INTERSTATE 5/STATE ROUTE 56 INTERCHANGE PROJECT

WATER QUALITY REPORT

State of California
Department of Transportation
District 11

October, 2010

TABLE OF CONTENTS

TABLE OF CONTENTS

TABLE OF CONTENTS

List of Figures

List of Tables

TABLE OF CONTENTS

List of Appendices

EXECUTIVE SUMMARY

The purpose of this report is to address the water quality aspects associated with the construction of Interstate 5 (I-5) and State Route 56 (SR-56) project. This water quality report is intended to inform the public about existing water quality, the potential impacts associated with the project construction and operation, and avoidance/minimization measures that will be implemented.

The California Department of Transportation (Caltrans) proposes to improve the traffic operations along the I-5 and SR-56 corridors between Del Mar Heights Road, Carmel Valley Road, and Carmel Country Road. The project, referred to as the I-5/SR-56 Interchange Project, would begin south of Carmel Valley Road along I-5 at post mile (PM) 32.7 and continue to PM 34.8 north of Del Mar Heights Road. Along SR-56, the project would begin at PM 0.0 at El Camino Real and continue to PM 2.5 east of Carmel Country Road. The length of the project is 3.4 miles on I-5 and 2.5 miles on SR-56, for a total length of 5.9 miles. The proposed project may include improvements to surface streets, the addition of auxiliary lanes along I-5 and SR-56, interchange improvements, and/or new freeway-to-freeway connector ramps. The proposed project is located within the City of San Diego in San Diego County, east of the City of Del Mar and south of the City of Solana Beach.

Water quality standards within project limits are set by the State Water Resource Control Board (SWRCB), specifically the San Diego Regional Water Quality Control Board (SDRWQCB). Existing surface water quality varies depending on the pollutant loading to the various hydrologic units originating mainly from rainfall and irrigation. Designated beneficial uses for the receiving water bodies with the project limits include agricultural supply, industrial service supply, contact and non-contact water recreation, warm fresh water, wildlife habitats, marine habitats, preservation of biological habitats of special significance, rare, threatened and endangered species, spawning, reproduction, and/or early development, migration of aquatic organisms, and shellfish harvesting.

The proposed project is located within the Los Penasquitos Hydrologic Unit (906), which encompasses the Los Penasquitos Creek watershed (Miramar Reservoir Hydrologic Area (HA) 906.10 – Poway HA 906.20), several coastal tributaries (Scripps HA 906.30), and the Mission Bay watershed (Miramar HA 906.40 – Tecolote HA 906.50). The proposed project is located within the Miramar Reservoir HA 906.10. The proposed project drains directly to Carmel Valley Creek and Los Penasquitos Lagoon (Lagoon). Carmel Valley Creek merges with Los Penasquitos Creek before discharging into the Lagoon.

The Federal Clean Water Act (CWA) requires States to identify and make a list of surface water bodies that are polluted. These water bodies, referred to in law as "water quality limited segments," do not meet water quality standards 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). States must also prioritize the water bodies on the list and develop Total Maximum Daily Loads (TMDLs) to improve the water quality. Los Penasquitos Creek is 303(d)

listed for phosphate and total dissolved solids and the Lagoon is listed for sedimentation/siltation.

Caltrans has been working with the San Diego Regional Water Quality Control Board and the Lagoon dischargers (Cities of San Diego, Poway, Del Mar, and the County of San Diego) to develop total maximum daily loads for the Lagoon. In addition, the project falls within the coastal zone and will require a Coastal Development Permit from the California Coastal Commission.

The project is proposing four Build Alternatives and a No-Build alternative. To assess the potential water quality impacts of the build alternatives, the report analyzes the cumulative short and long term effects of the project and avoidance/minimization measures to be implemented during construction, operation, and maintenance.

The proposed project will potentially have short-term impacts on storm water runoff quality during construction as a result of construction activities, that could contribute pollutants, and construction materials that will be used. Examples of construction activities include clearing and grubbing, major grading, utility excavations, sandblasting and landscaping operations. Examples of construction materials that have the potential to contribute pollutants to storm water discharges, if not contained properly include vehicle fluids, such as oil, grease and petroleum, concrete curing compounds, asphaltic emulsions associated with asphalt concrete paving operations, paints, solvent and thinner, base and subbase material and curing compounds.

The primary storm water pollutant at construction sites is sediment. Sediment (not contained by appropriate BMPs) can cloud the water, which reduces the amount of sunlight reaching aquatic plants, clog fish gills, smother aquatic habitat and spawning areas, and impede navigation in our waterways. Sediment also transports other pollutants such as nutrients, metals, and oils and greases. The Auxiliary Lane Alternative is anticipated to disturb the least amount of soil (30.6 acres) followed by the Hybrid Alternative (64 acres). The hybrid with Flyover and the Direct Connector Alternatives disturb greater amount of soil (78.8 and 91.2 acres consecutively). Thus, the Auxiliary Lane Alternative is anticipated to have the least potential temporary water quality impacts. Temporary impacts will be avoided or minimized by the use of construction site best management practices (BMPs) such as fiber rolls, hydraulic mulch, drainage inlet protection, check dams, concrete washouts, construction entrances, and street sweeping.

Table ES.1 Temporary Disturbed Soil Areas for the Build Alternatives

Disturbed Soil Area	**Acres (Hectares)**		
Direct Connector Alt.	**Auxiliary Lane Alt.**	**Hybrid Alt.**	**Hybrid with Flyover Alt.**
91.2 (36.9)	30.6 (12.4)	64.0 (25.9)	78.8 (31.9)

The permanent impacts are assessed based on the additional pavement area added by each of the Build Alternatives and the preliminary treatment BMP implementation feasibility. The Auxiliary Lane Alternative adds the least amount of pavement area (12.4 acres) compare to the other build alternatives (38.1 acres for the Direct Connector, 27.2

acres for the Hybrid, and 31.1 acres for the Hybrid with Flyover). It also has a greater opportunity for BMPs implementation, treating approximately 3.6 times the amount of pavement area added compare to the other build alternatives, which are treating approximately twice the amount of pavement area added. The Direct Connector Alternative adds the greatest amount of pavement area, which is approximately three times greater than the paved area added by the Auxiliary Lane Alternative. The Hybrid Alternative adds approximately twice the amount of pavement proposed by the Auxiliary Lane Alternative while the Hybrid with Flyover Alternative adds two and a half times the pavement proposed by the Auxiliary Lane Alternative.

Table ES.2 Comparison of Existing & Proposed Pavement Areas for the Build Alternatives

Alternatives	Existing Impervious Area Acres (Hectares)	Proposed Additional Impervious Area Acres (Hectares)	Total Impervious Areas Acres (Hectares)	Percentage of Additional Impervious Areas (%)
Direct Connector Alt.	102.5 (41.5)	38.1 (15.4)	140.6 (56.9)	27.1
Auxiliary Lane Alt.	102.5 (41.5)	12.4 (5.0)	114.9 (46.5)	10.8
Hybrid Alt.	102.5 (41.5)	27.2 (11.0)	129.7 (52.5)	21.0
Hybrid with Flyover Alt.	102.5 (41.5)	31.1(12.6)	133.6 (54.1)	23.3

Impervious surface is directly proportional to higher runoff volume, higher velocities and less opportunity for infiltration or for vegetation to slow down flows. A drainage study has been completed for this phase of the project to ensure that all opportunities to reduce flows and velocities are accounted for through drainage improvements and the incorporation of treatment BMPs.

Table ES.3 Comparison of Proposed Treated Pavement Areas for the Build Alternatives

Alternatives	Proposed Additional Impervious Area Acres (Hectares)	Total Impervious Areas Acres (Hectares)	Treated Impervious Areas Acres (Hectares)	Percentage Treated of Total Impervious Areas (%)	Percentage Treated of Additional Impervious Areas (%)
Direct Connector Alt.	38.1 (15.4)	140.6 (56.9)	79.0 (32)	56%	208%
Auxiliary Lane Alt.	12.4 (5.0)	114.9 (46.5)	45.2 (18.3)	39%	366%
Hybrid Alt.	27.2 (11.0)	129.7 (52.5)	62.5 (25.3)	48%	230%
Hybrid with Flyover Alt.	31.1(12.6)	133.6 (54.1)	66.2 (26.8)	50%	213%

The Auxiliary Lane Alternative is anticipated to have the lowest potential water quality impacts since it's disturbing the least amount of soil areas, adding the least amount of additional pavement, and treating the greatest amount of paved surfaces compare to the amount of impervious area added. The Direct Connector Alternative would have greater potential for impacting water quality due to the great amount of disturbed soil areas anticipated during construction and the large addition of impervious surface .However, it would be treating twice the amount of pavement area added and over half of the total project pavement area.

The short-term potential impacts will be avoided or minimized during the construction phase by the implementation of temporary Best Management Practices (BMPs), while

implementing permanent BMPs (Design Pollution Prevention, Treatment BMPs, and Maintenance BMPs) to the Maximum Extent Practicable (MEP) will minimize the long-term potential impacts.

Section ONE INTRODUCTION

1.1 PROJECT DESCRIPTION

The California Department of Transportation (Caltrans) proposes to improve the traffic operations along the Interstate 5 (I-5) and State Route 56 (SR-56) corridors between Del Mar Heights Road, Carmel Valley Road, and Carmel Country Road. The project, referred to as the I-5/SR-56 Interchange Project, would begin south of Carmel Valley Road along I-5 at post mile (PM) 32.7 and continue to PM 34.8 north of Del Mar Heights Road. Along SR-56, the project would begin at PM 0.0 at El Camino Real and continue to PM 2.5 east of Carmel Country Road. The length of the project is 3.4 miles on I-5 and 2.5 miles on SR-56, for a total length of 5.9 miles. The proposed project may include improvements to surface streets, the addition of auxiliary lanes along I-5 and SR-56, interchange improvements, and/or new freeway-to-freeway connector ramps. The proposed project is located within the City of San Diego in San Diego County, east of the City of Del Mar and south of the City of Solana Beach.

The primary purpose of the proposed project is to maintain or improve the existing and future traffic operations along the I-5 and SR-56 corridors between Del Mar Heights Road, Carmel Valley Road, and Carmel Country Road and along local streets within the Carmel Valley Community to improve the safe and efficient local and regional movement of people and goods, while minimizing environmental and community impacts for planning design year 2030.

The objectives of the proposed project are to:

- Maintain or improve 2030 forecasted traffic levels of service (LOS) as compared to the 2030 No Build Alternative LOS;
- Maintain or reduce off-peak and peak-hour delay for SR-56 traffic moving to and from the north on I-5 as compared to the No Build Alternative;
- Maintain or reduce peak-hour congestion at the El Camino Real and SR-56 ramp termini as compared to the No Build Alternative;
- Maintain or reduce peak-hour congestion at the Carmel Valley Road and I-5 ramp termini as compared to the No Build Alternative;
- Maintain or reduce traffic volumes along local streets during peak hours as compared to the No Build Alternative;
- Maintain or reduce congestion on I-5 and SR-56 mainlines during the peak hours;
- Provide a facility that is compatible with future transit and other modal options;
- Follow the 2030 RTP, the transportation plan for the San Diego region, where feasible and be in compliance with Federal and State regulations;
- Maintain the facility as an effective link in the intraregional and interregional movement of people and goods; and
- Avoid and minimize impacts to the human and natural environment.

The project is proposing four Build Alternatives and a “No-Build” Alternative, which are further described below.

1.1.1 No-Build Alternative

The No Build Alternative assumes the existing configuration for the I-5/SR-56 interchange with the improvements proposed as part of the I-5 North Coast Corridor Widening Project, which are independent of the I-5/SR-56 Interchange Project. This alternative would not include the construction of direct freeway-to-freeway connectors in the westbound SR-56 to northbound I-5 (west to north) or southbound I-5 to eastbound SR-56 (south to east) directions or improvements to local streets in the Carmel Valley area.

1.1.2 Direct Connector Alternative

- The direct connector alternative proposes the construction of the direct freeway-to-freeway structures with two general purpose lanes in the westbound (WB) to northbound (NB) and southbound (SB) to eastbound (EB) directions. This alternative includes the extension of the local bypass in both the northbound and the southbound directions to the Del Mar Heights Road Interchange.
- A concrete barrier will separate the freeway mainline traffic from the local bypass traffic in the northbound and southbound directions. The south to east connector would exit the southbound freeway mainline near Carmel Valley Road. The west to north connector would merge with the northbound bypass near Carmel Valley Road before entering the northbound freeway mainline at Del Mar Heights Road.
- A barrier separated collector/distributor system along westbound SR-56 will separate the westbound to southbound traffic from the westbound to northbound traffic just east of the Carmel Creek interchange.
- A barrier would be constructed along SR-56 between El Camino Real and Carmel Creek Road to eleiminate the weave between vehicles accessing Carmel Creek Road from the northbound I-5 to eastbound SR-56 (north to east) connector and vehicles entering eastbound SR-56 from El Camino Real.
- An auxiliary lane will be constructed along EB & WB SR-56 between Carmel Creek Road and Carmel Country Road and along NB & SB I-5 local bypass between Carmel Valley Road and Del Mar Heights Road.
- Improvements are proposed for the northbound on- and off-ramps and the southbound off-ramp at Carmel Valley Road. Improvements are also proposed for the eastbound and westbound on- and off-ramps at Carmel Creek Road. The eastbound on- and off-ramps and westbound loop on-ramp at Carmel Country Road would be realigned to accommodate the widened SR-56 freeway mainline.
- Carmel Valley Road would be widened to eight lanes east of I-5 and the Carmel Valley Road/SR-56 on-ramp intersection would be widened to accommodate higher traffic volumes.
- The Del Mar Heights interchange will be reconstructed; the overcrossing will be replaced and the NB & SB on and off ramps will be realigned.
- The El Camino Real overcrossing would be widened to accommodate the west to north connector ramp.
- To improve operations and to accommodate the connector ramps, the northbound and southbound bypass lanes would be realigned north of Carmel Valley Road.
- Portofino Circle will be realigned and reconstructed.
- This alternative will construct seventeen retaining walls.

1.1.3 Auxiliary Lane Alternative

- This alternative proposes the construction of an auxiliary lane along SB I-5 between the southbound diamond on-ramp at Del Mar Heights Road and the southbound off-ramp at Carmel Valley Road.
- The southbound off-ramp would be widened to a two-lane freeway exit and the northbound on- and off-ramps would be widened at Carmel Valley Road.
- A barrier would be constructed along eastbound SR-56 between El Camino Real and Carmel Creek Road. Drivers traveling eastbound would need to use local street alternatives to access Carmel Creek Road. The eastbound on-ramp at El Camino Real would be realigned and widened.
- Carmel Valley Road would be widened to eight lanes east of I-5. Additionally, the Carmel Valley Road/eastbound SR-56 on-ramp intersection would be widened to accommodate higher traffic volumes.
- Westbound SR-56 would be widened to the north to accommodate an additional general purpose lane and the future construction of high-occupancy-vehicle (HOV) lanes within the median. Due to this addition, the westbound Carmel Creek Road loop on- and off-ramp and the Carmel Country Road loop on-ramp would be realigned.
- Reconstruction of the Del Mar Heights Road overcrossing and associated operational improvements are also proposed.
- The alternative includes the construction of seven retaining walls.

1.1.4 Hybrid Alternative

- The Hybrid Alternative is a combination of the Direct Connector Alternative and the Auxiliary Lane Alternative discussed above. In this alternative, the proposed westbound to northbound connection featured in the Direct Connector Alternative would be combined with the proposed southbound to eastbound local street movement featured in the Auxiliary Lane Alternative.

1.1.5 Hybrid with Flyover Alternative

- This alternative is a variation of the Hybrid Alternative. It proposes the construction of a separation structure that would provide a direct connection from eastbound Carmel Valley Road to the eastbound SR-56 fast lane, allowing traffic to bypass the El Camino Real/eastbound SR-56 on-ramp intersection.
- This Alternative includes the proposed west to north connector featured as part of the Direct Connector Alternative.
- This alternative would require the use of non-standard lane and shoulder width along Carmel Valley Road and tunneling behind the Carmel Valley Road undercrossing abutments to provide pedestrian/bicycle access.

1.2 WATER QUALITY REPORT APPROACH

This report is organized as follows.

Section 1 describes the project major features and the four Build and a No-Build alternatives. It also describes how this report is organized.

Section 2 describes the project area including the population and land use, topography and climate of the area, regional geology, existing drainage and local hydrology, and biological habitats.

Section 3 describes the Federal and State Regulations and all the required permits from the resource agencies.

Section 4 describes the project impacts on the watershed and the San Diego Regional Water Quality Control Board (SDRWQCB) Basin Plan requirements including beneficial uses and water quality requirements for the receiving water bodies.

Section 5 discusses the short term (during construction) and long-term (during operation and maintenance) potential impacts on water quality.

Section 6 addresses the Department's commitment under the National Pollutant Discharge Elimination System (NPDES) permit Order 99-06-DWQ issued by the California State Water Resource Control Board (SWRCB) during the planning, design, construction and maintenance of the project. It discusses avoidance/minimization measures that will be implemented by the Department to address potential impacts of the project's construction and operation on water quality.

Section 7 lists the References.

Appendix A is the Project Features Maps

2.1 GENERAL SETTINGS

Within the limits of the project, the following existing environmental resources and issues are anticipated to be impacted: archaeological sites, biological resources including wetlands and sensitive species, water quality, proximity impacts to existing residential areas such as noise, air pollution, change of community character, and visual impacts to natural undisturbed areas due to cuts, fills, and structures. This section will focus on the resources that are related to water quality.

2.1.1 Population Growth & Traffic Demand

The Department typically uses the projected population and employment increases published by the San Diego Association of Government (SANDAG) to forecast future traffic volumes in the project area assuming existing land use policies (see Table 2.1). Since the I-5 & SR-56 experience periodic traffic congestions during peak hours, as an interregional route for recreation and tourism linking activity centers between the San Diego Region and Baja California, future improvements to these routes are needed to improve or maintain the highway operation.

Existing properties adjacent to the I-5 freeway are moderately to densely developed with residential and commercial properties. West of I-5, the mesa above the cut slopes had been terraced for residential and minor commercial development. Along SR-56, adjacent properties are predominately residential with some commercial development north of the freeway. On the south side of the freeway, the properties adjacent to the freeway are mainly open land with some residential development. [1]

***Table 2.1** *Population, Housing Units and Employment in the San Diego Region*

POPULATION	2004	2010	2020	2030	2004-2030 Change in percentage
City of San Diego	1,295,147	1,365,130	1,514,336	1,656,257	28%
San Diego Region	3,013,014	3,245,279	3,635,855	3,984,753	32%
HOUSING UNITS					
City of San Diego	490,266	518,063	574,254	610,049	24%
San Diego Region	1,095,077	1,174,180	1,309,340	1,383,803	26%
EMPLOYMENT					
City of San Diego	812,028	880,326	956,165	1,010,157	24%
San Diego Region	1,449,349	1,573,742	1,741,033	1,913,682	32%

*Source. SANDAG Info. 2030 Regional Growth Forecast Update 2030, July 2008
http://www.sandag.org/uploads/publicationid/publicationid_1390_8531.pdf

2.1.2 Climate & Topography

The I-5/SR-56 Improvements Project is located within the San Diego Regional Water Quality Control Board Basin Planning Area. This basin encompasses most of San Diego County and parts of southwestern Riverside County and southwestern Orange County (Water Quality Control Plan for the San Diego Basin (referred to thereafter as" Basin Plan") (Basin Plan, 1994). According to the Basin Plan, the region is comprised of coastal plains, central mountain valley area and an eastern mountain valley area. The climate is generally mild. According to National

1 Dokken Engineering, Draft District Preliminary Geotechnical Report for the Interstate 5/State Route 56 Interchange Project, January 2009.

Weather Service Forecast Office the San Diego Area year average maximum temperature is about 72.4 Degrees Fahrenheit (º F) and the average minimum is 57.6º F with the highest average monthly maximum between June and September and the lowest average monthly minimum between December and March. The average annual precipitation is 10.76 inches with the majority falling between November and March. This information is based on average data between 1971 and 2000.

Within the project area, I-5 transitions from embankment fill to cross Carmel Valley into a cut slope as the topography rises toward Del Mar Heights. SR-56 transitions through a series of embankment fills and shallow cuts from I-5 eastward toward Carmel Country Road. Slopes are typically 1:2 and up to 50 feet high along I-5 and up to 45 feet along SR-56.

The cut sections along I-5 within the project limits are between 0.2 miles north of Carmel Valley Road to the end of the project. Along I-5 within the cut sections, the general trend of the topography is downhill to the east-southeast and the taller slopes are found along the westside of I-5 and can range up to 130 feet. Fill slopes along I-5 within project limits occur between the beginning of the project to and 0.2 mile north of Carmel Valley Road, the on and off ramps and at the abutment of the Del Mar Heights overcrossing.

Cut slopes along SR-56 within the project area occur between east of the Carmel Creek Road Interchange to east of Carmel Country Road Interchange. Fill slopes along SR-56 are encountered at various locations where SR-56 crosses small canyons and arroyos. [1]

2.1.3 Existing Drainage[2]

The existing drainage system within the project limits consists of primarily inlets, cross culverts, concrete channels and brow ditches. There are dikes on the lower side of the superelevated sections and on both sides of the crowned sections.

I-5 North of Del Mar Heights Road

There's a high point north of the Del Mar Height's Interchange. North of this point, the roadway runoff by inlets and runoff from the surrounding slopes is collected by brow ditches on both sides of the freeway. A main culvert runs south to north under the center of the freeway where runoff is periodically collected from adjacent brow ditches. At approximately 0.6 mile (1 kilometer) north of the Del Mar Heights overcrossing, this main culvert empties into a brow ditch on the east side of the freeway, which eventually discharges to the lagoon.

I-5 South of Del Mar Heights Road

South of the high point mentioned earlier, roadway runoff is collected by inlets and adjacent slope runoff is collected by brow ditches on both sides of the freeway and directed into the storm drains. The storm drains converge into an 84 inch (2150 millimeter) reinforced concrete pipe (RCP) that runs south on the east side of the freeway. The pipe turns east to collect runoff form the adjacent local development before discharging to an existing detention basin southwest of High Bluff Drive and El Camino Real intersection.

2 Dokken Engineering, Interstate 5/State Route 56 Preliminary Drainage Study, August 2009.

At approximately 0.2 miles (0.4 kilometers) south of the Del Mar Heights overcrossing, a central culvert collects runoff form the freeway and adjacent slopes. The culvert runs south where it gets intercepted by a 48 inch (1220 mm) RCP east of the freeway at approximately 0.2 miles (0.4 kilometer) north of Carmel Valley Road. The culvert runs southward toward parallel to the freeway collecting roadway runoff form drainage inlets. The culvert system eventually discharges to Carmel Valley Creek.

I-5/SR-56 Interchange

I-5 southbound off ramp to Carmel Valley Road has a brow ditch flow southward on both sides collecting runoff from adjacent slopes. The brow ditches on the east side of the ramp collect runoff form SB I-5 and the Carmel Valley Road intersection and eventually discharges to Carmel Valley Creek.

There's an existing detention basin northeast of the intersection of Carmel Valley Road and I-5 northbound on ramp, which receives runoff from the surrounding development through a 42 inch RCP.

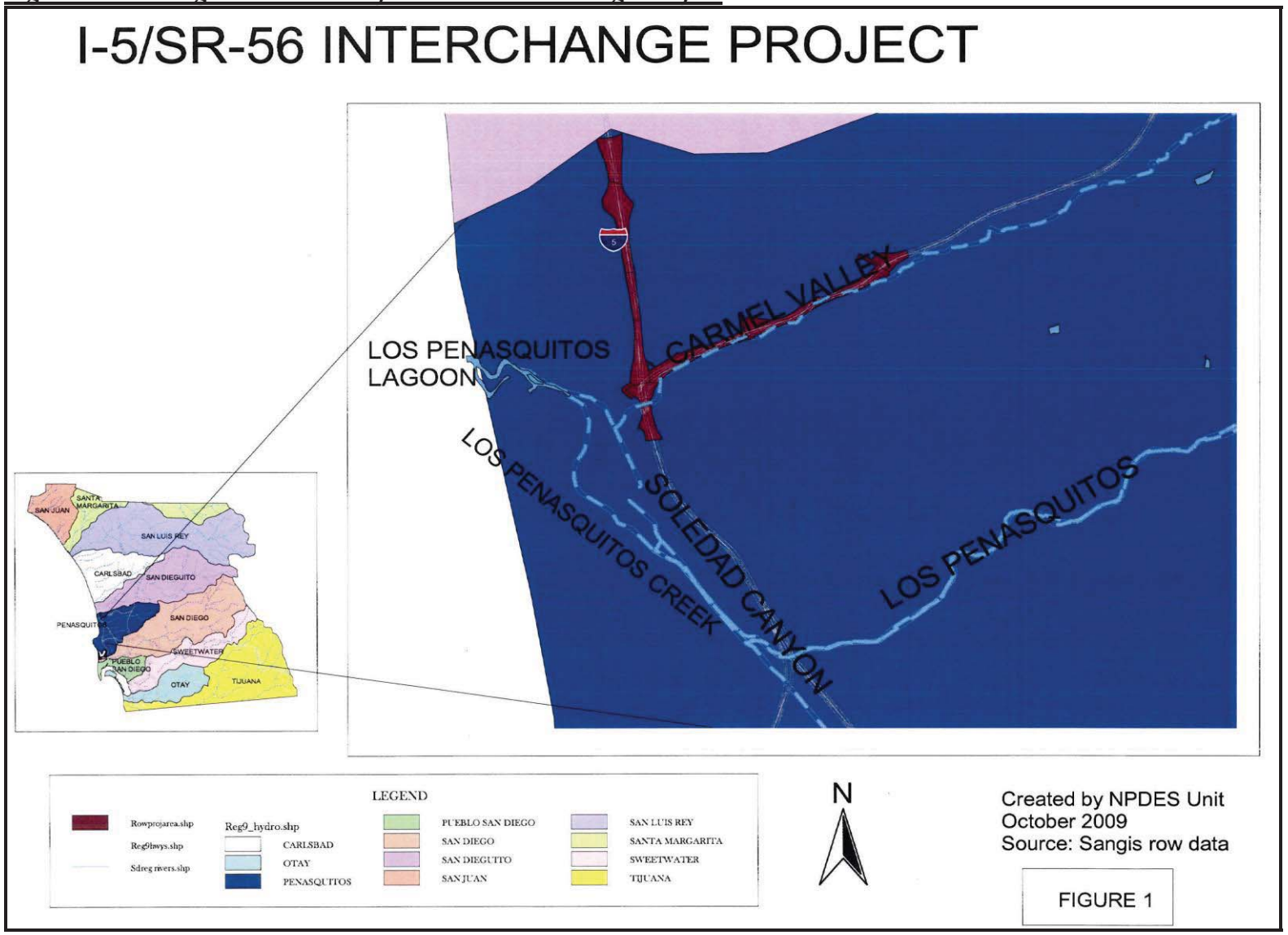
Runoff form the NB on ramp is collected at the bottom of the ramp through inlets that collect some of the runoff form the NB bypass, NB I-5 and the intersection. The storm drains converge into a 600 mm RCP which runs beneath the NB off ramp and then ties into a system that collects runoff from the ramp as well as NB I-5 which flows southwest before discharging to Carmel Valley Creek.

Along El Camino Real, a storm drain system running north to south of the west side of the freeway collects runoff form El Camino Real, private property, WB Carmel Valley Road and SR-56 WB off ramp before discharging into Carmel Valley Creek.

SR-56

The runoff along SR-56 is collected into a series of cross culverts which run north to south into Carmel Valley Creek. Some of the cross culverts collect runoff from adjacent development as well as the freeway.

Figure 1 Receiving Water Bodies of I-5/SR-56 Interchange Project



2.1.4 Local Hydrology

The project lies within the Penasquitos HU (906.00) within the San Diego Basin. The San Diego Region is divided into 11 major HUs, 54 Hydrologic areas (HAs) and 147 hydrologic subareas (HSAs). The State Department of Water Resources (DWR) established the initial boundaries in 1964, which they were then enumerated in the early 1970 by the SWRCB. According to the early definitions by the DWR, HU are defined as the entire watershed of one or more streams; HAs are major tributaries and/or major groundwater basins within the HUs; and HSAs are major subdivisions of the HAs including water-bearing and non-water bearing formations (Basin Plan, 1994).

This project is within the Peñasquitos Hydrologic Unit (HU). This HU is triangular shaped area and covers approximately 170 square miles extending form Poway to the east to La Jolla on the west. The project drains to Carmel Valley Creek and Los Penasquitos lagoon which are within the Miramar Reservoir HA. Carmel Valley Creek is a tributary to Los Penasquitos Lagoon. Los Peñasquitos Lagoon receives flows from three sub-watersheds (Carmel Valley Creek, Los Peñasquitos Creek, and Carroll Canyon Creek). Of the three creeks feeding into the lagoon, Los Peñasquitos Creek drains the largest land area (37,028 acres), followed by Carmel Creek (11,180 acres) and Carroll Canyon Creek (11,004 acres).

2.1.5 Regional Geology[1]

"The project study is located within the Peninsular Ranges Geomorphic Province of California. Peninsular Ranges Geomorphic Province is characterized by northwest trending mountains and valleys and associated northwest trending faults and fault zones. San Diego County can be divided among three distinct geomorphic regions; the Coastal Plain regions exposed wets of the Peninsular Ranges; the Peninsular Range region, and the Salton Torugh region as exposed east of the Peninsular Ranges. This geomorphic division reflects a basic geologic difference between the three regions, with Mesozoic, metavolcanic, metasedimentary, and plutonic rocks predominating in the Peninsular Ranges, and primarily Cenozoic sedimentary rocks predominating to the west and east of the central mountain range. The irregural contact between these geologic regions reflects the ancient topography of this area before it was buried by the thick sequence of Cretaceous and Tertiary sedimentary rocks deposited over the last 75million years by ancient rivers and ancient seas (December, 2008).

The Peninsular Ranges geomorphic province encompasses an area that extends 125 miles, from the Transverse Ranges and the Los Angles Basin, south to the Mexican Border, and beyond another 795miles of the tip of Baja, California. The geomorphic province varies in width from 30 to 100 miles, most of which is characterized northwest trending mountain ranges separated by sub-parallel fault zones. The Peninsular Ranges Region is underlain primarily by Cretaceous-age plutonic (i.e., granitic) rocks that formed from the cooling of molten magmas deep within the earth's crust. These magmas were generated during subduction of an oceanic crustal plate that was converging on the North American Plate between 140 and 90 million years ago. Over this long period of time, extensive masses of granitic rocks accumulated at depth to from the Southern California Batholoth. Intense heat associated with these plutonic magmas metamorphosed the ancient sedimentary rocks into which the plutons intruded. These

metasediments are now preserved in the Peninsular Range Region as marbles, slates, schist, quartzites, and gneiss. The western-most portion of the province in San Deigo County generally consists of uplifted Upper Cretaceous-, Tertiary-, and Quaternary age sedimentary rocks (Harden, 1997; Kennedy, 1997; CGS, 2004).

In the Coastal Plain region (which includes the study area), resistant peaks composed of Mesozoic crystalline rocks (such as at Rock Mountain on the north side of Otay Valley, Black Mountain near Rancho Penasquitos, and Cowles Mountain near San Carlos) are actually "rooted" at depth to the buried Mesozoic crystalline rock terrain. These basement "highs" poke through the younger Cretaceous and Tertiary sedimentary cover and demonstrate the amount of topographic relief on the buried landscape of western San Diego County.

The Coastal Plain Region is underlain by a "layer cake" sequence of marine and non-marine sedimentary rock units that record portions of the last 140 million years of history. Over this period of time the relationship of land and sea has fluctuated drastically so that today we have ancient marine rocks preserved up to elevations around 900 feet above sea level and ancient river deposits as high as 1,200 feet. Faulting related to th La Nacion and Rose Canyon fault zones has broken up this "layer cake" sedimentary sequence into a number of distinct fault blocks in the southwestern part of the county. North of La Jolla the effects of faulting are not as great and the rock units here are relatively undeformed.

The Coastal Plain Region is traversed by several major active faults. The Newport –Englewood (offshore), Agua Blanco-Coronado Bank and San Clemente faults are active faults located to the northwest and west-southwest. The local Rose Canyon fault zone, located wets of the site, has also been recognized as active by the State of California. Major tectonic activity associated with these and other faults within this regional tectonic framework is right-laterla strike-slip movment. These faults, as well as other faults in the region, have the potential for generating strong ground motions at the project site.

The basement rocks within the study area are predominately granodiorites and tonalites, related to the regional Southern California Batholith of the Peninsular Ranges Geomorphic Province which are overlain by undifferentiated sedimentary rocks of Upper Cretaceous and Eocene age. The structure of the Peninsular Ranges is characterized by a serried northwest trending mountain ranges separated by northwest trending valleys, sub-parallel to faults branching from the San Andreas Fault. The trend of the major tectonic activity associated with theses and other faults within the regional tectonic framework is right-lateral strike-slip movement. The trend of topography is similar to the Coast Ranges, but the geology is more like the Sierra Nevada, with granitic rock intruding the older metamorphic rocks, east of the coastal plain (CGS, 2004).

The Peninsular Ranges extend into Lower California and are bound on the east by the Colorado Desert. The Los Angles Basin and the island group (Santa Catalina, Santa Barbara, and the distinctly terraced San Clemente and San Nicolas islands), together with the surrounding continental shelf (cut by deep submarine fault troughs), are included in this province." (Dokken Engineering, 2009)

2.1.6 Biological Impacts

This section presents information regarding the anticipated impacts to biological resources for the proposed project based on the Natural Environmental Study (NES) dated June 2009. Anticipated impacts to biological resources include impacts to natural communities of special concern and sensitive plant/animal species, as well as migration corridors and cumulative impacts from a regional perspective. In addition, this section presents proposed measures that would be implemented to avoid and/or minimize sensitive resource impacts to the extent feasible and presents compensatory mitigation for these impacts.

2.1.6.1 Vegetation Communities and Other Land Cover Types

Auxiliary Lane and Hybrid Alternatives are anticipated to result in temporary and permanent impacts to southern maritime chaparral, disturbed southern maritime chaparral, coastal sage scrub, and disturbed coastal sage scrub, as well as ornamental, disturbed, and developed areas. Direct Connector Alternative is anticipated to result in temporary and permanent impacts to coastal sage scrub, as well as ornamental, disturbed, and developed areas. Hybrid with Flyover Alternative is anticipated to result in temporary impacts to disturbed southern maritime chaparral, and temporary and permanent impacts to coastal sage scrub and disturbed coastal sage scrub, as well as ornamental, disturbed, and developed areas.

2.1.6.2 Vegetation Communities of Special Concern

Sensitive habitats are those that are wetland and/or riparian habitats regulated by the U.S. Army Corps of Engineers under Section 404 of the Clean Water Act and by the California Department of Fish and Game (CDFG) under Section 1600 of the California Fish and Game Code, considered rare within the region, or are considered sensitive by the CDFG. Vegetation communities listed on the California Natural Diversity Database (CNDD) as having the highest inventory priorities are also considered sensitive. Biologically, the vegetation types that provide the highest habitat values within the Biological Study Area (BSA) are native upland habitat and riparian habitat. Two natural communities of special concern that would be impacted by the proposed project include southern maritime chaparral (as well as disturbed southern maritime chaparral) and coastal sage scrub (as well as disturbed coastal sage scrub). Details of impacts can be found in the NES prepared for this project.

2.1.6.3 Sensitive Plant Species

The proposed project has been designed to avoid three of the four sensitive plant species. It is anticipated that permanent impacts to two California Native Plant Society (CNPS) listed rare plant species [wart-stem lilac (CNPS List 2.2) and Del Mar Mesa sand aster (CNPS List 1B.1)] would occur as a result of this project. Impacts to Del Mar manzanita and sea dahlia are not anticipated to occur with selection of any of the current build alternatives. Details of the impacts are outlined in the NES prepared for this project.

2.1.6.4 Sensitive Animal Species

The proposed project has been designed to avoid impacts to sensitive animal species to the greatest extent possible. No impacts are anticipated for federally or state listed animal species (individuals); however, temporary and permanent impacts are anticipated in the form of loss of suitable habitat for three CDFG species of special concern (San Diego coast horned lizard, San

Diego pocket mouse, and San Diego desert woodrat). Anticipated impacts to sensitive animals detected within the BSA are detailed in the NES prepared for this project.

2.1.6.5 Migration Corridors

"Animals can exhibit both direct sensitivity to roads (increased mortality and fitness) and indirect sensitivity to roads (altered behavior, altered movement, or avoidance of areas/roads). Common reasons credited for increased sensitivity to roads include increased noise as a result of traffic volume, increased artificial light, and increased human presence (Smith 2003). It is not anticipated that wildlife movement south of SR-56 (along the regional corridor) would be negatively affected during construction of the proposed project due to the presence of a preexisting 10-foot-tall earthen berm. This berm currently provides a physical barrier that significantly reduces the levels of noise, light, and human activity within the adjacent riparian corridor to the south of the project."[3]

2.1.6.6 Cumulative Impacts

"Cumulative impacts are those that result from past, present, and reasonably foreseeable future actions, combined with the potential impacts of this project. Cumulative impacts can result from individually minor, but collectively substantial impacts taking place over a period of time. One project that is planned for construction in the vicinity of the proposed project includes the I-5 North Coast Corridor Project.

The I-5 North Coast Corridor Project when complete will extend 27 miles along the I-5 transportation corridor in central and northern San Diego County. The main purpose of the project is to reduce congestion on I-5 by increasing capacity along this segment of the corridor through the addition of HOV lanes and/or main travel, or general purpose lanes. In addition, the existing corridor would be brought up to current transportation standards through the addition of auxiliary lanes in specified locations to facilitate traffic entering and exiting main travel lanes along the freeway. Other safety devices, such as concrete barriers, guard rails/end treatments, crash cushions, bridge rails, noise barriers, retaining walls, drainage improvements, and signage, would also be placed at specific locations along the corridor.

The I-5 North Coast Corridor Project will expand a north/south freeway in coastal San Diego County through a variety of habitats including crossing six coastal lagoons, one perennial river, and several small streams and drainages. In addition to all of the wetland habitats that the project crosses, there are sensitive upland habitats including coastal sage scrub, maritime succulent scrub, southern maritime chaparral, and coastal bluff scrub. All of the sensitive habitats support a variety of sensitive species including several listed species. The light-footed clapper rail, coastal California gnatcatcher, California least tern, western snowy plover, brown pelican (*Pelecanus occidentalis*), Belding's savannah sparrow, and Del Mar manzanita are all federal and/or state listed species that occur within the project vicinity.

Another project that will contribute to cumulative impacts in the vicinity of the proposed project is the Pacific Highlands Ranch 17-22A Project (SDPC 2004). In October of 1992, the San Diego City Council adopted the North City Future Urbanizing Area Framework Plan (NCFUAFP). In response to the NCFUAFP, a Master Environmental Impact Report was prepared by the City of

3 EDAW, Inc., Natural Environment Study, Interstate 5 – State Route 56 Interchange, San Diego County, June 2009.

San Diego for the Pacific Highlands Ranch (Subarea III) Specific Plan (finalized on July 20, 1999). The Pacific Highlands Ranch 17-22A Project site would be situated north of SR-56 at the northwest corner of Carmel Valley Road and Santa Fe Farms Road. The project would result in construction of 677 single-family dwelling units and a private community recreational center.

The Pacific Highlands Ranch 17-22A Project would primarily impact abandoned agricultural fields that were likely a mix of coastal sage scrub and southern maritime chaparral prior to being transformed into farmland. On a north-facing slope just north of the planned project site, several acres of coastal sage scrub and chaparral habitat exist and could support a variety of sensitive species including orange-throated whiptail (*Aspidoscelis hyperythra*), coastal California gnatcatcher, western burrowing owl (*Athene cunicularia*), wart-stemmed ceanothus, and summer holly (*Comarostaphylis diversifolia* ssp. *diversifolia*).

Another project in the vicinity of the proposed project is the San Dieguito Lagoon Wetland Restoration Project. This project is in progress and aims to create and/or substantially restore at least 150 acres of tidally influenced wetlands and will therefore have beneficial effects to biological resources in the surrounding area. The work is primarily being performed by Southern California Edison to satisfy a portion of mitigation requirements for the impacts from the cooling water systems for the San Onofre Nuclear Generating Station on the marine environment. As a condition of approval of the restoration plan, the CCC requires that the lagoon tidal inlet be maintained in an open condition in perpetuity. For this commitment, a 35-acre credit was given to Southern California Edison; therefore, 115 acres of wetlands needs to be created or restored.

The project site is located at the western end of the San Dieguito River Valley and is entirely within the coastal zone and within both the city of Del Mar and the city of San Diego. It is within 440 acres of public land bounded to the east, west, north, and south, respectively, by El Camino Real, the Pacific Ocean, Via de la Valle, and the north edge of the Carmel Valley Planning area. Restoration of the project will create subtidal and intertidal habitats through excavation and dredging, maintenance of the inlet channel in an open state, construction of berms along the river, establishment of disposal sites for excavated materials, and establishment of nesting sites for threatened and endangered bird species. Other project tasks include slope protection, permanent access roads, protection of utility lines and infrastructure, and planting of various types of habitats. These habitats include low, mid, and high salt marsh; uplands; coastal sage scrub; and grasslands. Construction of these features is expected to take approximately 3 years. Following construction, the San Dieguito Joint Powers Authority will be responsible for the long-term maintenance and monitoring of the project.

When considered with other projects that have been completed, are in progress, or are planned for the vicinity, such as the I-5 North Coast Corridor Project and the Pacific Highlands Ranch 17-22A Project, the I-5/SR-56 Interchange Project is anticipated to contribute to cumulative effects at a regional level, with some of those impacts being offset by projects resulting in a positive effect on biological resources, such as the San Dieguito Lagoon Wetland Restoration Project. Furthermore, the proposed mitigation measures (discussed below) for the proposed project have been designed to reduce impacts to a level below significance under CEQA."[3]

2.1.6.7 Avoidance, Minimization and Compensatory Mitigation

"Caltrans has finalized a project design that would include construction limits and staging areas that have been reduced or relocated to avoid or minimize direct effects to sensitive resources and maximize use of nonnative, disturbed, and developed land cover types. Final avoidance, minimization, and mitigation measures would be determined by the resource agencies.

The following are general avoidance and minimization measures that would be implemented to minimize unavoidable impacts to natural communities of special concern, sensitive plants, and sensitive animals:

1. Limits of construction (including construction staging areas and access routes) would be clearly marked on project maps provided to the contractor(s) to indicate "no construction" zones. Natural vegetation communities outside or adjacent to impact areas would be designated as Environmentally Sensitive Areas (ESAs) and be delineated with ESA fencing (orange snow fencing) to prevent work from occurring in these areas. Temporary construction fencing would be removed upon project completion. A construction monitor would be present during vegetation clearing to ensure that work is limited to designated construction limits.

2. Vegetation clearing will occur outside of the breeding season (February 15 through August 31) so that impacts to nesting birds can be avoided. In addition, nest clearance surveys will be completed by a qualified biologist immediately prior to vegetation clearing to verify that no birds are nesting in the area.

3. All equipment maintenance, staging, and dispensing of fuel, oil, coolant, or any other such activities would occur in designated areas and within the fenced project impact limits. These designated areas would be located in previously compacted and disturbed areas to the maximum extent practicable in such a manner as to prevent any runoff from entering jurisdictional wetlands or waters, and would be shown on the construction plans. Fueling of equipment would take place within existing paved areas greater than 100 feet from jurisdictional wetlands or waters. Contractor equipment would be checked for leaks prior to operation and repaired as necessary. "No-fueling" zones would be designated on construction plans.

4. In areas that do not require excavation or grading, vegetation would be trampled instead of completely removed.

5. The project site would be kept as clean of debris as possible to avoid attracting predators of sensitive wildlife. All food-related trash items would be enclosed in sealed containers and regularly removed from the site.

6. Pets of project personnel would not be allowed on the project site.

7. A majority of construction is expected to be undertaken during daylight; however, when nighttime construction is necessary, lighting would be of the lowest illumination necessary for human safety, would be diverted away from any native vegetation communities, and would consist of low-sodium or similar lighting equipped with shields to focus light downward onto the appropriate subject area.

Compensatory mitigation for impacts to upland habitats will likely be completed at the Dean Mitigation Parcel immediately east of I-5 in the former tomato field, or at the Sage Hill Mitigation Bank. Specifically, permanent impacts to coastal sage scrub and southern maritime chaparral will be completed on Caltrans mitigation property on the slopes of San Dieguito Lagoon at a proposed 2:1 ratio, subject to discussions with the resource agencies. The proposed mitigation measures have been designed to reduce each potentially significant impact to a level below significance under CEQA." [3]

Section THREE REGULATORY SETTINGS

3.1 FEDERAL REQUIREMENTS

This section provides a description of the federal permits and requirements necessary for the project. Although Section 402 is a requirement under the Federal Clean Water Act, it's administrated by the San Diego Regional Water Quality Control Board (SDRWQB). Thus, they are discussed under Section 3.2 "STATE LAWS AND REGULATIONS".

3.1.1 Clean Water Act Title 33 US Code (§1251 et seq.)

The Federal Water Pollution Control Act of 1948 was the first major law that addressed water pollution. As public awareness and concerns for protecting water quality grew, the law was reorganized and expanded in 1972. In 1977, the law was once again amended and became commonly referred to as the "Clean Water Act". The Clean Water Act (CWA) is the primary federal law that protects our nation's waters, including lakes, rivers, aquifers and coastal areas. The Clean Water Act's primary objective is to restore and maintain the integrity of the nation's waters. This objective translates into two fundamental national goals:

- Eliminate the discharge of pollutants into the nation's waters, and
- Achieve water quality levels that are fishable and swimmable.

The CWA provides a comprehensive framework of standards, technical tools and financial assistance to address the many causes of pollution and poor water quality, including municipal and industrial wastewater discharges, polluted runoff from urban and rural areas, and habitat destruction.

In recent years, federal and state environmental regulations have evolved to require the control of pollutants from municipal separate storm sewer systems (MS4s), construction sites, and industrial activities. Discharges from such sources were brought under the NPDES permit process by the 1987 amendments to the Federal Clean Water Act and subsequent 1990 promulgation of federal storm water regulations by United States Environmental Protection Agency (USEPA). In California, USEPA has delegated administration of the NPDES program to the SWRCB and the nine RWQCBs. The SWRCB has issued statewide general NPDES storm water permits for designated types of construction and industrial activities. The SWRCB also developed and issued the statewide NPDES Storm Water Permit, adopted July 15, 1999, that applies to Caltrans.

3.1.2 Endangered Species Act (ESA) of 1973 (Title 16 US Code §1531-1544)

The purpose of the ESA is to protect and recover imperiled species and the ecosystems upon which they depend. It is administered by the Interior Department's United States Fish and Wildlife Service (USFWS) and the Department's National Marine Fisheries Service (NMFS). The USFWS has primary responsibility for terrestrial and freshwater organisms, while the responsibilities of NMFS are mainly marine wildlife. Protocol surveys for federally listed plants and animals are required since they are either present, or have the potential to occur, within or near the proposed project.

3.1.3 Migratory Bird Treaty Act of 1918

The Migratory Bird Treaty Act prohibits take of protected migratory birds. Although not planned, if vegetation removal is necessary during the breeding season, surveys for migratory bird nests and raptor nests are required.

3.2 STATE LAWS AND REGULATIONS

3.2.1 California Water Code – Porter Cologne Water Quality Control Act of 1969

This Act, California Water Code §13000 et seq. provides for aesthetic values, fish and wildlife preservation, water reclamation, and comprehensive planning and regulation to attain the highest "reasonable" water quality in consideration of conflicting demands. The Act requires the RWQCBs to establish water quality objectives and adopt water quality control plans (commonly referred to as Basin Plans).

California's Porter-Cologne Water Quality Control Act (1969), which became Division 7 ("Water Quality") of the State Water Code, establishes the responsibilities and authorities of the nine Regional Water Quality Control Boards (previously called Water Pollution Control Boards) and the SWRCB. The Porter-Cologne Act names these Boards "...the principal State agencies with primary responsibility for the coordination and control of water quality" (Section 13001). Each Regional Board is directed to "...formulate and adopt water quality control plans for all areas within the region." A water quality control plan for the waters of an area is defined as having three components: beneficial uses, which are to be protected, water quality objectives that protect those uses, and an implementation plan that accomplishes those objectives (Section 13050).

The Porter-Cologne Water Quality Control Act also serves to ensure California's eligibility to implement the National Pollutant Discharge Elimination System permit process required by the Federal Clean Water Act. The Act designates the State Water Resources Control Board as the "State water pollution control agency" for the purposes of implementing the Clean Water Act and directs the SWRCB to take the actions required by that Act.

3.2.2 Section 402 – NPDES Regulations

Section 402 of the Clean Water Act established the NPDES permit (Permit) to regulate the discharge of pollutants from point sources. Caltrans is currently regulated by Order No. 99-06–DWQ, No. CAS000003 NPDES Permit Statewide Storm Water Permit and Waste Discharge Requirements (WDRs) for The State of California, Department of Transportation properties, facilities and activities adopted on July 15, 1999 by State Water Resources Control Board.

The NPDES permit in San Diego County is administered and enforced by the San Diego Regional Water Quality Control Board (SDRWQCB). The storm water runoff pollution prevention aspects will be covered under the aforementioned NPDES Permit or any re-issuance thereafter.

A Notice of Construction will be filed with the SDRWQCB 30 days prior to the start of construction activities.

3.2.3 California Endangered Species Act (1984)

The California Endangered Species Act (CESA) states that all native species of fishes, amphibians, reptiles, birds, mammals, invertebrates, and plants, and their habitats, threatened with extinction and those experiencing a significant decline which, if not halted, would lead to a threatened or endangered designation, will be protected or preserved. Protocol surveys for state listed plants and animals are required since they are either present, or have the potential to occur within or near the proposed project.

3.2.4 Construction General Permit

The State Water Resources Control Board adopted Order No. 2009-0009–DWQ, NPDES No. CAS000002 NPDES General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities on September 2, 2009 with an effective date of July 1, 2010. The permit covers construction activities that result in land disturbance of equal or greater than one acre or construction activities that result in land surface disturbance of less than one acre if the construction activity is part of a common plan of development.

The permit requires the dischargers to implement a Storm Water Pollution Prevention Plan (SWPPP) that contains BMPs that will prevent construction pollutants from entering a receiving water body.

The SWPPP has the following objectives:

- All pollutants and their sources, including sources of sediment associated with construction, construction site erosion and all other activities associated with construction activity are controlled;
- Where not otherwise required to be under a Regional Water Board permit, all non-storm water discharges are identified and either eliminated, controlled, or treated;

- Site BMPs are effective and result in the reduction or elimination of pollutants in storm water discharges and authorized non-storm water discharges from construction activity to the BAT/BCT standard;
- Calculations and design details as well as BMP controls for site run-on are complete and correct, and
- Stabilization BMPs installed to reduce or eliminate pollutants after construction are completed.

The new Construction General Permit is a risk-based permit that establishes three levels of environmental risk possible for a construction site. The Risk Level (RL) is calculated in two parts: 1) Project Sediment Risk, and 2) Receiving Water Risk. The RL determination quantifies sediment and receiving water characteristics and uses these results to determine the project's overall RL. Highly erodible soils, in higher rainfall areas, on steep slopes increase the 'sediment risk'. Monitoring and reporting requirements increase as the RL goes from 1 to 3.

Caltrans's stormwater program complies with the substantive provisions of the Construction General Permit on projects. The permit requirements are implemented during the design phase

through the water pollution control plans and project's specifications. During the construction phase, the requirements will be met through the implementation of the Stormwater Pollution Prevention Plans (SWPPPs) prepared for each project under the construction phase and compliance with the project's specifications.

3.2.5 Statewide NPDES Permit

The State Water Resources Control Board adopted Order No. 99-06–DWQ, NPDES No. CAS000003 NPDES Permit Statewide Storm Water Permit and Waste Discharge Requirements (WDRs) For the State of California, Department Of Transportation properties, facilities and activities herein referred to as Permit. The permit requires Caltrans to implement a Storm Water Management Plan (SWMP), which purpose is to protect and achieve water quality standards at all times. The minimum requirement is to ensure that pollutants in discharges from storm drain systems owned or operated by Caltrans are reduced to the maximum extent practicable (MEP) and that pollutants in discharges from construction activities covered by the Construction General Permit are reduced by employing Best Available Technology /Best Conventional Technology (BAT/BCT) performance standards. The MEP analysis is the process of evaluating the selected BMPs based on legal and institutional constraints, technical feasibility, relative effectiveness, and cost/benefit ratio.

The project will be designed to comply with the current Statewide NPDES Permit or any reissuance thereafter. This project will implement any future additional requirements of the new permit during the design phase as it is anticipated the Statewide NPDES Permit will be re-issued during that time.

3.2.6 California Coastal Development Permit

The California Coastal Commission was established by voter initiative in 1972 (Proposition 20) and later made permanent by the Legislature through adoption of the California Coastal Act of 1976.

The Coastal Commission, in partnership with coastal cities and counties, plans and regulates the use of land and water in the coastal zone. Development activities, which are broadly defined by the Coastal Act to include (among others) construction of buildings, divisions of land, and activities that change the intensity of use of land or public access to coastal waters, generally require a coastal permit from either the Coastal Commission or the local government.

The Coastal Act includes specific policies that address issues such as shoreline public access and recreation, lower cost visitor accommodations, terrestrial and marine habitat protection, visual resources, landform alteration, agricultural lands, commercial fisheries, industrial uses, water quality, offshore oil and gas development, transportation, development design, power plants, ports, and public works. The policies of the Coastal Act constitute the statutory standards applied to planning and regulatory decisions made by the Commission and by local governments, pursuant to the Coastal Act.

Caltrans has determined that this project will require a Coastal Development Permit from the California Coastal Commission. The process will be initiated for this project.

Section FOUR WATERSHED CHARACTERISTICS

4.1 AFFECTED WATERSHED

The San Diego Regional Water Quality Control Board 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 (HA) 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)

Table 4.1 below lists the hydrologic area that is within the proposed *I-5/SR-56 Interchange Project*. The table compares the existing Caltrans right of way within the I-5/SR56 project limits to the hydrologic area. The table below shows that the project's tributary area to the hydrologic area is less than one percent.

Table 4.1 Existing I-5/SR-56 Interchange Contribution to the watershed within project limits

Hydrologic Unit	Hydrologic Area Number	HA (Acres)	Project Tributary Area (Acres)	Existing I-5/SR-56 Interchange Contribution to HA (%)
Penasquitos	906.10	32,228	23.4	0.07

* Source: sangis/landuse/right_of_way.shp

4.2 BASIN PLAN REQUIREMENTS

4.2.1 Beneficial Uses

The San Diego Basin Plan designates Beneficial Uses for the water bodies within the Region which are defined as "… 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".

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 4.2 defines the existing and potential beneficial uses as outlined in the Water Quality Control Plan for the San Diego Basin (9). Tables 4.3 & 4.4 list the existing and potential beneficial uses for the Inland Surface Waters and Coastal Waters within the project limits.

Table 4.2 Existing and Potential Beneficial Uses Description

Beneficial Designation	Description
Municipal and Domestic Supply (MUN)	Includes uses of water for community, military, or individual water supply systems including, but not limited to, drinking water supply.
Agricultural Supply (AGR)	Includes uses of water for farming, horticulture, or ranching including, but not limited to, irrigation, stock watering, or support of vegetation for range grazing.
Industrial Process (PROC)	Includes uses of water for industrial activities that depend primarily on water quality.
Industrial Services Supply (IND)	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.
Ground Water Recharge (GWR)	Includes uses of water for natural or artificial recharge of ground water for purposes of future extractions, maintenance of water quality or halting of saltwater intrusions into freshwater aquifers.
Freshwater Replenishment (FRSH)	Includes uses of water for natural or artificial maintenance of surface water quality or quantity (e.g., salinity).
Navigation (NAV)	Includes uses of water for shipping, travel, or other transportation by private, military, or commercial vessels.
Hydropower Generation (POW)	Includes uses of water for hydropower generation.
Contact Recreation (REC1)	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.
Non-Contact Recreation (REC2)	Includes the uses of water for recreational 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, camping, boating, tidepool and marine life study, hunting, sightseeing, or aesthetic enjoyment in conjunction with the above activities.
Commercial and Sport Fishing (COMM)	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.
Aquaculture (AQUA)	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 Freshwater Habitat (WARM)	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 Freshwater Habitat (COLD)	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.
Migration of Aquatic Organisms (MIGR)	Includes uses of water that support habitats necessary for migration, acclimatization between fresh and salt water, or other temporary activities by aquatic organisms, such as anadromous fish.
Estuarine Habitat (EST)	Includes uses of water the at supports estuarine ecosystems including, but not limited to, preservation or enhancement of estuarine habitats, vegetation, fish, shellfish, or wildlife (e.g., estuarine mammals, waterfowl, shorebirds).
Marine Habitat (MAR)	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).
Wildlife Habitat (WILD)	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.
Preservation of Biological Habitats of Special Significance (BIOL)	Includes uses of water that support designated areas of 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, Threatened and Endangered Species (RARE)	By definition, water bodies with the rare designated support habitats necessary, at least in part, for the survival and successful maintenance of plant and animal species established under state or federal law as rare, threatened, or endangered.
Spawning, Reproduction, and/or Early Development (SPWN)	Includes any marine fish in water bodies with MAR and/or COLD beneficial uses. The cold freshwater fish used for the SPWN designation is the rainbow trout.
Shellfish Harvesting (SHELL)	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.

Table 4.3 Beneficial Uses for Inland Surface Waters

Water Body Name	HA	MUN	AGR	IND	PROC	GWR	FRSH	POW	REC1	REC2	BIOL	WARM	COLD	WILD	RARE	SPWN
Carmel Valley	906.10	+	●	●					○	●		●		●		
Los Penasquitos Creek	906.10	+	●	●					○	●		●		●		

● Existing Beneficial Use + Excepted from Municipal
○ Potential Beneficial Use

Table 4.4 Beneficial Uses for Coastal Waters

Water Body Name	HA	IND	NAV	REC1	REC2	COMM	BIOL	EST	WILD	RARE	MAR	AQUA	MIGR	SPWN	WARM	SHELL
Los Penasquitos Lagoon	906.10			●	●		●	●	●	●	●		●	●		●

● Existing Beneficial Use + Excepted from Municipal
○ Potential Beneficial Use

4.2.2 Section 303(d) of the Clean Water Act & Targeted Design Constituents

Section 303(d) of the Clean Water Act requires each State to identify water bodies within its boundaries for which the effluent limitations are not stringent enough to implement water quality standards applicable to such waters. These water bodies, referred to as "water quality limited segments," do not meet water quality standards even after discharges have been treated by the minimum required levels of pollution control technology. All States are required to create a list of these water bodies referred to as the "Clean Water Act Section 303(d) List of Water Quality Limited Segments".

As part of the Caltrans runoff characterization studies, 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 were identified. 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.

Table 4.5 Receiving 303(d) Impaired Water Bodies within Project Limits

303(d) Impaired Water Body	*HAS*	*Constituents of Concern*	*TDCs*
Los Penasquitos Lagoon	906.10	Sedimentation /Siltation	Sedimentation /Siltation
Los Penasquitos Creek	906.10	Phosphate & Total Dissolved Solids	Phosphate

Source: http://www.waterboards.ca.gov/tmdl/docs/303dlists2006/approved/r9_06_303d_reqtmdls.pdf
http://www.water-programs.com/wqpt.htm

4.2.3 Total Maximum Daily Loads

Surface waters on the 303(d) list require the preparation of Total Maximum Daily Loads (TMDL) for constituents of concern. The TMDL process provides a flexible assessment and planning framework for identifying load reductions or other actions needed to achieve water quality standards. Section 303(d) of the Federal Clean Water Act established the TMDL process to guide application of state standards to individual water bodies/watersheds. A TMDL or Loading Capacity is the maximum amount of a pollutant a water body can receive and still attain water quality objective and protect beneficial uses.

TMDLs in California are developed either by Regional Boards or by the United States Environmental Protection Agency (USEPA). TMDLs developed by Regional Boards are designed as Basin Plan amendments and include implementation provisions. TMDLs must consider and include allocations to both point sources and non-point sources of listed pollutants.

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 and other dischargers completed the monitoring required by the Investigation Order and are working with the SDRWQCB to develop TMDLs. Table 4.6 lists the water bodies addressed in this order and the responsible stakeholders. Los Penasquitos Lagoon is one of the project's receiving water bodies that have a TMDL in progress. Caltrans has been working with the San Diego Regional Water Quality Control Board and the Lagoon dischargers (Cities of San Diego, Poway, Del Mar, and the County of San Diego) to develop total maximum daily loads for the Lagoon. In addition, the project falls within the coastal zone and will require a Coastal Development Permit from the California Coastal Commission.

Table 4.6 List of Water Bodies Addressed in TMDLs & Responsible Stakeholders

Water Body	(HSA)	Responsible Stakeholders	
		Municipalities and Military Facilities	**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 Lagoon	**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

4.3 RUNOFF CHARACTERIZATION

Caltrans has conducted runoff monitoring 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 the various Caltrans facilities and providing information that can assist in developing effective storm water management strategies. The three year studies were initiated in 2000 a included multiple highway facilities throughout the State. Table 4-7 shows a summary of the statewide characterization studies data for highway facilities. The monitoring studies indicated that results could be significantly influenced by various factors such as:

- Traffic Volume. Pollutants concentrations in storm water runoff increase with higher traffic volumes.
- Cumulative Seasonal Precipitation (CSP). As CSP increases, pollutant concentration decreases, which is an evidence of pollutants washing off during the early wet season and tend to deceases thereafter.
- Antecedent Dry Periods. The longer the dry period, the higher the pollutant concentration in runoff.
- Total Event Rainfall. As total event rainfall increases, pollutant concentration decreases, which is due to dilution from large storms. Concentration of pollutants tends to be the highest in the initial portion of runoff and diluted as the storm continues.
- Maximum Rainfall Intensity. It had a similar affect to Total Event Rainfall.
- Drainage Areas. The larger the drainage area, few pollutant concentration tended to be lower for highways.
- Impervious Fraction of the Drainage Area. This factor did not have a consistent effect on pollutant concentrations. Higher the impervious area tended to increase concentration of some pollutants and decrease others but it was the weakest effect of all the factors evaluated.

Table 4.7 Summary Statistics for Highway Facilities (Monitoring Years 2000/01-02/03)

Constituent	Units	n*	Number of Sites	Median	Mean	Standard Deviation
CONVENTIONALS						
Dissolved Organic Carbon	mg/L	635	46	13.1	18.7	26.2
Hardness as CACO3	mg/L	635	46	26.9	36.5	34.2
pH	pH	633	46	7.0	7.1	0.7
Total Dissolved Solids	mg/L	635	46	60.3	87.3	103.7
Total Suspended Solids	mg/L	634	46	59.1	112.7	188.8
Total Organic Carbon	mg/L	635	46	15.3	21.8	29.2
METALS						
Dissolved Arsenic	µg/L	635	46	0.7	1.0	1.4
Total Arsenic	µg/L	635	46	1.1	2.7	7.9
Dissolved Cadmium	µg/L	635	46	0.13	0.24	0.54
Total Cadmium	µg/L	635	46	0.44	0.73	1.61
Dissolved Chromium	µg/L	635	46	2.2	3.3	3.3
Total Chromium	µg/L	635	46	5.8	8.6	9.0
Dissolved Copper	µg/L	635	46	10.2	14.9	14.4
Total Copper	µg/L	635	46	21.1	33.5	31.6
Dissolved Nickel	µg/L	635	46	3.4	4.9	5.0

Total Nickel	µg/L	635	46	7.7	11.2	13.2
Dissolved Lead	µg/L	635	46	1.2	7.6	34.3
Total Lead	µg/L	635	46	12.7	47.8	151.3
Dissolved Zinc	µg/L	635	46	40.4	68.8	96.6
Total Zinc	µg/L	635	46	111.2	187.1	199.8
NUTRIENTS						
Nitrate as Nitrogen	mg/L	634	46	0.6	1.07	2.44
Dissolved Ortho-Phosphate	mg/L	630	46	0.06	0.11	0.18
Total Phosphorous	mg/L	631	46	0.18	0.29	0.39
Total Kjeldahl Nitrogen	mg/L	626	46	1.40	2.06	1.90

*Number of Data Points

5.1 POTENTIAL POLLUTANT SOURCES

The project has the potential to impact water quality during the construction phase as well as during the operation of the freeway. Best Management Practices (BMPs) will 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.

5.1.1 No Build Alternative

This alternative would not construct the proposed I-5/SR-56 Interchange improvements project and thus will not create water quality impacts. Although this alternative assumes the construction of the I-5 North Coast Corridor project, potential short and long term water quality impacts associated with the construction and operation of this project has been analyzed in a separate water quality report.

5.1.2 Build Alternatives

Permanent Impacts

The Build Alternatives would retrofit the I-5/SR-56 Interchange project area with treatment BMPs to the Maximum Extent Practicable (MEP). As defined in the PPDG Manual, MEP Analysis is the process of evaluating the selected BMPs based on legal and institutional constraints, technical feasibility, relative effectiveness, and cost/benefit ratio. These alternatives would require analyzing the project area from a water quality perspective in relation to the 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 future TMDL requirements for Los Penasquitos Lagoon.

Table 5.1 below *Comparison of Existing and Proposed Pavement Areas for the Build Alternatives* shows the difference of additional pavement areas between each of the Build Alternatives. The permanent impacts are assessed based on the additional pavement area added by each of the Build Alternatives. The Auxiliary Lane Alternative adds the least amount of pavement area (12.4 acres) compare to the other build alternatives (38.1 acres for the Direct Connector, 27.2 acres for the Hybrid, and 31.1 acres for the Hybrid with Flyover). The Direct Connector Alternative adds the greatest amount of pavement area, which is approximately three

times greater than the paved area added by the Auxiliary Lane Alternative. The Hybrid Alternative adds approximately twice the amount of pavement proposed by the Auxiliary Lane Alternative while the Hybrid with Flyover Alternative adds two and a half times the pavement proposed by the Auxiliary Lane Alternative.

Table 5.1 Comparison of Existing & Proposed Pavement Areas for the Build Alternatives

Alternatives	Existing Impervious Area Acres (Hectares)	Proposed Additional Impervious Area Acres (Hectares)	Total Impervious Areas Acres (Hectares)	Percentage of Additional Impervious Areas (%)
Direct Connector Alt.	102.5 (41.5)	38.1 (15.4)	140.6 (56.9)	27.1
Auxiliary Lane Alt.	102.5 (41.5)	12.4 (5.0)	114.9 (46.5)	10.8
Hybrid Alt.	102.5 (41.5)	27.2 (11.0)	129.7 (52.5)	21.0
Hybrid with Flyover Alt.	102.5 (41.5)	31.1(12.6)	133.6 (54.1)	23.3

Temporary Impacts

To assess potential short term impacts of each of the build alternatives, Table 5.2 *Temporary Disturbed Soil Areas for the Build Alternatives* presented below shows the approximate temporary disturbed soil areas (DSA) for each of the Build Alternatives. This area was estimated based on exposed and erodible soil within the project limits. Sediment is a major and most common construction pollutant. The Auxiliary Lane Alternative is anticipated to disturb the lowest amount of pavement (30.6 acres) compare to the other alternatives. The Direct Connector Alternative is anticipated to disturb three times as much soil (91.2 acres) as the Auxiliary Lane Alternative, while the Hybrid is anticipated to disturb twice the amount of soil (64.0 acres) and the Hybrid with Flyover is anticipated to disturb two and a half times (78.8 acres) the Auxiliary Lane Alterative.

Erosion during construction can contribute large amounts of sediment to storm water runoff, which consequently can result in higher polluted runoff leaving the construction site and reaching the surface waters. All erosion potential impacts will be avoided or minimized during construction by the use of various avoidance/minimization measures as discussed in Section 6 "AVOIDANCE/MINIMIZATION MEASURES". Examples of such measures include a combination of soil stabilization and sediment control best management practices by stabilizing the slopes with temporary erosion control and implementing temporary fiber rolls when an area is non-active for 14 days or before the onset of rain. All disturbed slopes will be stabilized before the completion of construction with landscaping or permanent erosion control. After completion of construction, fiber rolls will be installed along the slopes to capture sediment until vegetation is established.

Table 5.2 Temporary Disturbed Soil Areas for the Build Alternatives

Disturbed Soil Area	Acres (Hectares)		
Direct Connector Alt.	Auxiliary Lane Alt.	Hybrid Alt.	Hybrid with Flyover Alt.
91.2 (36.9)	30.6 (12.4)	64.0 (25.9)	78.8 (31.9)

Cumulative Impacts

Evaluating the impacts of any of the build alternatives on water quality requires an assessment of temporary and permanent impacts. The Auxiliary Lane Alternative is anticipated to have the lowest potential water quality impacts since it is disturbing the least amount of soil areas and adding the least amount of additional pavement. The Direct Connector Alternative would have greater potential for impacting water quality due to the large amount of disturbed soil areas anticipated during construction and the large amount of impervious surface it would be adding, which are three times greater than the Auxiliary Lane Alternative. The Hybrid Alterative temporary and permanent impacts are twice as much as the Auxiliary Lane Alterative and the Hybrid with Flyover Alterative impacts are two and a half times the Auxiliary Lane Alternative.

Impervious surface is directly proportional to higher runoff volume and higher velocities and less opportunities for infiltration or for vegetation to slow down flows. All Build Alternatives have been evaluated to ensure that all opportunities to reduce flows and velocities are accounted for through drainage modifications and the incorporation of treatment BMPs, which is further discussed in Section Six "AVOIDANCE/MINIMIZATION MEASURES". A preliminary drainage analysis was completed for the project to ensure every opportunity to treat and/or reduce runoff to the MEP before leaving the project site.

6.1 INTRODUCTION

The Statewide Storm Water Management Plan (SWMP) describes how the California Department of Transportation (Caltrans) will comply with the provisions of the NPDES Permit (Order 99-06-DWQ). The SWMP describes the program Caltrans would implement to reduce the discharge of pollutants to the storm water drainage system that serve the highway and highway related properties, facilities and activities.

Best Management Practices (BMPs) will need to be considered to address potential water quality impacts during the planning and design, construction, and operational and maintenance phases. The SWMP divides the BMPs into separate categories from the planning and design phase to the operational and maintenance phase.

Short term potential impacts to water quality during the construction phase are avoided and or minimized through the use of Construction Site BMPs while the long term potential impacts due to operation and maintenance of the freeway or other Caltrans facilities are avoided/minimized through the use of Design Pollution Prevention BMPs, Treatment BMPs and Maintenance BMPs

The general categories of BMPs have been identified for use in the Project Planning and Design Guide (PPDG) Manual and are shown in *Table 6.1 BMP Descriptions*.

Table 6.1 BMP Descriptions

BMP	Description
Design Pollution Prevention BMPs	Preservation of existing vegetation, concentrated flow conveyance, slope/surface protection, etc.
Treatment BMPs	Permanent treatment devices and facilities.
Construction Site BMPs	Temporary soil stabilization and sediment control, non-storm water management, and waste management. Refer to the Construction BMP Manual.
Maintenance BMPs	Litter pick up, waste management, street sweeping, etc.

Source: PPDG Manual, Table 2-3, July 2010

6.2 CALTRANS STANDARD PROCEDURES AND PRACTICES

6.2.1 Project Planning and Design

During the process of planning and design of all new facilities and reconstruction or expansion of existing facilities, the Project Engineer considers and, as appropriate, incorporates BMPs. Design Pollution Prevention BMPs are permanent measures to reduce pollution discharges after construction is completed; while Treatment BMPs are permanent measures to improve/maintain storm water quality after construction is completed.

Project-specific BMP consideration is an iterative process that begins with initial project planning and scoping activities. As the project moves into detailed design, Caltrans design division revisits the BMP consideration process and goes through a detailed BMP selection methodology that works efficiently with the design of the highway and drainage facilities. This process is documented in the Storm Water Data Report.

6.2.1.1 Design Pollution Prevention (DPP) BMPs

During the project development process, the Project Engineer will incorporate specific DPP BMPs into a project to minimize potential impacts to water quality. Design Pollution Prevention BMPs are permanent measures to reduce pollution discharges (e.g., reduce erosion, manage non-stormwater discharges, etc.) after construction is completed. They can also provide water quality benefits similar to Treatment BMPs. These benefits are not quantified as done for Treatment BMPs, but may include:

- The settling of solids and other pollutants;
- Increased detention time within the drainage system to allow infiltration where conducive; and
- Ancillary filtration and infiltration within vegetated conveyances and surfaces.

For example, vegetated surfaces can also serve to reduce runoff (volume, velocity, and flow) and thus reduce the sediment and pollutant loads and concentrations in receiving waters.

The table below lists the DPP BMPs to achieve the above design objectives.

Table 6.2 Design Pollution Prevention BMPs

Consideration of Downstream Effects Related to Potentially Increased Flow
Peak Flow Attenuation Basins
Reduction of Paved Surface (i.e., increase pervious area)
Soil Modification
Energy Dissipation Devices
Preservation of Existing Vegetation[1]
Concentrated Flow Conveyance Systems
Ditches, Berms, Dikes and Swales
Overside Drains, Down Drains, Paved Spillways
Channel Lining
Flared Culvert End Sections
Outlet Protection/Velocity Dissipation Devices
Slope/Surface Protection Systems
Vegetated Surfaces
Benching/Terracing, Slope Rounding, Reduce Gradients
Hard Surfaces

[1] *For all Caltrans projects, Caltrans will maximize vegetation-covered soil areas of a project.*

Source: PPDG Manual, Table 2-4, July 2010

Consideration of Downstream Effects Related to Potentially Increased Flow

Since the project will increase the volume and the velocity of runoff due to the increase in impervious areas, Caltrans will evaluate the effects on downstream channel stability and consider the following measures and incorporate them and appropriate:

- Reduction of total paved areas.
- Modifications to channel (both natural and man-made) lining materials, including vegetation, geotextile mats, rock and rip-rap;
- Energy dissipation devices at culvert outlets;
- Smoothing the transition between culvert outlets/headwalls/wing walls and channels to reduce turbulence and scour, and

- Incorporating peak flow attenuation facilities to reduce peak discharges.
- Modifications to site soils to improve infiltration.
- Low Impact Development (LID) measures and sustainable infrastructure,

Preservation of Existing Vegetation

The project will protect desirable vegetation that provides sediment and erosion control measures. This BMP can also be considered an LID technique when an area is used to attenuate runoff. Caltrans will preserve existing vegetation in areas where no construction activity is planned within project limits or will occur at a later date. The following measures will be considered and incorporated as appropriate:

- Identify and delineate on contract documents all vegetation to be retained.
- Delineate areas to be preserved in the field prior to the commencement of soil disturbing activities.
- Minimize disturbed areas by locating temporary roadway to avoid impacting existing vegetation and follow existing contours to reduce cutting and filling;
- Consider impacts to adjacent vegetation that needs to be preserved when removing vegetation.

Concentrated Flow Conveyance Systems

"Concentrated flow conveyance systems consist of permanent design measures that are used alone or in combination to intercept and divert surface flows, and convey and discharge concentrated flows with a minimum of soil erosion." (PPDG Manual, 2010). Caltrans will consider the following measures and incorporate them as appropriate:

- All DPP BMPs under this category will be designed in accordance with the Highway Design Manual (See Topics 813, Topic 830 (Topics 835, 836 & 834.4), Chapter 860, and Chapter 820 (Topics 823 & 827), Chapter 870) ;
- Carefully evaluate design flows based risks due to erosion, overtopping, flow backups or washouts;
- Consider outlet protection devices where localized scour is anticipated.
- Evaluate the risk due to erosion, overtopping, flow backup or washouts when selecting design flows.
- Consider run-on from off site sources.
- Conveyances must be lined when velocities exceed the permissible limits.
- Metal pipe downdrains to be used on slopes 1:4 or flatter. For flatter than 1:4 slopes, paved spillways will be used. Corrugated metal flumes with tapered entrance to be used on 1:2 slopes or flatter for low flow rates.

Slope/Surface Protection System

"Surface protection consists of permanent design measures that area used alone or in combination to minimize erosion from completed, yet unvegetated (bare) surfaces" (PPDG Manual, 2010). Slope surfaces protection system could be either vegetated surfaces or hard surfaces. Vegetated surfaces have the advantage of lowering the runoff volume and velocities, which consequently will prevent erosion and other pollutants from entering the storm drain

system. But when site or slope conditions don't allow the adequate establishment of vegetation, hard surfaces are used. Examples of hard surfaces are rock slope protection, rock blankets, slope paving and gabions. Caltrans will consider the following measures and incorporate them as appropriate:

- The project site will be evaluated based on soil type, climate and season, topography, and types of e appropriate vegetation and maintenance. The vegetation cover will be selected to reduce overland and concentrated flow depth and velocities and augment contact time between the runoff and the vegetation, which will improve infiltration and pollutant removal efficiency.
- Harvest and stockpile topsoil (duff) and existing vegetation when feasible and use on the completed slopes before seeding application. If not feasible, use compost and mulch.
- Slope rounding, roughening or stepping to be used where feasible to reduce concentrated flows and enhance the effectiveness of temporary and permanent hydroseeding.
- Implement hard surfaces in areas where it's difficult to maintain vegetation or when vegetation wouldn't provide adequate erosion control due to slope or soil conditions such as culvert outlets and gore areas.
- Pave below bridge decks at abutments where it's difficult for vegetation to be established.

6.2.1.2 Treatment BMPs

Treatment BMPs listed in Table 6.3 were considered for this project as these BMPs have been approved for statewide consideration and implementation as appropriate. Treatment BMPs must be considered for this project as required under the SWMP to avoid or minimize the potential long term impacts from any Caltrans facilities or activities. The approved treatment BMPs listed below are considered to be technically and fiscally feasible. Caltrans experience has found these BMPs to be constructible, maintainable, and effective at removing pollutants to the maximum extent practicable.

Table 6.3 Approved Treatment BMPs

Biofiltration Systems
Infiltration Devices
Detention Devices
Traction Sand Traps
Dry Weather Flow Diversion
Gross Solid Removal Devices (GSRDs)
Media Filters
Multi Chamber Treatment Train
Wet Basins

Source: PPDG Manual, Table 2-5, July 2010

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, TMDLs, other environmental considerations, etc.). Preliminary locations of some of the treatment BMPs are shown on the Project Features Maps (Appendix A). 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 will be maximized and very effort will 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.

Table 6.4 *Comparison of Proposed Treated Pavement Areas for the Build Alternatives* below shows that the Direct Connector Alternative has the highest percentage of total treated impervious surface (56%), followed by the Hybrid with Flyover Alternative (50%). Conversely, the Auxiliary Lane Alternative has the lowest treatment percentage (39%), followed by the Hybrid Alternative, which is proposing to treat 48% of the total pavement area. However, the Auxiliary Lane Alternative is treating approximately three and a half times the additional pavement, while the other alternatives are treating approximately twice the additional pavement added

Table 6.4 Comparison of Proposed Treated Pavement Areas for the Build Alternatives

Alternatives	Proposed Additional Impervious Area Acres (Hectares)	Total Impervious Areas Acres (Hectares)	Treated Impervious Areas Acres (Hectares)	Percentage Treated of Total Impervious Areas (%)	Percentage Treated of Additional Impervious Areas (%)
Direct Connector Alt.	38.1 (15.4)	140.6 (56.9)	79.0 (32)	56%	208%
Auxiliary Lane Alt.	12.4 (5.0)	114.9 (46.5)	45.2 (18.3)	39%	366%
Hybrid Alt.	27.2 (11.0)	129.7 (52.5)	62.5 (25.3)	48%	230%
Hybrid with Flyover Alt.	31.1(12.6)	133.6 (54.1)	66.2 (26.8)	50%	213%

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 such as the Multiple Species Conservation Program (MSCP) or permitting agencies.

Below are description of the treatment BMPs that will be potentially sited within the project limits, their appropriate application and siting criteria, and factors affecting their preliminary design. A description of the other treatment BMPs is found in Appendix B of the PPDG Manual, (July, 2010).

Biofiltration: Strips and Swales

Biofiltration swales are vegetated channels that receive directed flow and convey storm water. While biofiltration strips are vegetated sections of land over which storm water flows as overland sheet flow.

Pollutants are removed by filtration through the grass, sedimentation, adsorption to soil particles, and infiltration through the soil. Swales and strips are mainly effective at removing debris and solid particles, although some dissolved constituents are removed by adsorption onto the soil.

Application/Siting Criteria

- The climate and site conditions allow vegetation to be established (70% minimum vegetation cover is required for treatment to be effective).
- Flow velocities are low enough to prevent scour.
- Consider upstream of other treatment BMPs to provide pretreatment (such as detention basins and infiltration devices)
- If the proposed location is above hazardous soils or contaminated groundwater plumes, contact the RWQCB for clear direction.

Preliminary Design Factors

- The District Landscape Architect must provide vegetation mix appropriate for climate and location
- The bioswale must be designed to handle the Water Quality Flow (WQF) as well as the peak drainage facility design event using the Rational Method.
- Hydraulic Residence Time (HRT) has to be a minimum of 5 minutes; maximum velocity is 1.0 ft/sec and maximum depth of flow 0.5 ft.
- The slope in the direction of flow cannot be less that 0.25% and can't exceed 6% with 1 to 2 % preferred.
- The minimum width of the invert and the side slope ratio of the bioswale must receive concurrence from maintenance with 2 feet as the minimum and 10 feet is the maximum allowable invert width, and a side slope ration of 1:4 or flatter
- The biostrip should be sized as long as possible in the direction of flow and the maximum length should not exceed 100 ft and should be free of gullies and rills.

Infiltration Devices

An infiltration basin is a treatment device designed to remove pollutants from surface discharges by capturing the Water Quality Volume (WQV), temporality storing it and infiltrating it directly to the soil rather than discharging it to receiving water.

Application/Siting Criteria

- The ability to treat a WQV greater or equal to 0.1 acre-feet.
- Runoff quality must meet or exceed standards for infiltration to local groundwater.
- The site is not located over a previously identified groundwater plume.
- Separation form the seasonally high water table must be a minimum of 10 feet. Otherwise the RWQCB must be consulted.
- Soil types restricted to HSG A, B or C with an infiltration rate equal or greater than 0.5 in/hr and less than 2.5 in/hr. higher infiltration rates must be approved by the RWQCB.
- Soil should have clay content of <30% and a combined silt/clay content of < 40%.
- Site should not be located in area containing fractured rock within 10 ft of invert

Preliminary Design Factors

- Infiltrate the WQV within 40-48 hours
- Provide maintenance access road around the basin or at least to the overflow spillway and also a ramp to the basin invert.
- They should not be in service during a construction contract unless the area upstream has been stabilized or they shall be protected from sediment-laden runoff.

- They must have a downstream overflow outlet to pass the peak drainage facility design event that will enter the basin.
- Provide a 12 in minimum water quality freeboard.
- Provide a scour protection on the inflow and overflow outlets.
- The basin invert slope should not be greater than 3%.
- A detailed investigation must be conducted including subsurface soil investigation, in-hole conductivity testing and groundwater elevation determination.
- A flood control spillway with scour protection and a maintenance access road must be provided
- The basin must be able to handle the WQV (123 m3) with a drawdown time between 40-48 hrs. It must also be designed with adequate freeboard above the WQV.
- It must be designed with interior side slopes no steeper than 1:4, unless approved by the District Maintenance (1:3 maximum).
- The basins should have vegetation (typically grasses) at the invert and side slopes.

Additional siting and design criteria for infiltration basins are found in the PPDG Manual, Appendix B, as well a detailed pre-screening procedure.

Detention Devices

A detention Device is a permanent treatment BMP designed to reduce sediment and particulate loading in runoff by temporarily detaining the runoff to allow sediments and particles to settle out before the it's discharged into a receiving water. Detention Devices remove litter; total suspended solids and pollutants that are attached to the settled particulate matter.

Application/Siting Criteria

- The WQV has to be greater or equal to 0.1 acre-ft.
- Sufficient head to prevent objectionable backwater conditions in the upstream drainage systems.
- The basin invert must be at least 10 feet above seasonally high groundwater table unless approved by the RWQCB.
- Use a liner if the basin is located over a known groundwater plume unless approved by the RWQCB.
- If significant sediment is expected, consider increasing the volume of the detention basin an amount equivalent to the annual loading.
- Locate outside the clear recovery zone or consult with Traffic Operations to determine if guard railing is required.

Preliminary Design Factors

- To be sized to capture the WQV.
- Outlet designed to empty the basin within 24-72 hours (40 hours recommended when using the debris screen).
- Flow path to width ratio of 2:1 recommended.
- Maximum water level should not cause groundwater to occur under the roadway within 0.7 feet of the roadway subgrade.
- Sufficient access must be provided for maintenance including a road around the basin and a ramp to the basin invert.

- Downstream spillway or overflow riser sized to pass the design storms.
- Provide a water quality freeboard of 12 inches.
- Use scour protection on inflow, outflow and spillway of necessary.
- If a vegetated invert is used, consider adding a low flow channel between the influent pipe and the outlet device to reduce erosion caused by the initial flow into the basin.
- Use 1:4 side slopes unless approved by the District Maintenance (not to exceed 1:3 slopes).
- Provide vegetation on invert and side slopes.
- Minimum orifice size is 0.5 in.

6.2.1.2.1 Existing Treatment BMPs within the I-5/SR-56 Interchange project

Caltrans has been incorporating treatment BMPs into projects that meet specific criteria in accordance with the PPDG Manual. There are existing treatment BMPs within the project limits that were constructed as part of major construction contracts or Caltrans Statewide BMP Retrofit Pilot Program. Any treatment BMPs that will be impacted by the construction of this project will be replaced with one of the approved treatment BMPs.

Table 6.5 Existing Treatment BMPs within the I-5/SR-56 Interchange Project

BMP type	Location	Construction Contract	Impact Status
Detention Basin	West of SB I-5 between I-5/SR-56 Connectors & Carmel Valley Road	Pilot Program	No Impact
Detention Basin	East of I-5, southwest of El Camino Real and High Bluff Drive	Local Contract by City of San Diego	No Impact
Infiltration basin	East of NB I-5 North of Del Mar Heights Rd.	0301U4	May need to be expanded depending on alternative selected.
Bioswale	East of NB I-5 North of Del Mar Heights Rd.	0301U4	No Impact
Continuous Deflective Separation Unit	South of EB SR-56 at Carmel Creek Road	172864 per Coastal Commission requirements	If Direct Connector or Hybrid w/ Flyover Alternative is selected, it will be replaced.
Continuous Deflective Separation Unit	South of EB SR-56 at Carmel Country Road	172864 per Coastal Commission requirements	If Direct Connector or Hybrid w/ Flyover Alternative is selected, it will be replaced.

6.2.2 Project Construction Phase

The proposed project will have potential short-term impacts to the storm water runoff quality during construction due to the type of construction activities that have the potential to contribute pollutants and the type of construction materials that will be used. Examples of construction activities include clearing and grubbing, major grading, utility excavations, sandblasting and landscaping operations. Vehicle fluids, such as oil, grease and petroleum, concrete curing compounds, asphaltic emulsions associated with asphalt concrete paving operations, paints, solvent and thinner, base and sub-base material and curing compounds are examples of construction materials that have the potential to contribute pollutants to storm water discharges, if not contained properly.

The selected BMPs are directed at reducing pollutants in storm water discharges and eliminating non-storm water discharges. The BMPs to be implemented will cover the following categories.

Table 6.6 Construction Site BMP Categories

Category
Temporary Soil Stabilization
Temporary Sediment Control
Wind Erosion Control
Tracking Control
Non-Storm Water Management
Waste Management and Materials Pollution Control

Since the project will disturb more than 1-acre of soil, the potential of erosion if not controlled by an effective combination of erosion and sediment control BMPs is very likely. Construction Site BMPs will be incorporated to address both storm water and non-storm water discharges during construction. Table 6.7 is a matrix of the construction site BMPs that Caltrans would implement, as appropriate, on construction sites to avoid or minimize the short term potential impacts. The temporary control practices are consistent with the BMPs and control practices required under the Construction General Permit and intended to achieve compliance with the requirements of the Permit. As mentioned in Section Three "Regulatory Settings", this project will comply with the new Construction General Permit (2009-0009-DWQ) provisions that are effective as of July 1, 2010.

The permit covers construction activities that result in land disturbance of equal or greater than one acre or construction activities that result in land surface disturbance of less than one acre if the construction activity is part of a common plan of development. The permit requires the dischargers to implement a Storm Water Pollution Prevention Plan (SWPPP) that contains BMPs that will prevent construction pollutants from entering a receiving water body.

The SWPPP has the following objectives:

- All pollutants and their sources, including sources of sediment associated with construction, construction site erosion and all other activities associated with construction activity are controlled;
- Where not otherwise required to be under a Regional Water Board permit, all non-storm water discharges are identified and either eliminated, controlled, or treated;

- Site BMPs are effective and result in the reduction or elimination of pollutants in storm water discharges and authorized non-storm water discharges from construction activity to the BAT/BCT standard;
- Calculations and design details as well as BMP controls for site run-on are complete and correct, and
- Stabilization BMPs installed to reduce or eliminate pollutants after construction are completed.

The new Construction General Permit is a risk-based permit that establishes three levels of environmental risk possible for a construction site. The Risk Level (RL) is calculated in two parts: 1) Project Sediment Risk, and 2) Receiving Water Risk. The RL determination quantifies sediment and receiving water characteristics and uses these results to determine the project's overall RL. Highly erodible soils, in higher rainfall areas, on steep slopes increase the 'sediment risk'. Monitoring and reporting requirements increase as the RL goes from 1 to 3.

Caltrans's stormwater program complies with the substantive provisions of the Construction General Permit on projects. The permit requirements are implemented during the design phase through the water pollution control plans and project's specifications. During the construction phase, the requirements will be met through the implementation of the Stormwater Pollution Prevention Plans (SWPPPs) prepared for each project under the construction phase and compliance with the project's specifications.

Table 6.7: Construction Site BMPs for Typical Highway Construction Activities

BEST MANAGEMENT PRACTICE	Typical Highway Construction Activities																									
	Demolish Pavement/Structures	Clearing & Grubbing	Construct Access Roads	Grading (inc. cut and fill slopes)	Channel Excavation	Channel Paving	Trenching / Underground Drainage	Underground Drainage System Installation	Drainage Inlet Modification	Utility Trenching	Utility Installation	Subgrade Preparation	Base Paving	AC Paving	Concrete Paving	Saw Cutting	Joint Sealing	Grind/Groove	Structure Excavation	Erect False work	Bridge / Structure Construction	Remove False work	Striping	Miscellaneous Concrete Work	Sound Walls/Retaining Walls	Planting and Irrigation	Contractor Activities	Treatment BMP Construction
Temporary Soil Stabilization																												
Scheduling	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X		X	X	X	X	X	X
Preservation of Existing Vegetation		X	X	X			X	X		X									X	X		X			X			
Hydraulic Mulch	X	X		X	X																X					X		X
Hydroseeding	X	X		X	X																X					X		X
Soil Binders	X	X		X	X														X		X					X		X
Straw Mulch	X	X	X	X	X		X	X		X		X							X		X					X		X
Geotextiles, Mats / Plastic Covers and Erosion Control Blankets	X	X	X	X	X		X	X		X		X							X		X					X		X
Wood mulching																										X		

AVOIDANCE/ MINIMIZATION MEASURES

BEST MANAGEMENT PRACTICE	Typical Highway Construction Activities																									
	Demolish Pavement/Structures	Clearing & Grubbing	Construct Access Roads	Grading (inc. cut and fill slopes)	Channel Excavation	Channel Paving	Trenching / Underground Drainage	Underground Drainage System Installation	Drainage Inlet Modification	Utility Trenching	Utility Installation	Subgrade Preparation	Base Paving	AC Paving	Concrete Paving	Saw Cutting	Joint Sealing	Grind/Groove	Structure Excavation	Erect False work	Bridge / Structure Construction	Remove False work	Striping	Miscellaneous Concrete Work	Sound Walls/Retaining Walls	Planting and Irrigation	Contractor Activities	Treatment BMP Construction
Earth Dikes / Drainage Swales & Lined Ditches		X	X	X																	X							
Outlet Protection / Velocity Dissipation Devices		X	X	X																	X							
Slope Drains				X																	X							
Streambank stabilization		X		X	X	X			X	X	X								X	X	X	X					X	
Slope Roughening	X	X		X	X																X					X		X
Temporary Sediment Control																												
Silt Fence	X	X	X	X	X		X			X		X							X		X					X		X
Sediment / Desilting Basin	X	X	X	X	X																X					X		X
Sediment	X	X	X	X	X		X			X		X							X		X					X		X

AVOIDANCE/ MINIMIZATION MEASURES

BEST MANAGEMENT PRACTICE	Typical Highway Construction Activities																										
	Demolish Pavement/Structures	Clearing & Grubbing	Construct Access Roads	Grading (inc. cut and fill slopes)	Channel Excavation	Channel Paving	Trenching / Underground Drainage	Underground Drainage System Installation	Drainage Inlet Modification	Utility Trenching	Utility Installation	Subgrade Preparation	Base Paving	AC Paving	Concrete Paving	Saw Cutting	Joint Sealing	Grind/Groove	Structure Excavation	Erect False work	Bridge / Structure Construction	Remove False work	Striping	Miscellaneous Concrete Work	Sound Walls/Retaining Walls	Planting and Irrigation	Contractor Activities	Treatment BMP Construction
Trap																											
Check Dam	X	X		X	X		X																				X
Fiber Rolls	X	X	X	X	X		X			X											X					X		X
Gravel Bag Berm	X	X	X	X	X		X			X											X					X		X
Street Sweeping and Vacuuming	X	X	X	X	X		X	X		X	X	X	X	X	X	X		X	X		X				X	X	X	X
Sandbag Barrier	X	X	X	X	X		X			X		X							X		X					X		X
Straw Bale Barrier	X	X	X	X	X		X			X		X							X		X					X		X
Slope Drains	X	X	X	X	X		X	X	X	X		X	X			X	X	X	X								X	X
Drain Inlet Protection	X	X	X	X	X		X	X	X	X		X	X			X	X	X	X								X	X
Wind Erosion Control																												
Wind Erosion Control		X	X	X	X		X			X		X	X	X	X											X		X

AVOIDANCE/ MINIMIZATION MEASURES

BEST MANAGEMENT PRACTICE	Typical Highway Construction Activities																										
	Demolish Pavement/Structures	Clearing & Grubbing	Construct Access Roads	Grading (inc. cut and fill slopes)	Channel Excavation	Channel Paving	Trenching / Underground Drainage	Underground Drainage System Installation	Drainage Inlet Modification	Utility Trenching	Utility Installation	Subgrade Preparation	Base Paving	AC Paving	Concrete Paving	Saw Cutting	Joint Sealing	Grind/Groove	Structure Excavation	Erect False work	Bridge / Structure Construction	Remove False work	Striping	Miscellaneous Concrete Work	Sound Walls/Retaining Walls	Planting and Irrigation	Contractor Activities	Treatment BMP Construction
Tracking Control																											
Stabilized Construction Entrance / Exit		X	X	X																							
Stabilized Construction Roadway		X	X	X																							
Entrance / Exit Tire Wash		X	X	X																					X	X	
Waste Management and Materials Pollution Control																											
Material Delivery and Storage	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Material Use	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Stockpile Management	X		X					X		X	X		X	X	X			X									
Spill Prevention	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

AVOIDANCE/ MINIMIZATION MEASURES

BEST MANAGEMENT PRACTICE	Typical Highway Construction Activities																										
	Demolish Pavement/Structures	Clearing & Grubbing	Construct Access Roads	Grading (inc. cut and fill slopes)	Channel Excavation	Channel Paving	Trenching / Underground Drainage	Underground Drainage System Installation	Drainage Inlet Modification	Utility Trenching	Utility Installation	Subgrade Preparation	Base Paving	AC Paving	Concrete Paving	Saw Cutting	Joint Sealing	Grind/Groove	Structure Excavation	Erect False work	Bridge / Structure Construction	Remove False work	Striping	Miscellaneous Concrete Work	Sound Walls/Retaining Walls	Planting and Irrigation	Contractor Activities	Treatment BMP Construction
and Control																											
Solid Waste Management	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Hazardous Waste Management	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Contaminated Soil Management	X	X		X			X	X		X	X									X							
Concrete Waste Management	X		X			X		X			X		X		X	X		X	X		X			X	X	X	X	X
Sanitary / Septic Waste Management	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Liquid Waste Management														X		X	X		X		X		X				X	X
Non-Stormwater Management																											
Water Conservation	X	X	X	X	X	X	X	X	X	X		X				X	X	X	X		X			X		X	X	X

AVOIDANCE/ MINIMIZATION MEASURES

BEST MANAGEMENT PRACTICE	Typical Highway Construction Activities																										
	Demolish Pavement/Structures	Clearing & Grubbing	Construct Access Roads	Grading (inc. cut and fill slopes)	Channel Excavation	Channel Paving	Trenching / Underground Drainage	Underground Drainage System Installation	Drainage Inlet Modification	Utility Trenching	Utility Installation	Subgrade Preparation	Base Paving	AC Paving	Concrete Paving	Saw Cutting	Joint Sealing	Grind/Groove	Structure Excavation	Erect False work	Bridge / Structure Construction	Remove False work	Striping	Miscellaneous Concrete Work	Sound Walls/Retaining Walls	Planting and Irrigation	Contractor Activities	Treatment BMP Construction
Practices																											
Dewatering Operations	X			X	X	X	X	X	X	X	X								X		X			X	X	X		X
Paving and Grinding Operations			X			X			X				X	X	X	X	X	X			X							
Temporary Stream Crossing			X				X	X		X	X									X	X	X		X				
Clear Water Diversion	X		X		X	X														X	X	X			X			X
Illicit Discharge / Illegal Connections Detection and Reporting	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Potable Water / Irrigation			X								X															X	X	
Vehicle and	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

BEST MANAGEMENT PRACTICE	Typical Highway Construction Activities																										
	Demolish Pavement/Structures	Clearing & Grubbing	Construct Access Roads	Grading (inc. cut and fill slopes)	Channel Excavation	Channel Paving	Trenching / Underground Drainage	Underground Drainage System Installation	Drainage Inlet Modification	Utility Trenching	Utility Installation	Subgrade Preparation	Base Paving	AC Paving	Concrete Paving	Saw Cutting	Joint Sealing	Grind/Groove	Structure Excavation	Erect False work	Bridge / Structure Construction	Remove False work	Striping	Miscellaneous Concrete Work	Sound Walls/Retaining Walls	Planting and Irrigation	Contractor Activities	Treatment BMP Construction
Equipment Cleaning																											
Vehicle and Equipment Fueling	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Vehicle and Equipment Maintenance	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Pile Driving Operations		X	X	X				X	X	X	X	X								X					X		X	X
Concrete Curing													X	X	X		X				X			X	X		X	X
Material and Equipment Use Over Water	X	X	X		X			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Concrete Finishing							X	X	X		X				X						X			X	X		X	X
Structure Demolition Over or	X	X	X	X	X		X	X	X	X		X				X		X	X	X	X	X			X		X	X

AVOIDANCE/ MINIMIZATION MEASURES

BEST MANAGEMENT PRACTICE	Typical Highway Construction Activities																									
	Demolish Pavement/Structures	Clearing & Grubbing	Construct Access Roads	Grading (inc. cut and fill slopes)	Channel Excavation	Channel Paving	Trenching / Underground Drainage	Underground Drainage System Installation	Drainage Inlet Modification	Utility Trenching	Utility Installation	Subgrade Preparation	Base Paving	AC Paving	Concrete Paving	Saw Cutting	Joint Sealing	Grind/Groove	Structure Excavation	Erect False work	Bridge / Structure Construction	Remove False work	Striping	Miscellaneous Concrete Work	Sound Walls/Retaining Walls	Planting and Irrigation	Contractor Activities	Treatment BMP Construction
Adjacent to Waters																												

X = BMP may be applicable to activity.

[1] BMP lists and categories are dynamic.

6.2.3 Project Operation and Maintenance

The Division of Maintenance performs various activities on different facilities throughout the state to ensure safe and usable conditions for the public. Most of the 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 activities involve the use of a variety of products. Under normal, intended conditions of use, these materials are not considered "pollutants of concern." However, if these products are used, stored, spilled or disposed of in a way that may cause them to contact storm water or enter storm water drainage systems, they may become a concern for water quality. Maintenance activities are performed in dry weather to minimize impacts to water quality; however conditions may exist which require these activities be conducted in wet weather.

Potential pollutants of concern for maintenance activities include petroleum products, sediments, trash and debris, metals, acidic/basic materials, nutrients, solvents, waste paint, herbicides, pesticides, and others. Many of these potential pollutants can be prevented from being discharged via storm water drainage systems by selecting and implementing BMPs appropriate for the activity being conducted.

Guidance that addresses the implementation of storm water BMPs during highway maintenance activities and activities conducted at maintenance facilities are identified and discussed in more detail in the SWMP. BMPs to be implemented are technology-based controls to attain MEP pollutant control as well as other BMPs are to be implemented as required depending on the highway maintenance activities and activities conducted at maintenance facilities.

Table 6.8 identifies the general maintenance activities as outlined in the Maintenance Staff Guide Storm Water Quality Handbook. General BMPs that apply to a majority of Caltrans activities are identified in Table 6.9. The BMPs are grouped into "families" based on crew assignments (e.g., if a roadway crew plans to conduct asphalt work, a Maintenance Supervisor would refer to BMPs under the "A Family" heading "Flexible Pavement"). Maintenance Supervisors are responsible for ensuring that the personnel under their direct supervision are implementing the BMPs.

Table 6.8 General Maintenance BMPs

Scheduling and Planning
Spill Prevention and Control
Sanitary/Septic Waste Management
Material Use
Safe Alternative Products
Vehicle/Equipment Cleaning, fueling and Maintenance
Illicit Connection Detection, Reporting and Removal
Illegal Spill Discharge Control
Maintenance Facility Housekeeping Practices

Table 6.9 Maintenance Activities as Classified in the Maintenance Staff Guide

A Family-Flexible Pavement
Family-A1 Asphalt cement crack Joint grinding/sealing
Family-A2 Asphalt paving
Family-A3 Structural pavement failure (dig outs). Pavement grinding and paving
Family-A4 Emergency pothole repair
Family-A5 Sealing operations

B Family-Rigid Pavement
Family-B1 Portland cement crack and joint sealing
Family-B2 Mudjacking and drilling
Family-B3 Concrete Slab and spall repair

C Family-Slope/Drains/ Vegetation
Family-C1 Shoulder grading
Family-C2a Non-landscaped chemical vegetation control
Family-C2b Non-landscaped mechanical vegetation control/mowing
Family-C3 Non-landscaped tree and shrub pruning, brush chipping, tree and shrub removal
Family-C5 Drainage Ditch and Channel Maintenance
Family-C6 Drain and Culvert Maintenance
Family-C9 Curb and sidewalk repair

D Family-Litter/Debris/Graffiti
Family-D3 Sweeping operations
Family-D4 Litter and debris removal
Family-D5 Emergency response and clean up practices
Family-D6 Graffiti removal

E Family-Landscaping
Family-E1a Chemical vegetation control
Family-E1b Manual vegetation control
Family-E1c Landscaped mechanical vegetation control/mowing
Family-E2b Landscaped trees and shrub pruning
Family-E2c Brush chipping
Family-E2d Tree and shrub removal
Family-E3a Irrigation line repairs
Family-E3b Irrigation (watering), potable and no potable

F Family-Environmental
Family-F2 Strom drain stenciling
Family F4 Roadside slope inspection
Family-F4b Roadside stabilization
Family-F7a Storm water treatment devices
Family-F7b Traction Sand trap devices

G Family- Public Facilities
Family-G1-3 Public facilities

H Family-Bridges
Family-H2 Welding and grinding
Family-H7a Sandblasting, wet blast with sand injection and hydroblasting
Family H7b Painting
Family-H9a Bridge repairs
Family-H9b Draw bridge maintenance

J Family-Other Structures
Family-J1 Pump station cleaning
Family-J2 Tube and tunnel maintenance and repair

K Family- Electrical
Family-K6 Sawcutting for loop installation

M Family- Traffic Guidance
Family-M1a and M2a Thermoplastic striping and marking
Family-M1b&M2b Paint Striping and marking
Family-M3 Raised/recessed pavement marker application and removal
Family-M4 Sign repair and maintenance
Family-M7 Median barrier and guardrail repair
Family-M8 Emergency vehicle energy attenuator repair

R Family-Snow and Ice Control
Family-R1 Snow removal
Family-R2 Ice control

S Family-Storm Maintenance
Family-S3 Minor slides and slipouts cleanup/repair

T Family- Management and Support
Family-T5b Building and ground maintenance
Family-T7a Storage of hazardous materials (working stock)
Family-T7c Material Storage control (hazardous waste)
Family-T7d Outdoor storage of raw materials
Family-T9a Vehicle and equipment fueling
Family-T9b vehicle and equipment cleaning
Family-T9c Vehicle and equipment maintenance and repair
Family-T9d Aboveground and underground tank leak and spill control

Maintenance of Treatment BMPs

The operation and maintenance requirements for vegetated treatment BMPs are outlined in the Caltrans Strom Water Quality Handbook, Maintenance Staff Guide (CTSW-RT-02-057). Field measurements of maintenance indicators are made by visual observation. Frequencies provided are for the minimum required level of service. Greater maintenance frequencies may be required depending on the particular site and level of traffic.

1. California Regional Water Quality Control Board, San Diego Region, September 8,1994, Water Quality Control Plan for the San Diego Basin (9) <http://www.swrcb.ca.gov/rwqcb9/water_issues/programs/basin_plan/index.shtml >

2. California Regional Water Quality Control Board, San Diego Region, 303(d) & Total Maximum Daily Loads, < http://www.swrcb.ca.gov/rwqcb9/water_issues/programs/303d_list/index.shtml & http://www.swrcb.ca.gov/rwqcb9/water_issues/programs/303d_list/index.shtml>. (Last visited on July 15, 2009).

3. Project Clean Water website, Los Penasquitos Watershed, <http://www.projectcleanwater.org/html/ws_penasquitos.html>, (Last visited on September 24, 2009).

4. State Water Resources Control Board, Order No. 99 - 06 – DWQ, NPDES No. CAS000003 NPDES Permit Statewide Storm Water Permit and Waste Discharge Requirements (WDRs) for The State of California, Department Of Transportation (Caltrans) properties, facilities and activities.

5. State Water Resources Control Board, Order No. 2009-0009-DWQ, NPDES No. CAS000002 NPDES General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities (Construction General Permit).

6. California Department of Transportation Statewide Storm Water Management Plan (CTSW-RT-02-008) May 2003.

7. California Department of Transportation Storm Water Quality Handbooks-Project Planning and Design Guide Manual (CTSW-RT-10-254.03), July 2010.

8. California Department of Transportation Storm Water Quality Handbooks-Construction Site Best Management Practices Manual, March 2003.

9. Caltrans Storm Water Quality Handbook, Maintenance Staff Guide (CTSW-RT-02-057), May 2003.

10. "ESA Basics." US Fish and Wildlife Service, Endangered Species Program. 2/2009. <http://www.fws.gov/endangered/whatwedo.html#programs>, (Last visited on July 6, 2009).

11. Dokken Engineering, Draft District Preliminary Geotechnical Report for Interstate 5/State Route 56 Interchange Project, January 2009.

12. Dokken Engineering, Interstate 5/State Route 56 Interchange Preliminary Drainage Study, August 2009.

13. Dokken Engineering, Draft Storm Water Data Report for I-5/SR-56 Interchange Project, October 2010.

14. EDAW, Inc. Interstate 5-State Route 56 Interchange Natural Environmental Study, June 2009.

15. Storm Water Data Management-Discharge Characterization Study Report, CTSW-RT-03-065.51.42, November 2003.

16. National Weather Service Forecast office, San Diego, California. 2009, <http://www.weather.gov/climate/xmacis.php?wfo=sgx> (Last visited on September 24, 2009).

17. Weston Solutions, TMDL Monitoring for Sedimentation/Siltation in Los Penasquitos Lagoon in Response to Investigation Order R9-2006-0076, January 21, 2009.

18. California Coastal Commission Program Overview, last accessed on September 24, 2009, < http://www.coastal.ca.gov/whoweare.html>.