9 G,K	310 Grant Street	66	66	67 A/E	--	--	66	1	65	2	63	4	63	4	S859 / Feasible
R20.10 G,K	309 Garfield Street	67	67	68 A/E	--	--	67 T	1	65	3	64	4	**63 R**	**5**	S859 / Feasible
R20.11 W	326 Garfield Street	73	73	74 A/E	--	--	72	2	70	4	69	5	**67 R**	**7**	S859 / 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 – Leq(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 Noise Abatement Criteria (NAC) of 67dBA 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 / Southbound	3.0 m (10 ft) and 4.3 m (14 ft) / 423 m (1,389 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 / Southbound	3.7 m (12 ft) / 248 m (814 ft)	$618,046	$96,000	Not Reasonable	Recommended for SI[3] Only
S862	R20.1 – R20.3	REC (6 Frontage Units)	R/W / Northbound	3.7 m (12 ft) and 4.3 m (14 ft)/ 258 m (845 ft)	$506,051	$300,000	Not Reasonable	Recommended
S863	R20.5 – R20.8, R20.10 and R20.11	6 SFR, 5 MFR, and 1 SCH (15 Frontage Units)	R/W / Southbound	3.6 m (12 ft) to 4.9 m (16 ft) / 667 m (2,189 ft)	$1,989,486	$1,300,000	Not Reasonable	Not Recommended (Existing wall would be replaced as a project feature)

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 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 insertion loss. 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 *Figure 2-2.14ak – 2-2.14al*. 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 six 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 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 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] Leq(h), dBA	Future Peak Hour Noise Levels, Leq(h), dBA[1,2]												Soundwall No. / Feasibility
			Future "No Build"	Project without Soundwall	Noise Prediction with Soundwall and Soundwall Insertion Loss (I.L.)										
					2.4 m (8 ft)		3.0 m (10 ft)		3.7 m (12 ft)		4.3 m (14 ft)		4.9 m (16 ft)		
					Leq(h)	I.L.	Leq(h)	I.L.	Leq(h)	I.L.	Leq(h)	I.L.	Leq(h)	I.L.	
R21.1	1402 Olive Street	67	67	68 A/E	68	0	67T	1	67	1	67	1	66	2	Not Feasible
R21.2K	1348 Buena Street	62	61	63 N	--	--	--	--	--	--	--	--	--	--	--
R21.3K	1330 Buena Street	65	64	66 A/E	64	2	63T	3	63	3	62	4	**61R**	**5**	S868 / Feasible
R21.4K	1316 Buena Street	67	66	68 A/E	66	2	65	3	64T	4	63	5	**63R**	**5**	S868 / Feasible
R21.5*	1307 Bush Street	78	73	74 A/E	71T	3	70	4	69	5	68	6	**68R**	**6**	S868 / Feasible
R21.6	1304 Bush Street	70	70	71 A/E	69	2	69	2	68	3	68	3	67T	4	Not Feasible
R21.7*K	1310 Bush Street	64	64	65 N	64	1	63	2	63	2	62	3	62T	3	Not Feasible
R21.8	1305 Higgins Street	69	69	71 A/E	69	2	69	2	68	3	67	4	67T	4	Not Feasible
R21.8A	1308 Higgins Street	67	67	69 A/E	68	1	67	2	67	2	66	3	65T	4	Not Feasible
R21.9	Comfort Suites - Pool Area	65	68	71 A/E	68	3	67	4	64T	7	**64R**	**7**	63	8	S875 / Feasible
R21.10K	211 Dittmar	61	64	66 A/E	65	1	64	2	63	3	62	4	**61R**	**5**	S875 / Feasible
R21.11	712 Neptune Way	68	71	73 A/E	71	2	70	3	69	4	67T	6	**66R**	**7**	S875 / Feasible
R21.12*K	715 N Clementine Street	64	64	66 A/E	62	4	**61R**	**5**	60	6	59	7	58	8	S871 / Feasible
R21.13K	908 Windward Way	68	68	70 A/E	65T	5	**64R**	**6**	63	7	61	9	60	10	S871 / Feasible
R21.14	710 N Clementine Street	76	75	78 A/E	73T	5	**71R**	**7**	69	9	68	10	67	11	S871 / Feasible
R21.15*K	613 Horne Street North	63	73	65 N	61	4	**60R**	**5**	**60R**	5	59	6	58	7	S871 / Feasible
R21.16K	621 Horne Street North	66	66	67 A/E	63T	4	**62R**	**5**	**62R**	**5**	60	7	60	7	S871 / Feasible
R21.17	606 Horne Street North	71	71	73 A/E	68T	5	**67R**	**6**	67	6	66	7	65	8	S871 / Feasible
R21.18	1100 Sportfisher Drive - Playground	76	76	77 A/E	74T	3	**72R**	**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	**71R,T**	**5**	69	7	68	8	68	8	67	9	S871 / Feasible

1 – Leq(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 Noise Abatement Criteria (NAC) of 67dBA 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 / Northbound	4.9 m (16 ft) / 223 m (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 / Southbound	2.4 m (8 ft), 3.0 m (10 ft) / 535 m (1,755 ft)	$939,468	$1,350,000	Reasonable	Recommended
S875	R21.9 – R21.11	4 SFR and I HM	R/W / Southbound	4.3 m (14 ft), 4.9 m (16 ft) / 220 m (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.

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 insertion loss. *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 *Figure 2-2.14al & 2-2.14am*. 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 Levels[1] Leq(h), dBA	Future Peak Hour Noise Levels, Leq(h), dBA[1,2]												Soundwall No. / Feasible
			Future "No Build"	Project without Soundwall	Noise Prediction with Soundwall and Soundwall Insertion Loss (I.L.)										
					2.4 m (8 ft)		3.0 m (10 ft)		3.7 m (12 ft)		4.3 m (14 ft)		4.9 m (16 ft)		
					Leq(h)	I.L.	Leq(h)	I.L.	Leq(h)	I.L.	Leq(h)	I.L.	Leq(h)	I.L.	
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	76T	6	72	10	**69R**	**13**	67	15	66	16	S882 / Feasible
R22.3*K	514 San Luis Rey Drive	68	69	70 A/E	67	3	66	4	**65R**	**5**	65	5	64	6	S882 / Feasible
R22.4	512 San Luis Rey Drive	76	76	78 A/E	74	4	72	6	**71R**	**7**	70	8	69	9	S882 / Feasible
R22.4A	519 Monterey Drive	80	80	81 A/E	74	7	73	8	**71R**	**10**	70	11	69	12	S882 / Feasible
R22.5	518 Capistrano Drive	75	75	76 A/E	72T	4	71	5	**70R**	**6**	69	7	68	8	S882 / Feasible
R22.6	514 Capistrano Drive	75	75	76 A/E	74T	2	72	4	**71R**	**5**	70	6	69	7	S884 / Feasible
R22.7	510 Sunset Drive	76	76	78 A/E	73T	5	71	7	**69K**	**9**	67	11	66	12	S884 / Feasible
R22.8	512 Sunset Drive	75	75	76 A/E	72T	4	71	5	**69R**	**7**	68	8	67	9	S884 / Feasible
R22.8A*	516 Sunset Drive	72	72	73 A/E	70T	3	69	4	**68R**	**5**	67	6	66	7	S884 / Feasible
R22.9W	451 Koelper Street	59	58	59 N	--	--	--	--	--	--	--	--	--	--	--
R22.10*K2	Sandy Shores Mobile Home Park - N Coast Hwy	62	64	65 N	--	--	--	--	--	--	--	--	--	--	--
R22.11*K2	Sandy Shores Mobile Home Park - N Coast Hwy	58	60	61 N	--	--	--	--	--	--	--	--	--	--	Not Feasible
R22.12	1401 N Coast Hwy - Travelodge - Outdoor Area	68	70	71 A/E	71	0	70	1	69	2	69T	2	68	3	Not Feasible
R22.13	1103 N Coast Hwy - Guest House Hotel - Pool Area	57	59	60 N	--	--	--	--	--	--	--	--	--	--	--

1 – Leq(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 Noise Abatement Criteria (NAC) of 67dBA 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 / Northbound	3.7 m (12 ft) / 181 m (596 ft)	$469,023	$616,000	Reasonable	Recommended
S884	R22.6 – R22.8A	9 SFR	R/W / Northbound	3.7 m (12 ft) / 23 m (730 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.

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. 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.

Equipment Noise Control

- 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 avoid impulsive noises.
- 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.

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

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.

Transportation-related activities account for approximately half of all the petroleum products consumed in California (Department of Energy, Petroleum Profile, 2000). 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. The Department also emphasizes energy efficiency in the design, construction, operation and maintenance of its facilities. Building on current efforts, the Department 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

> The California Department of Transportation (Department) manages resources efficiently and effectively. The principles of Reduce, Reuse, and Recycle are consistent with the Department's 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* for Traffic 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 in 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 feel constrained to walk or ride 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

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 proposed project 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.

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 proposed project 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 proposed project would likely cause a 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 & 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 with Barrier and 8+4 with 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.

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 beam/guardrail 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.
- The use of energy-efficient construction vehicles.