FINAL

JOINT ENVIRONMENTAL IMPACT STATEMENT/ ENVIRONMENTAL IMPACT REPORT

Volume I

SAN CLEMENTE SHORELINE PROTECTION PROJECT

San Clemente, CA

Prepared for:

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EXECUTIVE SUMMARY

This Final Joint Environmental Impact Statement/Environmental Impact Report (Final EIS/EIR) has been prepared for the Los Angeles District of the US Army Corps of Engineers (USACE) and the City of San Clemente (Local non-Federal sponsor) to analyze potential environmental impacts associated with the proposed action and alternatives for providing shoreline protection to approximately 3,412 feet ([ft], 1,040 meters [m]) of the San Clemente shoreline from coastal storms.

The USACE is the Federal lead agency responsible for compliance with the National Environmental Policy Act (NEPA) of 1969 (42 U.S.C. § 4331 (1996)), and the City of San Clemente (City) is the lead agency under the California Environmental Quality Act (CEQA) of 1970 (Cal. Pub. Res. Code § 21,000 et seq.), as amended. This Final EIS/EIR has been prepared at the project-level of detail and complies with the requirements of both NEPA and CEQA.

PROJECT AREA

The City of San Clemente is located along the coast of southern California about 60 miles (100 kilometers) south of Los Angeles at the southern end of Orange County near the border of San Diego County. The study area is encompassed within the City of San Clemente and extends approximately 3,412 ft (1,040 m) from Linda Lane to T-Street and is located within the San Clemente 7.5-minute U.S. Geological Survey (USGS) topographic quadrangle in Section 4 of Township 9 South and Range 7 West.

OVERVIEW

Beach erosion is an ongoing problem along the San Clemente shoreline. Over the past 20 years, average beach widths in the City's beaches have been gradually reduced to about 50 ft (15 m), a reduction of more than 50 percent compared to beach measurements from 1958 and 1981. San Clemente beaches were especially impacted by the El Niño Southern Oscillation (ENSO) storms of 1983 and 1998. Bottom elevation surveys conducted since 1981 along the San Clemente Municipal Pier (Pier) indicate that the cross-shore is deepened with a maximum fluctuation of about 15 ft (4.6 m) at various locations. Changes to the beach shoreline caused by erosion have reduced recreational opportunities and are threatening the stability of City facilities, private property, and a major southern California commuter rail corridor.

Running along the entire length of the San Clemente shoreline, a portion of the Los Angeles to San Diego (LOSSAN) railroad corridor, a major passenger rail line linking the coastal cities of southern California, including Los Angeles and San Diego, runs between the beach and the coastal bluffs through San Clemente and is owned by the Orange County Transportation Authority (OCTA). This nationally strategic rail corridor is among the busiest in the country. Riprap along the seaward side of the rail corridor provides some protection to the tracks. This corridor is operated by the Southern California Regional Rail Authority (SCRRA). Loss of shore protection and recreational beach width threatens the railroad and is a continuous problem for the City of San Clemente.

The purpose of the San Clemente Shoreline Protection Project (Project) is to provide shore protection through nourishment of the beach at the Pier. Developing and maintaining the beach is needed to prevent the severe beach erosion that results from winter storms and to prevent damage to adjacent beachfront structures, including the heavily used rail line that runs along the beach through the City. In addition to the above, the loss of sand at the beach would have an impact on beach recreation, which contributes to the local economy, and would reduce the ecological functioning of the sand beach/littoral zone.

The San Clemente Shoreline Reconnaissance Study, a Section 905(b) Analysis of the Water Resources Development Act of 1986 (WRDA 86), was prepared as an initial response to the Energy and Water Appropriations Act of 2000, Public Law 106-60, 29 September 1999, which reads as follows:

> "The Committee recommendation includes funds for the Corps of Engineers to conduct a reconnaissance study investigating shoreline protection alternatives for San Clemente, California."

PROPOSED PROJECT

Two scales of the Beach Fill Alternative were analyzed; both consist of dredging material from offshore Oceanside, then hauling and placing it at San Clemente Beach. The proposed Project is a 50 foot (15 m) resultant beach width. Beach fill would be 3,412 ft (1,040 m) long with a +17 ft (+5.2 m) crest elevation. The dredge volume is estimated to be approximately 251,000 cubic yards (192,000 m^3). Dredge material gradation is 6 to 12 percent of fines, 5 to 8 percent of gravel/cobbles, and the rest is sand. Material classification assumed is 10 percent fines, 83 percent sand and 7 percent gravel. Maintenance nourishment efforts will occur when the shoreline reaches the 0 ft base beach width (i.e., approximately 35 ft [11 m]) over the project life of 50 years. Maintenance nourishment efforts would return the beach to the design beach width 50 ft (15 m) and would involve up to approximately 251,000 cy (192,000 m^3) of material. Construction for initial fill is anticipated to begin in 2012.

Construction Method

The proposed Project will be constructed with hopper dredging equipment with pump ashore capability and conventional earthmoving equipment. Typical Los Angeles District beach fill projects require large capacity open-ocean capable dredges. A medium-sized hopper dredge (e.g., Sugar Island) would be used. The hopper dredge effective capacity is estimated at 1,700 cy (1,300 m^3) and 3.2 loads per day. The hopper dredge would pump out the dredge material via a 24-inch pipe line at 1,800 cy/hr (1,376 m^3/hr). The hopper dredge will be filled at the designated borrow site approximately one mile offshore of Oceanside and hauled approximately 21 miles (35 km) to San Clemente. At the receiver beach, the dredge will be attached to a moored floating section of pipeline extending 1,500 ft (457 m) to the shoreline. The material would be re-suspended and discharged through the on-board pumping system to the receiver site.

The hopper dredge requires a mono buoy to discharge its sand onto the beach. A mono buoy is a floating pipeline connection platform that is moored to the seafloor, and is used to interconnect with a steel sinker pipeline that carries the slurry along the seafloor to the beach. For this Project, the mono buoy would be anchored in at least 25 ft (7.6 m) of water, between 2,500 and 5,000 ft (762 to 1,524 m) from shore and in the appropriate location in relation to sensitive resources and engineering considerations. From one mono buoy location, sand can be pumped directly onshore and up to approximately 2,000 ft (610 m) alongshore in either direction.

Dredging would be performed 24 hours a day, 7 days a week. Shore equipment would work 12 hours a day, 7 days a week. The proposed Project duration is estimated at 46 working days over the course of 4 months.

Onshore Placement Method

Sand would be combined with seawater until it reaches the consistency of slurry. It then would be conveyed to the beach either via pipeline or a combination of hopper dredge and pipeline, as described above.

Existing sand at the receiver site would be used to build a small, "L"-shaped berm to anchor the sand placement operations. The short side of the "L" would be transverse (crosswise) to the shoreline and would be approximately 50 ft (15 m) long. The long side would be shore parallel at the seaward edge and would be approximately 200 ft (61 m) long. Berm construction may be adjusted from the design requirements during fill placement depending on actual field conditions. The crosswise side of the berm would be constructed to allow alongshore landward beach access for emergency access at all times.

The slurry would be pumped onto the beach between this berm and toe. The berm reduces ocean water turbidity by allowing all the sand to settle inside the bermed area while the seawater is channeled along the berm until it reaches the open end where it drains into the ocean. Temporary dikes within the berm will allow sand to settle in designated areas. Once a 200 ft (61 m) section of berm is filled in with sand, another 200 ft (61 m) of berm will be created, the pipeline will be moved or extended on the dry beach only into the new berm area, and the process would begin again; the pipeline along the seafloor would not be moved. As the material is deposited behind the berm, the sand would be spread using two bulldozers and one front-end loader to direct the flow of the sand slurry and form a gradual slope to the existing beach elevation. The berm would be subject to the forces of the waves and weather once constructed and will eventually settle down to a natural grade for the beach.

Construction Access and Staging Areas

Beach access for the construction equipment and crew will be split between open space on the beach and a City-owned public parking lot. An open area exists along the beach immediately adjacent and north of the Pier and in the immediate vicinity of the Marine Safety Headquarters. It is expected this site will be used for the contractors' office trailer, parking area for heavy earthmoving equipment, and storage area for dredge pipe and other miscellaneous materials. This site is used extensively for access to the Marine Safety Headquarters and other municipal operations. It poses no new environmental considerations, minimizes disturbance to the environment, and is ideally located for contractor ease of operations. Although access to this area is controlled by a signal controlled, at-grade railroad crossing, it is anticipated that there will be no significant restrictions on utilization of this portion of the contractors work and storage area.

The contractors' dredge and vessels will require off-site mooring and berthing space. There is no mooring area available within the City of San Clemente. The nearest suitable mooring area is Dana Point Harbor, a small craft harbor approximately 5 mi (8 km) north.

Public Access

For the beach fill operation, up to 300 ft (91 m) of beach would be inaccessible to the public around the discharge pipeline and berms. In addition, there would be intermittent restrictions on public access for approximately 350 ft (107 m) on either side of this discharge zone. This space would be needed for maneuvering heavy equipment during construction of the temporary berms.

Future Project Beach Profile Monitoring

Long-term shoreline erosional processes create damages through long-term profile translation landward and the increasing potential for wave related damages. The landward advancing shoreline reduces the beach width available for storm damage protection, thereby increasing the probability of wave related damages to facilities and structures. Long-term beach erosion also results in the gradual reduction of the beach surface area available for recreation. The peak erosion rate is –0.7 ft/yr (–0.21 m/yr), the maximum erosion rate is -1.5 ft/yr (–0.46 m/yr), and the maximum accretion rate is +1.24 ft/yr (+0.38 m/yr).

The purpose of this monitoring is to allow the timing and the detailed design of the periodic nourishment to be optimized. Surveying of the beach and seabed morphology is paramount to the monitoring efforts. Changes in beach and seabed morphology will define the sediment transport patterns at the shoreline and ultimately the short-term and long-term beach erosion processes. Alongshore transects will be crucial to determine the effects, if any, the proposed Project has on updrift and/or downdrift shorelines. The monitoring period will be for the 50-year period of Federal involvement. However, not all aspects of the monitoring plan will be conducted each year.

Maintenance nourishment efforts will occur when the shoreline reaches the 0 ft base beach width (i.e., approximately 35 ft [11 m]). Maintenance nourishment efforts would return the beach to the design beach width 50 ft (15 m) and would involve up to approximately 251,000 cy (192,000 m^3) of material. Maintenance nourishment efforts also would be dependent upon available funding at the time of request.

ENVIRONMENTAL CONSEQUENCES

Issues that were found not to be significant for the proposed Project included land use and policy. Issues that were found to be less than significant without the need for mitigation measures were geology and topography, noise, transportation, aesthetics, and public health and safety. The construction and long-term maintenance of the proposed Project would not have a significant effect on these elements, and the analyses of these issues are detailed in the environmental consequences section.

Although significant impacts to biological resources (i.e., surfgrass) and recreation (i.e., surfing) are not likely to occur due to the footprint and temporary nature of the Project, mitigation measures will be implemented if monitoring demonstrates impacts are significant. If a substantial amount of surfgrass were lost, impacts may not be mitigable to not significant. If adverse impacts to surfgrass beyond those anticipated for the species to recover are observed from the monitoring, subsequent nourishment activities will be modified to avoid or minimize these impacts as part of adaptive management. If adverse impacts still are observed after all reasonable attempts to avoid or minimize impacts have been exhausted, additional renourishment would not occur until impacted surfgrass has recovered or a mitigation measure is accepted. A consistently successful method to transplant surfgrass has not yet been devised, although recent experiments may provide new options. A Mitigation Monitoring and Reporting Plan has been prepared to address potential mitigation, if necessary. Likewise, if surfing is demonstrated to be significantly impacted, mitigation measures will be implemented; however, creation of an artificial surfing reef has not yet been successful off the coast of California.

Environmental Justice

The construction and long-term maintenance of the proposed Project would not be expected to have any negative effect on minority or low-income populations. In addition, the expansion of the beach width would be a public improvement that would benefit residences and businesses alike.

Irreversible and Irretrievable Commitment of Resources

The proposed Project would result in the placement of approximately 251,000 cy of dredged beach-compatible fill material along a 3,412 ft long and 50 ft wide beach adjacent to the San Clemente Pier. The Project would nourish the eroded existing beach, which would provide recreational opportunities not only for residents, but also contribute to the regional tourist industry. The proposed action would result in the consumptive use of nonrenewable energy sources and labor required to operate dredges, trucks, pumping equipment, and grading equipment. These commitments of resources could have otherwise been applied to projects other than the proposed action. However, the proposed Project would not result in the use of a substantial amount of resources. Additionally, no natural resources would be permanently destroyed, and beach replenishment would be considered beneficial to the region.

Growth Inducing Impacts

A benefit of the proposed Project would be the enhancement or continuation of the recreational usage of the beach at San Clemente Pier. Protection of the beach shoreline provides an amenity for local residents and tourists. The resulting recreational benefits derived from the additional beach area would not be expected to increase the demand for public services and utilities, nor create a need for additional recreational facilities above current projections. Fewer than 100 workers would be involved in construction of the proposed Project, and they would be expected to primarily be drawn by the local work force. The San Clemente Shoreline Protection Project would not involve any new development or add any people to the local population. The proposed Project would have no growth-inducing impacts.

Energy Requirements and Conservation Potential of Alternatives and Mitigation Measures

The proposed Project would implement several mitigation measures that would reduce inefficient, wasteful, and unnecessary consumption of energy. The energy requirements for the proposed construction activity would be confined to fuel for the dredge, labor transportation, and other construction equipment. Examples of mitigation measures include use of a diesel oxidation catalytic converter for the dredge and the use of newer, lower-emitting trucks to transport construction workers as well as equipment and material to and from construction sites, such as the use of "low-sulfur diesel for construction equipment and diesel particulate filters for diesel equipment and trucks". The use of alternative clean fuel, such as electric or compressed natural gas-powered construction equipment with oxidation catalysts instead of gasoline- or diesel-powered engines, is also recommended. However, where diesel equipment must be used because there are no practical alternatives, it is recommended that the construction contractors use low-sulfur diesel. In addition, the proposed Project does not involve the trucking of materials, which would decrease the use of trucking equipment typically associated with a beach nourishment project. The minimal use of pieces of construction equipment and implementation of the mitigation measures recommended would allow impacts to energy to be less than significant.

Relationship between Short-Term Uses of the Environment and Maintenance and Enhancement of Long-Term Productivity

Implementation of the proposed Project would not result in any environmental impacts that would significantly narrow the range of beneficial uses of the environment or pose long-term risks to health, safety, or the general welfare of the public communities surrounding the beach at San Clemente Pier. Rather, the Project would provide for future beneficial beach resources (e.g., recreational activities, sandy shoreline habitat).

PUBLIC INVOLVEMENT

This Final Joint EIS/EIR will be circulated for a public review period of 45 days to appropriate resource agencies, local interest groups, and individuals. All comments and concerns that are received during the review period shall be incorporated into the final EIS/EIR.

Send Comments to:
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1.0 INTRODUCTION

This Final Joint Environmental Impact Statement/Environmental Impact Report (Final EIS/EIR) has been prepared for the Los Angeles District of the U.S. Army Corps of Engineers (USACE) and the City of San Clemente (Local non-Federal sponsor) for the San Clemente Shoreline Protection Project (Project). This Final EIS/EIR analyzes potential environmental impacts associated with the proposed action and alternatives for providing shoreline protection to approximately 3,412 feet ([ft], 1,040 meters [m]) of the San Clemente shoreline from coastal storms.

This joint EIS/EIR is an informational document to advise decision-makers and the general public of the benefits and potential adverse impacts of the Project as well as feasible alternatives. This document assesses short-term, long-term, and cumulative impacts and benefits of the Project. This Final EIS/EIR also is intended to provide information to all agencies whose discretionary approvals must be obtained for Project actions.

The USACE is the Federal lead agency responsible for compliance with the National Environmental Policy Act (NEPA) of 1969 (42 U.S.C. § 4331 (1996)), and the City of San Clemente (City) is the lead agency under the California Environmental Quality Act (CEQA) of 1970 (Cal. Pub. Res. Code § 21,000 et seq.), as amended. This Final EIS/EIR has been prepared at the project-level of detail and complies with the requirements of both NEPA and CEQA.

1.1 Study Area

The City of San Clemente is located along the coast of southern California about 60 miles ([mi], 100 kilometers ([km]) south of Los Angeles at the southern end of Orange County near the border of San Diego County (Figure 1-1). The study area is encompassed within the City of San Clemente and extends approximately 3,412 ft (1,040 m) from Linda Lane to T-Street (Figure 1-2) and is located within the San Clemente 7.5-minute U.S. Geological Survey (USGS) topographic quadrangle in Section 4 of Township 9 South and Range 7 West. The communities of Capistrano Beach and Dana Point are located upcoast of the study area; San Onofre State Beach Park and the Marine Corps Base Camp Pendleton (MCBCP) are located to the south. The study area is in the 48th Congressional District. A borrow area at Oceanside has been identified as the potential source for beach replenishment material.

Along the entire length of the San Clemente shoreline, a portion of the Los Angeles to San Diego (LOSSAN) railroad corridor, a major passenger rail line linking the coastal cities of southern California, runs between the beach and the coastal bluffs through San Clemente and is owned by the Orange County Transportation Authority (OCTA). This nationally strategic rail corridor is among the busiest in the country. Riprap along the seaward side of the rail corridor provides some protection to the tracks. The railroad seaward slope incorporates the conventional ballast construction and has a slope of 1:1 horizontal:vertical (H:V). This corridor is operated by the Southern California Regional Rail Authority (SCRRA). Loss of beach width threatens the railroad and is a continuous problem for the City of San Clemente.

Figure 1-1 Vicinity Map

Figure 1-2 Location Map

1.2 Project Background

The City of San Clemente was founded in 1925, incorporated in 1928, and was originally promoted as "The Spanish Village," designed to be a residential settlement featuring white stucco homes with red tile roofs sited on wide, meandering streets with ocean views. The San Clemente Municipal Pier (Pier) extends approximately 1,200 ft (400 m) into the Pacific Ocean and is part of the recreational appeal for tourists/visitors of San Clemente City Beach and the 100-acre (40-hectare) State Beach, locally renowned as one of the premier surfing locales in the region.

Prior to urban development in the 1990s, the beaches within the study area remained relatively stable because of a balanced sediment supply delivered from the San Juan Creek to the Oceanside littoral cell. However, documented historical beach widths above the Mean Sea Level (MSL) line between T-Street and Mariposa Point were as narrow as 25 m (82 ft) in the winter months during this time period (USACE-SPL, 1991). As a consequence, storm damages occurred in the past (e.g., 1964, 1983, 1988, and 1993), as the protective buffer beach width was narrow, particularly in the winter season.

Since the 1990s, the project area has experienced chronic, mild, long-term erosion. Shoreline retreat is a result of the decrease of fluvial sand supply resulting from the concreting of creeks and rivers, upstream dams, and urban development. Continued future shoreline retreat is expected to result in storm waves breaking directly upon the railroad ballast, which significantly threatens the operation of the rail corridor. Continued future shoreline retreat also will subject public facilities to storm wave-induced damages. These facilities, maintained by the City of San Clemente, include the Marine Safety Building, public restroom facilities located on the beach, lifeguard stations, parking areas, and paving near the pier.

The railroad is a vital transportation link for passenger and freight service between cities in San Diego, Orange, and Los Angeles counties. The Department of Defense has designated this right-of-way as a Strategic Rail Corridor with great significance to National defense. Due to chronic beach erosion, the railroad corridor between the bluff and the beach is threatened by undermining. Metrolink has been randomly placing riprap along the segment between North Beach and the Marine Safety Building to reduce wave energy impacts on the railroad tracks. Train service has been delayed during winter storm events in order to provide extra precautionary measures to allow trains to move safely through the area. Crews are dispatched during high tide and storm conditions to visually inspect for track damage that could potentially cause derailments. The impact of riprap placement over the years has resulted in a cumulative decrease of lateral beach access.

1.3 Document Organization

This document is organized to assist the reader through the various steps taken by the USACE and the City to thoroughly and adequately analyze the environmental consequences of this Project. In general, this document defines the problem, presents possible solutions, and describes the existing conditions and the consequences of each alternative on baseline conditions. Through this analysis, and other economic analyses, a preferred alternative was selected as the proposed action.

The purpose, need, and the objectives associated with protection of the San Clemente shoreline are described in Section 2.0 of this joint EIS/EIR. Alternatives are described in Section 3.0. Baseline environmental conditions are described in Section 4.0, and the environmental consequences associated with each alternative are discussed in Section 5.0. Different aspects of impact assessment, such as cumulative impacts, unavoidable significant impacts, and mitigation measures, among others, are discussed in Sections 6.0 through 9.0. Other NEPA and CEQA required analyses are presented in Section 10.0. Public and interagency involvement is described in Section 11.0. The preparers and reviewers of the joint EIS/EIR are listed in Section 12.0. References are provided in Section 13.0. The appendices provide background data and supporting documentation and analyses.

2.0 NEED FOR AND OBJECTIVES OF PROPOSED ACTION

2.1 Purpose and Need

The purpose of this Project is to provide shore protection through nourishment of the beach at the City of San Clemente Pier. Developing and maintaining the beach is needed to prevent the severe beach erosion that results from winter storms and to prevent damage to adjacent beachfront structures, including the heavily used rail line that runs along the beach through the City. In addition to the above, the loss of sand at the beach would have a negative impact on recreation, which supports the local economy, and would reduce the ecological functioning of the sand beach/littoral zone.

A number of public concerns were identified during the course of the reconnaissance study. Initial concerns were expressed in the study authorization. Additional input was received through coordination with the City and other agencies. The public interest related to the establishment of planning objectives and planning constraints are:

1. To reduce the potential for storm damages to the LOSSAN Rail Corridor rail facilities and rail line operations, located along the beaches of the City of San Clemente;
2. To reduce the potential for storm damages to public beach facilities;
3. To restore the recreation beach along the Pacific Coast of the City of San Clemente;
4. To preserve the nearshore ecosystem that supports commercial lobster, fisherman, and snorkeling activities;
5. To preserve and enhance opportunities for surfing along the San Clemente coast; and
6. To improve public access and safety to the recreation beach areas of the City of San Clemente.

2.1.1 Storm Damages

Prior to the 1990s, the beaches within the study area were marginally stable as sufficient sediment was supplied from San Juan Creek to the Oceanside littoral cell. This was prior to upland urban development that deprived the sand supply resulting from the damming and concreting of creeks and rivers, and urban development. As a result, the beaches provide minimal protection against storm-induced damages to the railroad and public facilities. The documented historical beach width above the Mean Sea Level (MSL) line between T-Street and Mariposa Point was as narrow as 25 meters (82 ft) in the winter months (USACE-SPL, 1991). As a consequence, storm damages occurred in the past (e.g., 1964, 1983, 1988, and 1993), as the protective buffer beach width was narrow, particularly in the winter season.

The narrowing of the beaches along the shoreline has subjected the public facilities to wave-induced damages. These facilities include the Marine Safety Building, public restrooms, lifeguard stations, parking areas, and concession stands. The meteorological conditions of El Nino occurred in the years 1983, 1988, and 1998. The majority of repairs in the years of 1983 and 1988 were due to damages to the San Clemente Pier. The City spent $2,109,000 in Pier repairs in 1983 and $2,305,000 in 1988. In addition, repair costs for a revetment in the community of Capistrano Shores totaled $288,000. In addition, the City is spending $5,000 per year to use a tractor to reduce the steepness of the shoreline.

2.1.2 Threat to the Railroad Corridor

Due to chronic beach erosion, the railroad corridor between the bluff and the beach is threatened by undermining. In response, OCTA has been randomly placing riprap stones along the most critical segment between North Beach and the Marine Safety Building to reduce wave impacts on the railroad tracks. This maintenance practice of adding additional stones to the existing under-designed revetment has cost OCTA an average of $200,000 to $300,000 every three years. If the loss of sand continues as expected, the cost to protect the tracks with riprap will increase. The cumulative impact of stone placement over the years has resulted in a reduction of lateral beach access. This railroad is a vital transportation link for passenger and freight service. In addition, the Department of Defense (DOD) has designated this right-of-way as a Strategic Rail Corridor with great significance to National defense. During winter storm events, train service has been delayed in order to provide extra precautionary measures to move the trains safely through the area. Crews are dispatched during high tide and storm conditions to visually inspect for track damage that could cause derailments. Continued erosion along the San Clemente shoreline will lead to further disruption of rail service.

2.1.3 Public Safety and Liability

As a result of the continued beach erosion throughout the City's shoreline, a number of public safety concerns have surfaced. Public restrooms are located on the beach, seaward (west) of the railroad tracks; continued damages to these facilities may require their relocation to the landward side (east) of the railroad tracks. This would result in beachgoers continually crossing the tracks to use the restrooms. Depending on the location of construction of restrooms, if necessary under managed retreat, crossing the tracks may be dangerous if beachgoers decide to do so rather than use the designated pedestrian crossings. There currently are safe pedestrian crossings for beachgoers to cross the tracks and access the beach. A public safety issue may create because it is expected that many will cross the railroad tracks in an unsafe manner. Furthermore, the loss of sand within the active nearshore profile has exposed underlying hard substrate. A public safety issue is created because the exposed material, in many cases, remains underwater and hidden from sight, posing a number of potential dangers to unwary recreational swimmers. The City is liable for accidents resulting from exposed man-made structures. The adverse economic impact associated with the City's liability has the potential to be substantial.

2.1.4 Recreation Opportunity

San Clemente has an annual tourist visitation of about two million people, or approximately 60 percent non-residents. Continuous shoreline retreat will further degrade the City's beaches and significantly impact beach recreation, tourism, and economic benefits.

2.2 Project Objective

The objective of the San Clemente Shoreline Protection Project is:

1. To reduce the potential for storm damages to facilities located along the coast of the City of San Clemente, including recreation beach facilities and the LOSSAN Rail Corridor, and
2. To restore and maintain recreation use along the Pacific Coast of the City of San Clemente.

These objectives were accomplished by formulating and evaluating an array of feasible alternatives and identifying the one that most effectively reduces storm-related risks and damages while complying with Local, State, and Federal environmental laws and regulations. The scope of this Final EIS/EIR describes the physical, environmental, and socioeconomic baseline conditions and identifies the environmental consequences of the alternatives, including future without Project conditions (No Action Alternative).

2.3 Study Authority

The San Clemente Shoreline Reconnaissance Study, a Section 905(b) Analysis of the Water Resources Development Act of 1986 (WRDA 86), was prepared as an initial response to the Energy and Water Appropriations Act of 2000, Public Law 106-60, 29 September 1999, which reads as follows:

> "The Committee recommendation includes funds for the Corps of Engineers to conduct a reconnaissance study investigating shoreline protection alternatives for San Clemente, California."

In addition, Section 208 of the Flood Control Act of 1965 states:

> "The Secretary of the Army is hereby authorized and directed to cause surveys for flood control and allied purposes, including channel and major drainage improvements, and floods aggravated by or due to wind or tidal effects, to be made under the direction of the Chief of Engineers, in drainage areas of the United States and its territorial possessions, which include the localities specifically named in this section…Coasts of Washington, Oregon, and California to determine advisability of protection work against storm and tidal waves."

This Final EIS/EIR supports the USACE feasibility study for the Project; the feasibility study incorporates the conclusions of this EIS/EIR. Since storm damage risk management is an output with a high budget priority, and preventing storm damages is the primary output of the alternatives to be evaluated in the feasibility phase, there is a strong Federal interest in participating in the proposed Project. Long-term erosion can reasonably be expected to undermine and increase the flood potential of existing public and private structures along the San Clemente shoreline. As the width of the sandy beach decreases over time, winter storm damages will have a greater impact on the public transportation corridor and residential communities. The proposed Project construction would be dependent upon authorization by Congress.

2.4 Compliance with Applicable Regulatory Statutes and Permit Requirements

Federal and State environmental requirements considered in the preparation of this Final EIS/EIR are briefly reviewed in this subsection. The City shall use the environmental analysis included in this Final EIS/EIR to support permit applications and other required compliance activities pursuant to the respective laws, orders, and regulations.

2.4.1 Federal Environmental Regulations

2.4.1.1 National Environmental Policy Act of 1969 (Public Law 91-190) as amended

This Final EIS/EIR has been prepared in accordance with the requirements of the NEPA of 1969 (42 USC 43221, as amended) and the Council on Environmental Quality (CEQ) Regulations for Implementing the Procedural Provisions of NEPA (40 Code of Federal Regulations [CFR] 1500-1508), dated 1 July 1988. NEPA requires that agencies of the Federal Government shall implement an environmental impact analysis program in order to evaluate "major federal actions significantly affecting the quality of the human environment". A "major federal action" may include projects financed, assisted, conducted, regulated, or approved by a federal agency. NEPA regulations were followed in the preparation of this EIS.

2.4.1.2 ER-200-2-2, 33 CFR 230, March 1988

This engineer regulation (ER) provides guidance for implementation of the procedural provisions of the NEPA for the Civil Works Program of the USACE. It supplements CEQ regulations 40 Code of Federal Regulations (CFR) 1500-1508, November 29, 1978, in accordance with CEQ regulations. Wherever the guidance in this regulation is unclear or not specific, the reader is referred to the CEQ regulations. This regulation is applicable to all the USACE responsibility for preparing and processing environmental documents in support of civil works functions.

2.4.1.3 Coastal Zone Management Act of 1972 and California Coastal Act of 1976

The Coastal Zone Management Act (CZMA) preserves, protects, develops, and, where possible, restores or enhances the Nation's coastal zone resources for this and succeeding generations. This Final EIS/EIR shall act as the Coastal Consistency Determination (CCD) to the California Coastal Commission (CCC), in satisfaction of CZMA requirements, Section 106(d), to certify consistency to the maximum extent practicable with an approved State Coastal Zone Management Plan. The USACE shall submit the Final EIS/EIR to the CCC for their review and approval. The USACE has determined that the Project is consistent to the maximum extent practicable with the CZMA. The USACE shall obtain concurrence from the CCC prior to construction.

2.4.1.4 Clean Water Act of 1977 (Public Law 95-217)

The Clean Water Act (CWA) governs discharge or dredge of materials in the waters of the United States, and it governs pollution control and water quality of waterways throughout the U.S. Its intent, in part, is to restore and maintain the biological integrity of the Nation's waters. The goals and standards of the CWA are enforced through permit provisions.

Section 404 outlines the permit program required for dredging or filling the Nation's waterways. The USACE does not issue itself a permit for civil works projects. Therefore, a Section 404(b)(1) analysis has been prepared. USACE has determined that full compliance with CWA Section 404 is met and thus may invoke, if needed, CWA 404(r), once the project is authorized by Congress. Section 404(b)(1) addresses project-related impacts to the waters of the U.S. and provides appropriate mitigation measures to minimize impacts. Section 230.10(a) of the 404(b)(1) guidelines requires consideration of a "practicable alternative to the proposed discharge which would have less impact on the aquatic ecosystem, so long as the alternative does not have other significant adverse environmental consequences". Section 230.10(a)(2) states that "an alternative is practicable if it is available and capable of being done after taking into consideration costs, existing technology, and logistics in light of overall project purposes." Section 230.10(a)(4) states "for actions subject to NEPA, where the Corps of Engineers is the permitting agency, the analysis of alternatives required for NEPA environmental documents, including supplemental Corps NEPA documents, will in most cases provide the information for the evaluation of alternatives under these Guidelines."

The City must follow all the environmental commitments identified in the EIS/EIR where applicable. The USACE shall continue to coordinate with the Regional Water Quality Control Board (RWQCB) throughout the CWA process and construction activities.

2.4.1.5 Rivers and Harbors Act of 1899

Section 10 of the Rivers and Harbors Act prohibits the unauthorized obstruction or alteration of any navigable waters of the United States, and authorizes the USACE to regulate all activities that affect the course, capacity, or coordination of waters of the U.S. Navigable waters of the U.S. are defined in 33 CFR Part 329 as those waters that are subject to the ebb and flow of the tide and/or are presently used, or have been used in the past, or may be susceptible for use to transport interstate or foreign commerce. USACE has complied with River and Harbors Act in the development of this Final EIS/EIR.

2.4.1.6 Fish and Wildlife Coordination Act of 1958 (Public Law 85-624, 16 USC 661-666(c))

The Fish and Wildlife Coordination Act (FWCA) protects fish and wildlife from Federal actions that result in the control or modification of a natural stream or water body. The FWCA requires consultation with the U.S. Fish and Wildlife Service (USFWS), the California Department of Fish and Game (CDFG), and National Oceanographic and Atmospheric Administration, National Marine Fisheries Service (NOAA Fisheries), all of which has been coordinated with during the initial and current stages of planning, development of the proposed alternatives, environmental commitments, and potential mitigation measures. The USACE shall continue to coordinate with

NOAA Fisheries throughout the NEPA process and construction activities. The Final Coordination Act Report (CAR) is included as Appendix G.

2.4.1.7 Federal Endangered Species Act of 1973

The Federal Endangered Species Act of 1973 (ESA) protects endangered and threatened species by prohibiting Federal actions that would jeopardize the continued existence of such species or result in the destruction or adverse modification of habitat of such species. Coordination with respect to Federal endangered and threatened species has occurred with both USFWS and NOAA Fisheries in the development of this Final EIS/EIR. NOAA Fisheries provided conservation recommendations during the public review period and these recommendations are addressed in Section 14.0 of this Final EIS/EIR. Federally endangered or threatened species that inhabit the Project area are listed and discussed in Section 4.0.

Under Section 7(a)(2) of the ESA, Federal agencies must consult with Federal resource agencies (i.e., USFWS, NOAA Fisheries) and prepare a Biological Assessment (BA) if listed species and/or critical habitat are present in an area to be impacted by Project activity. The USFWS and/or NOAA Fisheries then would prepare a Biological Opinion (BO) on how the action would affect the species and/or its critical habitat, and would suggest reasonable and prudent measures to avoid jeopardizing the continued existence of the species or adversely modifying its critical habitat. If prior to and/or during construction it is determined that Federal endangered and threatened species would be adversely impacted, the USACE would initiate Section 7 consultation.

2.4.1.8 Magnuson-Stevens Fishery Management and Conservation Act, as amended 1996 (Public Law 104-267)

Federal agencies must consult with NOAA Fisheries on actions that may adversely affect Essential Fish Habitat (EFH). EFH is defined as those “waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity”. NOAA Fisheries encourages streamlining the consultation process using review procedures under NEPA, FWCA, CWA, and/or ESA, provided that documents meet requirements for EFH assessments under Section 600.920(g). EFH assessments must include (1) a description of the proposed action, (2) an analysis of effects, including cumulative effects, (3) the Federal agency’s views regarding the effects of the action on EFH, and (4) proposed mitigation, if applicable. The description and evaluation of EFH for the coastal zone is included in this Final EIS/EIR in Section 5.4.

2.4.1.9 Marine Mammal Protection Act of 1972

The Marine Mammal Protection Act (MMPA) protects marine mammals and establishes a marine mammal commission to regulate such protection. The requirements of this act were considered in the evaluation of environmental consequences of the proposed Project and alternatives.

2.4.1.10 Migratory Bird Treaty Act, as amended (16 USC 703-711)

The Migratory Bird Treaty Act (MBTA), as amended, provides legal protection for almost all breeding bird species occurring in the United States by restricting the killing, taking, collecting, and selling or purchasing of native bird species or their parts, nests, or eggs. Certain game bird species are allowed to be hunted for specific periods determined by Federal and State governments. The intent of the MBTA is to eliminate any commercial market for migratory birds, feathers, or bird parts, especially for eagles and other birds of prey. The MBTA was considered in the evaluation of environmental consequences of the proposed Project and alternatives.

2.4.1.11 Executive Order 11990

This order requires that governmental agencies, in carrying out their responsibilities, provide leadership and "take action to minimize the destruction, loss, or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands". This order was considered in the development of the proposed Project and alternatives.

2.4.1.12 Executive Order 11991

This order is related to the protection and enhancement of environmental quality. Section 1 of this order directs the CEQ to issue guidelines to Federal agencies for implementing procedural provisions of NEPA (1969). The guidelines recommend early EIS preparation and impact statements that are concise, clear, and supported by evidence that agencies have made the necessary analyses. These guidelines (ER 200-2-2, 33 CFR 230 March 1988) were followed in the preparation of this Final EIS/EIR.

2.4.1.13 National Historic Preservation Act of 1966, as amended (16 USC 479)

Section 106 of the National Historic Preservation Act (NHPA) established the National Register of Historic Places (NRHP), which is a master list of historic properties of national, State, and Local significance. Under Section 106, agencies are required to consider the effects of their actions on properties that may be eligible for or are listed in the NRHP. The NRHP established the Advisory Council on Historic Preservation (ACHP) to comment on Federally licensed, funded, or executed undertakings affecting National Register properties. Regulations of the ACHP (36 CFR 800, 1997) provide guidance for Federal agencies to meet Section 106 requirements. This process involves consultation with the State Historic Preservation Officer (SHPO), the ACHP, and other interested parties, including Native American Tribes, as warranted.

2.4.1.14 Clean Air Act of 1972

The Clean Air Act (CAA) regulates emissions of air pollutants to protect the nation's air quality. The CAA is applicable to permits and planning procedures related to the disposal of dredged materials onshore and in open waters within 3 mi (4.8 km) of the nearest shoreline. Section 118 of the CAA (42 USC 7418) requires all Federal agencies engaged in activities that may result in the discharge of air pollutants to comply with Federal and State laws, and interstate and local requirements regarding control and abatement of air pollution. Section 176(c) requires all Federal projects to conform to U.S. Environmental Protection Agency (USEPA) approved or promulgated State Implementation Plans (SIPs). This act was considered in the evaluation of environmental consequences of the proposed Project and alternatives. In addition, the Project has been coordinated with the Off-Road Inventory and Assessments Section of the ARB regarding the method of determining effects of the daily rail activity. A CAA Conformity Analysis was prepared for this Project.

2.4.1.15 Executive Order 12088

This order requires Federal compliance with applicable pollution control standards concerning air and water pollution, and hazardous materials and substances. Federal agencies are directed to consult with State and Local agencies concerning the best techniques and methods available for the prevention, control, and abatement of environmental pollution. This order was considered in the development of the proposed Project and alternatives.

2.4.1.16 Executive Order 12898

This executive order requires that the joint EIS/EIR analyze the impacts of federal actions on minority and low-income populations and provides opportunities for input on the joint EIS/EIR by affected communities. The alternatives developed for the Final EIS/EIR were based on a set of criteria that did not discriminate on the basis of race, color, or national origin. The proposed Project would not have an impact on minority communities or low-income populations.

2.4.1.17 Executive Order 13045

This order addresses "Environmental Health and Safety Risks to Children". This order is designed to focus Federal attention on actions that affect human health and safety conditions that may disproportionately affect children. The proposed Project would not disproportionately impact children in the region of influence.

2.4.1.18 Federal Water Project Recreation Act (Public Law 89-72), July 9, 1965

This act requires that any Federal water project must give full consideration to opportunities afforded by the project for outdoor recreation and fish and wildlife enhancement. The proposed Project would provide opportunity for recreational activities by development of beach, including recreational use areas, which would be primarily passive in nature.

2.4.2 State Environmental Regulations

2.4.2.1 California Environmental Quality Act (Public Resources Code, Sections 21000-21177)

CEQA requires that State and Local agencies consider environmental consequences and project alternatives before a decision is made to implement a project requiring State or Local government approval, financing, or participation by the State of California. In addition, CEQA requires the identification of ways to avoid or reduce environmental degradation or prevent environmental damage by requiring implementation of feasible alternatives or mitigation measures. This joint EIS/EIR was prepared in accordance with this regulation.

2.4.2.2 California Coastal Act of 1976, as amended

The act specifies basic goals for coastal conservation and development related to protection, enhancement, and restoration of coastal resources, giving priority to "coastal-dependent" uses and maximizing public access to California residents and visitors. The act defines the "coastal zone" of California, which generally extends 3.0 mi (4.8 km) out to sea and inland generally 1,000 yards ([yd], 914 m). It may be extended further inland in certain circumstances. It also is less than 1,000 yd (914 m) wide in some urban areas. Each city and county in California on the coast must prepare a Local Coastal Program (LCP) for all areas within the coastal zone. The LCP includes Land Use Plans (LUPs), zoning ordinance amendments, and map changes to reflect the Coastal Act and LCP goals and policies at the local level. This act was considered in the preparation of this joint EIS/EIR.

2.4.2.3 Porter-Cologne Water Quality Control Act of 1966 (California Water Code §§ 13000-13999.10)

This act mandates that activities that may affect waters of the State shall be regulated to attain the highest quality. The RWQCB provides regulations for a "non-degradation policy" that are especially protective of waters with high quality. This act was considered in the evaluation of consequences of the proposed Project and alternatives.

2.4.2.4 California State Lands Commission

The California State Lands Commission (CSLC) has regulatory authority to administer, sell, lease or dispose of the public lands owned by the State or under its control, including not only school lands but tidelands, submerged lands, swamp and overflowed lands, and beds of navigable rivers and lakes (California Public Resources Code [PRC] Section 6216). The CSLC created the California Coastal Sanctuary, which includes all State waters subject to tidal influence, such as the study area. California PRC Section 6303 requires that a Lease Agreement for Utilization of Sovereign Lands be issued prior to initiation of any project that occurs on State-owned lands.

2.4.2.5 California Endangered Species Act (California Fish and Game Code Sections 2050-2116)

The California Endangered Species Act (CESA) parallels the Federal ESA. As a responsible agency, the CDFG has regulatory authority over State-listed endangered and threatened species. If a proposed Project may affect species that are listed as threatened or endangered under both the State and Federal Endangered Species Acts, then such Project is subject to CEQA and NEPA review, and the CDFG shall participate to the greatest extent practicable in the Federal endangered species consultation. The State legislature encourages cooperative and simultaneous findings between State and Federal agencies. Further, the General Counsel for the CDFG has issued a memorandum to CDFG regional managers and division chiefs clarifying the CESA consultation process wherein, if a Federal BO has been prepared for a species, the CDFG must use this BO in lieu of its own findings unless it is inconsistent with CESA. CDFG Code Section 2095 authorizes participation in Federal consultation and adoption of a Federal BO. By adopting the Federal BO, the CDFG need not issue a taking permit per Section 2081 of the State Code. If the BO is consistent with CESA, the CDFG will complete a 2095 form in finalizing the adoption of the BO. If the Federal BO is found to be inconsistent with CESA, the CDFG will issue its own BO per Section 2090 of the State Code and may issue a 2081 take permit with conditions of approval. The proposed Project would comply with this act.

2.4.3 Local Environmental Regulations

The City of San Clemente is responsible for compliance with and executing local actions with a number of regional environmental regulations.

2.4.3.1 South Coast Air Quality Management Plan (AQMP); South Coast Air Quality Management District (SCAQMD) and Southern California Association of Governments (SCAG)

The SCAQMD is intended to provide compliance with the Federal Clean Air Act. Essentially, it incorporates mechanisms to reduce source and mobile pollutants. To facilitate compliance with the SCAQMD requirements, San Clemente is participating as a member of a countywide Air Quality Technical Advisory Committee which is responsible for the identification of applicable local implementation mechanisms and model ordinances.

3.0 ALTERNATIVES

This section presents the process used to formulate alternative plans and evaluation criteria leading to the recommendation of the Proposed Action for implementation. Under NEPA, reasonable alternatives are those that are practical or feasible from a technical or economic perspective and based on common sense (46 Federal Register 18026, as amended, 51 Federal Register 15618). Under CEQA, reasonable alternatives are those that would feasibly attain most of the project objectives, but would avoid or substantially lessen any of the significant effects of the project (California Code Regulations, Title 14, § 15126.6(a)). Factors used to determine feasibility include site suitability, economic limitations, consistency with local plans and policies, other plan or regulatory limitations, and jurisdictional boundaries.

3.1 Plan Formulation of Alternatives

Plan formulation begins with a large array of management measures and then screens these measures through a series of increasingly focused analysis and comparison. A management measure is a feature or activity at a site addressing one or more of the planning objectives. Management measures should address planning objectives, which represent desired positive changes, as well as planning constraints, which represent restrictions that should not be violated. A preliminary screening of the measures eliminates those that prove unacceptable or infeasible. Measures passing this initial screening are developed and screened further until a final array of measures is selected. Any implementable combination of these measures may be considered a separate alternative. Each final alternative receives equal development, analysis, and comparison.

Alternatives were formulated to maximize storm damage reduction and minimize cost and were recommended when their benefits exceeded their costs. Improvements to safety and recreational opportunities resulting from any alternative were considered incidental to the main objective of reducing storm damages. All alternatives were analyzed under both the NEPA and the CEQA review processes.

3.1.1 Evaluation Criteria

In general, the planning process needs to consider measures to avoid or mitigate any significant adverse impacts associated with the planning constraints. The planning constraints for this study are the following:

a. Preserve the nearshore ecosystem that supports commercial lobster and fishing industries and snorkeling activities;
b. Preserve the opportunities for surfing along the Pacific coast of the City of San Clemente;
c. Preserve any critical habitat that supports Federal or State threatened and endangered species;
d. Preserve water quality characteristics along the coast and near shore areas of the City of San Clemente;

e. Preserve cultural and historic features located in the study area;
f. Preserve air quality conditions within the study area.

A wide variety of measures were considered and assessed, some of which were found to be infeasible due to technical, economic, or environmental constraints. Measures that were considered feasible during the plan formulation process were screened and developed into project alternatives for full analysis.

3.1.2 Screening-level Comparison

Alternatives to address the reduction of potential storm damages were developed considering different scopes of plans by varying levels of protection, such as protecting only against frequent minor storm events as compared to protecting against the less frequent major storm events. Previous consideration was given to protecting several reaches or the entire study area (i.e., entire San Clemente coastline) as compared to certain reaches of the study area. For the planning objective involving restoration of beach area for recreation use, consideration also was given to different levels of restoration involving very wide beaches that may be needed on the highest peak use days only, compared to narrower beaches that may be used more frequently on average peak use days. Alternatives for this objective also were looked at by study reach, where some reaches may have minimal use for recreation. Screening of these alternatives was considered based on the evaluation criteria stated above, including economic costs and benefits, environmental impacts, and significant impacts to the planning constraints. Mitigation measures to avoid or minimize these impacts were incorporated into the alternative plans, as necessary.

The descriptions and results of the evaluations of the measures considered in this study are presented below. The detailed accounts of the comparisons between project alternatives are included in the San Clemente Shoreline Final Feasibility Report.

3.1.2.1 Non-structural Measures Considered

Anything that achieves the Project objectives without a structure is considered a non-structural alternative.

Managed Retreat

Managed retreat is a term commonly used to describe a policy that restricts or opposes efforts to control long-term retreat of the shoreline. It has been used to describe policies ranging from complete removal of all shore protection structures to simply not allowing new structures to be built.

For this Project area, managed retreat of coastal development would include relocation of the railroad and beach facilities due to the continued erosion of the recreation beach area. At this time, most of the public beach facilities are located along the backshore in the Project area. Continued erosion and storm wave attack would likely eliminate any beach area available for recreation use and may eliminate the need for facilities or relocate some facilities (e.g., restrooms) to the landward side of the railroad. The relocation of the railroad would be extremely costly, and any decision for such relocation is beyond the scope and intent of this study. Managed retreat is not considered a viable non-structural measure.

3.1.2.2 Structural Measures Considered

Structural measures considered include revetments, sheet pile seawalls, breakwaters, offshore reefs, and groins.

Beach Fill

For the purpose of this document, beach fill or nourishment was the only soft structure measure considered viable for this area. Beach nourishment involves placement of compatible sand from a borrow area to effectively widen the beach. The beach fill material acts as a buffer, dissipating storm waves and run-up over the wider profile.

The beach fill design parameters were determined by considering various combinations of beach-fill widths and different replenishment cycles. Each option had one combination of an initial beach width and a repetitive duration for the subsequent renourishment cycles. The optimal option was the one that yielded the maximum net benefit. The Los Angeles District coastal engineering section developed the WENDY Model for Simulating Shoreline Change, which was used to predict the shoreline morphology over multiple years as waves redistribute sand after it is placed mechanically on the beach. The optimization consisted of finding the beach width and replenishment period for both segments that maximized the net benefits while avoiding impacts to known sensitive nearshore habitat.

Beach nourishment may use offshore or onshore borrow sites. In the study area, offshore sources have historically been used for several reasons. Prior offshore studies of the area conducted by the USACE have identified potential sources of sand suitable for an offshore borrow site. The potential offshore borrow sites in the study area were investigated for beach-compatible sand located by previous investigations off Oceanside by the San Diego Association of Governments (SANDAG 2000) and USACE (1993).

For this Project, offshore dredging would be required for the beach fill alternative. Available offshore borrow sites exist, and sand would be delivered to the beach fill sites using hopper dredges with pumpout or large cutter suction dredges. For the hopper dredge with pumpout, temporary nearshore pipeline and mono buoys would be positioned at about the 30 ft (9 m) depth contour to permit the dredge to pump each load directly ashore.

Revetments and Seawalls

Revetments are “flexible” structures (i.e., not locked in concrete) made of placed quarry stone. They are typically built of 3- to 5-ton stone over a layer of smaller stone over a layer of fill designed to stop shoreline retreat and to protect landslide improvements from damage by wave action. Revetments are generally effective if maintained, but they encroach significantly onto the beach. The seawall structural measure typically requires less spatial area and maintenance.

Sheet pile walls are steel or precast concrete panels vertically placed in the ground to form continuous seawalls for protecting back beach improvements.

Offshore Reefs and Breakwaters

Offshore reefs or submerged breakwaters would protect the shoreline against direct wave attack and reduce the transmitted wave energy to less damaging levels along the beach. Breakwaters are concrete or rock walls built roughly parallel to the shore just beyond the breaker zone to absorb wave energy by stopping transmission or breaking the wave before it hits the beach. They can be permeable or solid, depending on desired amount of wave energy absorption versus reflection.

Submerged artificial reef type designs for the purpose of sand retention and storm damage reduction come in many forms, but may be simplified into "soft" and "hard" designs. In the soft designs, nearshore sand berms are constructed of dredged sand placed parallel to the beach in shallow water. The "soft" breakwater reduces incident wave height, and gradual onshore migration of the sediment can contribute to renourishment of the adjacent shoreline, providing the berm itself is stable enough to withstand the wave environment.

“Hard” submerged breakwaters, which include “artificial reefs”, reduce wave energy through breaking and dissipation. They are generally not as effective as surface piercing breakwaters at retaining sand, but do not generally have the adverse effects on surfing conditions that surface-visible structures do and may enhance surfing conditions if designed for dual purpose.

Although much theoretical research has been conducted, real world data on the performance of artificial reefs as sand retention structures is only now becoming available because few reefs have been built. In addition, most of these reefs were built in either Florida or Australia, where conditions differ greatly from the Southern California coastline. Pratte’s Reef was constructed off of El Segundo, California out of large geotube sand bags as an experimental surfing reef to mitigate impacts from construction of a groin, but was ultimately too small (200 thirteen-ton bags within an area of approximately 244 ft by 92 ft) and too far offshore to have any noticeable impact on the shoreline (M&N, SANDAG 2000). An artificial reef with the purpose of sand retention would require to be constructed on a much larger scale to be effective along the entire Project length.

Shore Perpendicular Structures

Cross-shore sand retention structures, such as groins and jetties, are constructed perpendicular to the shore to form fillets that can slow beach erosion by trapping littoral sediment. Most of the littoral drift occurs inshore of the normal breaker line under prevailing wave conditions (about the 7- to 10-ft (2- to 3-m) depth contours on the Pacific coast). Hence, extension of sand retention structures beyond about MLLW is generally uneconomical (USACE 1984).

The shore perpendicular structures are generally utilized to preserve a minimum berm width and slow erosion rates so that renourishment volumes may be smaller and episodes less frequent. The amount of sand trapped by the structure depends on the permeability, height, and length of the structure and the amount of sand in the littoral system. As material accumulates on the updrift side of the structure, supply to the downdrift side is reduced. This results in local beach accretion on the updrift side of the structure and erosion for some distance downshore. After the beach near the structure adjusts to an "equilibrium" stage in accordance with the wave conditions, all littoral drift either will pass the structure directly over it or diverted around the seaward end of the structure. Because of the potential adverse effects on downdrift beaches, groins and similar structures should be used only after careful consideration of the factors involved.

3.1.2.3 Comparison of Management Measures to Evaluation Criteria

Ultimately, the alternative plans identified in this study should follow the general guidelines listed below. Therefore, the management measures that become the alternative plans also must follow the following guidelines.

Technical Feasibility - The recommended plan presented should be complete and sound, and in sufficient detail to allow development of engineering plans and specifications.

Economic Feasibility - Any potential project that is in the Federal interest must display feasibility by satisfying benefit-cost (B/C) criteria. Generally, this ratio must be greater than one to allow Federal participation in continued study and any project proposal. In addition, the sponsoring agency is required to show their ability and willingness to fund their share of any recommended project as required by the Principles and Guidelines.

Environmental Impacts - Applicable environmental requirements must be met for a feasibility level study. Environmental acceptability must be ascertained; and adverse impacts should be avoided if possible or minimized if avoidance is not possible. The screening of alternatives based on environmental acceptability limitations are conducted with respect to Federal environmental statutes. Federal examples include the Coastal Zone Management Act (CZMA) and the Fish and Wildlife Coordination Act (FWCA). The California Coastal Commission currently interprets the CZMA in a manner that favors almost any type of shore protection over rock revetments and/or seawalls, especially in areas where there is a lot of public beach use and recreation. A revetment of the size necessary at this site would have very little chance of obtaining a Coastal Consistency Determination.

Public Acceptability - The alternative options and plans should be acceptable to the local residents, agencies, organization, and the non-Federal sponsor(s), as well as the interested State and Federal agencies. The local sponsor has indicated that they are severely constrained by public opinion and cannot support any recommendation that meets with severe public opposition. Unacceptable plans include any visible offshore structure and any structure that significantly impedes beach access, such as rock revetments.

Table 3-1 compares the management measures to the evaluation criteria.

Table 3-1 Comparison of Management Measures to Environmental Evaluation Criteria

Management Measure	Meets Purpose and Need	Technically Feasible	Economically Feasible	Environmentally Acceptable	Acceptable to Public
Beach fill	Yes	Yes	Yes	Yes	Maybe
Managed Retreat	Maybe	Yes	No	No	Maybe
Revetment	Maybe	Yes	Maybe	No	No
Seawall	No	Yes	Yes	No	No
Groin	Yes	Maybe	No	No	No
Visible Offshore Breakwater	Maybe	Yes	No	No	No
Submerged Reef	Maybe	No	No	Maybe	Maybe

Beach nourishment is highly effective at protecting the coastline as long as the beach is maintained. A wide beach berm resulting from beach fill can effectively provide a buffer against storm wave attack and improve recreational safety and opportunities significantly. Beach fill would address all of the problems and concerns.

Revetments and sheet pile walls would effectively address storm damage concerns; however, they do not address beach recreation concerns. Seawalls and revetments are placed parallel to the shoreline as a last line of defense to protect adjacent land areas from direct wave attack, flooding, and erosion. As such, they often provide the most reliable form of shoreline protection; however, they do nothing to increase beach width and can impede public access to the beach. Revetments are the most economic structural measures. Revetments are less aesthetically pleasing than beach replenishment or seawall. Revetments are difficult and hazardous for pedestrians to cross, and they severely impede access to the beach. In addition, they take up a significant portion of the beach width and impede alongshore access, constituting a significant impact to public access. Revetments would extend seaward up to 33 ft (10 m), which would result in no beach in the winter and would severely limit available beach space in the summertime.

The California Coastal Commission currently interprets the Coastal Act in such a way that favors almost any type of shore protection over rock revetment, especially in areas with high public beach use and recreation. The size of this Project would be a constraint. Local, well-organized, and well-funded citizens groups, including Surfrider Foundation, have expressed strong opposition to revetments both in public meetings and in litigation. Any proposed project including revetment would encounter severe opposition from these groups.

Groins are cross-shore retention structures that act as a barrier to alongshore sediment transport. Offshore breakwaters are effective at retaining sand, but are expensive and require a healthy source of littoral sand to perform their sand trapping function.

3.2 Measures Eliminated from Further Study

After reviewing the possible alternatives that were considered for the Project, only the beach fill alternatives were carried forward into the final array. Although all of the screening criteria were deemed important, the primary screening criteria included potential permanent and temporary impacts on Essential Fish Habitat, inconsistencies with the Coastal Zone Management Act, and project costs. Construction footprints for either breakwaters or groins would potentially have a permanent impact on Essential Fish Habitat. Consistency with the Coastal Zone Management Act was a criterion for eliminating breakwaters, groins, and revetments. The high cost of implementing the remaining alternatives, compared to beach nourishment, would not maximize NED benefits and achieve the Planning Objectives.

The cost for beach nourishment will depend on the sand volume required for reconstruction, the need for retention structures, and the frequency of renourishment. Revetments would be the least costly alternative, but they have limited benefits addressing problems associated with San Clemente's sand loss. The only consideration of a seawall is as a protective measure used by the railroad to protect their tracks and is not carried forward as a separate alternative.

Visible breakwaters were considered, however they were screened out of the final analysis due to public safety issues, extremely high cost, impact on down-coast littoral transport, impact on surfing, impact on aesthetics, and most importantly, and lack of support from the local sponsor and local community. Soft breakwaters and submerged reefs are generally not suited for the type of wave environment in the study area because the relatively small grain sizes of available sand would not be stable when subject to the wave-induced bottom currents. Therefore, soft submerged berms were not carried into the final analysis.

Groins would entail extremely high costs, lack of public/sponsor support, severe impact on lateral beach access, potential impacts to downdrift beaches, and concerns regarding effectiveness because groins have not been very effective in similar areas with limited sand supply. This measure was screened out of the final analysis.

3.3 Measures Carried Forward

Beach nourishment is highly effective at protecting the coastline as long as the beach is maintained. A wide beach berm resulting from beach fill can effectively provide a buffer against storm wave attack, and improve recreational safety and opportunities significantly. Beach fill is the only measure that met all the environmental evaluation criteria mentioned above.

3.4 Description of Alternatives

3.4.1 No Action

The USACE is required to consider the No Action, or Future without Project, Alternative to comply with the requirements of NEPA. The No Action Alternative assumes that no project would be implemented by the Federal government to achieve the planning objectives. For the purposes of the initial screening, the No Action Alternative assumes the SCRRA's existing maintenance plan will continue to be implemented, which may result in potential damage to the railroad ballast and tracks, but without any measures implemented by the City to address continued erosion of the recreation beaches near the San Clemente Pier. With the No Action Alternative, the erosion-prone beaches are assumed to be further depleted and storm damages would be expected to increase in severity, increasing the threat to the railroad corridor. Public safety and liability problems would not be resolved, and recreational activity on the beaches would be degraded, resulting in a loss of associated economic benefits.

Due to chronic beach erosion in recent years that resulted in storm wave attack directly against the railroad corridor, the SCRRA and OCTA have constructed un-engineered riprap revetment segment by segment in the San Clemente area where the railroad ballast and tracks are vulnerable to storm wave-induced damages. The SCRRA has been side-dumping riprap stones in a random but controlled manner along the most critical segment between North Beach and the Marine Safety Building to mitigate wave-induced impacts on the railroad tracks. The cumulative impact of stone placement over the years has been a curtailment of lateral beach access. SCCRA is in the process of modifying the existing maintenance practices in response to evolving California Coastal Commission policies. In order to avoid and minimize any possible service disruption, it may become necessary or mandatory for the SCRRA to construct an "engineered" seawall.

3.4.2 Beach Fill Alternative

The Beach Fill Alternative consists of dredging material from offshore Oceanside (Figure 3-1), then hauling and placing it at San Clemente Beach. The borrow site (Borrow Area 2) is approximately 940 acres, with a 128 acre area instead the borrow site (Borrow Area 2A) that contains the more desirable material. The beach fill design parameters were determined by considering various combinations of beach-fill widths (i.e., between 10 m and 60 m at 5 m intervals) and different replenishment cycles. These combinations are scales (e.g., 10 m, 15 m, 20 m, etc. beach width) of the same alternative (i.e., beach fill). Two beach widths have been chosen that reasonably represent the scales that were modeled (i.e., 15 m and 35 m), but were expected to have apparent differences in environmental impacts based on preliminary screening. The 15 m beach width was chosen to represent the smallest scale beach width that met the project objectives. The 35 m beach width was chosen to represent the largest scale beach width that met project objectives. Although it is recognized that these two widths are scales of the same alternative, they are addressed in this document as two separate alternatives.

3.4.2.1 Common Design Elements of Action Alternatives

The following design elements were determined to optimize the effectiveness of the beach nourishment alternative. The model outputs are principally economic values, annual net benefits, and benefit cost ratio (BCR). According to USACE planning guidelines, an economically justified plan satisfies the conditions of BCR greater than 1.0 and annual net benefits greater than 0. Unique features of the two alternatives are described in Section 3.4.2.2.

Alongshore Length

Approximately 3,412 ft (1,040 m) of shoreline within the City are recommended for nourishment. The area is approximately centered about the Pier; the south limit is located immediately south of the T-Street overpass, while the north limit is located immediately north of the Marine Safety Headquarters. A taper continues an additional 330 ft (100 m) to the north and south to merge with the existing shoreline.

Berm Crest Elevation

The design berm elevation for this study has been set at +17 feet (+5.2 m) MLLW. This elevation matches the height of the natural berm of adjacent healthy beaches, which has been established by numerous surveys over the years. Historical beach profiles measured over the years indicate natural, stable berm elevations are approximately +17 feet (+5.2 m) MLLW. A design berm lower than the natural berm will form a ridge along the crest, which when overtopped by high water will produce flooding and ponding on the berm. A design berm higher than the natural berm will produce a beach face slope steeper than the natural beach and may result in formation of scarps that interfere with recreational use and other environmental uses.

Foreshore Slope

The design foreshore slope is established at 8H:1V. This slope matches the natural foreshore slope of adjacent beaches that has been established by numerous surveys and measurements over the years. Direct measurements obtained by the City of San Clemente indicate natural, stable foreshore slopes range between 4-18H:1V, with 8H:1V as the most common value. This slope has been shown to be a stable mean value between the seasonal variations.

The construction foreshore slope is established at 13H:1V. Los Angeles District beach fill construction experience with standard earthmoving equipment indicates that slightly flatter foreshore slopes are easier to construct. The post-construction foreshore is expected to evolve through an adjustment process known as equilibration. Natural foreshore processes would re-distribute a portion of the original fill volume throughout the profile.

Sediment Quantity

The volume of beach compatible sand for the different alternatives is provided in Section 3.4.2.2. The recommended quantity was derived from consideration of the planform (i.e., plan view) area and volume/area relationships. The volume/area value of 1.5 yd^3/ft^2 (12.3 m^3/m^2) was used in the present study; a value of 0.5 yd^3/ft^2 (4.1 m^3/m^2) has been shown to result in rapid erosion of the fill while the range of 1.0-1.5 yd^3/ft^2 (8.2-12.3 m^3/m^2) typically yields more realistic estimates of sediment requirement per surface area. Engineering practice in southern California indicates volume/area relationships are the most reliable predictor for fill quantities. It is expected that this quantity will have the greatest in-place stability.

A fill quantity is provided for each alternative to fill the design prism, including additional overfill requirements. The volume of sand represents a geometric area equivalent to the respective beach width. The construction profile is initially overfilled with the expectation that equilibration process will result in the design profile. Dredge material gradation is 6 to 12 percent of fines, 5 to 8 percent of gravel/cobbles, and the rest is sand. Material classification assumed is 10 percent fines, 83 percent sand, and 7 percent gravel.

Berm (or Beach) Width

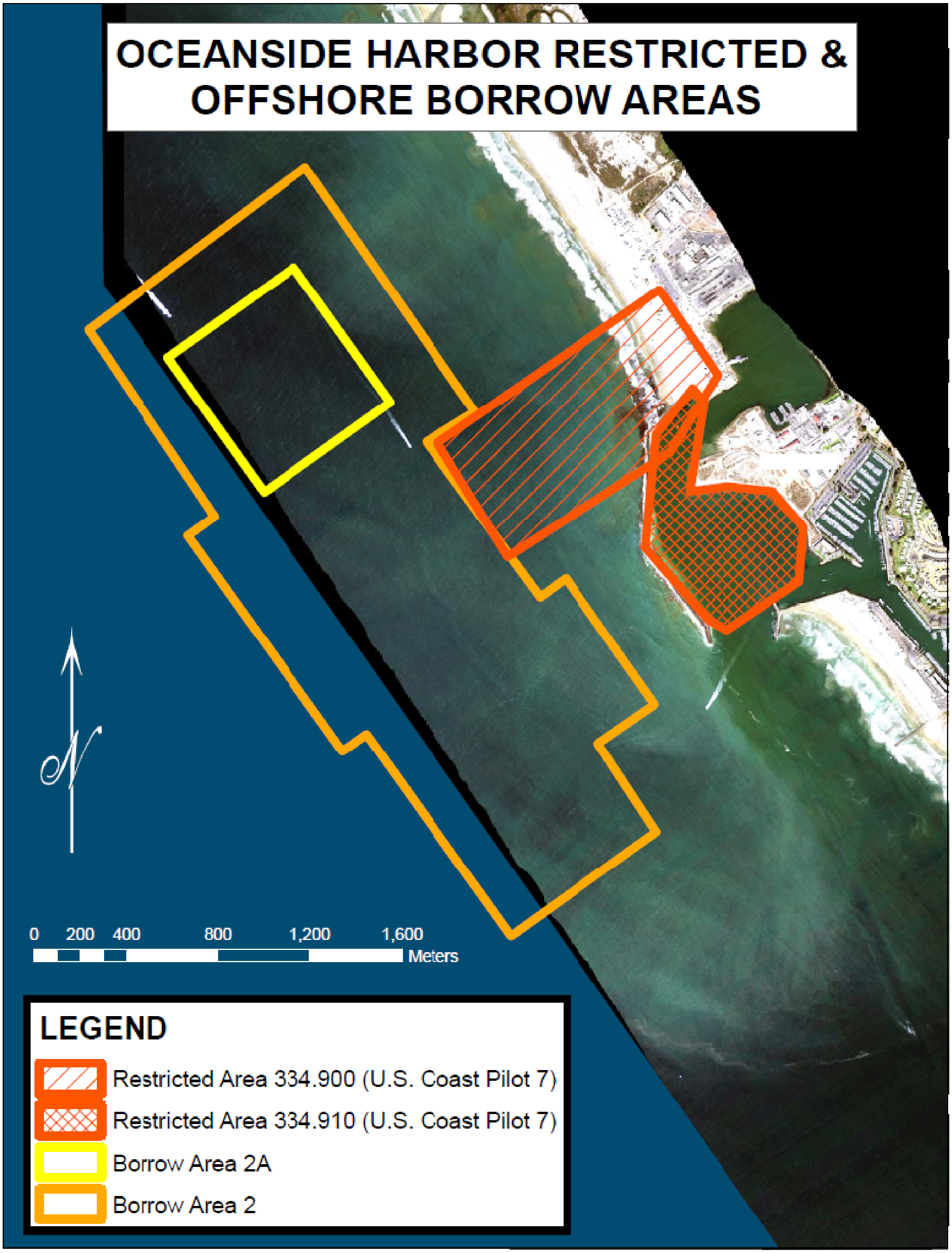
The berm width for the different alternatives considered is provided in Section 3.4.2.2. Berm width in this study is defined as that portion of the beach between the foreshore berm contour and a fixed location on the backshore, or the "dry" portion of the beach not subject to erosion. In this study, the seaward edge of the railroad revetment is considered the fixed point on the backshore. Several scales (e.g., 10 m, 15 m, 20 m, etc.) of berm width were originally modeled to determine the optimal width for the proposed Project. Two of these berm widths were considered for further analysis.

Similar to the fill quantity, in order to achieve the design intent, an additional width of beach is required. This material is placed to offset expected beach fill losses due to anticipated winnowing and equilibration of the construction profile. At the time of construction, the actual immediate post-construction width will be more than the equilibration or resultant beach width. The initial fill profile is expected to evolve through an adjustment process known as equilibration. Natural foreshore processes will re-distribute a portion of the original fill volume throughout the profile. The overfill material has been added to the design quantity to account for the equilibration process.

Nourishment Interval

A periodic nourishment interval is not optimized explicitly, but is a result of the sacrificial beach width optimization. The sacrificial beach width represents a period of time between successive nourishments. The sacrificial beach width divided by the mean long-term erosion rate will yield an approximate value for the nourishment interval. For example, a 66 ft (20 m) sacrificial beach width divided by 13 ft/yr (4.0 m/yr) long-term erosion rate approximately equals a 5-year periodic nourishment interval. Therefore, optimization of the sacrificial beach width will yield the periodic nourishment interval.

Figure 3-1 – Oceanside Borrow Site



3.4.2.2 Unique Features of Action Alternatives

50 ft (15 m) Beach Width Alternative

The design berm width for this alternative is approximately 50 ft (15 m). At the time of construction, the actual immediate post-construction width is expected to be approximately 76 ft (23 m). The recommended plan will require approximately 251,000 cy (192,000 m^3) of beach compatible sand. In other words, approximately 251,000 cy (192,000 m^3) in-place will create an immediate post-construction dry beach width of 76 ft (23 m) (Figure 3-2). It is expected that up to 26 ft (8 m) of dry beach width will be distributed from the foreshore to the profile during the equilibration process. This alternative is estimated to take 46 working days to complete.

115 ft (35 m) Beach Width Alternative

The design berm width for this alternative is approximately 115 ft (35 m). At the time of construction, the actual immediate post-construction width is expected to be approximately 171 ft (52 m). The recommended plan will require approximately 586,000 cy (448,000 m^3) of beach compatible sand. In other words, approximately 586,000 cy (448,000 m^3) in-place will create an immediate post-construction dry beach width of 171 ft (52 m) (Figure 3-3). It is expected that up to 56 ft (17 m) of dry beach width will be distributed from the foreshore to the profile during the equilibration process. This alternative is estimated to take 108 working days to complete.

3.4.2.3 Construction Method for Action Alternatives

The proposed Project, regardless of the action alternative chosen, will be constructed with hopper dredging equipment with pump ashore capability and conventional earthmoving equipment. Typical Los Angeles District beach fill projects require large capacity open-ocean capable dredges.

A medium-sized hopper dredge (e.g., Sugar Island) would be used. The hopper dredge effective capacity is estimated at 1,700 cy (1,300 m^3) and 3.2 loads per day. The hopper dredge would pump out the dredge material via a 24-inch pipeline at 1,800 cy/hr (1,376 m^3/hr). The hopper dredge would be filled at the designated borrow site at Oceanside and hauled approximately 21 miles (35 km) to San Clemente. At the receiver beach, the dredge would be attached to a moored floating section of pipeline extending 1,500 ft (457 m) to the shoreline. The material would be re-suspended and discharged through the on-board pumping system to the receiver site.

The hopper dredge requires a mono buoy to discharge its sand onto the beach. A mono buoy is a floating pipeline connection platform that is moored to the seafloor, and is used to interconnect with a steel sinker pipeline that carries the slurry along the seafloor to the beach. For this Project the mono buoy would be anchored in at least 25 ft (7.6 m) of water, between 2,500 and 5,000 ft (762 m to 1,524 m) from shore and in the appropriate location in relation to sensitive resources and engineering considerations. From one mono buoy location, sand can be pumped directly onshore and up to approximately 2,000 ft (610 m) alongshore in either direction.

Dredging would be performed 24 hours a day, 7 days a week. Shore equipment would work 12 hours a day, 7 days a week. The Project duration is estimated at four months. Anticipated number of working days differs between the alternatives. Construction is anticipated to begin in 2012.

Onshore Placement Method

Sand would be combined with seawater until it reaches the consistency of slurry. It then would be conveyed to the beach via either pipeline or a combination of hopper dredge and pipeline, as described above.

Existing sand at the receiver site would be used to build a small, “L”-shaped berm to anchor the sand placement operations. The short side of the “L” would be transverse (crosswise) to the shoreline and would be the proposed width. The long side would be parallel to the shore at the seaward edge and would be approximately 200 ft (61 m) long. Berm construction may be adjusted from the design requirements during fill placement depending on actual field conditions. The crosswise side of the berm would be constructed to allow alongshore landward beach access for emergency access at all times.

The slurry would be pumped onto the beach between this berm and toe. The berm reduces ocean water turbidity by allowing all the sand to settle out inside the bermed area while the seawater is channeled along the berm until it reaches the open end where it drains into the ocean. Temporary dikes within the berm will allow sand to settle in designated areas. Once a 200 ft (61 m) section of berm is filled in with sand, another 200 ft (61 m) of berm would be created, the pipeline would be moved or extended into the new berm area, and the process would begin again. As the material is deposited behind the berm, the sand would be spread using two bulldozers and one front-end loader to direct the flow of the sand slurry and form a gradual slope to the existing beach elevation. The berm would be subject to the forces of the waves and weather once constructed and would eventually settle down to a natural grade for the beach.

Figure 3-2 Plan View of 50 ft (15 m) Beach Width Alternative

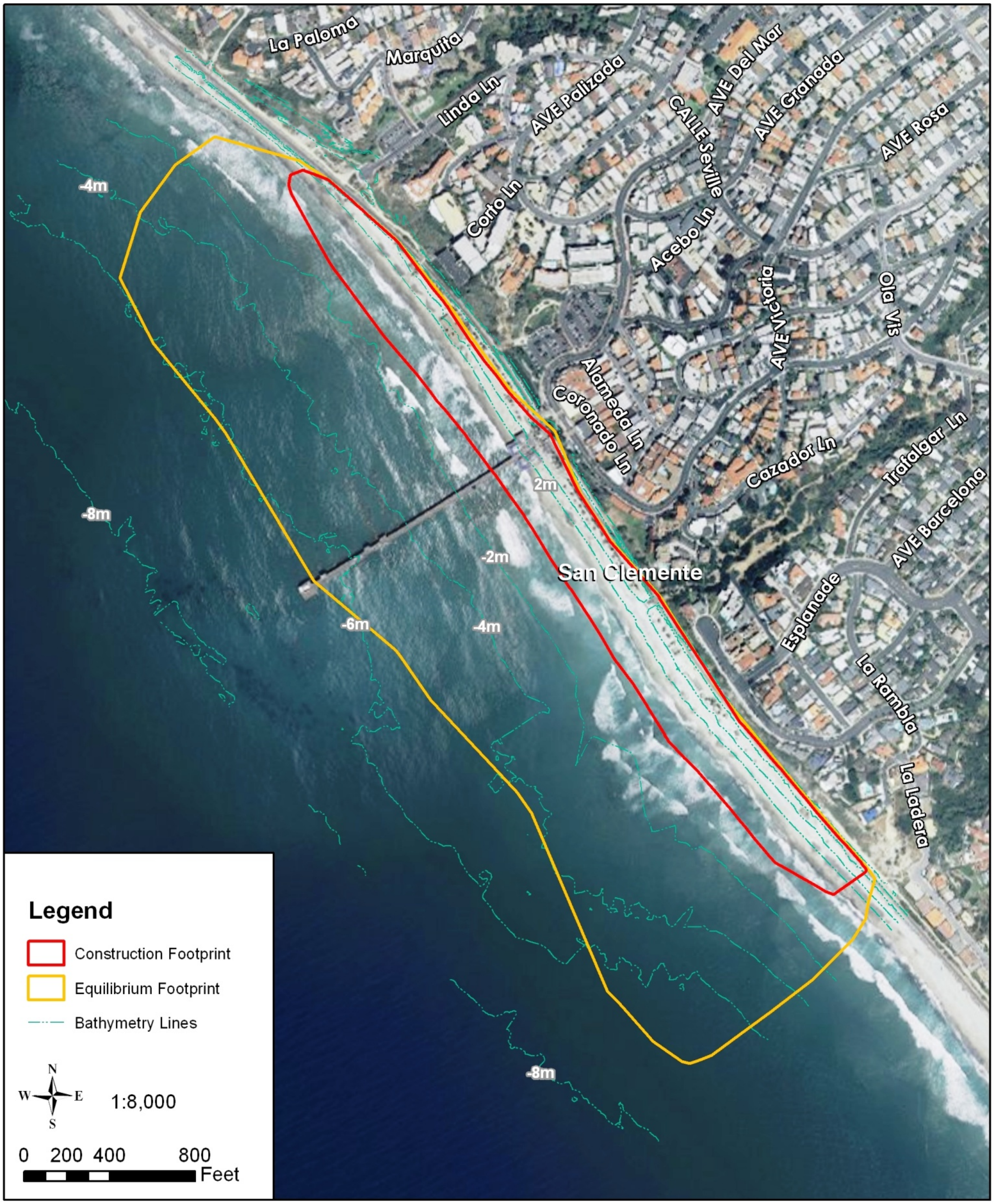


Figure 3-3 Plan View of 115 ft (35 m) Beach Width Alternative

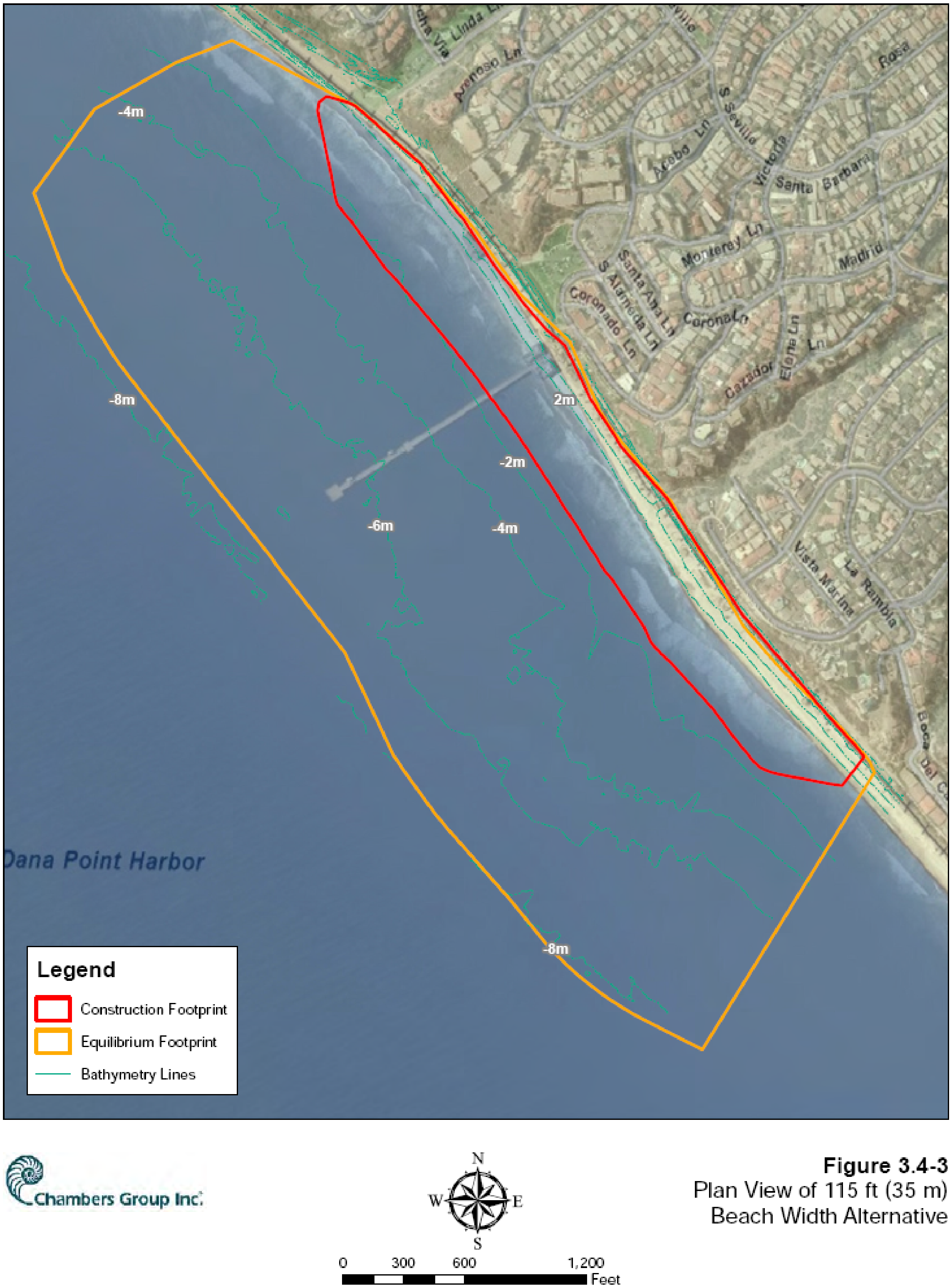


Figure 3.4-3
Plan View of 115 ft (35 m)
Beach Width Alternative

Construction Access and Staging Areas

Beach access for the construction equipment and crew would be split between open space on the beach and a city owned public parking lot and is shown in Figure 3-4. An open area exists along the beach immediately adjacent and north of the Pier and in the immediate vicinity of the Marine Safety Headquarters. It is expected this site would be used for the contractors' office trailer, parking area for heavy earthmoving equipment, and storage area for dredge pipe and other miscellaneous materials. This site is used extensively for access to the Marine Safety Headquarters and other municipal operations. It poses no new environmental considerations, minimizes disturbance to the environment, and is ideally located for contractor ease of operations. Although access to this area is controlled by a signal controlled, at-grade railroad crossing, it is anticipated that there would be no significant restrictions on utilization of this portion of the contractors work and storage area.

The contractors' dredge and vessels would require off-site mooring and berthing space. There is no mooring area available within the City of San Clemente. The nearest suitable mooring area is Dana Point Harbor, a small craft harbor approximately 5 mi (8 km) north.

Figure 3-4 Beach Access and Staging Areas

3.4.2.4 Public Access

For the beach fill operation, up to 300 ft (91 m) of beach would be inaccessible to the public around the discharge pipeline and berms. In addition, there would be intermittent restrictions on public access for approximately 350 ft (107 m) on either side of this discharge zone. This space would be needed for maneuvering heavy equipment during construction of the temporary berms.

3.4.2.5 Future Project Beach Profile Monitoring

Long-term shoreline erosional processes create damages through long-term profile translation landward and the increasing potential for wave related damages. The landward advancing shoreline reduces the beach width available for storm damage protection thereby increasing the probability of wave related damages to facilities and structures. Long-term beach erosion also results in the gradual reduction of the beach surface area available for recreation. The peak erosion rate is –0.7 ft/yr (–0.21 m/yr), the maximum erosion rate is -1.5 ft/yr (–0.46 m/yr), and the maximum accretion rate is +1.24 ft/yr (+0.38 m/yr).

The purpose of this monitoring is to allow the timing and the detailed design of the periodic nourishment to be optimized. Surveying of the beach and seabed morphology is paramount to the monitoring efforts. Changes in beach and seabed morphology will define the sediment transport patterns at the shoreline and ultimately the short term and long-term beach erosion processes. Alongshore transects will be crucial to determine the effects, if any, of the proposed Project on updrift and/or downdrift shorelines. The monitoring period will be for the 50-year period of Federal involvement. However, not all aspects of the monitoring plan will be conducted each year.

Maintenance nourishment efforts would occur when the shoreline reaches the base beach width (i.e., approximately 35 ft [11 m]). Based on a maximum erosion rate of -12.8 feet per year (3.9 m/yr), nourishment for the 50 ft (15 m) wide beach would be required approximately every 6 years and nourishment for the 115 ft (35 m) wide beach would be required approximately every 10 years. Maintenance nourishment efforts would return the beach to the design beach width, either 50 ft (15 m) or 115 ft (35 m), and would involve up to a similar amount of material as original construction based on the design beach width. Maintenance nourishment efforts also would be dependent upon available funding at the time of request.

3.5 Comparative Impacts Criteria of Alternative Plans

Alternatives were compared using the following four formulation criteria suggested by the U.S. Water Resources Council.

> **Completeness** - Completeness is a determination of whether or not the plan includes all elements necessary to achieve the objectives of the plan. It is an indication of the degree that the outputs of the plan are dependent upon the action of others.

Effectiveness – All of the plans in the final array provide some contribution to the planning objectives. Effectiveness is defined as a measure of the extent to which a plan achieves its objectives.

Efficiency – All of the plans in the final array provide net benefits. Efficiency is a measure of the cost effectiveness of the plan expressed in net benefits.

Acceptability – All of the plans in the final array must be in accordance with Federal law and policy. The comparison of acceptability is defined as acceptance of the plan to the local sponsor and the concerned public.

3.6 Recommended Plan Alternative

Alternatives were considered that may have fewer direct, indirect, and cumulative impacts to aquatic resources that still meet the Project purpose. Potential project related impacts are provided in the alternatives analysis in Section 5.0 of this report. The 50 ft (15 m) Beach Width Alternative is identified as the **recommended plan**.

The recommended plan is developed by considering the storm damage reduction and recreational potential of various beach fill configuration alternatives and optimization based on the average annual benefits and the benefit/cost ratio. Primary optimization parameters of each alternative are the dimensions of the base beach width and sacrificial beach width of the cross-sectional design profile. An array of sacrificial beach widths yields a matrix of Project alternatives. Based on the evaluation of management measures above and the comparison of the alternatives formulated for this study, the tentatively recommended plan is the 50 ft (15 m) Beach Width Alternative.

The recommended plan is expected to perform in a manner consistent with other recent fills within the southern California region. A similar beach nourishment operation was performed in 2001 by the San Diego Association of Governments (SANDAG 2000). The project entailed dredging 2 million cubic yards (1.5 million cubic meters) of beach compatible sediments from 6 borrow sites for placement on 12 receiver beaches. The wide spread locations of the receiver beaches relative to the borrow locations required the use of a trailing suction hopper dredge. Sediment discharge was accomplished by pumping through floating pipelines to the beach. The dry land operation is expected to be conducted by conventional earthmoving equipment, including bulldozers and front-end loaders. Ancillary equipment is expected to include small maintenance/tool trailers and small service trucks. Oceanside Beach is the transect deemed most applicable to San Clemente. At Oceanside Beach, the fill quantity (421,000 cy / 322,000 m^3), median grain size (0.64 mm [0.03 in]), alongshore length (4,400 ft [1,341 m]), and fill width (185 ft [56 m]) are comparable to the recommended plan of this study, and its performance is deemed representative of expected performance at San Clemente.

Estimates based on the SANDAG monitoring data suggest the San Clemente fill will erode on average at a rate of 12.8 feet per year (3.9 m/yr). A beach fill erodes at substantially higher rates than the native beach. Due to the time varying nature of the wave climate, sediment supply to the beach, and other factors driving longshore sediment transport, it is expected that the beach will erode at a greater rate in some years, at a slower rate in some years, and possibly accrete in other years. Based on a 50 ft (15 m) wide beach, and the 12.8 ft/yr (3.9 m/yr) erosion rate, it is anticipated that a fill will last about 6 years on average.

4.0 AFFECTED ENVIRONMENT

4.1 Meteorology and Air Quality

4.1.1 Climate/Meteorology

The proposed San Clemente Shoreline Project lies in the South Coast Air Basin (SCAB), with a borrow area located in the San Diego Air Basin.

4.1.1.1 South Coast Air Basin (SCAB)

The SCAB includes all of Orange County as well as the non-desert portions of Los Angeles, Riverside, and San Bernardino counties. The SCAB is located in a coastal plain with connecting broad valleys and low hills, bounded by the Pacific Ocean in the southwest quadrant with high mountains forming the remainder of the perimeter. The general region lies in the semi-permanent high-pressure zone of the eastern Pacific. As a result, the climate is mild, tempered by cool sea breezes. This usually mild climatological pattern is interrupted infrequently by periods of extremely hot weather, winter storms, or Santa Ana winds.

The annual average temperature varies little throughout the SCAB, ranging from the low to middle 60s, measured in degrees Fahrenheit (ºF). With a more pronounced oceanic influence, coastal areas show less variability in annual minimum and maximum temperatures than inland areas. The climatological station located in Laguna Beach (to the north) reports a yearly average of 61ºF. The average low is reported at 44ºF in January while the average high is 77ºF in August and September.

In contrast to a very steady pattern of temperature, rainfall is seasonally and annually highly variable. Almost all rain falls from November through April. Summer rainfall is normally restricted to widely scattered thundershowers near the coast with slightly heavier shower activity in the east and over the mountains. Rainfall averages around 12.45 inches per year in the Project area, again, as measured at Laguna Beach.

Although the SCAB has a semi-arid climate, the air near the surface is typically moist because of the presence of a shallow marine layer. Except for infrequent periods when dry, continental air is brought into the SCAB by off shore winds, the ocean effect is dominant. Periods of heavy fog, especially along the coastline, are frequent; and low stratus clouds, often referred to as “high fog” are a characteristic climatic feature. Annual average humidity is 70 percent at the coast and 57 percent in the east portions of the SCAB.

Wind patterns across the south coastal region are characterized by westerly and southwesterly onshore winds during the day and easterly or northeasterly breezes at night. Wind speed is somewhat greater during the dry summer months than during the rainy winter season. Annually, typical winds in the project area average about 6 to 8 miles per hour during the day and 2 to 8 miles per hour during the night.

Between the periods of dominant airflow, periods of air stagnation may occur, both in the morning and evening hours. Whether such a period of stagnation occurs is one of the critical determinants of air quality conditions on any given day. During the winter and fall months, surface high-pressure systems over the SCAB, combined with other meteorological conditions, can result in very strong, downslope Santa Ana winds. These winds normally have duration of a few days before predominant meteorological conditions are reestablished.

In conjunction with the two characteristic wind patterns that affect the rate and orientation of horizontal pollutant transport, there are two similarly distinct types of temperature inversions that control the vertical depth through which pollutants are mixed. These inversions are the marine/subsidence inversion and the radiation inversion. The height of the base of the inversion at any given time is known as the "mixing height". This mixing height can change under conditions when the top of the inversion does not change. The combination of winds and inversions are critical determinants in leading to the highly degraded air quality in summer, and the generally good air quality in the winter in the project area.

4.1.1.2 San Diego Air Basin (SDAB)

The SDAB covers 4,260 square miles and lies in the southwest corner of California and comprises the entire San Diego region. The topography in the San Diego region varies greatly, from beaches on the west to mountains and desert on the east. Much of the topography in between consists of mesa tops intersected by canyon areas. The topography in the San Diego region, along with local meteorology, influences the dispersal and movement of pollutants in the basin.

The weather of the San Diego region, as in most of southern California, is influenced by the Pacific Ocean and its semi-permanent high-pressure systems that result in dry, warm summers and mild, occasionally wet winters. The average temperature ranges from the mid 40s to the high 90s. Most of the county's precipitation falls from November to April, with infrequent (approximately ten percent) precipitation during the summer.

The interaction of ocean, land, and the Pacific High Pressure Zone maintains clear skies for much of the year and drives the prevailing winds. Local terrain is often the dominant factor inland, and winds in inland mountainous areas tend to blow through the valleys during the day and down the hills and valleys at night.

4.1.2 Ambient Air Quality

The following characterization of the baseline atmospheric environment includes an evaluation of the ambient air quality and applicable rules, regulations, and standards for the area. Because the Project has the ability to release gaseous emissions of criteria pollutants and dust into the ambient air, it falls under the ambient air quality standards promulgated on the local, state, and federal levels.

4.1.2.1 Baseline Air Quality

Topographical features that affect the transport and diffusion of pollutants in the project area include the mountain ranges to the northeast that prevent the transport of pollutants. Air quality in the SCAB generally ranges from fair to poor and is similar to air quality in most of coastal Southern California. The entire region experiences heavy concentrations of air pollutants during prolonged periods of stable atmospheric conditions. During the past 20 years, the SDAB has experienced a decline in the number of days with unhealthy levels of ozone despite the region's growth in population and vehicle miles traveled, which both contribute to air pollution problems. This improvement in air quality clearly shows that efforts to reduce air pollution are working.

Pollutants emitted into the air from stationary and mobile sources affect the ambient air quality. Stationary sources can be divided into two major subcategories: point sources and area sources. Point sources consist of one or more emission sources at a facility with an identified location and are usually associated with manufacturing and industrial processing plants. Area sources are widely distributed and produce many small emissions, such as residential water heaters.

Mobile sources refer to emissions from motor vehicles, including tailpipe and evaporative emissions, and are classified as either on-road or off-road. On-road sources are a combination of emissions from automobiles, trucks, and indirect sources. Indirect sources are sources that by themselves may not emit air contaminants; however, they indirectly cause the generation of air pollutants by attracting vehicle trips or consuming energy. Examples of indirect sources include an office complex or commercial center that generates commuter trips and consumes energy resources through the use of natural gas for space and water heating. Indirect sources also include actions proposed by local governments, such as redevelopment districts and private projects involving the development of either large buildings or tracts. In addition, indirect sources include those emissions created by the distance vehicles travel. Off-road sources include aircraft, ships, trains, and self-propelled construction equipment.

4.1.2.2 Affected Environment

Existing levels of ambient air quality and historical trends and projections in the project area are best documented by measurements made by the SCAQMD. The sand placement is located within the southern portion of Source Receptor Area (SRA) 21 Capistrano Valley. The closest monitoring station to the San Clemente area is located at Lake Forest (Saddleback Valley SRA 19). Excepting NO_2 that is not monitored in this area, data from the monitoring station in SRA 19 are summarized in Table 4-1. Data for NO_2 included in Table 4-1 are as monitored in the North Coastal SRA 18. The borrow area is located near Oceanside. The nearest monitoring station to the borrow site is located at Camp Pendleton. The Camp Pendleton site measures ozone, $PM_{2.5}$, and NO_2. Table 4-1 also includes ambient data for Camp Pendleton.

At the SCAG monitoring sites, ozone pollution decreased between 2004 and 2005 with an increase again in 2006 and decrease in 2007 with 5 days experiencing a violation of the federal hourly standard. The SCAG data show recurring violations of and fluctuations in both the State and Federal ozone standards and no clear trend is apparent. The SCAG data also indicate that the area occasionally exceeds the PM_{10} and $PM_{2.5}$ State and Federal standards with only one day in 2006 that exceeded the standards for either pollutant. The CO and NO_2 standards have not been violated in the last five years at this station.

Table 4-1 Ambient Air Quality Monitoring Summary

Pollutant/Standard	Number of Days Thresholds Were Exceeded and Maximum Levels During Such Violations				
	2003	2004	2005	2006	2007
Ozone – Lake Forest					
State 1-Hour > 0.09 ppm	16	11	3	13	5
State 8-Hour > 0.07 ppm	ND	20	6	17	10
Federal 1-Hour > 0.12 ppm	4	0	1	0	0
Federal 8-Hour > 0.08 ppm	8	0	1	6	2
Max. 1-Hour Conc. (ppm)	0.153	0.116	0.125	0.12	0.108
Max. 8-Hour Conc. (ppm)	0.105	0.089	0.085	0.105	0.089
Ozone – Camp Pendleton					
State 1-Hour > 0.09 ppm	4	4	0	0	0
State 8-Hour > 0.07 ppm	10	12	2	5	4
Federal 1-Hour > 0.12 ppm	0	0	0	0	0
Federal 8-Hour > 0.08 ppm	5	6	0	0	0
Max. 1-Hour Conc. (ppm)	0.099	0.110	0.090	0.086	0.083
Max. 8-Hour Conc. (ppm)	0.084	0.095	0.074	0.073	0.074
Carbon Monoxide – Lake Forest					
State 8-Hour > 9.0 ppm	0	0	0	0	0
Federal 8-Hour $\geq$ 9.5 ppm	0	0	0	0	0
Max 1-Hour Conc. (ppm)	3	2	2	2	3
Max. 8-Hour Conc. (ppm)	1.8	1.6	1.6	1.8	2.1
Nitrogen Dioxide – SRA 18					
State 1-Hour $\geq$ 0.25 ppm	0	0	0	0	0
Max. 1-Hour Conc. (ppm)	0.11	0.10	0.09	0.10	0.07
Nitrogen Dioxide – Camp Pendleton					
State 1-Hour $\geq$ 0.25 ppm	0	0	0	0	0
Max. 1-Hour Conc. (ppm)	0.11	0.10	0.09	0.10	0.07
Inhalable Particulates (PM_{10})[2] – Lake Forest					
State 24-Hour > 50 $\mu g/m^3$	3.5	0.0	0.0	2.0	5
Federal 24-Hour > 150 $\mu g/m^3$	0.0	0.0	0	0	0
Max. 24-Hour Conc. ($\mu g/m^3$)	64	47	41	57	74
Inhalable Particulates ($PM_{2.5}$)[2] – Lake Forest					
Federal 24-Hour > 65 $\mu g/m^3$	0.0	0.0	0.0	0.9	0.0
Max. 24-Hour Conc. ($\mu g/m^3$)	50.6	49.4	35.4	47.0	46.9

[1] NO_2 as measured at the North Coastal Orange County monitoring station. All other pollutants as measured at the Saddleback monitoring station.
[2] Percent of samples exceeding standard.
ppm: parts per million; $\mu g/m^3$: micrograms per cubic meter
Source: South Coast Air Quality Management District

At the SDAG monitoring sites, ozone pollution stayed fairly steady between 2004 and 2005 and actually decreased between 2005 and 2007 with an average of 3 days experiencing a violation of the State hourly standard during those three years. The NO_2 standards have not been violated in the last five years at this station.

4.1.2.3 Sensitive Receptors

Some land uses are considered more sensitive to air pollution than others due to the types of population groups or activities involved. Sensitive population groups include children, the elderly, the acutely ill, and the chronically ill, especially those with cardio-respiratory diseases. Residential areas are considered to be sensitive to air pollution because residents (including children and the elderly) tend to be at home for extended periods of time, resulting in sustained exposure to any pollutants present. Schools are also considered as sensitive as children are present for extended durations and engage in regular outdoor activities. Recreational land uses are considered moderately sensitive to air pollution because exercise places a high demand on respiratory functions, which can be impaired by air pollution. Sensitive receptors in the Project vicinity include several residential neighborhoods approximately 196 feet from the Project site.

4.1.3 Regulatory Framework

The following characterization of the baseline atmospheric environment includes an evaluation of the ambient air quality and applicable rules, regulations, and standards for the area. Because the Project has the ability to release gaseous emissions of criteria pollutants and dust into the ambient air, it falls under the ambient air quality standards promulgated on the Local, State, and federal levels.

4.1.3.1 Criteria Pollutants

Federal and State laws regulate the air pollutants emitted into the ambient air by stationary and mobile sources. These regulated air pollutants are known as “criteria air pollutants” and are categorized as primary and secondary pollutants. Primary air pollutants are those that are emitted directly from sources. Carbon monoxide (CO), reactive organic gases (ROG), nitrogen oxides (NO_X), sulfur dioxide (SO_2), and most fine particulate matter (PM_{10}, $PM_{2.5}$), including lead (Pb) and fugitive dust; are primary air pollutants. Of these CO, SO_2, PM_{10}, and $PM_{2.5}$ are criteria pollutants. ROG and NO_X are criteria pollutant precursors that go on to form secondary criteria pollutants through chemical and photochemical reaction in the atmosphere. Ozone (O_3) and nitrogen dioxide (NO_2) are the principal secondary pollutants. A description of each of these primary and secondary criteria air pollutants and their known health effects is presented in Appendix C.

4.1.3.2 Toxic Air Contaminants

The public's exposure to toxic air contaminants (TACs) is a significant environmental health issue in California. In 1983, the California Legislature enacted a program to identify the health effects of TACs and to reduce exposure to these contaminants to protect the public health. The Health and Safety Code defines a TAC as “an air pollutant which may cause or contribute to an increase in mortality or in serious illness, or which may pose a present or potential hazard to human health". A substance that is listed as a hazardous air pollutant pursuant to subsection (b) of Section 112 of the Federal Act (42 USC Sec. 7412[b]) is a toxic air contaminant. Under State law, the California Environmental Protection Agency, acting through the CARB, is authorized to identify a substance as a TAC if it determines the substance is an air pollutant which may cause or contribute to an increase in mortality or an increase in serious illness, or which may pose a present or potential hazard to human health.

California regulates TACs primarily through AB 1807 (Tanner Air Toxics Act) and AB 2588 (Air Toxics "Hot Spot" Information and Assessment Act of 1987). The Tanner Air Toxics Act sets forth a formal procedure for CARB to designate substances as TACs. Once a TAC is identified, CARB adopts an "airborne toxics control measure" for sources that emit designated TACs. If there is a safe threshold for a substance at which there is no toxic effect, the control measure must reduce exposure to below that threshold. If there is no safe threshold, the measure must incorporate toxics best available control technology (T-BACT) to minimize emissions.

Air toxics from stationary sources are also regulated in California under the Air Toxics "Hot Spot" Information and Assessment Act of 1987. Under AB 2588, toxic air contaminant emissions from individual facilities are quantified and prioritized by the air quality management district or air pollution control district. High priority facilities are required to perform a health risk assessment and, if specific thresholds are exceeded, required to communicate the results to the public in the form of notices and public meetings.

To date the CARB has designated nearly 200 compounds as TACs. Additionally, the CARB has implemented control measures for a number of compounds that pose high risks and show potential for effective control. The majority of the estimated health risks from TACs can be attributed to a relatively few compounds, the most important being particulate matter from diesel-fueled engines.

4.1.3.3 Other Effects of Air Pollution

Just as humans are affected by air pollution, so too are plants and animals. Animals must breathe the same air and are subject to the same types of negative health effects. Certain plants and trees may absorb air pollutants that can stunt their development or cause premature death.

There are also numerous impacts to the human economy including lost workdays due to illness, a desire on the part of business to locate in areas with a healthy environment, and increased expenses from medical costs. Pollutants may also lower visibility and cause damage to property. Certain air pollutants are responsible for discoloring painted surfaces, eating away at stones used in buildings, dissolving the mortar that holds bricks together, and cracking tires and other items made from rubber.

4.1.3.4 Federal Ambient Air Quality Standards (AAQS)

The Federal Clean Air Act Amendment of 1971 (CAA) established national Ambient Air Quality Standards (AAQS) with states retaining the option to adopt more stringent standards or to include other pollution species. These standards are the levels of air quality considered safe, with an adequate margin of safety, to protect the public health and welfare. They are designed to protect those "sensitive receptors" most susceptible to further respiratory distress such as asthmatics, the elderly, very young children, people already weakened by other disease or illness, and persons engaged in strenuous work or exercise. Healthy adults can tolerate occasional exposure to air pollutant concentrations considerably above these minimum standards before adverse effects are observed.

Both the State of California and the federal government have established health based AAQS for six air pollutants. As shown in Table 4-2, these pollutants include ozone, carbon monoxide, nitrogen dioxide, sulfur dioxide, suspended particulate matter (PM_{10}, $PM_{2.5}$), and lead. In addition, the State has set standards for sulfates, hydrogen sulfide, vinyl chloride, and visibility reducing particles. These standards are designed to protect the health and welfare of the populace with a reasonable margin of safety.

In addition to primary and secondary AAQS, the State of California has established a set of episode criteria for ozone, carbon monoxide, nitrogen dioxide, sulfur dioxide, and particulate matter. These criteria refer to episode levels representing periods of short-term exposure to air pollutants that actually threaten public health.

4.1.3.5 Air Quality Management Planning

The SCAQMD and the Southern California Association of Governments (SCAG) are the agencies responsible for preparing the Air Quality Management Plan (AQMP) for the SCAB. Since 1979, a number of AQMPs have been prepared. The 1997 AQMP, updated in 1999 and replaced in 2003, was based on the 1994 AQMP and ultimately the 1991 AQMP, and was designed to comply with State and Federal requirements, reduce the high level of pollutant emissions in the SCAB, and ensure clean air for the region through various control measures. To accomplish its task, the 1991 AQMP relied on a multilevel partnership of governmental agencies at the Federal, State, regional, and local level. These agencies (i.e., the USEPA, CARB, local governments, SCAG, and SCAQMD) are the cornerstones that implement AQMP programs.

The 2003 AQMP, adopted in August 2003, updated the attainment demonstration for the Federal standards for ozone and PM_{10}; replaced the 1997 attainment demonstration for the Federal CO standard and provided a basis for a maintenance plan for CO for the future; and updated the maintenance plan for the Federal NO_2 standard that the SCAB has met since 1992.

The most recent comprehensive plan was adopted on July 13, 2007. The 2007 comprehensive plan is designed to meet the State and Federal CAA planning requirements and focuses on ozone and $PM_{2.5}$. The 2007 comprehensive plan incorporates significant new emissions inventories, ambient measurements, scientific data, control strategies, and air quality modeling.

Areas that meet the ambient air quality standards are classified as "attainment" areas while areas that do not meet these standards are classified as "non-attainment" areas. The classifications for ozone non-attainment include and range in magnitude from: marginal, moderate, serious, severe, and extreme. The attainment status for the SCAB is included in Table 4-3.

Table 4-2 Ambient Air Quality Standards for Priority Pollutants

Pollutant	Averaging Time	California Standard	Federal Primary Standard	Major Pollutant Sources
Ozone (O_3)	1 hour	0.09 ppm	*	Motor vehicles, paints, coatings, and solvents.
	8 hours	0.070	0.075 ppm	
Carbon Monoxide (CO)	1 hour	20 ppm	35 ppm	Internal combustion engines, primarily gasoline-powered motor vehicles.
	8 hours	9.0 ppm	9 ppm	
Nitrogen Dioxide (NO_2)	Annual Average	*	0.053 ppm	Motor vehicles, petroleum-refining operations, industrial sources, aircraft, ships, and railroads.
	1 hour	0.18 ppm	*	
Sulfur Dioxide (SO_2)	Annual Average	*	0.03 ppm	Fuel combustion, chemical plants, sulfur recovery plants, and metal processing.
	1 hour	0.25 ppm	*	
	24 hours	0.04 ppm	0.14 ppm	
Suspended Particulate Matter (PM_{10})	Annual Arithmetic Mean	20 $\mu g/m^3$	50 $\mu g/m^3$	Dust and fume-producing construction, industrial, and agricultural operations, combustion, atmospheric photochemical reactions, and natural activities (e.g. wind-raised dust and ocean sprays).
	24 hours	50 $\mu g/m^3$	150 $\mu g/m^3$	
Suspended Particulate Matter ($PM_{2.5}$)	Annual Arithmetic Mean	12 $\mu g/m^3$	15 $\mu g/m^3$	Dust and fume-producing construction, industrial, and agricultural operations, combustion, atmospheric photochemical reactions, and natural activities (e.g. wind-raised dust and ocean sprays).
	24 hours	*	35 $\mu g/m^3$	
Lead (Pb)	Monthly	1.5 $\mu g/m^3$	*	Present source: lead smelters, battery manufacturing & recycling facilities. Past source: combustion of leaded gasoline.
	Quarterly	*	1.5 $\mu g/m^3$	
Sulfates (SO_4)	24 hours	25 $\mu g/m^3$	*	Industrial processes.

ppm: parts per million; $\mu g/m^3$: micrograms per cubic meter
* = standard is not used for this pollutant/duration by this entity.

Table 4-3 Attainment Status for the SCAB

Pollutant	State Status	Federal Status
Ozone (1-hour)	Extreme Non-attainment	Extreme Non-attainment (under the prior standard)
Ozone (8-hour)	Extreme Non-Attainment	Extreme
PM_{10}	Serious Non-attainment	Serious Non-attainment
$PM_{2.5}$	Non-attainment	Non-attainment
CO	Attainment	Attainment/Maintenance
NO_2	Attainment	Attainment/Maintenance

On April 15, 2010, EPA signed a final rule to grant requests to reclassify SCAB from "severe-17" to "extreme". The SCAB also is designated as attainment of the CAAQS for SO2, lead, and sulfates. Areas that are designated as Severe 17 for the ozone standard must meet attainment of the 8-hour standard by 2021 (2024 if reclassified to Extreme). Areas considered as serious non-attainment of the PM10 standards must have reached attainment by the end of 2006, or as expeditiously as possible. The $PM_{2.5}$ attainment date is to be met in the year 2015.

General Conformity

The EPA established the General Conformity Rule on November 30, 1993. The rule implements the CAA conformity provision, which mandates that the Federal government not engage, support, or provide financial assistance for licensing or permitting, or approve any activity not conforming to an approved CAA implementation plan. The purpose of the General Conformity Rule was to ensure that Federal activities do not hamper local efforts to control air pollution. The total quantified emissions of nonattainment or maintenance pollutants from both direct and indirect sources is compared to rates listed in Title 40, Part 51, Section 51.853(b), considered the *de minimis* levels, where, if they are determined to exceed those levels, the Federal agency is required to conduct a Conformity Determination.

Since all on-shore activities are located at the main project site in San Clemente, the *de minimis* levels are based on attainment designations/classifications in the SCAB. Table 4.3a shows the General Conformity *de minimis* levels.

Table 4-4a General Conformity *De Minimis* Levels

Pollutant	Classification	Tons/yr
Ozone	Extreme	10
PM_{10}	Serious	70
CO	Maintenance	100
NO_2	Maintenance	100

4.1.3.6 Standard Conditions and Uniform Codes

All projects constructed in the SCAB are subject to Standard Conditions and Uniform Codes. Compliance with these provisions is mandatory and as such, does not constitute mitigation under CEQA. Those conditions specific to air quality that would apply to the Project are included below:

- Adherence to SCAQMD Rule 403, which sets requirements for dust control associated with grading and construction activities.
- Adherence to SCAQMD Rules 431.1 and 431.2, which require the use of low sulfur fuel for stationary construction equipment.

During construction, the project would be subject to SCAQMD Rule 403 (fugitive dust). SCAQMD Rule 403 does not require a permit for construction activities, per se, but rather, sets forth general and specific requirements for all construction sites (as well as other fugitive dust sources) in the SCAB. The general requirement prohibits a person from causing or allowing emissions of fugitive dust from construction (or other fugitive dust source) such that the presence of such dust remains visible in the atmosphere beyond the property line of the emissions source. SCAQMD Rule 403 also prohibits a construction site from causing an incremental PM_{10} concentration impact at the property line of more than 50 micrograms per cubic meter as determined through PM_{10} high-volume sampling, but the concentration standard and associated PM_{10} sampling do not apply if specific measures identified in the rule are implemented and appropriately documented.

4.1.3.7 Greenhouse Gas Emissions

In 2005, in recognition of California's vulnerability to the effects of climate change, Governor Schwarzenegger established Executive Order S-3-05, which sets forth a series of target dates by which statewide emission of greenhouse gas would be progressively reduced, as follows:

- By 2010, reduce greenhouse gas emissions to 2000 levels;
- By 2020, reduce greenhouse gas emissions to 1990 levels; and
- By 2050, reduce greenhouse gas emissions to 80 percent below 1990 levels.

In 2006, California passed the California Global Warming Solutions Act of 2006 (AB 32; California Health and Safety Code Division 25.5, Sections 38500, et seq.), which requires CARB to design and implement emission limits, regulations, and other measures, such that feasible and cost-effective statewide greenhouse gas emissions are reduced to 1990 levels by 2020 (representing an approximate 25 percent reduction in emissions).

Discrete early action measures are measures that will be in place and enforceable by January 1, 2010. The discrete early action items include: (1) a Low Carbon Fuel standards for ethanol, biodiesel, hydrogen, electricity, compressed natural gas, liquefied petroleum gas, and biogas; (2)

restrictions on High Global Warming Potential Refrigerants; (3) Landfill Methane Capture; (4) Smartway Truck Efficiency; (5) Port Electrification; (6) Reduction of perfluorocarbons from the semiconductor industry; (7) Reduction of propellants in consumer products; (8) Tire inflation; and (9) Sulfur Hexafluoride (SF6) reductions from non-electricity sector.

The 2020 target reductions are currently estimated to be 174 million metric tons of carbon dioxide (CO2) equivalent (MMTCO2E). In total, the recommended early actions have the potential to reduce greenhouse gas emissions by at least 42 MMTCO2E emissions by 2020, representing about 25 percent of the estimated reductions needed by 2020. The CARB Board adopted Resolution 07-55 in December 2007, approving 427 MMTCO2E as the statewide greenhouse gas emissions limit for 2020, which is equivalent to the 1990 emissions level. The measures are in the sectors of fuels, transportation, forestry, agriculture, education, energy efficiency, commercial, solid waste, cement, oil and gas, electricity, and fire suppression.

4.2 Geology and Topography

This discussion of the existing topographic and geologic features of the Project area was based on the Geotechnical Report prepared by the Geotechnical Branch of the USACE (USACE 2005b) and the Coastal Engineering Appendix to the San Clemente Shoreline Feasibility Study (USACE 2009, Appendix D). Those reports contain a summary of geologic conditions in the Project area as well as the results of sediment testing performed by the USACE in 1993 and 2003 and SANDAG in 1999.

The shoreline in the Project area consists mainly of narrow, gently to moderately sloping sandy beaches backed by high, coastal bluffs. This sandy beach grades into a foreshore consisting of cobble and gravel pockets at the water’s edge. At Mariposa Point, located some 980 feet (300 meters) northwest of the San Clemente Pier, offshore rocks, and boulders protrude from the high intertidal sand beach and become the dominant habitat type throughout the mid and low intertidal zones. The extensive rocky intertidal habitat at Mariposa Point consists of a series of low-lying shale reef platforms that begin mid-beach and extend into the subtidal zone along with individual high relief boulders.

4.2.1 Offshore

The area offshore of San Clemente is a part of the Capistrano Bight, located at the eastern edge of the Gulf of Santa Catalina. This area is described as that part of the California coast known as the “Continental Borderland”, as there is no real continental shelf in this part of the coast. The area from Dana Point Harbor in Orange County downcoast to La Jolla in San Diego County is further defined as the “Oceanside Littoral Cell”. San Clemente Beach is located in the extreme upper portion of this Littoral Cell. Published information for the bedrock exposures of most of the offshore area, exclusive of San Clemente Beach and the Channel Islands, is sparse and is based upon scattered bottom samples and reconnaissance type geophysical investigations. Local lifeguards and divers have informally stated that the ocean floor area offshore contained only bedrock and there were no deposits of beach sand.

In May 2002, bathymetric surveys, seismic surveys, sub-bottom profiling, and a side scan sonar survey were conducted offshore of San Clemente Beach to determine the presence or absence of shallow bedrock. The bathymetric survey indicates that the ocean bottom slopes gradually seawards from an elevation 0 Mean Lower Low Water (MLLW) at the shoreline to an elevation deeper than -100 ft (-32.8 m) MLLW at a distance of about 0.9 mi (1,500 m) from shore. The seafloor slope direction is southwest - normal to the beach. The seafloor gradient averages 0.9 percent (slope 110H:1V) but varies locally. The inshore gradient between 10 to 20 ft (3 to 6 m) is 5 percent off San Clemente Beach and decreases farther to the northwest.

The geophysical surveys further indicated that the ocean floor is a bedrock surface covered with a thin veneer of littoral sediments that vary in thickness from about 0 to about 1 ft (0.32 m) or more, out to a distance of 4,950 ft (1,500 m) from the shoreline. This surficial sediment cover likely changes seasonally as beach sands migrate cross-shore.

Several bedrock spurs extend out from shore; the largest one is the seaward extension of the San Mateo Point. These spurs may rise several meters above the intervening swales. The San Mateo Rocks northwest of San Mateo Point are isolated and may be remnant spurs. Bedrock outcrops the seafloor in places between the shore and about the 50 ft (15 m) isobath. Where outcrops occur, the seafloor is uneven from the resistant bedrock mounds. Some of the larger outcrops rise as much as 20 ft (6 m) above the surrounding seabed. The topography seaward of the outcrops is a smooth seafloor with an even slope. The smooth texture is the result of unconsolidated recent sediment deposition.

The proposed borrow area for the beach replenishment is located approximately 21 mi (35 km) downcoast of San Clemente Beach, approximately 1 mi (1.7 km) north of Oceanside Harbor, Oceanside, California. The borrow site is sand bottom, although some artificial reefs have been identified in the vicinity (SANDAG 2000).

4.2.2 Onshore

The San Clemente area comprises a part of the western flank of the Peninsular Ranges Geologic Province of southern California and includes areas of the western foothills of the Santa Ana Mountains and the southeastern flank of the San Joaquin Hills. The Peninsular Ranges extend from the Palos Verdes Peninsula in the north to the tip of Baja California in the south. The bedrock exposures in the area are comprised of marine sedimentary and volcanic rocks of Miocene, Pliocene and Pleistocene ages. The bedrock formations both onshore and offshore consist of the San Mateo Formation, an arkosic sandstone of Pleistocene age; the Capistrano Formation, a series of silty shales, mudstones, siltstones, and coarse sandstones of late Miocene and early Pliocene age; and the San Onofre Breccia, which is a series of volcanic breccias, ash flows, and tuffs derived from large landslides during volcanic eruptions, interbeded with layers of fine-grained volcanic ash deposited into fresh or salt water and is of Miocene age.

On the San Clemente Beach marine erosion has formed a broad wave-cut terrace, which extends back from the coastline and lies several meters above sea level. This relatively flat-lying surface is cut mainly in rocks of the Capistrano Formation of late Miocene and early Pliocene age and is mantled with poorly consolidated non-marine alluvial cover of Holocene and Pleistocene age and marine terrace deposits of Upper Pleistocene age. The non-marine cover consists of poorly bedded fine-grained sediments. The marine terrace deposits consist of poorly consolidated sands, sandstones, and conglomerates. The beach, which begins at the foot of the wave-cut terrace, is composed of fine to medium-grained sands and silty sands. Because of various seasonal cycles of sand deposition and erosion and the lack of adequate natural beach re-nourishment, the beach varies in width from 0 to 200 ft (0 to 60 m). Within the Project area the beach width meanders from 0 ft wide to 76 ft (23 m) to 0 ft to 129 ft (39 m) and back to 0 ft along the reach.

4.2.3 Geologic Hazards

4.2.3.1 Landslides

Several landslides have been mapped in the hills and mountains that form the eastern boundary of San Clemente Beach. These are shown on an accompanying geologic map “Natural Slope Stability as Related to Geology, San Clemente Area, Orange and San Diego Counties, California, Special Report 98” published by the California Division of Mines and Geology. The geologic map indicates that there are seven small areas of the bluff behind the beach, extending from the San Clemente Pier to San Mateo Point, which contain landslide deposits. None of these slides extend all of the way onto the beach, so they are not a potential problem for beach nourishment. Neither the literature search nor the offshore seismic and side-scan sonar surveys indicate any landslides offshore of the beach.

4.2.3.2 Seismicity

All of southern California including the San Clemente area is seismically active. There are several major northwest-southeast trending faults in both the onshore and the offshore areas east and west of San Clemente. The Whittier-Elsinore, Agua Caliente, San Jacinto, and the San Andreas Fault zones are located approximately 20 mi (32 km), 27 mi (43 km), 40 mi (64 km), and 62 mi (100 km) northeast of San Clemente, respectively. The Newport-Inglewood–Rose Canyon Fault lies approximately 5 mi (8 km) offshore of the beach. The Palos Verdes Fault zone parallels the Pacific Coast offshore from the San Pedro – Long Beach area to La Jolla, and lies about 18 mi (29 km) from the coastline. The San Clemente Island Fault zone lies approximately 55 mi (88 km) offshore and is parallel to the Newport-Inglewood-Rose Canyon Fault zone. These three faults trend parallel to the onshore faults. The Christianitos Fault, which is the closest fault to the Project area, trends northwest-southeast, and passes through the mountain ranges behind the San Clemente area and trends down San Mateo Creek and goes offshore to parallel the coastline near San Onofre in a southerly direction past Oceanside. The fault is located approximately 1 to 5 mi (2-8 km) offshore of San Clemente Beach. This well-studied fault is considered to be inactive. This information is based on the absence of displacement of the boulder layer just above the platform and also the lack of displacement of the 90 ft (27 m) of overlying dark-brown alluvial deposits above.

4.2.3.3 Soils

According to data published by U.S. Department of Agriculture, Soil Survey, the shoreline south of Dana Point through San Clemente is indicated as Beaches (115) with the exception of the area between Dana Point and Dana Cove (within Dana Point Harbor). That area is listed as Cieneba sandy loam (142), 30 to 75 percent slope, eroded. Adjacent soils, from at or near Paso De Cristobal southward to San Mateo Point, are composed of Myford Sandy Loam (177), 9 to 30 percent slopes, eroded.

From Paseo De Cristobal northward near San Clemente Pier, adjacent soils are Xerorthents loamy (220), cut and fill areas, 15 to 30 percent slopes. North of San Clemente Pier adjacent soils near the outfall of Segunda Deshecha (creek) are Calleguas Clay loam (134), in the Northernmost portion, 50 to 75 percent slopes, eroded, and Sorrento clay loam (209), 2 to 9 percent slopes, to the south of Calleguas Clay loam, and Aloe clay (101), 15 to 30 percent slopes south of Sorrento clay loam.

A small area near Poche, located near a trailer park, consists of Riverwash (191), with Cropley clay (149), 2 to 9 percent slopes, on each side. Capistrano Beach southward to Poche is listed as Cieneba sandy loam (142), 30 to 75 percent slopes, eroded. Near San Juan Capistrano, San Juan Creek and Trabuco Creek converge with their combined outfall at Doheny State Beach (Capistrano Beach). These soils are depicted as Riverwash (191) and Metz loamy sand (163) on both sides of the outfall.

4.3 Water Quality, Sediments, and Oceanography

Water quality is affected by a variety of factors including oceanographic processes, climatic conditions, atmospheric fallout, river runoff, municipal wastewater outfalls, minor industrial outfalls, non-point source runoff, and vessel discharges. Currents, waves, and seasonal variations, as well as episodic events, such as El Niño Southern Oscillation (ENSO) conditions, are the main factors that affect fluctuations from surface to bottom waters.

Rivers and streams discharge and transport freshwater, suspended sediments (turbidity), nutrients, debris, and contaminants from agricultural and urban runoff to nearshore waters. Ocean wastewater outfalls discharge treated sewage effluent, which introduces suspended solids and pollutants to the marine environment. Storm drains with coastal outlets introduce non-point source inputs of pollutants and debris to the ocean.

The mouths of two streams are within 3 mi (5 km) of the beach placement area: the mouth of Prima Deshecha Cañada Creek, which is approximately 2 mi (3.2 km) northwest of the study area boundary and discharges to the ocean at Poche Beach, and Segunda Deshecha Cañada Creek, which is approximately 1.5 mi (2.4 km) northwest of the study area boundary and discharges to the ocean at North Beach. Several storm drain outlets are also within the study area. Two major rivers enter the ocean near the Oceanside borrow site. These are the Santa Margarita River and the San Luis Rey River. In addition, the City of Oceanside's Ocean outfall discharges an average of about 17.5 million gallons per day of treated sewage through a 250 foot (75 m) long diffuser section at a depth of approximately 100 feet (30 m).

Several water quality-monitoring programs have study locations within the study area and in the watersheds which drain into the study area in order to compare conditions of the waters to the water quality objectives set forth by the California Ocean Plan (SWRCB 2005) and requirements of other regulations. The objectives established in the California Ocean Plan to protect marine aquatic life are given in Table 4-5. The objectives represent thresholds below which beneficial uses of waters will be unimpaired. Relevant baseline physical and chemical characteristics of waters within the study area are described in Section 4.3.1, bacterial characteristics are described in Section 4.3.2, and sediments are described in Section 4.3.3.

A CWA 404(b)(1) analysis that is complete and is provided in Appendix A in accordance with Section 404(b)(1) of the Federal Water Pollution Control Act Amendments of 1972 (Public Law 92-500) as amended by the Clean Water Act of 1977 (Public Law 95-217). The intent of the analysis is to state and evaluate information regarding the effects of the discharge of dredged or fill material into waters of the United States. The document discusses the effects of the dredging, the initial sand placement and future renourishment actions. Appropriate and practicable steps taken to minimize potential adverse impacts of the discharge on the aquatic ecosystem are discussed as avoidance, minimization, and compensation measures. To satisfy requirements of the Federal CWA, USACE will submit this Final EIS/EIR and appropriate technical documentation to the San Diego RWQCB, which is delegated with implementing the CWA within the region, for their review for CWA Section 401 certification, pursuant to 33 CFR 336.1(a)(1). Upon review of the submittal, the RWQCB would evaluate if issuance of a Section 401-water quality certification is appropriate. USACE will continue to coordinate with the RWQCB throughout the remaining study, design and construction phases of this project. USACE has determined that full compliance with CWA Section 404 is met and thus may invoke, if needed, CWA 404(r), once the project is authorized by Congress.

Table 4-5 California Ocean Plan Water Quality Objectives

A. Bacterial Characteristics
   1. Water-Contact Standards
      Within a zone bounded by the shoreline and a distance of 1,000 feet (305 meters) from the shoreline or the 30-foot (9 meter) depth contour, whichever is further from the shoreline and in areas outside this zone used for water contact sports, as determined by the Regional Board, but including all kelp beds, the following bacterial objectives shall be maintained throughout the water column:
      30-day Geometric Mean - the following standards are based on the geometric mean of the five most recent samples from each site:
         Total coliform density shall not exceed 1,000 per 100ml;
         Fecal coliform density shall not exceed 200 per 100 ml; and
         Enterococcus density shall not exceed 35 per 100 ml.
      Single Sample Maximum:
         Total coliform density shall not exceed 10,000 per 100 ml;
         Fecal coliform density shall not exceed 400 per 100 ml;
         Enterococcus density shall not exceed 104 per 100 ml; and
         Total coliform density shall not exceed 1000 per 100 ml when the fecal coliform/total coliform ratio exceeds 0.1
      The "Initial Dilution Zone" of wastewater outfalls shall be excluded from designation as "kelp beds" for purposes of bacterial standards and Regional Boards should recommend extension of such exclusion zone where warranted to the State Board (for consideration under Chapter III.H.) Adventitious assemblages of kelp plants on waste discharge structures (e.g., outfall pipes and diffusers) do not constitute kelp beds for purposed of bacterial standards.
   2. Shellfish Harvesting Standards
      At all areas where shellfish may be harvested for human consumption, as determined by the Regional Board, the following bacterial objectives shall be maintained throughout the water column:
      The median total coliform density shall not exceed 70 per 100 ml and not more than 10 percent of the samples shall exceed 230 per 100 ml.

B. Bacterial Assessment and Remedial Action Requirements
   Describes guidelines for monitoring enterococcus bacteria. (See Plan for full description).

C. Physical Characteristics
   1. Floating particulates and grease and oil shall not be visible.
   2. The discharge of the waste shall not cause aesthetically undesirable discoloration of the ocean surface.
   3. Natural light shall not be significantly reduced at any point outside the initial dilution zone as a result of the discharge of waste.
   4. The rate of deposition of inert solids and the characteristics of inert solids in ocean sediments shall not be changed such that benthic communities are degraded.

D. Chemical Characteristics
   1. The dissolved oxygen concentration shall not at any time be depressed more than 10 percent from which occurs naturally, as a result of the discharge of oxygen demanding waste materials.
   2. The pH shall not be changed at any time more than 0.2 units from that which occurs naturally.
   3. The dissolved sulfide concentration of waters in and near sediments shall not be significantly increased above that present under natural conditions.
   4. The concentration of substances set forth in Chapter Ii, Table B in marine sediments shall not be increased to levels which would degrade indigenous biota.
   5. The concentration of organic materials in marine sediments shall not be increased to levels which would degrade marine life.
   6. Nutrient materials shall not cause objectionable aquatic growths or degrade indigenous biota.

E. Biological Characteristics
   1. Marine communities, including vertebrate, invertebrate and plant species, shall not be degraded.
   2. The natural taste, odor and color of fish, shellfish, or other marine resources used for human consumption shall not be altered.
   3. The concentration of organic materials in fish, shellfish or other marine resources used for human consumption shall not be bioaccumulated to levels that are harmful to human health.

F. Radioactivity
   1. Discharge of radioactive waste shall not degrade marine life.

4.3.1 Water Column Physical and Chemical Characteristics

4.3.1.1 Temperature

Offshore waters, such as those at the borrow site, typically are stratified (development of thermocline/pycnocline) during the summer and fall, unstratified during the winter, and transitional (e.g., stratification weakening or increasing) in late fall and spring. Thermoclines represent barriers to mixing between surface and bottom waters. Water temperatures in the study area range from 57.2 to 67.1 ºF (14.0 to 19.5 degrees Celsius [ºC]) near the surface (USACE 2004). During summer, surface waters are up to 50 ºF (10 ºC) warmer than in deeper water. Shallow nearshore waters are generally unstratified year round due to turbulent mixing and shallower depths.

4.3.1.2 Salinity

Salinity levels range from 22 to 34 parts per thousand (ppt) within the study area (USACE 2004). Nearshore ocean salinity is generally uniform, from approximately 33 to 34 ppt. Seasonally, the near-surface salinity can decrease near the Prima Deshecha and Segunda Deshecha watersheds following storm-related discharges of freshwater and/or (historically) intermittent discharges of sewage into the river.

4.3.1.3 Dissolved Oxygen

Dissolved oxygen values range from 6.5 to 10 milligrams per liter (mg/L) (USACE 2004). Natural deviations of dissolved oxygen result from a combination of factors, including intrusions of water masses, primary production (phytoplankton blooms), and upwelling/down welling events. Concentrations of dissolved oxygen in surface and nearshore waters generally are high due to mixing at the water/atmosphere interface and continuous wave action.

4.3.1.4 pH

Values for pH range from 7.4 to 7.6 within the study area (USACE 2004). Slightly higher pH levels occur during May through September when water temperatures are warmer (SANDAG 2000).

4.3.1.5 Suspended Particulate Matter (Turbidity) and Light Transmission

Light penetration in seawater is the limiting factor associated with photosynthetic growth of phytoplankton, kelp, and other marine plants. Waters tend to be more turbid in the winter due to greater wave energy, surface runoff, and river discharges. Runoff related discharges and associated natural turbidity occur in pulses rather than as continual discharges (Continental Shelf Associates 1984). Other seasonal reductions in water clarity may occur in spring and summer due to plankton and suspended particles concentrating near the thermocline. Phytoplankton blooms (e.g., red tides) may reduce light transmittance (transmissivity) levels in summer months.

Water clarity is measured using a variety of methods, including percent light transmittance, suspended solids concentration, and the nephelometric method, which measures and compares light scattered by a water sample and light scattered by a reference solution. In general, light transmittance tends to increase and suspended solid concentrations decrease with distance from shore. Transmissivity levels typically range from 40 to 90 percent offshore (MEC 1997).

Similar to transmissivity values, total suspended solids (i.e., particulate) concentrations are lower offshore than nearshore. Highest concentrations generally are recorded after storm events or occasionally in the summer, probably due to phytoplankton blooms (MEC 1997).

Nearshore measurements ranging from less than 1 to 11 Nephelometric Turbidity Units (NTU) represent typical background values; however, values of 50 to 187 NTU also have been reported at locations in northern San Diego County (USACE 2005a). These naturally occurring elevations in turbidity were related to high waves and/or storms.

4.3.1.6 Nutrients

Nutrient concentrations for nearshore waters typically are higher near the bottom than near the surface, except during upwelling periods. Nearshore nutrient concentrations may be elevated in areas of wastewater discharge and near the outlet of rivers, lagoons, bays, and harbors.

Typical nutrient concentrations in nearshore waters of the Southern California Bight (SCB) are nitrates at approximately 5 to 200 nanomoles per liter; phosphates at approximately 100 to 500 nanomoles per liter; and ammonium at approximately 300 nanomoles per liter (Eganhouse and Venktesan 1993). Discharges from Prima Deshecha Cañada Creek and Segunda Deshecha Cañada Creek likely represent an important seasonal source of nutrients to nearshore waters off San Clemente. Upwelling events also contribute nutrients to surface waters.

4.3.2 Bacterial Characteristics

Several storm drains have outlets onto beaches within the study area and its vicinity. The City of San Clemente and the County of Orange have been required to monitor bacterial levels at storm drain outlets and in the adjacent surf zone since January 2003 as part of the Coastal Storm Drain Outfall Monitoring (CSDM) Program (County of Orange et al. 2003). For the CSDM Program, monitoring was conducted on both the discharge from the storm drain and the surf zone 25 yards (23 meters) up-coast and 25 yards (23 meters) down-coast of the storm drain to ocean interface. Grab samples were collected weekly for the analysis of total coliform, fecal coliform, and Enterococcus bacteria. An estimate of the flow rate from the storm drain was made and the temperatures of the storm drain discharge and the surf zone down-coast were measured (County of Orange et al. 2006).

During the monitoring period of July 2005 through June 2006, bacteria levels at nine out of ten monitoring stations within the study area or within two miles of its boundaries met California Ocean Plan standards in 90 percent or more results. The tenth monitoring station, located at Poche Beach approximately two miles north of the study area, exceeded Ocean Plan standards in

10-40 percent of results during the monitoring period (County of Orange et al. 2006). Poche Beach is at the outlet of the Prima Deshecha Flood Control Channel.

4.3.3 Sediments

The primary natural sand supply for the beaches on the Pacific Coast is provided by the rivers and streams which transport the sediment to the coast during the winter and spring storms. Eroding sea cliffs and bluffs provide a secondary source of sediment. The waves and currents distribute the sand as it arrives at the coast. The adjacent beaches are replenished as the flow of sand moves alongshore. The predominate direction of the sand movement along southern California beaches is north to south, notwithstanding seasonal local variations. Generally the best places to find suitable beach sand for replenishment are at the deltas of the various streams that empty into the ocean. There are no such streams in the vicinity of San Clemente except for the mouth of San Juan Creek, which empties into the ocean at Capistrano Beach, south of Dana Point and north of San Clemente. Prior exploration by others has indicated that the sediments at this location are too fine-grained and are unsuitable for beach replenishment. Accordingly, in January 2003, a vibracore exploration was first conducted about 1 mi (1.6 km) offshore of San Clemente Beach for a distance of about 6.2 mi (10 km) parallel to the coastline to determine if suitable sand was present. The results were negative; on the second day of the exploration, the vibracore was moved offshore near the mouth of the Santa Margarita River, a few miles northwest of Oceanside Harbor.

The sediments in the Project area are described as silty sands and sandy silts, as determined by both the geophysical surveys conducted in Summer 2002 and core samples derived from six vibracore test holes conducted in January 2003. The vibracore holes were placed and sampled at random locations offshore of the City of San Clemente from the vicinity of the San Clemente Pier downcoast to San Mateo Point (i.e., the Orange County-San Diego County Line). The test holes were placed at least one mile offshore in order to avoid the shallow bedrock encountered by the seismic survey. The elevations of the mudline at the holes varied from -54 ft (-17.7 m) MLLW to -62.2 ft (-20.4 m) MLLW, which is the limit of the most economical dredging operations. The exploration indicated that at 1 mi (1.73 km) seawards of the beach, the bedrock is still fairly shallow and was encountered between 5.1 ft (1.6 m) to 12.2 ft (3.7 m) below the mud line. The sediments encountered overlying the bedrock were silts and fine-grained sands, visually deemed unsuitable for beach replenishment. The exploration program was moved to Oceanside near the mouth of the Santa Margarita River, where previous reconnaissance exploration had indicated suitable material.

In August 2003, 26 additional test holes were sampled with a vibracore for a beach replenishment study at the Oceanside Beach site. The purpose of the study was to determine if there was enough suitable sand for a beach replenishment program at both San Clemente and Oceanside. The depth of the holes varied from 9.5 ft (2.9 m) to 20 ft (6.1 m), and averaged 13.7 ft (4.2 m). The mudline elevations of the holes varied from -36.4 ft (-11.1 m) to -57.1 ft (-17.4 m) MLLW. These holes were explored and sampled in the same proposed borrow area, but were placed to fill in the gaps between prior holes and obtain more information about certain reaches of the area in more detail.

In 1999, SANDAG explored and sampled 35 vibracore holes in this same proposed borrow area. From these sites, two offshore beach compatible sites were chosen: site SO-9, located north of Oceanside Harbor, and site SO-8, located south of Oceanside Harbor.

Site SO-8 contained 12 of the vibracore holes. These vibracore holes varied in depth from 3.6 to 17.1 ft (1.1 to 5.2 m). The mudline elevations of the holes varied from -53.5 to -70 ft (-16.3 to -21.3 m) MLLW. The site identified 4.7 million cubic yards (3.6 million cubic meters) of fine-grained, somewhat silty sand which is suitable for beach nourishment purposes. This sand is located beneath 4 to13 ft (1.2 to 4.0 m) of unsuitable sandy silt and silty sand.

Site SO-9 contained 23 vibracore holes. These vibracore holes varied in depth from 4.0 to 17.3 ft (1.2 to 5.3 m). The mudline elevations of the holes varied from -48 to -59 ft (-14.6 to -18.0 m) MLLW. The site identified 0.9 million cubic yards (0.7 million cubic meters) of suitable fine- to medium-grained sand near shore 3 to 13 ft (0.9 to 4.0 m) thick. At the SO-9 borrow site, three layers of sediments were found (SANDAG 2000). The top (surficial) layer consists of sandy silt. The grain-size analyses showed this surficial layer to be approximately 0 to 2 ft (0.6 m) deep over the dredge site, and unsuitable for beach nourishment material. Beneath the surficial silt is a layer of fine- to medium grained sand that is suitable for beach replenishment. This sand layer is 2 to 13 ft (0.6 to 3.9 m) thick, and is exposed on the seafloor surface along the central region of the site. SANDAG later removed some of the material in water deeper than 50 ft (16.4 m) and placed the material on various portions of the beach in Oceanside and vicinity.

As part of the contract for the January 2003 program, Group Delta, a Geotechnical Engineering Consultant, produced a report of project activities and results therein, entitled “Vibracore Exploration Program, San Clemente Beach Shoreline, Orange and San Diego Counties, California” (Group Delta 2003) for the Geotechnical Branch of the Los Angeles District.

4.3.3.1 San Clemente (Borrow Area #1)

Sampled materials encountered with Borrow Site #1 were generally greenish-gray silty, very-fine grained sands and sandy silts with minor amounts of shell fragments. A soft, micaceous wackestone bedrock was encountered in possibly four of the holes, causing refusal of the vibracore. These materials appeared to be too fine grained for beach nourishment purposes. Samples for chemical analysis were not taken, as the recovered sediments were too fine to be placed onto the beach.

Physical tests were performed on eight selected samples from this borrow area. Group Delta reported that the samples show an average of 0.9 percent gravel, 51.5 percent sand and 47.6 percent fines passing the #200 sieve. The percent fines ranged from 21 percent to 67 percent. These values show that the sampled area off of San Clemente Beach does not contain suitable compatible beach replenishment material.

4.3.3.2 Oceanside (Borrow Area #2)

The sampled materials were generally fine-grained sands with local silty intervals and minor amounts of shell fragments. Significant laterally discontinuous gravel/cobble beds and lenses were encountered throughout the area, but the thicknesses generally averaged 2 ft (0.65 m) or less. Often the gravel intervals possessed supporting dense, silty sand material, which acted as a “pavement” holding the cobbles tightly, making the core penetration difficult. Shell and shell fragments were encountered throughout the area.

Physical tests were performed on 91 samples from this borrow area. The samples showed an average of 12.3 percent gravel, 81.4 percent sand and 6.3 percent fines passing the #200 sieve. A total of 25 out of the 27 test holes within the Oceanside site are beach-compatible, with the total fines of 12 percent or less.

4.3.3.3 Sediment Quality

Chemical testing of the proposed borrow area offshore Oceanside has been done by the San Diego Association of Governments (SANDAG 2000) and the USACE (1993). The analytical results are summarized and compared to the Sediment Quality Guidelines (SQGs) in Table 4-6. The Sediment Quality Guidelines (SQGs) are based on Puget Sound Dredged Disposal Analysis (PSSDA) and NOAA guidelines. The PSSDA screening level (SL) identifies the concentration below which sediment is expected to have no unacceptable adverse effects. The higher value is the maximum level (ML) above which effects are likely. The NOAA published effects-based sediment quality values for evaluating the potential for constituents in sediment to cause adverse biological effects are referred to as Effects Range-Low (ER-L) and Effects Range-Median (ER-M). Sediment samples in which all chemical concentrations are below ER-L values are not expected to be toxic. Generally, effects may occasionally be expected when chemical concentrations occur between ER-L and ER-M values. The probability of toxicity is expected to increase with the number and level of exceedances above the ER-M. These values are not accepted standards or criteria, but rather provide effects-based guidelines. Since SQGs have not been developed for southern California, these are used as an initial, informal evaluation to determine the need for further Tier II or Tier III testing.

Table 4-6 San Clemente Shoreline Project – Borrow Area #2 Sediment Composite Sample: Chemical Results

	Analytical Method (1)	Method Reporting Limit / Detection Limit	Units (2)	Sediment Quality Guidelines (SQGs) ERL (Long et al., 1999)	ERM	SL (PSDDA, 1998)	ML	USACE 2003		SANDAG 2000
PHYSICAL CONVENTIONALS										
Total Solids (dry weight)	EPA 160.3	0.1	%					75.1	75.2	
Total Volatile Solids	SM 2540-E	0.1	%					0.62	0.6	
pH	EPA 150.1	0.1	pH units					8.31	8.3	
Ammonia-N	SM 4500-NH3 F	0.01	mg/L					.63	0.6	
Total Organic Carbon (dry weight)	Plumb, 1981 EPA 415.1	0.01	%					0.15	0.09	0.08%
Dissolved Sulfides	SM 4500-S2 D	0.002	mg/L					ND	ND	
Oil and Grease	EPA 1664	0.1	mg/L					ND	ND	
TPH-Diesel	EPA 8015m	0.25	mg/kg					ND	ND	
TPH-Motor Oil	EPA 8015m	0.25	mg/kg					ND	ND	
TRPH	EPA 415.1	0.1	mg/kg					ND	ND	
METALS										
Aluminum (Al)	EPA 6020	1	mg/kg					5840	5960	
Antimony (Sb)	EPA 6020	0.05	mg/kg			15	200	0.1	0.1	
Arsenic (As)	EPA 6020	0.05	mg/kg	8.2	70	57	700	1.43	1.37	1.2
Barium (Ba)	EPA 6020	0.05	mg/kg					33.7	32.5	
Beryllium (Be)	EPA 6020	0.01	mg/kg					0.11	0.12	
Cadmium (Cd)	EPA 6020	0.01	mg/kg	1.2	9.6	5.1	14	0.03	0.02	<0.1
Chromium (Cr)	EPA 6020	0.05	mg/kg	81	370			9.11	10.4	6.2
Cobalt (Co)	EPA 6020	0.01	mg/kg					1.6	1.59	
Copper (Cu)	EPA 6020	0.01	mg/kg	34	270	390	1,300	2.53	2.52	3.0
Iron (Fe)	EPA 6020	1	mg/kg					6580	6470	
Lead (Pb)	EPA 6020	0.01	mg/kg	46.7	218	450	1,200	0.86	0.89	0.9
Manganese (Mn)	EPA 6020	0.05	mg/kg					90.2	94.6	
Mercury (Hg)	EPA 6020	0.005	mg/kg	0.15	0.71	0.41	2.3	0.03	0.03	<0.03
Molybdenum (Mo)	EPA 6020	0.05	mg/kg					0.41	0.55	
Nickel (Ni)	EPA 6020	0.01	mg/kg	20.9	51.6	140	370	3.69	4.25	2.5
Selenium (Se)	EPA 6020	0.05	mg/kg					0.25	0.26	<0.1
Silver (Ag)	EPA 6020	0.01	mg/kg	1	3.7	6.1	8.4	0.02	0.01	<0.1
Strontium (Sr)	EPA 6020	0.05	mg/kg					25.1	24.6	
Thallium (Tl)	EPA 6020	0.01	mg/kg					0.08	0.08	
Tin (Sn)	EPA 6020	0.05	mg/kg					0.5	0.57	
Titanium (Ti)	EPA 6020	0.05	mg/kg					755	791	
Vanadium (VO	EPA 6020	0.05	mg/kg					19.7	19.6	
Zinc (Zn)	EPA 6020	0.05	mg/kg	150	410	410	3,800	13.6	13.2	14.2
ORGANICS										
PESTICIDES										
Total Chlorinated Pesticides (4)			ug/kg	5.22	62	56.9	69.0			ND
Aldrin	EPA 8270	1	ug/kg			10		ND	ND	
alpha BHC	EPA 8270	1	ug/kg					ND	ND	

	Analytical Method (1)	Method Reporting Limit / Detection Limit	Units (2)	Sediment Quality Guidelines (SQGs) ERL (Long et al., 1999)	ERM	SL (PSDDA, 1998)	ML	USACE 2003		SANDAG 2000
alpha-Chlordane	EPA 8270	1	ug/kg			10		ND	ND	
beta-BHC	EPA 8270	1	ug/kg					ND	ND	
delta-BHC	EPA 8270	1	ug/kg					ND	ND	
Dieldrin	EPA 8270	1	ug/kg	0.02	8.0	10		ND	ND	
Endosulfan I	EPA 8270	1	ug/kg					ND	ND	
Endosulfan II	EPA 8270	1	ug/kg					ND	ND	
Endosulfan Sulfate	EPA 8270	1	ug/kg					ND	ND	
Endrin	EPA 8270	1	ug/kg					ND	ND	
Endrin Aldelhyde	EPA 8270		ug/kg					ND	ND	
gamma-BHC Lindane	EPA 8270	1	ug/kg			10		ND	ND	
gamma-Chlordane	EPA 8270	1	ug/kg					ND	ND	
Heptachlor	EPA 8270	1	ug/kg			10		ND	ND	
Heptachlor Epoxide	EPA 8270	1	ug/kg					ND	ND	
Methoxychlor	EPA 8270	1	ug/kg					ND	ND	
Mirex	EPA 8270	1	ug/kg					ND	ND	
Toxaphene	EPA 8270	10	ug/kg					ND	ND	
Trans-Nonachlor	EPA 8270	1	ug/kg					ND	ND	
Total DDT (5)	EPA 8270	0	ug/kg	1.58	46.1	6.9	69.0	0	0	
2,4'-DDD	EPA 8270	1	ug/kg					ND	ND	
2,4'-DDD	EPA 8270	1	ug/kg					ND	ND	
2,4'-DDD	EPA 8270	1	ug/kg					ND	ND	
4,4'-DDD	EPA 8270	1	ug/kg	1.0	7.0			ND	ND	
4,4'-DDE	EPA 8270	1	ug/kg	2.2	27			ND	ND	
4,4'-DDT	EPA 8270	1	ug/kg	2.0	20			ND	ND	
ORGANOTINS										
Total Organotins(4)	Krone, et al. 1989	1	ug/kg					0	0	
Monobutyltin	Krone, et al. 1989	1	ug/kg					ND	ND	
Dibutyltin	Krone, et al. 1989	1	ug/kg					ND	ND	
Tributyltin	Krone, et al. 1989	1	ug/kg					ND	ND	
Tetrabutyltin	Krone, et al. 1989	1	ug/kg			0.15(7)		ND	ND	
PHTHALATES										
Total phthalates(4)			ug/kg			23,170		8.4	8.8	
Bis (2-ethylhexyl) phthalate	EPA 8270	5	ug/kg			8,300		8.4	8.8	
Butyl benzyl phthalate	EPA 8270	5	ug/kg			970		ND	ND	
Diethyl phthalate	EPA 8270	5	ug/kg			1,200		ND	ND	
Dimethyl phthalate	EPA 8270	5	ug/kg			1,400		ND	ND	
Di-n-butyl phthalate	EPA 8270	5	ug/kg			5,100		ND	ND	
Di-n-butyl phthalate	EPA 8270	5.	ug/kg			6,200		ND	ND	
POLYCHLORINATED BIPHENYLS (PCB)										
Total PCBs(4)			ug/kg	22.	18	130	3,100	0	0	ND
Aroclor 1016	EPA 8270	10	ug/kg					ND	ND	
Aroclor 1221	EPA 8270	10	ug/kg					ND	ND	
Aroclor 1232	EPA 8270	10	ug/kg					ND	ND	
Aroclor 1242	EPA 8270	10	ug/kg					ND	ND	
Aroclor 1248	EPA 8270	10	ug/kg					ND	ND	
Aroclor 1254	EPA 8270	10	ug/kg					ND	ND	

	Analytical Method (1)	Method Reporting Limit / Detection Limit	Units (2)	Sediment Quality Guidelines (SQGs) ERL	ERM	SL	ML	USACE 2003		SANDAG 2000
				(Long et al., 1999)		(PSDDA, 1998)				
Aroclor 1260	EPA 8270	10	ug/kg					ND	ND	
POLYNUCLEAR AROMATICS HYDROCARBONS (PAH)										
Total PAHs(4)			ug/kg	4,02	44,7			0	0	ND
1-Methylnaphthalene	EPA 8270	1	ug/kg					ND	ND	
1-Methyphenanthrene	EPA 8270	1	ug/kg					ND	ND	
2,3,5-Trimethylnaphthalene	EPA 8270	1	ug/kg					ND	ND	
2,6-Dimethylnaphthalene	EPA 8270	1	ug/kg					ND	ND	
2-Methylnaphthalene	EPA 8270	1	ug/kg	70	67	670	1,900	ND	ND	
Acenaphthene	EPA 8270	1	ug/kg	16	50	500	2,000	ND	ND	
Acenaphthylene	EPA 8270	1	ug/kg	44	64	560	1,300	ND	ND	
Anthracene	EPA 8270	1	ug/kg	85.1	1,00	960	13,000	ND	ND	
Benzo(a)anthracene	EPA 8270	1	ug/kg	261	1,60	1,300	5,100	ND	ND	
Benzo(a,e)pyrene	EPA 8270	1	ug/kg	430	1,60	1,600	3,600	ND	ND	
Benzo(b)fluoranthene	EPA 8270	1	ug/kg			1,600	4,950	ND	ND	
Benzo(k)fluranthene	EPA 8270	1	ug/kg			1,600	4,950	ND	ND	
Biphenyl	EPA 8270	1	ug/kg					ND	ND	
Chrysene	EPA 8270	1	ug/kg	384	2,80	1,400	21,000	ND	ND	
Dibenzo(a,h) anthracene	EPA 8270	1	ug/kg	63.4	26	230	1,900	ND	ND	
Fluoranthene	EPA 8270	1	ug/kg	600	5,10	1,700	30,00	ND	ND	
Fluorene	EPA 8270	1	ug/kg	19	54	540	3,600	ND	ND	
Indeno(1,2,3-CD)pyrene	EPA 8270	1	ug/kg			600	4,400	ND	ND	
Naphthalene	EPA 8270	1	ug/kg	160	2,10	2,100	2,400	ND	ND	
Perlene	EPA 8270	1	ug/kg					ND	ND	
Phenanthrene	EPA 8270	1	ug/kg	240	1,50	1,500	21,000	ND	ND	
Pyrene	EPA 8270	1	ug/kg	665	2,60	2,600	16,000	ND	ND	
PHENOLS										
Total Phenols			ug/kg			1582	5777	0	0	ND
2,4,6-Trichlorophenol	EPA 8270	50	ug/kg			29	310	ND	ND	
2,4-Dichlorophenol	EPA 8270	50	ug/kg			29	210	ND	ND	
2,4-Dimethylphenol	EPA 8270	100	ug/kg			29	210	ND	ND	
2,4-Dinitrophenol	EPA 8270	200	ug/kg			29	210	ND	ND	
2-Chlorophenol	EPA 8270	50	ug/kg					ND	ND	
2-Methy-4,6-dinitrophenol	EPA 8270	500	ug/kg					ND	ND	
2-Nitrophenol	EPA 8270	100	ug/kg					ND	ND	
4-Chloro-3-methyphenol	EPA 8270	100	ug/kg					ND	ND	
4-Nitrophenol	EPA 8270	100	ug/kg					ND	ND	
Pentachlorophenol	EPA 8270	50	ug/kg			400	690	ND	ND	
Phenol	EPA 8270	100	ug/kg					ND	ND	

(1) Analytical Method
EPA = United States Environmental Protection Agency
EPA Methods are EPA SW-846, 1994 3rd Edition or EPA 600/4-79-020, March 1983
APHA = American Public Health Association
APHA Method is APHA Standard Methods, 18th Edition, 1992
Plumb = Procedure for Handling and Chemical Analysis of Sediment and Water Samples. Tech. Rep USEPA/CE-81, Russell H. Plumb, Jr. 1981.

(2) Units: mg/kg = milligrams per kilogram, parts per million (dry weight unless otherwise noted)
ug/kg = micrograms per kilogram, parts per billion (dry weight unless otherwise noted)

(3) ND = not detected in this analysis or less than Method Reporting Limit value for the particular compound(s) of interest
(4) Total Chlorinated Pesticides, Total Organotins, Total Phthalates, Total PCBs, Total PAHs, and Total Phenols = sum of named compounds and their derivatives
(5) Total DDT = sum of 4,4'-DDE, 4,4'-DDD; and 4,4'-DDT

The total organic carbon concentration was 0.08 percent in the SANDAG samples and 0.15 percent in the USACE samples. Contaminant concentrations of metals, pesticides, polychlorinated biphenyls (PCBs), polycyclic aromatic hydrocarbons (PAHs), phthalates, and phenols were non-detectible to low and well below all the thresholds in the SQGs for both sample sets. No dichlorodiphenyltrichloroethane (DDT) or chlorinated pesticides were detected in the samples. The bulk chemistry data indicated that chemicals detected within the sediments at the proposed borrow site are at very low levels and do not exceed the SQGs. Therefore, the borrow source sediments appear suitable for placement at the receiving beach.

4.3.4 Oceanographic Characteristics and Coastal Processes

Water levels and wave energy influence the amount and erosive force of water on the beach (USACE 2005b). Oceanographic conditions and the transport of sediment along the shoreline and on the beaches are described in the following subsections. Additional description of oceanographic characteristics is in the Coastal Engineering Appendix (Appendix D).

4.3.4.1 Water Levels

Water levels within the surf zone vary according to four primary factors: (1) astronomical tides, (2) storm surge and wave set-up, (3) climatic variation related to ENSO events, and (4) long-term changes in sea level.

Tides

The tides at San Clemente are mixed, semi-diurnal tides with two unequal high tides and low tides roughly per day. Tidal variations are caused by the passage of two harmonic tidal waves; one with a period of 12.5 hours and one with a period of 25 hours. This causes a difference in height between successive high and low waters. The result is two high waters and two low waters each day, consisting of a higher high water (HHW) and a lower high water (LHW), and a higher low water (HLW) and a lower low water (LLW).

A greater than average range between HHW and LLW occurs when the moon, sun, and earth are aligned with each other to create a large gravitational effect. This spring tide corresponds to the phenomenon of a new or full moon. Neap tides, which occur during the first and third quarters of the moon, have a narrower range between HHW and LLW. In this situation, the moon, sun, and earth are perpendicular to each other, thereby reducing the gravitational effects on water levels.

There is no tidal data available for the immediate San Clemente area, however, the tidal datum elevations at La Jolla, California, are shown in Table 4-7 and are assumed representative of those at San Clemente. The mean tidal range for the Project area is 5.4 ft (1.6 m). The tidal epoch is

1983 to 2001. The La Jolla National Ocean Service (NOS) Primary Tide Station is located approximately 81 km (50 miles) from the San Clemente Pier. In southern California, tides typically have spatial characteristics on the order of hundreds of kilometers. Datum information for an NOS tidal station located at Newport Bay Harbor (station discontinued in 1994) located approximately 30 km (19 miles) from San Clemente indicates MSL and MHHW differences of 0.02 m and 0.03 m respectively. Therefore, the sea level variation between La Jolla and San Clemente is assumed to be negligible.

Table 4-7 Tidal Datum Elevations at La Jolla, CA

Tidal Datum	Elevation ft, (m)
Highest observed water level (11/13/97)	+7.65 (2.33)
Mean Higher High Water (MHHW)	+5.33 (1.62)
Mean High Water (MHW)	+4.60 (1.40)
Mean Sea Level (MSL)	+2.73 (0.83)
Mean Tide Level (MTL)	+2.75 (0.84)
North American Vertical Datum – 1988 (NAVD)	+0.19 (0.06)
Mean Low Water (MLW)	+0.90 (0.28)
Mean Lower Low Water (MLLW)	0.00
Lowest observed water level (12/17/33)	-2.87 (-0.87)
Elevations are referenced to MLLW.	

Storm Surge

Water levels may be higher during storms because of winds and atmospheric pressure. Storm surge is the super-elevation of the tidal level at the coast due to wind stresses and atmospheric pressure fluctuations acting upon the sea surface. Wind and atmospheric fluctuations associated with strong storms in southern California typically produce 1-2 ft (0.3-0.6 m) storm surges (Appendix D). Due to a narrow continental shelf and the absence of tropical storms and/or hurricanes, storm surge heights on the California coast are small compared to those on the east and Gulf coasts, where extreme surge heights of 3-10 ft (1-3 m) are more typical, and a peak 25 ft (8 m) was documented during Hurricane Camille in 1969. West coast storm surges typically have time scales of one to three days, with longer surge episodes possible due to bunching of successive storms.

El Niño Southern Oscillation Event

ENSO events are global-scale climatic variations with a duration lasting for approximately two to seven years. They represent an oscillatory exchange of atmospheric mass as manifested by a decrease in sea surface pressure in the eastern tropical Pacific Ocean, a decrease in the easterly trade winds, and an increase in sea level on the west coast of North and South America (USACE 1986). The interaction between the atmospheric and oceanic environment during these events drives climatic changes that can result in significant modifications of wave climate along the world's coasts.

The severe winter seasons of 1982 to 1983 and 1997 to 1998, which produced some of the most severe storms to ever impact the southern California coast, were the result of the intense ENSO events. The atmospheric disturbance associated with these two events caused abnormally warm water temperatures, a reversal of the westerly trade winds, and an increase in the monthly mean sea levels (MSL) by as much as 0.42 ft (0.13 m) in 1982 to 1983 and 0.52 ft (0.16 m) in 1997 to 1998 at La Jolla, near San Diego (Flick 1998).

Sea Level Rise

Relative sea level rise has Project impacts from two primary considerations: 1) long-term beach erosion, and 2) increased wave run-up and overtopping. Although the exact magnitude of the future sea level rise is unknown, the main contributions will come from both ocean water thermal expansion and the meltwater from continental glaciers and the Antarctic ice sheet. The proportion of each contribution depends largely upon the actual global distribution of the temperature increase, the resulting precipitation amounts, the glacial response and dynamics, the time scale of oceanic mixing, and the stability of the west Antarctic ice sheet (USACE 2005a). The present best estimates regarding sea level rise within southern California vary between 0.1 and 0.2 ft (0.03 to 0.06 m) in a time span of 25 years. Historic trends at San Diego, California, indicate a positive sea level rise of +0.008 ft/yr (+0.00245 m/yr) based on water level measurements during the period 1950-1999 (Appendix D). However, based on the two-dimensional model of the Bruun Rule, the long term shoreline change at San Clemente due to sea level rise is estimated at 0.32 ft/yr (0.10 m/yr).

4.3.4.2 Waves

Perhaps more than any other oceanographic factors, waves determine the fate of sediment movement and the associated impacts to the coastal environment. Essentially, waves are the driving force in generating the alongshore currents that are responsible for moving sand, suspended by wave action, along the coast (USACE 2005a). In shallow water, the circular motion within the water column can induce the resuspension and transport of bottom sediments.

Waves, especially in association with high tides, can damage coastal structures. Wave height and high-velocity swell tend to be most prominent during winter and spring due to storms from the North Pacific. The greater the wave energy, the more rip currents develop, causing elevated turbidity in nearshore water.

Wave Patterns

Wind waves and swell within the study area are produced by six basic meteorological weather patterns. These include extratropical storm swells in the northern hemisphere (north or northwest swell), wind swells generated by northwest winds in the outer coastal waters (wind swell), westerly (west sea) and southeasterly (southeast sea) local seas, tropical storm swells and hurricanes off the Mexican coast, and southerly swells originating in the southern hemisphere (southerly swell).

The Channel Islands archipelago (San Miguel, Santa Rosa, Santa Cruz, Anacapa, Santa Catalina, San Nicolas, and San Clemente) provide some sheltering to the coastal region depending on the swell approach direction. The swell window, which is open to the severe extratropical storms of the northern hemisphere, extends from approximately 277 degrees to 284 degrees. The exposure zone open to the southern swell and tropical storm swell extends from approximately 257 degrees to 190 degrees. The San Clemente coast is open to northwest wind swell and local seas from the west and southeast. The basic weather patterns in the study area are described below.

Extratropical Cyclone of the Northern Hemisphere (North or Northwest Swell)

This weather system represents the category of the most severe waves reaching the California coast. Northern hemisphere swell waves are usually produced by specific, remote meteorological disturbances, including Aleutian storms, subtropical storms north of Hawaii, tropical hurricanes, and strong winds in the eastern North Pacific. Deepwater wave heights rarely exceed 10 ft (3 m), with wave periods ranging from 12 to 18 seconds. However, during extreme northern hemisphere storm events, wave heights may exceed 20 ft (6 m) with periods ranging from 18 to 22 seconds.

Northwest Winds in the Outer Coastal Waters (Wind Swell)

Annually, the predominant wave action along the study area is due to the prevailing northwest winds north and west of the southern California coastal waters. This is particularly true during the spring and summer months. Moderate northwesters will produce breaker heights of 4 to 6 ft (1.2 to 1.8 m), while strong events can generate breaking wave heights ranging from 6 to 9 ft (1.8 to 2.7 m) with typical periods ranging from approximately 6 to 10 seconds.

West to Northwest Local Sea (West Sea)

Westerly winds can be divided into two types: (1) temperature-induced sea breezes, and (2) gradient winds. When strong enough, these winds may generate wind waves. The strongest sea breezes occur during the late spring and summer months, while the lightest winds occur during December and January. Gradient winds are typically confined to the months of November through May, with the peak occurring in March or early April. They usually occur following a frontal passage or with the development of a cold low-pressure area over the southwestern United States. The latter produces the strongest winds with duration of up to three days. Under such conditions, locally generated wind waves combine with components of the northwest swell generated off the California coast.

Pre-frontal Local Sea (Southeast Sea)

The study area coastline may be vulnerable to storm conditions related to winds blowing strongly from the southeast to southwest along the coast prior to a frontal passage. These winds typically turn toward the south-southeast to south a short distance offshore. Wind waves, with peak energies averaging between 6 and 8 seconds, reach the shore with minimal losses due to island sheltering or refraction. Wave heights are generally in the range of 4 to 8 ft (1.2 to 2.4 m). Extreme wave heights are rare because the fetch and often times the duration of these wind waves are short-lived. The fetch is defined as a region in which the wind speed and direction are reasonably constant.

Tropical Storm Swell
Tropical cyclones are produced by tropical hurricanes that commonly develop at low latitudes off the west coast of Mexico from July to October. These storms first move west as they depart the coast of mainland Mexico, then curve north and northeast before dissipating in the colder waters off Baja California. The swell waves generated by these events usually do not exceed 6 ft (1.8 m) in height. However, on rare occasions the offshore waters are warm enough to facilitate hurricane migration to more northern latitudes than usual. In September 1939, a hurricane passed directly over southern California, generating recorded wave heights of 26.9 ft (8.2 m). This storm caused widespread damage along the coast.

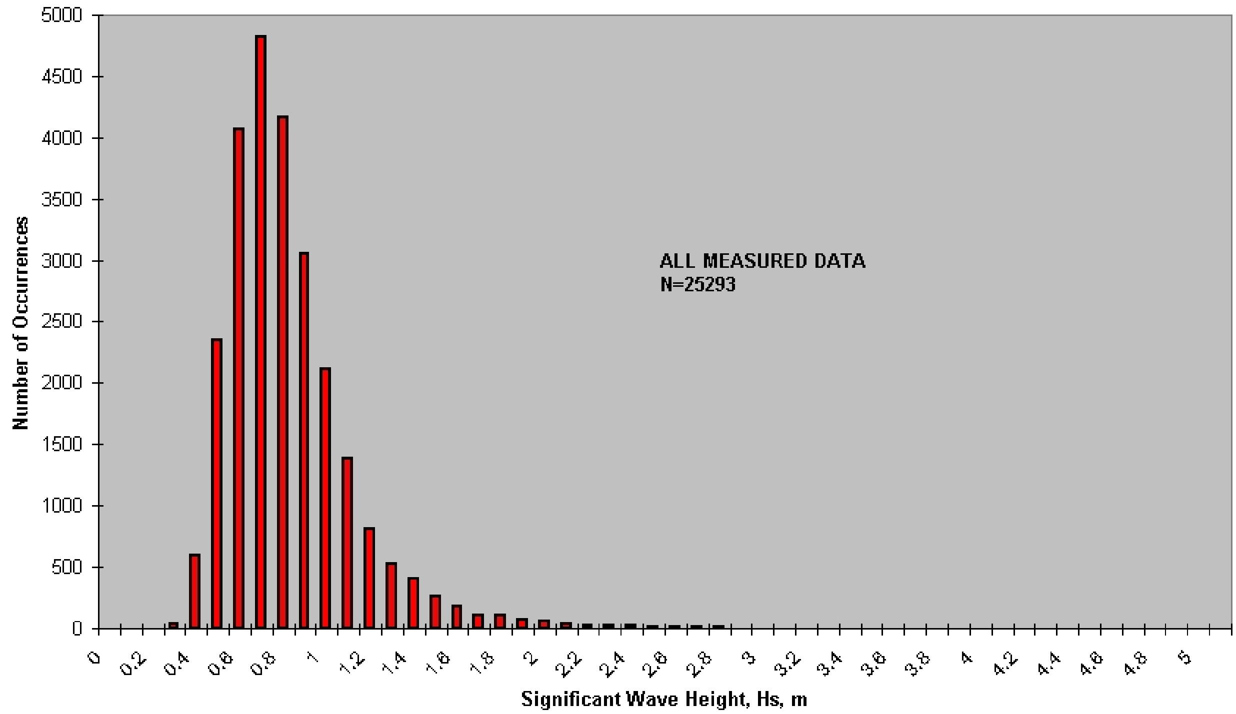
Extratropical Cyclone of the Southern Hemisphere (Southerly Swell)
From the months of April through October, and to a lesser extent the remainder of the year, large South Pacific storm systems traversing the ocean between south latitude 40 degrees and 60 degrees from Australia to South America send swells northward to the west coast of Central and North America. Typical southern hemisphere swell rarely exceeds 4 ft (1.2 m) in height in deep water, but with periods ranging between 18 and 21 seconds, they can break at over twice that height when they reach the coast. The southern swell also causes a reversal in the predominantly southward flow of littoral sand. During summer months, these waves dominate the littoral processes of the region driving alongshore currents northward as the northern-hemisphere swells are kept at bay.

Wave Characteristics Offshore San Clemente

Wave climatology information is available for the offshore area of San Clemente in the form of direct measurements as part of the Coastal Data Information Program (CDIP). The CDIP shallow-water station most applicable to San Clemente is the San Clemente Sxy slope array (Station ID 052) located approximately 1, 000 ft (300 m) offshore of the San Clemente Pier in 34 ft (10.2 m) of water. The Sxy slope array is a directional wave height recorder with a 178-month record during the period 1983-1998 at nominally four observations per day. The height and direction data records are intermittent reporting approximately 141 months of the 178 available; one long gap that occurred during the period July 1988 through July 1991, accounts for the majority of missing records. These data records are used to determine the daily and annual wave climate, the extreme wave analysis, and data input into wave transformation and shoreline damage numerical models.

The histogram for significant wave height off San Clemente is shown in Figure 4-1. Figure 4-1 illustrates that the most commonly occurring significant wave height is in the range 2.7-3.3 ft (0.80-1.00 m). Figure 4-1 also illustrates the complete absence of very large significant wave heights (> 13ft [4.0 m]). The maximum recorded significant wave height is 12 ft (3.63 m). The lack of higher recorded waves may be due to several conditions, including the fact that the Sxy slope array measures the wave climate in 33 ft (10 m) of water, whereas waves observed closer to the breaking depth will be larger due to shoaling. Also, the wave data are spectral-energy based (Hmo) rather than statistically based ($H_{1/3}$), which tends to under-represent wave heights compared to statistically based wave data. The wave climate is measured in the vicinity of the Pier and is assumed representative of the entire San Clemente Project area.

Figure 4-1 Significant Wave Height Histogram for Waves off San Clemente, 1983-1998



The winter wave climatology can be developed from the measured wave climate. Because the severest wave climate occurs during the winter season, the wave climatology was developed based on the winter wave population. The wave data was categorized based on the December-March winter meteorological season. The histograms for the winter significant wave height are shown in Figure 4-2.

Based on the measured data, the annual maximum wave heights for each year were determined. The annual maximum wave heights are shown in Table 4-8. Figure 4-3 illustrates that the dominant wave periods off San Clemente are in the range 12-14 seconds, with a smaller secondary peak at 6-8 seconds. The two peaks in the distribution demonstrate the dual sea/swell nature of the wave climate. Shorter period waves are typically associated with sea conditions; longer period waves are typically associated with swell conditions.

Figure **4-4** shows directional approach data for waves off San Clemente. This figure illustrates that approximately 91 percent of the waves approach from the relatively narrow 20-degree band between 230º-240º, and all other approach directions are minor or negligible. Shoreline normal in the San Clemente area is 235º. There is a very small fraction of waves (0.7 percent) approaching from 160º-220º, directions considered to be of tropical depression or southern hemisphere origins. Significantly, the predominant westerly wave direction envelops both local seas and extra-tropical swell.

Figure 4-2 Significant Wave Height Histogram off San Clemente, Winter Data, 1983-1998

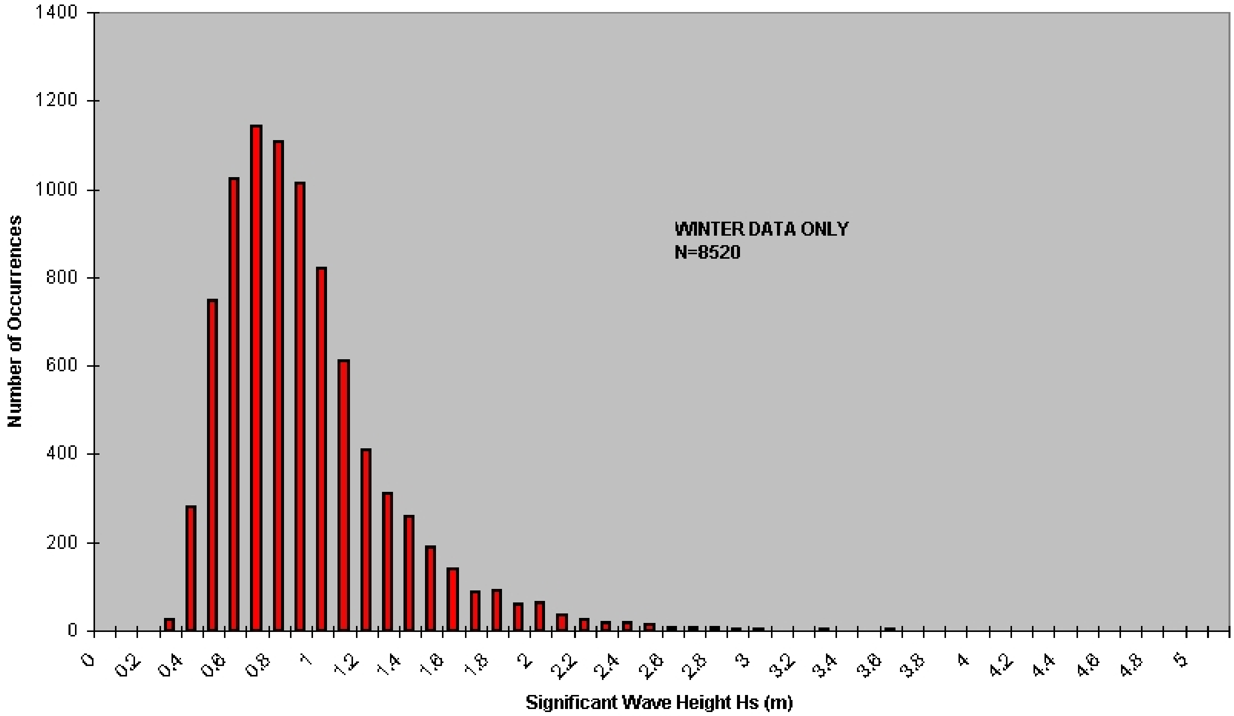


Table 4-8 Annual Maximum Wave Heights off San Clemente, 1983-1998

Year	Mo/Dy	Hs, m (ft)	Tp (sec)	Dir (deg)
1983	Dec 10	10.2, (3.10)	14.2	248
1984	Apr 01	6.1, (1.85)	6.1	273
1985	Nov 29	7.2, (2.18)	6.1	227
1986	Feb 16	11.7, (3.56)	16.0	234
1987	Mar 16	7.4, (2.24)	8.5	254
1988	Jan 18	11.9, (3.63)	14.2	218
1991	Nov 15	6.8, (2.06)	18.3	212
1992	Jan 30	7.6, (2.32)	14.2	250
1993	Feb 18	8.7, (2.66)	8.0	197
1994	Feb 07	6.6, (2.00)	7.3	191
1995	Jan 05	10.6, (3.22)	9.1	205
1996	Oct 26	7.4, (2.24)	8.8	259
1997	Dec 06	7.6 ,(2.31)	6.4	207
1998	Jan 30	9.8, (2.99)	18.3	238

Figure 4-3 Spectral Peak Period Histogram for Waves off San Clemente, 1983-1996

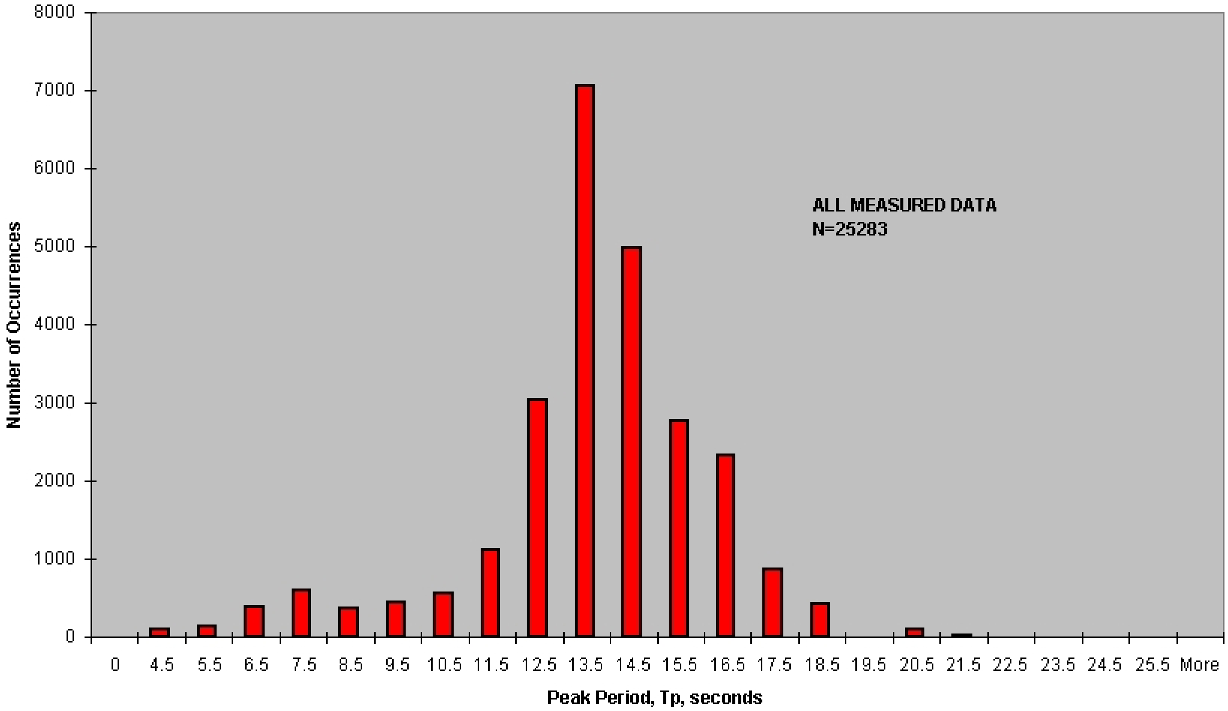
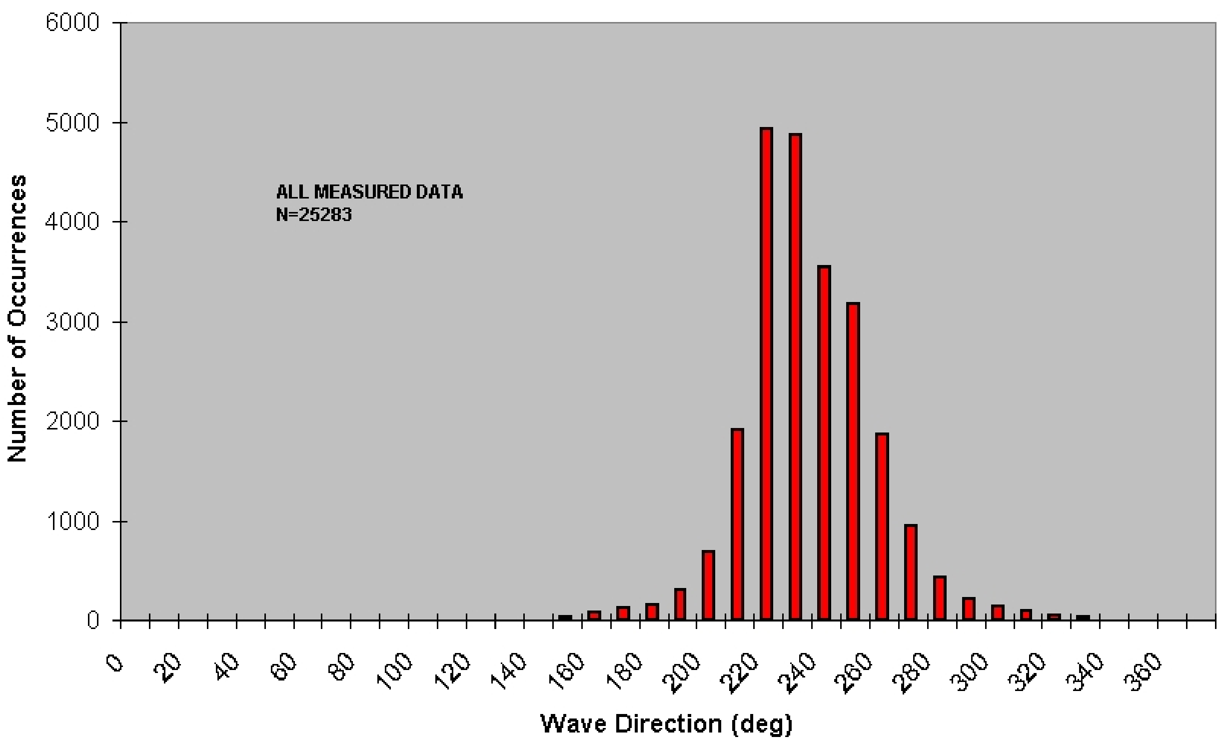


Figure 4-4 Wave Direction Histogram for Waves off San Clemente, 1983-1996



4.3.4.3 Littoral Processes and Sediment Transport

Beaches are dynamic environments subject to seasonal movement of sand offshore during the winter (erosion) and onshore (accretion) during the summer (USACE 2005a). Sand also is transported alongshore during its offshore-onshore sedimentation cycle.

Oceanside Littoral Cell

San Clemente is within the Oceanside Littoral Cell. The Oceanside Littoral Cell extends for 53.5 mi (86 km) from Dana Point in Orange County to Point La Jolla in San Diego County. The shoreline within the Oceanside Littoral Cell displays a wide variety of coastal features including cliffs, headlands, beaches composed of sand and/or cobbles, rivers, creeks, tidal lagoons and marshes, submarine canyons, man-made shore and bluff protection devices of many kinds, and major harbor structures. The littoral cell includes two small craft harbors, Dana Point Harbor and Oceanside Harbor. Dana Point Harbor is located on the northern end of the littoral cell, while Oceanside Harbor is in the center of the cell.

The cell is divided into three sub-cells based on natural physiographic units: (1) Dana Point to San Mateo Point, (2) San Mateo Point to Carlsbad Submarine Canyon, and (3) Carlsbad Submarine Canyon to Point La Jolla. The City of San Clemente is located in the north sub-cell.

Sediment Sources

Numerous rivers and small streams discharge sediment into the Oceanside Littoral Cell, as shown in Figure 4-5. San Juan Creek and San Mateo Creek are considered major river systems for the influx of sediment into the north sub-cell. Table 4-9 provides a range of estimates of the sediment loads carried by fluvial systems of this littoral sub-cell.

Sediment Budget

A sediment budget for without-project conditions has been developed based primarily on the Coast of California Storm and Tidal Wave Study (CCSTWS, USACE 1991). Development of the sediment budget involves defining the sediment sources, sinks, and losses; transport modes; erosion and accretion rates; and balancing the resultant budget.

The analysis of the budget of sediment for this cell has been carried out for three time periods: (1) the period from 1900 – 1938, (2) a mild, uniform weather period from 1960 – 1978, and (3) a period of more variable wave climate covered by the CCSTWS studies from 1983 – 1990. The 1900 – 1938 “natural” budget permits an uncluttered look at the cell as it predates construction of dams and Oceanside Harbor, although it necessarily draws on some findings from later studies. The mild, uniform period from 1960 – 1978 was selected to evaluate the effects of Oceanside Harbor at a time when the wave climate was consistent from year to year and less variable than the present wave climate. The last period of more variable wave climate, 1983 – 1990, emphasizes the change in wave climate from one that gave a consistent, strong, southerly littoral transport to one that yields a more variable transport with a net northerly component in some years. The resultant sediment budget for the three time periods is shown in Table 4-10.

Figure 4-5 Major Rivers and Drainage Basins, Oceanside Littoral Cell

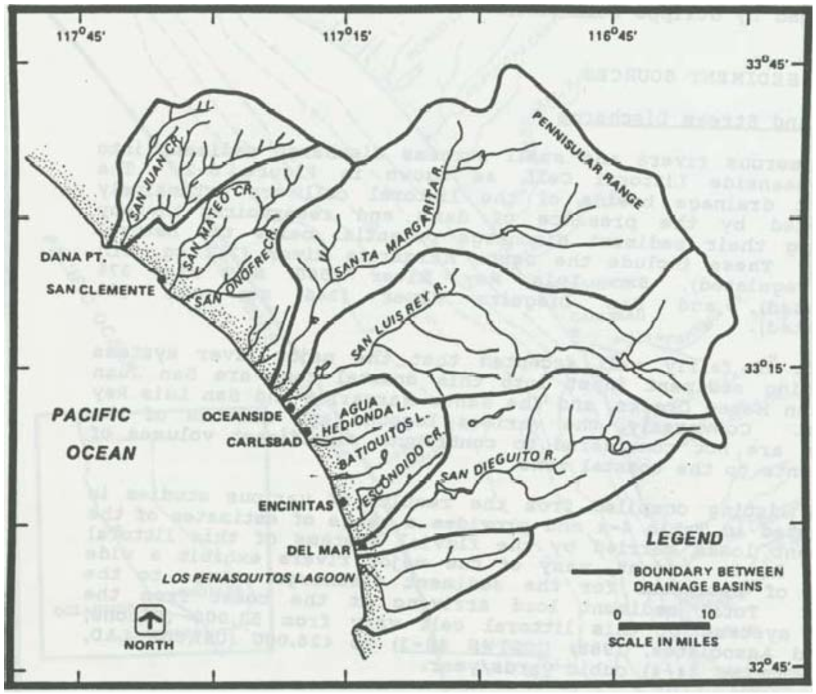


Table 4-9 Sediment Discharge from Rivers and Streams

	San Juan	**San Clemente**	**San Mateo**
Drainage Area mi^2 (ha)	175.5 (45,455)	19.9 (5,154)	132 (34,188)
	River / Stream Discharge Rate yd^3/yr (m^3/yr)		
Study			
Moffatt&Nichol 1977	17,000 (12,980)	14,340 (10,964)	2,240 (1,702)
CCSTWS 84-4 (1984)			32,000 (24,427)
Simons/Li 1985	8,000 (6,107)		16,000 (12,213)
CCSTWS 88-3 (Simons/Li 1988)	20,440 (15,603)	1,030 (786)	4,885 (3,729)
CCSTWS 90-2 (Moffatt&Nichol 1990)	36,000 (27,480)		8,400 (6,412)
COE-LAD 1999	52,071 (39,749)		

Table 4-10 Sediment Budget for Oceanside Littoral Cell (North – San Clemente) in 1000 m^3/yr

	1900-1938		1960-1978		1983-1990	
	Input	Output	Input	Output	Input	Output
Ql	0	130	0	130	0	35
Qn	0	15	0	15	0	5
Qb,o	130	45	90	45	45	0
Qa	0	0	90	0	0	0
Qr,s	65	0	45	0	0	0
Total	+195	-190	+225	-190	+45	-40
Net (t)/'V ∂∂	+5		+35		+5	
tX / ∂∂ (m/yr)	+0.03		+0.18		+0.03	

Notes:
Q = total sand transport rate into or out of cell, m^3/yr
a = artificial nourishment, bypassing, dredging, etc
b = bluff lands erosion; includes sea cliffs, gullies, coastal terrace, slumps, etc as distinct from rivers
l = longshore transport of sand in and near the surf zone
n = nearshore transport along the coast, outside the surf zone
o = onshore/offshore transport at the base of the shore rise
r = river yield to the coast
s = lost to submarine canyons
$\partial V' / \partial t$ = sand volume change rate, m^3/yr
$\partial X / \partial t$ = shoreline change rate, m/yr

The resultant sediment budget indicates the shoreline is essentially in balance between erosion and accretion. The budget is considered to be in balance when the shoreline change rate ($\partial X/\partial t$), computed from the volume flux, is less than 0.1 ft/yr (0.03 m/yr). The shoreline indicates a balance in the "natural" time period and the most recent variable wave climate time period. The net volume flux indicates the budget is very slightly accretional during the uniform wave climate period.

Long Term Shoreline Change

Historical Shoreline Change

Shoreline changes within the Oceanside Littoral Cell were investigated by the CCSTWS using historical maps and nautical charts, aerial photos, and the results of ground and bathymetric survey efforts. The results of these extensive efforts are shown in Table 4-11.

Table 4-11 indicates the alongshore variation of shoreline change within the immediate vicinity of San Clemente. The San Clemente study area is between SC 1623 (State Beach) and SC 1720 (Shore cliffs). There are contradictory trends observed in the data. The data sets are out of phase with adjacent locations; a location is erosional while the adjacent transect is accretional and vice versa. The mean values during the 1940-1960 and 1960-1980 periods are similar in magnitude; the mean values during the 1980-1989 period are remarkably higher. Detailed inspection of the data indicates a shoreline that is either erosional, balanced, or accretional. During the period 1940-1960, the shoreline indicated essentially zero change with a +2.5 ft/yr (+0.76 m/yr) change in the vicinity of SC 1680 (Linda Lane). During the period 1960-1980, the shoreline vacillated alongshore between positive and negative. The shoreline change was approximately equal between positive and negative ranging from -0.7 ft/yr (-0.21 m/yr) and +0.6 ft/yr (+0.18 m/yr). During the period 1980-1989, the shoreline was predominantly positive with accretion rates ranging from + 1.4ft/yr (+0.43 m/yr) to +7.2 ft/yr (+2.16 m/yr); an erosion value of -2 ft/yr (-0.61 m/yr) was recorded at SC 1660 (T-Street).

Table 4-11 Long Term Shoreline Change Rates in San Clemente Area

MHHW Shoreline Change Rate (ft/yr [m/yr])				Max Seasonal MHHW Movement (ft [m])	
Location	**1940-1960**	**1960-1980**	**1980-1989**	**Summer**	**Winter**
SC1623	-0.20 (-0.06)	-0.7 (-0.21)	7.10 (2.16)	25.4 (7.7)	-26 (-7.9)
SC1660	0.0 (0.00)	0.60 (0.18)	-2.00(-0.61)	17.0 (5.2)	-34 (-10.4)
SC 1680	2.50 (0.76)	-0.40 (-0.12)	1.40 (0.43)	45.5 (13.9)	-57.4 (-17.5)
SC 1720	0.0 (0.00)	0.00 (0.00)	4.80 (1.46)	30.0 (9.2)	-27 (-8.2)
DB 1805	-1.90 (-0.58)	8.10 (2.47)	-12.30 (-3.75	25.0 (7.6)	-45.6 (-13.9)
DB 1850	-0.60 (-0.18)	9.31 (2.84)	--------------	2.7 (0.8)	-70.2 (-21.4)
DB 1895	2.50 (0.76)	-0.40 (-0.12)	-0.50 (-0.15)	24.6 (7.5)	-31.4 (-9.6)
DB 1900	0.00 (0.00)	-1.90 (-0.58)	-10.0(-3.05)	59.8 (18.2)	-91.4 (-27.9)

Current Beach Width Monitoring

The City of San Clemente initiated a beach monitoring program to document changes in the condition of the shore between Dana Point Harbor and San Mateo Point. The results of this program provide a basis for evaluating the impacts of natural events and anthropogenic operations. The program includes semi-annual full cross-shore profile surveys at 11 representative sites and bi-monthly beach width measurements at 9 of the 11 profile sites.

Transect locations are shown in Table 4-12. The 11 profile locations include 6 historical locations originally established by the CCSTWS, and 5 locations established specifically for the beach monitoring program.

Recent Shoreline Change Rate

The shoreline change rate can be determined from the aggregate measured data collected in support of the CCSTWS and the City of San Clemente beach width monitoring program. The data is a compilation of measurements obtained in the 1980s through the present.

Table 4-12 San Clemente Area Beach Profile Transects

Site #	Transect Designation	Location	Origin
1	DB-1850	N. Doheny State Beach	CCSTWS
2	DB-1805	N. Doheny State Beach	CCSTWS
3	SC-1720	Shore cliffs	CCSTWS
4	SC-1705	Capistrano Trailer Court	Est. Oct. 2001
5	SC-1700	North Beach	Est. Oct. 2001
6	SC-1695	Dije Court	Est. Oct. 2001
7	SC-1680	Linda Lane	CCSTWS
8	SC-1660	T-Street	CCSTWS
9	SC-1645	Lost Winds	Est. Oct. 2001
10	SC1623	San Clemente State Beach	CCSTWS
11	SC-1605	Cottons Point	Est. Oct. 2001

It is noted that this beach width data set is expressed relative to the MSL contour. The beach widths are the distance between a fixed point on the backshore and the approximate location of the MSL contour. This MSL beach width incorporates a portion of the "wet" beach (e.g., the foreshore between the MSL contour and the berm), whereas the berm beach width definition, which is used in this study, incorporates only the "dry" portion of the beach. The MSL beach widths will be inherently greater than the berm beach widths. The MSL indicates a positive beach width where the beach has been previously defined in many reaches as having zero width. Based on a typical beach slope of 8H:1V, a berm elevation of +20.6 ft (+6.2 m) and a MSL contour elevation of +5.5 ft (+1.64 m), the estimated horizontal beach width attributable to this contour elevation difference is approximately 114 ft (35 m). It can be shown that the dry beach width is zero at Linda Lane and near zero at the other locations. Thus, the data sets are consistent with the conclusions developed in this study. It is assumed that the trend for the berm widths will coincide with the trend for the MSL data.

Figure 4-6 shows the measured data for the four locations that are historical to the CCSTWS (solid lines). The linear regression for each data set is shown as dotted lines. The slope of the lines represents the mean shoreline trend for each respective data set. State Beach, T-Street, and Linda Lane show a declining beach width while the beach width trend at Shorecliffs indicates widening.

The long-term shoreline change rate data sets are shown in Table 4-13. The measured data is shown for the four locations that are historical to the CCSTWS. The shoreline change data sets are considered together to obtain representative values for the entire study area. The mean shoreline change rate is –0.7 ft/yr (-0.20 m/yr), the maximum erosion rate is –2.0 ft/yr (-0.61 m/yr) and the maximum accretion rate is +1.24 ft/yr (0.38 m/yr).

There are contradictory trends observed in the data. The Shorecliffs data set is out of phase with the other three. The three data sets around the Pier are consistent in trend and phase. The data sets indicate consistent erosion and accretion trends at the same time. The mean values are similar in magnitude. The data set at Shorecliffs is nearly opposite in behavior. The beach is erosional and/or accretional when the others are accretional and/or erosional. The data in the 1980s is consistent among data sets. After the long absence of data in the 1990s, the 2002 data indicates a loss of beach width.

Figure 4-6 Recent Shoreline Change - MSL Beach Width (m)

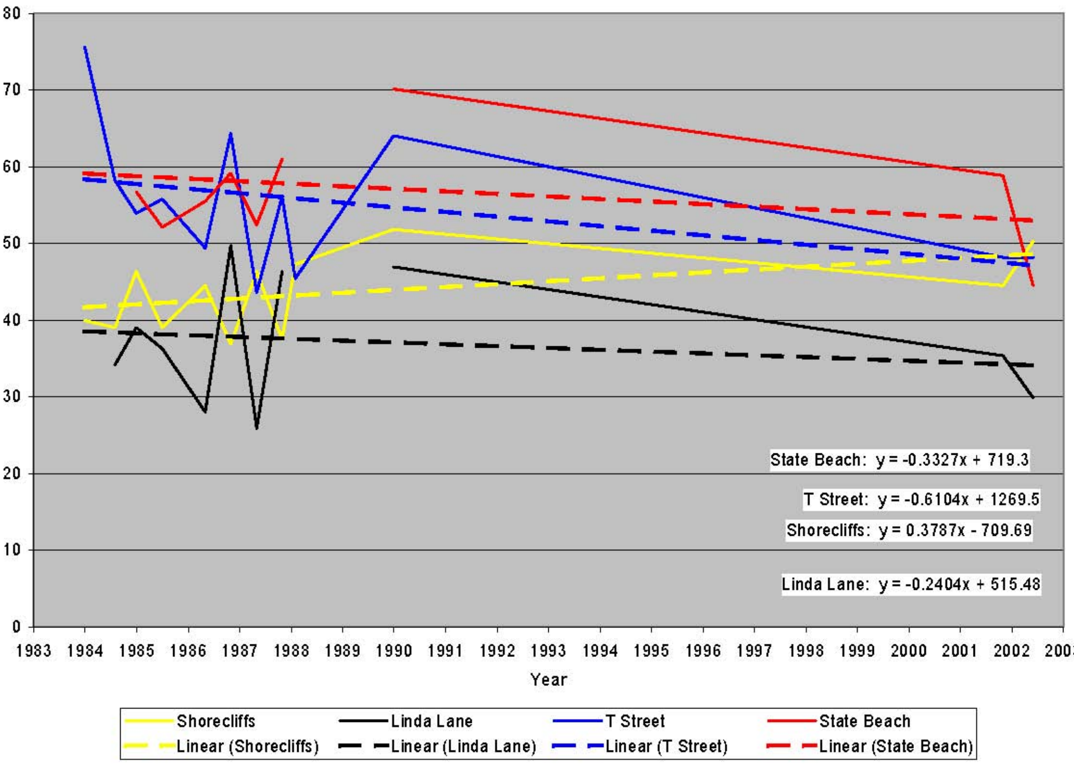


Table 4-13 Summary of Recent Long Term Shoreline Change Rates

Location	Erosion Rate ft/yr (m/yr)
SC 1720, Shorecliffs	+1.24 (+0.38)
SC 1680, Linda Lane	-0.79 (-0.24)
SC 1660, T–Street	-2.00 (-0.61)
SC 1623, State Beach	-1.09 (-0.33)

Cross-shore Profiles

Cross-shore profiles are compiled from the LIDAR topographic data and bathymetric measured data. Profiles from the vicinity of San Clemente Pier and Mariposa Point are representative of the beach and the armored shoreline respectively that are characteristic in the Project area (Figure 4-7 and Figure 4-8). Only the portion of the profile from the bluff to the waterline is shown to better illustrate the detail of the foreshore and backshore regions. The profile centerline is established at the seaward rail of the SCRRA railroad.

The Pier area beach profile indicates a typical berm elevation of +17 ft (+5.2 m), a typical foreshore slope of 8H:1V – 10H:1V, an offshore slope of 110H:1V, and a railroad elevation of approximately +21 ft (+6.4 m). The Mariposa Point area profile indicates a mean revetment elevation of +23 ft (+6.9 m), typical revetment slope of 1H:1V, toe elevation at approximately 0.0 ft, an offshore slope of 110H:1V, and a railroad elevation of approximately +21 ft (6.4 m).

Figure 4-7 Cross-Shore Profile of Beach

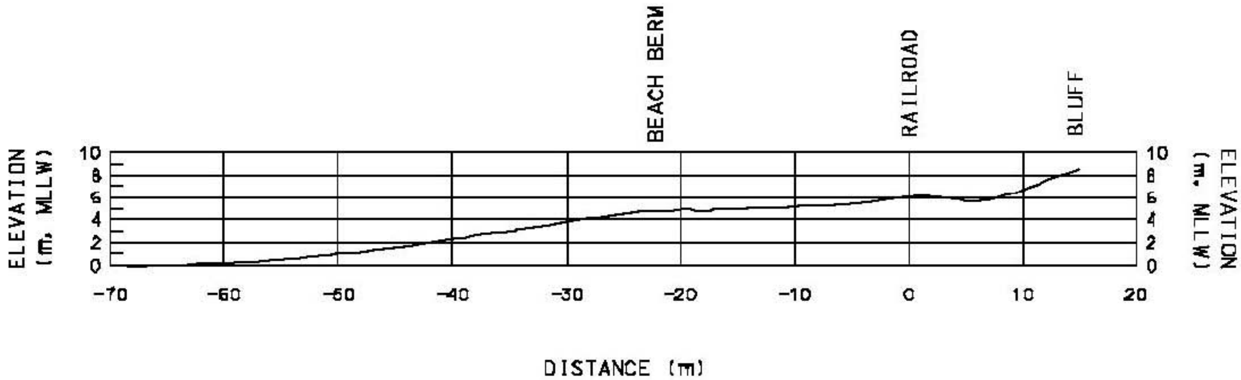
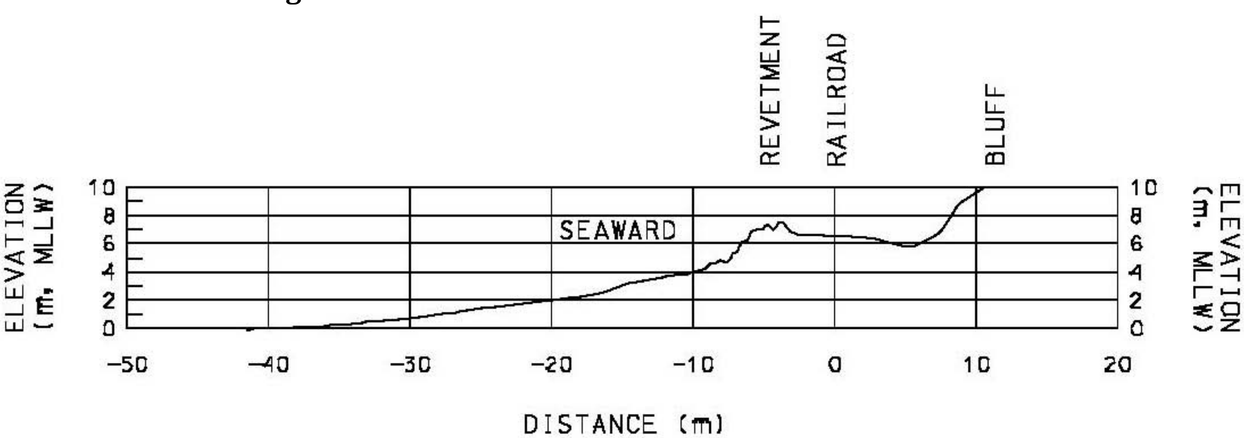


Figure 4-8 Cross-Shore Profile of Armored Shoreline



Sediment Profile Thickness

Data collected for the Sand Thickness Survey Report (USACE 1988) allows estimation of the available sediment supply and consequently any potential limits to erosion. This study conducted jet probing along various profiles to determine the available sediment thickness. Three profiles in the San Clemente area were jet probed including SC-1623 (San Clemente State Beach), SC-1660 (T-Street) and SC-1720 (Capistrano Shores). The survey results indicate the sediment thickness cross-shore along the profile. The results are summarized in Table 4-14.

On profile SC-1623, the sediment thickness ranges from 0.3-10.5 ft (0.1-3.2 m). The average profile is consistently thick 7.7-10.5 ft (2.4-3.2 m) across the beach locations and is near zero 0.4-1.8 ft (0.1-0.6 m) across the seaward portion of the profile.

On profile SC-1660, the sediment thickness ranges from 0-14.8 ft (0-4.5 m). The average profile is consistently thick 6.9-14.8 ft (2.1-4.5 m) across the beach locations and is near zero 0.4-2.2 ft (0.1-0.7 m) across the inner seaward portion of the profile. The data indicates a thickness of 8.8 ft (2.7 m) at the furthest offshore location.

On profile SC-1720, the sediment thickness ranges from 0-15 ft (0-4.6 m). The average profile is consistently thick 3.3-14.9 ft (1.0-4.5 m) across the beach locations and is near zero 0-7 ft (0-0.2 m) across the seaward portion of the profile.

The measurement results identified cobbles, boulders, and other hard substrate at various depths along the profile. The observations include "some pebbles scattered on beach surface and some boulders visible at backshore" and "offshore sand-stone outcrops with local bottom relief of 1 ft (0.30 m)". This information is consistent with 2002 geologic information collected during geophysical studies conducted as part of this study, and reported in the Geotechnical Appendix (Appendix E).

Table 4-14 Summary of Sand Thickness

		Probe Location		Sand Thickness		
Range Line	No.	Range ft (m)	Elevation (MLLW) ft (m)	1 ft (m)	2 ft (m)	Average ft (m)
SC-1623	1	69.3 (21.1)	13.5 (4.1)	9.9 (3.0)	10.2 (3.1)	10.1 (3.1)
SC-1623	2	113.5 (34.6)	11.1 (3.4)	10.5 (3.2)	10.4 (3.2)	10.5 (3.2)
SC-1623	3	169.6 (51.7)	6.9 (2.1)	7.7 (2.4)	7.6 (2.3)	7.7 (2.4)
SC-1623	4	636.8 (194.2)	-11.4 (-3.5)	0.3 (0.1)	0.4 (0.1)	0.4 (0.1)
SC-1623	5	872.8 (266.1)	-19.6 (-6.0)	0.8 (0.2)	0.9 (0.3)	0.9 (0.3)
SC-1623	6	1,653.8 (504.2)	-30.5 (-9.3)	1.8 (0.6)	1.8 (0.6)	1.8 (0.6)
SC-1660	1	37.6(11.5)	16.3 (5.0)	14.8 (4.5)	14.8 (4.5)	14.8 (4.5)
SC-1660	2	77.2 (23.5)	10.2 (3.1)	11.0 (3.4)	11.4 (3.5)	11.2 (3.4)
SC-1660	3	140.6 (42.9)	4.8 (1.5)	7.2 (2.2)	6.6 (2.0)	6.9 (2.1)
SC-1660	4	763.5 (232.8)	-10.1 (-3.1)	0.0 (0.0)	0.8 (0.2)	0.4 (0.1)
SC-1660	5	1,516.5 (462.4)	-21.3 (-6.5)	2.0 (0.6)	2.3 (0.7)	2.2 (0.7)
SC-1660	6	2,209.5 (673.6)	-29.6 (-9.0)	8.5 (2.6)	9.0 (2.7)	8.8 (2.7)
SC-1720	1	35.9 (10.9)	15.4 (4.7)	15.0 (4.6)	14.8 (4.5)	14.9 (4.5)
SC-1720	2	81.4 (24.8)	8.7 (2.7)	9.2 (2.8)	9.9 (3.0)	9.6 (2.9)
SC-1720	3	152.6 (46.5)	1.9 (0.6)	3.3 (1.0)	3.3 (1.0)	3.3 (1.0)
SC-1720	4	541.9 (165.2)	-8.1 (-2.5)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)
SC-1720	5	1,622.9 (494.8)	-21.9 (-6.7)	0.5 (0.2)	0.5 (0.2)	0.5 (0.2)
SC-1720	6	2,884.9 (879.5)	-28.3 (-8.6)	0.5 (0.2)	0.8 (0.2)	0.7 (0.2)

4.4 Biological Resources

These sections describe biological resources found in the vicinity of the proposed beach fill and borrow site areas along the San Clemente coastline. These descriptions are based upon existing literature on the Southern California Bight (SCB), which includes the eastern coastline of the Pacific Ocean from Point Conception, California, to Baja California, as well as the results of intertidal and subtidal reconnaissance site surveys conducted on March 13 and June 26, 2000, by Coastal Resources Management (CRM 2000), surfgrass surveys performed by Chambers Group in March 2008 and a kelp and surfgrass survey performed by Chambers Group in July 2009. A terrestrial biology survey was performed by Chambers Group on May 18, 2008.

Surfgrass (*Phyllospadix torreyi* and *P. Scouleri*) and giant kelp (*Macrocystis pyrifera*) are considered to be particularly valuable marine habitats by the resource agencies because they provide shelter for fishes and invertebrates, attachment sites for sessile invertebrates, and form the basis of many marine food chains, both as living material and detritus. Surfgrass and giant kelp beds occur in limited areas along the southern California coast, usually on hard bottom substrate, compared to much more common soft bottom habitat.

4.4.1 Terrestrial Shoreline Habitat

4.4.1.1 Vegetation

Residential and commercial development, a train railway, recreational activities, and introduced non-native, exotic plants have largely eliminated native terrestrial vegetation along the San Clemente shoreline and adjacent upland areas. The beach area is heavily used for recreation, and upland vegetation is limited primarily to ornamentals and a few patches of native vegetation. The vegetation is typified by common non-native species such as iceplant (*Lampranthus spp*.), sea rocket (*Cakile maritima*), African daisy (*Gazania spp*.), and mature palm trees. Native vegetation consists primarily of saltgrass (*Distichlis spicata*) and jimson weed (*Datura wrightii*). These sandy beach back bluffs are outside the Project area. The San Clemente Project study boundary does not include any of the terrestrial vegetation types east of the railroad tracks and, therefore, these are omitted from further analysis.

4.4.2 Marine Shoreline and Offshore Habitats

The predominant intertidal habitat along San Clemente's shoreline is sandy beach, although some rocky outcrops that extend from mid-beach to the low intertidal are present at Mariposa Point, north of San Clemente Pier. Beyond the surf zone, the seafloor is a mosaic of sand and low-to-high relief patch reef. Some pinnacles of the reef are visible in the nearshore zone at low tide while two prominent offshore pinnacles break the surface offshore of Mariposa Point and south of the San Clemente Pier. Other reef habitats are located south of the Pier offshore of T-Street that extends west, and then north around the end of the San Clemente Pier (Figure 4-9).

4.4.2.1 Rocky Intertidal

Although the predominant intertidal habitat along San Clemente's shoreline is sandy beach, an area of significant rocky intertidal is present at Mariposa Point, 3,200 ft (975 m) north of the San Clemente Pier and approximately 1,600 ft (488 m) north of the northern end of the proposed beach fill site at Linda Lane. Boulders and rocky outcroppings in this area support a variety of algal species (CRM 2000). In the high intertidal, boulders support filamentous green algae (*Enteromorpha* spp.). The mid to low intertidal algae composition is dominated by encrusting red algae (*Lithophyllum* spp., *Lithothamnion* spp.), encrusting brown algae (*Pseudolithoderma* spp.), and coralline algae (*Corallina* spp.). Green algae (*Enteromorpha* spp. and *Ulva* spp.) and several species of filamentous red algae also occur in these zones. Larger brown algae species colonize the base of the intertidal reef throughout the area, including palm kelp (*Eisenia aborea*) and feather boa kelp (*Egregia menziesii*). Surfgrass (*Phyllospadix torreyi*), an important species that enhances the biological value of nearshore habitat, is present in the low intertidal beginning approximately 300 ft (91 m) offshore of the sand beach. Surfgrass serves as a nursery for California spiny lobster (*Panulirus interruptus*) and provides shelter for a variety of juvenile and adult fishes. Surfgrass is present throughout the low intertidal platform of Mariposa Point, which is upcoast outside of the project area. Surfgrass off Mariposa Point occurs a minimum of three feet above the sand line with no more than one inch of sand covering the surface of the rocks. Surfgrass blades in this area are 1 to 2 ft (0.3 to 0.6 m) in length.

A diverse mid-to-low intertidal invertebrate community is found on boulders as well as the surfaces of the low-lying platform reefs at Mariposa Point (CRM 2000). The most common sessile invertebrate in this area is the California mussel (*Mytilus caliornianus*), which occurs throughout the mid and low intertidal zones, forming masses on the sides and upper surfaces of the boulders and platform reefs. Other common to abundant invertebrates in this area include the solitary and colonial forms of the anemone (*Anthopleura aggregate*), limpets (*Collisella scabra*, *Tectura* spp., *Collisella digitalis*), chitons (*Mopalia muscosa* and *Nuttalina californica*), acorn barnacles (*Balanus glandula*), and snails (*Acanthina spirata*). Although not common, the reef-building sandcastle tubeworm (*Phragmatopoma californica*) was found around the base of several boulders in the mid-intertidal zone.

Up to ten species of fish utilize the low to minus tidal zones of rocky intertidal habitats in the SCB (MEC 2002). Wooly sculpin (*Clinocottus analis*) is one of the more commonly encountered fish species in tidepools, but juvenile opaleye (*Girella nigricans*), rockpool blenny (*Hypsoblennius gilberti*), spotted kelpfish (*Gibbonsia elegans*), and California clingfish (*Gobiesox rhessodon*) also may be present (Cross and Allen 1993).

Figure 4-9 Historic Kelp Canopy and Reef Map

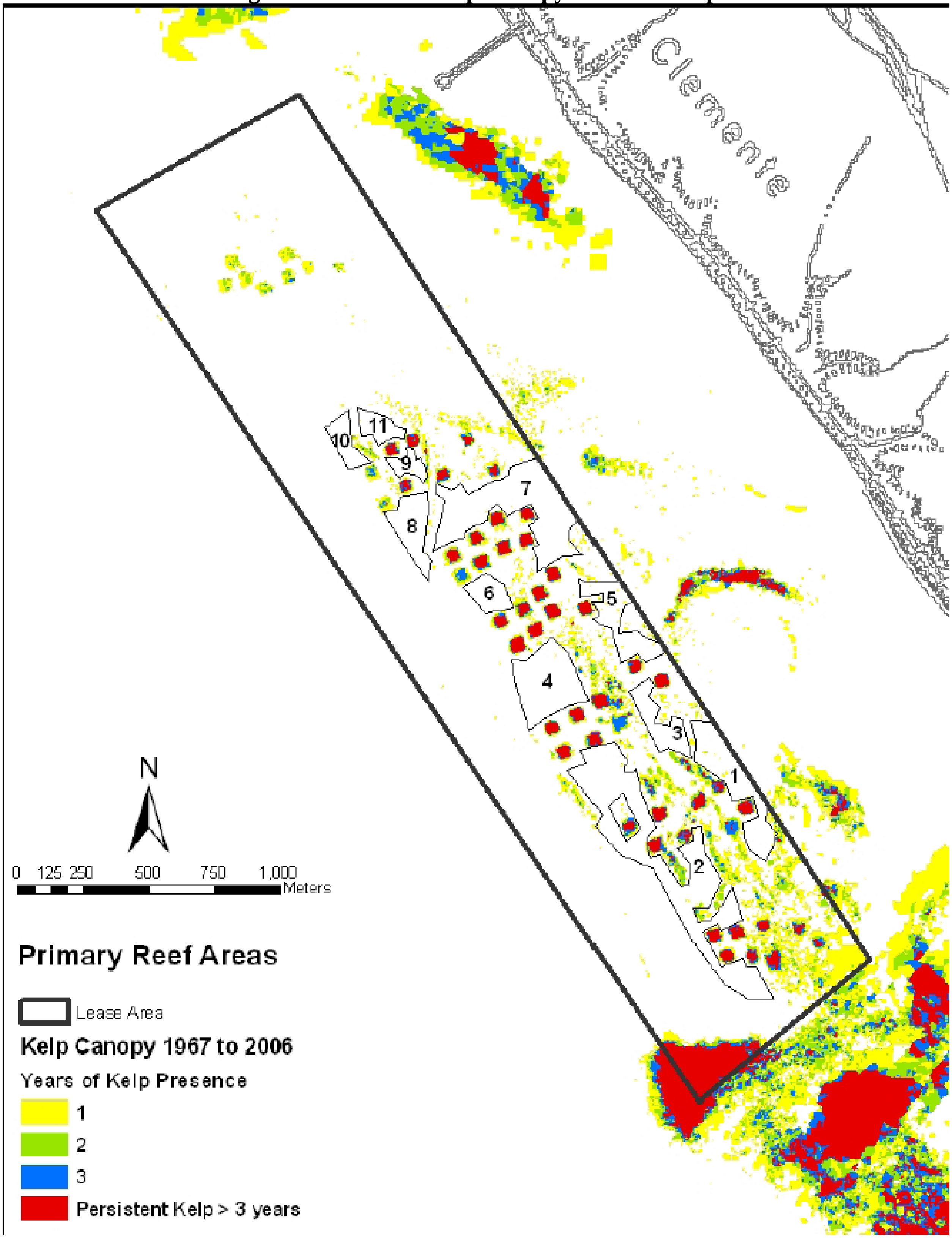


Figure provided by SCE, Wheeler North Reef Design Plan February 2008

4.4.2.2 Sandy Intertidal

The sandy beach along the San Clemente shore is variable in width. The shoreline at Mariposa Point consists of a riprap backshore environment that protects the railroad tracks. Immediately seaward of the riprap is a variable-width and gentle-to-moderate sloping sandy beach approximately 33 to 100 ft (10 to 30 m) in width. The rocky intertidal habitat described above in Section 4.4.1.1 lies seaward of this stretch of sandy beach. The beach within the Project footprint between Linda Lane and T-Street is narrow. A stone revetment to the north and an access road to the south provide backing along the beach at Linda Lane, which is fronted by a steeply sloping sandy beach to the water line. There is also a rock riprap that protects the lifeguard headquarters from wave run-up in front of buildings along this section of the shoreline. South of the Pier the beach is narrow and lies alongside the railroad tracks.

Sandy beaches in California are inhabited by an abundant invertebrate community that is an important food source for vertebrate predators, including shorebirds, seabirds, and fishes (Dugan et al. 2000). Intertidal invertebrates of sandy beaches show a characteristic zonation related to tidal exposure. The composition of the invertebrate community at a given beach, as well as the zonation, tends to be extremely dynamic due to the highly mobile nature of the sandy substrate and the resources on which these animals depend (Dugan and Hubbard 2006). Most exposed sandy beaches have two to three zones inhabited by distinct groups of mobile animals. These zones generally correspond to the relatively dry substrate of the upper intertidal zone at and above the drift line, the damp sand of the mid-intertidal zone, and the wet sand of the lower intertidal zone.

The lower intertidal zone (swash zone) in southern California sandy beaches is dominated by the filter feeding mole crab, *Emerita analoga*, which moves up and down the beach with the tides. The polychaete "bloodworm", *Euzonus*, also is common in the mid to lower intertidal. In the upper intertidal, drift kelp is an important source of food for many invertebrates. Common organisms associated with macrophyte wrack include beach hoppers (*Megalorchestia* spp.), kelp flies (*Coleopa vanduzeei*), isopods (*Alloniscus perconvexus* and *Tylos punctata*), and various species of beetles.

The sandy intertidal is also used by a nearshore fish, the California grunion (*Leuresthes tenuis*), which lays its eggs in the high intertidal zone between March and August. During the grunion spawning season, eggs and developing embryos are buried in the sand to incubate between the highest tides of each month, at the full and new moon (Martin 2006). The eggs incubate a few inches deep in the sand and hatch approximately 10 days later during the next series of high tides (Chambers Group 2002). Grunion are known to spawn on the beach in the vicinity of San Clemente Pier (K. Martin, Pepperdine University, pers. comm., 2007).

4.4.2.3 Subtidal Hardbottom

The shallow subtidal zone for much of the Project area is a mixture of sand and boulders, with occasional outcrops of exposed shale bedrock (CRM 2000). Historically, offshore kelp beds, dominated by giant kelp (*Macrocystis pyrifera*) with an understory of feather boa kelp (*Egregia* *menziesii*) and palm kelp (*Eisenia arborea*), have been prevalent along this section of coastline. The kelp canopy within the project area has fluctuated considerably over the last decade. Figure 4-9 shows the kelp canopy between 1967 and 2006 and is an indication of reef habitat deeper than approximately 20 feet (6 meters). During surveys in June 2000, CRM found low to moderate density kelp beds with little or no surface canopy 2,000 ft (610 m) off of Mariposa Point at depths between (-23 and -28 ft) (–7.0 and –8.5 m) MLLW. Another bed was observed 650 ft (198 m) off San Clemente Pier (T-Street) at a depth of 16 ft (4.9 m) in October 1999. This patch was not observed during the June 2000 survey (CRM 2000). Much of the kelp observed in June 2000 was ragged and covered with fouling ectoprocts (*Bryozoa*); however, newly settled recruit plants were also present (CRM 2000). In March 2008, kelp canopy was sparse in the project area. In July 2009, a thick kelp bed was observed on the considerable reef formations offshore and south of San Clemente Pier. Figure 4-10 shows the kelp mapped in July 2009. The kelp bed in 2009 corresponds generally with the historical kelp mapped previously (Figure 4-9).

The most extensive reef formations in the vicinity of San Clemente Pier are located off Mariposa Point, north of the project area. The shallow subtidal reefs off Mariposa Point have well-developed macrophyte growth, including dense stands of understory species of kelp and surfgrass (CRM 2000). These inshore reefs are approximately 300 to 700 ft (90 to 210 m) from the shoreline, and some of the rocks have several feet of vertical relief. Most, however, are sand inundated boulders less than 2 to 3 ft (0.6 to 1 m) in height. Surfgrass on these shallow subtidal reefs grows a minimum of 1 ft (0.3 m) above the sand line and have blades up to 2 ft (0.6 m) long.

The nearest high relief reef is located 2,000 ft (610 m) offshore of Mariposa Point (Washrock Reef) at depths between -23 and -28 ft (-7 and -8.4 m) MLLW. A 400 foot by 200 foot (120 meter by 60 meter) patch (1.83 acres or 7,434 square meters) of giant kelp was observed inshore of the Washrock Reef just north of the Pier at a depth of 26 ft (8 m) in October 1999 which persisted at least through June 2000 (CRM 2000). The apex of Washrock Reef is dominated by mussels (*Mytilus californianus* and *M. edulis*). Other characteristic reef organisms observed during the CRM June 2000 survey included gorgonians (*Muricea californica* and *M. fructicosa*), keyhole limpet (*Megathura crenulata*), purple and red sea urchin (*Strongylocentrotus purpuratus* and *S. franciscanus*), California sea cucumber (*Parastichopus californicus*), Kellet's whelk (*Kelletia kelletii*), and sea stars (*Pisaster brevispinus* and *P. giganteus*). Fishes observed included spotted sand bass (*Paralabrax maculofasciatus*), kelp bass (*P. clathratus*), seniorita (*Oxyjulis californicus*), bat ray (*Myliobatis californica*), and black perch (*Embiotica jacksoni*). Other fishes that are commonly associated with nearshore reef habitats with developed stands of perennial vegetation above 3 ft (1 m) in height also would be expected to occur within the Project area Species associated with southern California nearshore reefs include barred sand bass (*P. nebulifer*); shiner, walleye, and dwarf surfperches (*Embiotocidae*); California sheephead (*Semicossyphus pulcher*); garibaldi (*Hypsypops rubicundus*); jack mackerel (*Trachurus symmetricus*); giant kelpfish (*Heterostichus rostratus*); painted greenling (*Oxylebius pictus*); and halfmoon (*Medialuna californiensis*) (MEC 2002, Thompson et al. 1993).

Offshore the northern end of the proposed beach fill site at Linda Lane, low relief boulders occur at depths greater than 9 ft (2.7 m) MLLW (CRM 2000). Boulders appear to be frequently scoured and are characterized by growth of red turf algae and crustose corallines. Coastal

Resources Management observed surfgrass at this depth off the northern portion of the Linda Lane area, approximately 300 ft (90 m) from the shoreline. The surfgrass occurred on the upper surfaces of 1 ft (0.3 m) high boulders. Blades were approximately 2 to 3 ft (0.6 to 0.9 m) long. Chambers Group surveyed for surfgrass in the Project area in March of 2008. Offshore of the northern portion of the proposed sand placement area between San Clemente Pier and Linda Lane, only scattered patches of surfgrass were observed (Figure 4-10).

South of San Clemente Pier, cobble and reef habitat occur offshore beginning at a depth of -1.2 to (-4 to -5 ft) (-1.5 m) MLLW and extending to at least -11 ft (- 3.3 m) MLLW (CRM 2000). Surfgrass meadows are located approximately 300 ft (90 m) from the shoreline on T-street Reef. The surfgrass grows on 1 to 2 ft (0.3 to 0.6 m) high boulders and has blades that are 2 to 3 ft (0.6 to 0.9 m) long. Farther offshore surfgrass cover declines. Surfgrass at the deeper depths (-11 ft [- 3.3 m] MLLW) was growing on 1 ft (0.3 m) high boulders inundated with sand. In some cases, two-thirds of the length of the surfgrass blades were covered with sand and only 1 ft (0.3 m) of the blades remained above the sand line. Figure 4-10 shows surfgrass mapped by Chambers Group during the March 2008 survey. South of San Clemente Pier, surfgrass grows on the T-Street Reef starting at a water depth of between -4 and -6 ft (-1.2 and-1.8 m) MLLW and extending offshore to a water depth of between -11 and -13 ft (-3.3 and -3.9 m) MLLW.

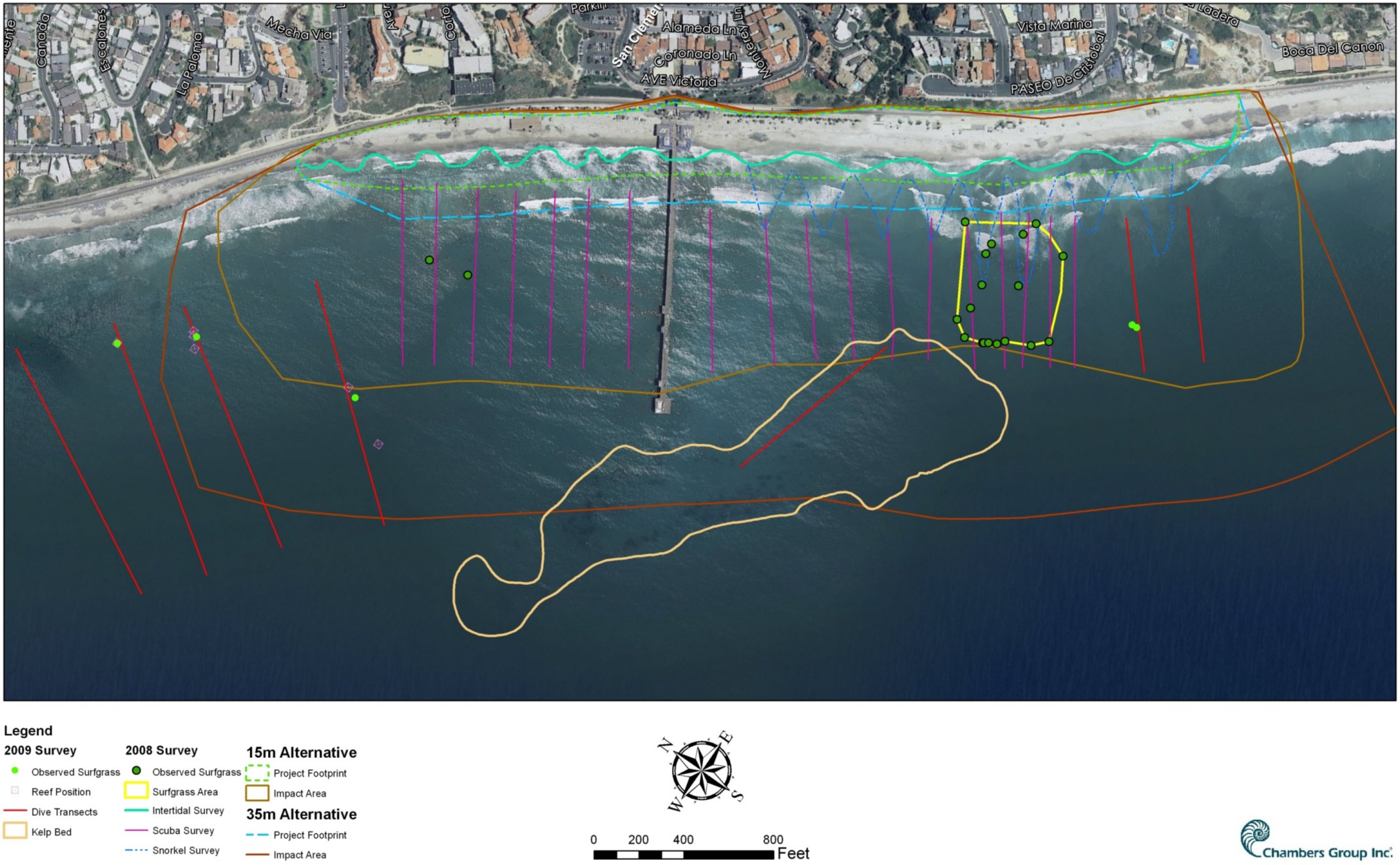
The subtidal reef habitat south of the Pier is extensive and angles around the tip of San Clemente Pier. This reef formation is shown on Figure 4-10. Larger macrophytes observed on the reef include giant kelp, feather boa kelp (*Endarchne binghamiae*) and bladder chain kelp (*Cystoseira*/ *Halidrys*) (CRM 2000). A small patch of giant kelp consisting of 12 plants was observed 650 ft (197 m) south of the Pier at a depth of 16 ft (5 m) in October 1999, but was not observed in June 2000. Kelp canopy was observed on the entire reef in July 2009.

California spiny lobster (*Panulirus interruptus*) is common in the subtidal reef habitat in the project area. Commercial lobster fishermen set traps in the area during the lobster fishing season of October through mid-March and lobster also are fished in the area by SCUBA divers. Abalone (*Haliotis rufescens*) have been reported historically in the general project area (Blunt 1980), but were not observed during any of the recent surveys.

4.4.2.4 Subtidal Softbottom

Benthic invertebrate species typical of Southern California nearshore soft bottom habitats include polychaete worms (e.g., *Diopatra spp., Loimia medusa, Pista pacifica*), sand dollars (*Dendraster excentricus*), crabs (*Heterocrypta occidentalis, Portunis xantusii, Randallia ornata*), hermit crabs (*Pagurus spp., Pagurites spp*.), marine snails (*Nassarius fossatus, Olivella biplicata, Polinices spp*.), clams (*Ensis spp*.), armored sea stars (*Astropecten armatus*), tube anemones (*Harenactis attenuata, Zaolutus actius*), sea pens (*Stylatula elongata*), and sea pansies (*Renilla kollikeri*) (MEC 2002, Thompson et al., 1993).

Figure 4-10 Surfgrass Survey



Fish commonly found over shallow sandy subtidal habitat (less than 30 ft or 9m) in southern California include California halibut (*Paralichthys californicus*), speckled sanddabs (Citharichthys *stigmaeus*), barred surfperch (*Amphistichus argenteus*), white croaker (*Genyonemus lineatus*), bat ray (*Myliobatus californica*), and shovelnose guitarfish (*Rhinobatos productus*) (MEC 2002, SANDAG 2000). Northern anchovy (*Engraulis mordax*), jack mackerel (*Trachurus symmetricus*), Pacific bonito (*Sarda chiliensis*), and topsmelt (*Athernops affinis*) are commonly encountered in the water column just beyond the surf zone (MEC 2002, SANDAG 2000).

The proposed borrow site offshore Oceanside (SO-9) was described by SANDAG (2000). The proposed borrow site consists of sand bottom habitat at between 45 and 60 ft (14 and 18 m) water depth. Fishes and invertebrates found in the vicinity of the Oceanside borrow site are typical of these depths on southern California offshore soft bottoms (SANDAG 2000). The most abundant invertebrate taxa identified for the Oceanside borrow site include several species of polychaete worms (*Diopatra* spp., *Euclymeninae* sp., *Melinna oculata*, *Metasychis disparidentatus*, *Paraprionospio pinnata*, *Petalodymene pacifica*, *Pista disjuncta, Spiophanes missionensis, Streblosoma* sp.) and the amphipod *Ampelisca cristata* (SANDAG 2000). Abundant fish species include longfin sanddab (*Citharichthys xanthostigma*), barred sand bass (*Paralabrax nebulifer*), California halibut, California lizardfish (*Synodus lucioceps*), and fantail sole (*Xystreurys liolepis*) (SANDAG 2000).

4.4.2.5 Essential Fish Habitat

In accordance with the 1996 amendments to the Magnuson-Stevens Fishery Management and Conservation Act, an assessment of Essential Fish Habitat (EFH) was conducted for the proposed Project. NOAA Fisheries provided conservation recommendations during the public comment period and these recommendations are addressed in Section 14.0 of this Final EIS/EIR. The Project is located within an area designated as EFH for two Fishery Management Plans (FMPs): Coastal Pelagic Species Fishery Management Plan and Pacific Coast Groundfish Fishery Management Plan. Many of the 86 species federally managed under these plans are known or expected to occur in the area and could be affected by the proposed Project. All of the five species managed under the Coastal Pelagic Species Fishery Management Plan are likely to occur in the Project area. These pelagic species are northern anchovy, Pacific sardine (*Sardinops sagax)*, Pacific mackerel (*Scomber japonicus*), jack mackerel, and market squid (*Loligo opalescens*). Approximately 16 species managed under the Pacific Coast Groundfish Fishery Management Plan are likely to occur in the Project area. These species include leopard shark (*Triakis semifasciata*), big skate (*Raja binoculata*), spiny dogfish (*Squalus acanthias*), cabezon (*Scorpaenichthys marmoratus*), four species of flatfish (*Pleuronichthys decurrens, Microstomus pacificus, Pleuronectes vetulis, Citharichthys sordidus*), and at least eight species of rockfish (*Sebastes chrysomelas, S. auriculatus, S. caurinus, S. rastrelliger, S. atrovirens, S. serranoides, S. serriceps and Scorpaena guttata*).

4.4.2.6 Birds

A diverse variety of resident and migratory seabirds and shorebirds are commonly observed along southern California beaches and offshore waters. Seabirds, such as pelicans, terns, and cormorants, forage for fish in the nearshore ocean. Gulls and shorebirds utilize sandy upper tidal beaches as roosts. Gulls feed on fish and invertebrates, particularly near the edge of the kelp canopy. Shorebirds probe for invertebrates in the damp sands of the middle and low intertidal zones, and some species also forage for small fish and invertebrates in the rocky intertidal. Kelp and surfgrass that have washed ashore harbor invertebrates provide good foraging areas for gulls and shorebirds.

The seabirds that are most commonly observed along the beaches and ocean waters offshore of Orange and San Diego counties include Heerman's gull (*Larus heermanni*), ring-billed gull (*L. delawarensis*), western gull (*L. occidentalis*), California brown pelican (*Pelecanus occidentalis californicus)*, surf scoter (*Melinita perspicillata*), terns (*Sterna spp*.), grebes (*Podicipedidae*), and double-crested (*Phalacrocorax auritus*), and pelagic (*P. pelagicus*) cormorants (Chambers Group 2002, MEC 2002).

A variety of shorebirds would be expected to use the beach in the vicinity of San Clemente Pier. Commonly observed species include the following shorebirds: marbled godwit (*Limosa fedoa*), sanderling (*Calidris alba*), whimbrel (*Numenius phaeopus*), willet (*Catoptrophorus semipalmatus*), black-bellied plover (*Pluvialis squatarola*), western sandpiper (*Calidris mauri*), and least sandpiper (*Calidris minutilla*) (McConnaughey and McConnaughey 1988, Chambers Group 2002, MEC 2002).

4.4.2.7 Marine Mammals (Non-Endangered)

The marine mammals that occur in the Southern California Bight have been described in detail in previous studies and environmental documents (e.g., Bonnell et al. 1981, 1983; Bonnell and Dailey 1993; Dohl et al. 1981, 1983; ADL 1984; Barlow et al. 1995, 1997; Barlow and Gerrodette 1996; Koski et al. 1998; DeLong and Melin 2000; Stewart and Yochem 2000). Although as many as 36 species of marine mammals inhabit or visit the Southern California Bight, including 6 species of pinnipeds (seals and sea lions), 29 species of cetaceans (whales, porpoises, and dolphins), and the sea otter, only about 6 species are expected to occur in the nearshore waters of the San Clemente study area on a regular basis. These include two pinnipeds, one whale, and three dolphin species (described below). Other species also may occur in the study area on an irregular basis.

California sea lion

The California sea lion (*Zalophus californianus*) ranges from British Columbia to Mexico. The current U.S. population size is estimated at 237,000-244,000 animals (Carretta et al. 2007). In the Southern California Bight, California sea lions currently breed on four islands: San Miguel, San Nicolas, Santa Barbara, and San Clemente. California sea lions are common along the California coast and occur within the project area.

Harbor seals

Harbor seals (*Phoca vitulina*) range from Mexico to the Aleutians. The North Pacific population is centered in Alaska (Hoover, 1988), and about 34,233 harbor seals are found in California

(Carretta et al. 2007). Peak harbor seal populations on land occur during the species' spring breeding and pupping season and early summer molt. Harbor seals forage relatively close to shore and occasionally “haul out” onto land at various times of the day for an indefinite period of time (Seaworld 2002). Harbor seals regularly haul out on large, exposed rocks south of the San Clemente sand placement site.

Gray Whale

Two separate populations of gray whales (*Eschrichtius robustus*) are recognized for the North Pacific: the eastern, or Californian, population and the Korean, or western, population (Le Duc et al. 2000). Gray whales also existed in the North Atlantic up to the 16th century, but this population became extinct probably due to whaling (Henderson 1984). The Californian population of gray whales migrates through southern California waters twice a year on its way between Mexican breeding lagoons and feeding grounds in the Bering Sea. The southbound migration through the Southern California Bight begins in December and lasts through February; the northbound migration is more prolonged, lasting from February through May with a peak in March (Bonnell and Dailey 1993). Gray whales are generally absent from southern California waters from August through November. Migrating gray whales generally travel along the near-shore shallow continental shelf within 2 mi (3 km) of the shoreline over most of the route (Graham 1989). This proximity to shore makes gray whales vulnerable to numerous threats by human activities, including industrial activities, oil exploration and extraction, shipping traffic, pollution, and whale-watching tourism (Crane 1992).

Bottlenose Dolphin

There are two California populations of bottlenose dolphins (*Tursiops truncatus*), coastal and offshore. Coastal bottlenose dolphins, which are the population that is most likely to occur in the study area, generally are found within approximately a mile (1-2 km) of shore, primarily from Point Conception south into Mexican waters. The coastal population appears to form small resident groups that range along the coastline, especially off Orange and San Diego counties (Weller and Defran 1989). The coastal population is estimated at about 323 animals (Carretta et al. 2007).

Pacific White-sided Dolphin

Pacific white-sided dolphins (*Lagenorhynchus obliquidens*) are found year-round in southern California and are widely distributed in the Southern California Bight. The distribution of this species shifts seasonally and they are most abundant in inshore waters in the spring and summer (Bonnell and Dailey 1993). They would be expected to occur occasionally in the project area at the borrow site and offshore the receiver site.

Common Dolphin

Short-beak common dolphin (*Delphinus delphis*) and long-beak common dolphin *D.bairdii*) are found year-round in southern California waters. The short-beak common dolphin is the most abundant cetacean off California, but generally occurs far offshore. The long-beak common dolphin is more likely to occur in nearshore waters. Either species may occasionally occur in the project area either at the borrow site or off the San Clemente receiver beach.

4.4.2.8 Wildlife

Wildlife species detected within the majority of the Project area are typical of the highly disturbed, heavily utilized sandy beach habitat. Shorebirds and seabirds are described above. Terrestrial wildlife that would be expected include American crows (*Corvus brachyrhynchos*), rock doves (*Columba livia*), and California ground squirrels (*Spermophilus beecheyi*).

Although the project reach is within heavily-urbanized downtown San Clemente, there are some canyons, including Linda Lane, the canyon between Cazador Land and Trafalgar Lane/Esplanade, and the canyon just south of T-street, that would be expected to support urban adapted mammals, including coyote (*Canis latrans*), gray fox (*Urocyon cinereoargenteus*), raccoon (*Procyon lotor*) and opossum (*Didelphis virginiana*). These mammals may occasionally wander onto the beach at night or early morning.

4.4.3 Special Status Listed Species

Section 7(c) of the ESA, as amended, requires that a federal agency request from the appropriate authority a list of threatened and/or endangered species present in an area of a proposed major federal action. Because of a lack of natural terrestrial habitat within the Project footprint, sensitive terrestrial plants and animals would not be expected to occur in the Project area. lists sensitive species with the potential to occur on the beach in the Project area or offshore in the vicinity of the borrow sites and/or the beach fill site. Potential impacts to these species are addressed in Section 5.4 of this joint EIS/EIR.

4.4.3.1 White Abalone (Federal Endangered)

In May 2001, white abalone (*Haliotis sorensoni*) became the first marine invertebrate to be listed as a Federal endangered species. White abalone is a mollusk that occurs on rocky habitat from Point Conception to Baja California at 80 to 200 ft (24 to 60 m) depths (Hobday and Tegner 2000). White abalone has been recorded in water as shallow as 25 ft (7.5 m) in the Santa Barbara Channel (Aspen 2005). White abalone typically is found in open low relief rock or boulder habitat surrounded by sand (Hobday and Tegner 2000). There has been a greater than 99 percent decline in both the abundance and density of white abalone in California since the 1970s (Hobday and Tegner 2000). The abalone fishery contributed to the decline of white abalone by overharvesting and reduced the density to the point where recruitment success has been unlikely. White abalone have a low potential to occur in the shallow subtidal habitat offshore San Clemente. Although this species has been found in water as shallow as 25 ft (7.5 m) off Santa Barbara, it generally is in water depths greater than 80 ft (24m) especially in the southern part of its range. No white abalone were observed during biological surveys of the Project area (CRM 2000).

Table 4-15 Special Status Listed Species that May Occur in the San Clemente Pier or Oceanside

Common Name	Scientific Name	Status	General Habitat	Distribution	Potential For Occurrence In Project Area
Invertebrates					
White Abalone	*Haliotis sorenseni*	FE	Open, low relief rock or boulder habitat surrounded by sand at 80 to 200 ft (24 to 60 m) depths (Hobday and Tegner 2000)	Point Conception to Baja California	Low
Fishes					
Southern steelhead	*Oncorhynchus mykiss*	FE (south of Point Conception)	Spawn in cool, clear, well-oxygenated streams. Higher-elevation headwaters are primary spawning and rearing areas. Southern steelhead likely have greater physiological tolerances to warmer water and more variable conditions.	The Southern California Evolutionarily Significant Unit of steelhead extends from the Santa Maria River to the U.S.-Mexico Border. Steelhead have recently been reported from San Mateo Creek on Camp Pendleton just south of San Clemente, and the Santa Margarita near the borrow site	Low
Birds					
Western snowy plover	*Charadrius alexandrinus nivosus*	FT	Beaches (migration and wintering)	Nests in sandy areas on beaches, bays and islands from Washington State to Baja California. Nearest nesting sites are on Camp Pendleton	Absent. Sea and Sage Audubon performed a 2010 winter survey; San Clemente Beaches were not included because beach habitat within the project placement footprint, as well as in Oceanside, are narrow and heavily used by people. Philip Unitt, San Diego Natural History Museum, Birds of San Diego County, Memoir 13, 1984, does not show snowy plovers in north portion of the county. California State Parks has tracked snowy plovers during winter window surveys and has driven San Clemente State Beach many times with zero plovers observed over the years (David Pryor, personal communication, February 2011).

Common Name	Scientific Name	Status	General Habitat	Distribution	Potential For Occurrence In Project Area
California least tern	*Sterna antillarum browni*	FE; SE (nesting colony)	Nearshore waters; breeding populations in California are restricted to coastal locations; forage close to their breeding colonies in bays, harbors, and nearshore ocean waters	Nesting occurs from the San Francisco Bay area to Baja California. Nearest nesting sites are on Camp Pendleton.	Absent Project would not occur when they are present in California

Notes:
FE = Federal Endangered
ST = State Threatened
FT = Federal Threatened
SE = State Endangered
Potential for Occurrence
Absent – species is restricted to habitats, environmental conditions or seasons that do not coincide with the project site or timing
Low – records for this species do not exist within the immediate vicinity of the site and/or habitats or environmental conditions needed to support the species are of low quality
Moderate - either an historical record exists of the species in the immediate vicinity of the site and marginal habitat exists on the site, or the habitat requirements and environmental conditions associated with the species occur within the site but no historical records exist of the species in the vicinity of the site
High- both historical records exist of the species within the site or its immediate vicinity and the habitat requirements and environmental conditions associated with the species occur on the site

4.4.3.2 Tidewater Goby (Federal Endangered)

The tidewater goby was listed as endangered on February 4, 1994, (59 FR 5498) and is categorized as a California Special Concern (CSC) species by CDFG. A recovery plan for this species was finalized in 2006 (USFWS 2005a), and critical habitat has been proposed (USFWS 2007b). Gobies are mostly coastal lagoon fishes that prefer shallow, usually brackish water (Love 1996). Primary tidewater goby habitat is found in small, shallow coastal lagoons that are separated from the ocean most of the year by beach barriers. This includes shallow areas of bays and areas near stream mouths in uppermost brackish portions of larger bays. The U.S. Fish and Wildlife Service designated critical habitat for the tidewater goby on November 20, 2000 (65 FR 69693-69717). Critical habitat includes stream channels and their associated wetlands, flood plains, and estuaries. Critical habitat within the vicinity of the San Clemente beach site includes San Mateo Creek and San Onofre Creek. Near the San Clemente Project area, populations of tidewater gobies, although highly variable in number, occur at San Mateo Creek and San Onofre Creek. Critical habitat onshore of the Oceanside borrow site includes Las Flores/Las Pulgas Creeks, Hidden Lagoon, Aliso Canyon, Cockleburr Canyon and the Santa Margarita River on Camp Pendleton as well as the San Luis Rey River near Oceanside Harbor. Within the last 10 years, tidewater gobies have been collected in Las Flores Creek, Hidden Lagoon, Aliso Canyon, and Cockleburr Canyon.

4.4.3.3 Steelhead Trout (Federal Endangered)

The effective date for listing the Southern California Evolutionarily Significant Unit (ESU) of west coast steelhead (*Oncorhynchus mykiss*) as endangered and the South Central California Coast ESU as threatened is October 17, 1997 (63 FR 32996). Steelheads from the Southern California ESU have already been extirpated from much of their historical range. There is a strong concern about the widespread degradation, destruction, and blockage of freshwater habitats within the region, and the potential results of continuing habitat destruction and water allocation problems. Total abundance of steelhead in the South-Central Coast ESU is extremely low and declining. Risk factors for this ESU are habitat deterioration due to sedimentation, and flooding related to land management practices.

Steelheads, like all salmon, need clean, cool water with plenty of oxygen and low amounts of suspended solids and contaminants. They also need gravel and rocks to spawn. Fine sediment is lethal to steelhead. Steelheads also require large, woody debris and deep pools in the river, which provide refuge from predators and resting places during storms. San Mateo Creek is the nearest occurrence of steelhead near the San Clemente Project. Historically, San Mateo Creek was one of the most productive streams for southern steelhead. In a report to NOAA Fisheries, the U.S. Marine Corps Base, Camp Pendleton (MCBCP) in coordination with the CDFG determined that San Mateo Creek in northern San Diego County still supports a small population of the southern California steelhead. This is based upon field surveys completed in 2003 by biologist from MCBCP and CDFG (S. Glowacki, pers. comm. 2004). Even though this steelhead population is relatively small, large adults were found. Southern steelhead also has been found in the Santa Margarita River near the borrow site.

4.4.3.4 California Brown Pelican (Federal and State Endangered)

The California brown pelican was delisted from the Federal endangered species list on November 17, 2009 by the U.S. Fish and Wildlife Service (74 FR 59443); it was delisted from the State endangered species list in a vote by Fish and Game Commission in February 2009

4.4.3.5 California Least Tern (Federal and State Endangered)

The California least tern was listed as endangered on October 13, 1970, (35 FR 16047) and State listed as endangered in June 27, 2004. A recovery plan for the species was published in 1980 (USFWS 1980), and was revised in 1985 (USFWS 1985). Critical habitat was never designated. The breeding range of the California least tern population occupies specific localized breeding colonies from about April to September each year. Colonies are usually in close proximity to a lagoons or estuary or river confluences with the ocean environs where they obtain most of the small fish they consume, although they may also forage up to 2 to 3 mi (3.2 to 4.8 km) from the beach in the near shore. Large numbers of least terns breed on the Marine Corps Base Camp Pendleton (MCBCP), 12 to 14 miles south of the Project area. In 2006, there were 1,423 nesting pairs of least terns at MCBCP (Marschalek 2007). Most of these (1,265 pairs) documented in the 2006 breeding survey were at the mouth of the Santa Margarita River. The nearest colonies to the Project area were at White Beach, approximately 14 mi (22 km) south of the proposed beach fill site, where 137 pairs bred in 2006 and at Red Beach, approximately 12mi (19 km) south of the Project site where 21 pairs bred (Marschalek 2007). The Oceanside borrow site is within the foraging range of the Santa Margarita River colony.

Least terns are known to use the near shore waters for foraging as they make their northbound and southbound migration treks. There are no known records of least terns using the San Clemente Pier sandy beach habitat for nesting or for night roosts.

4.4.3.6 Western Snowy Plover (Federal Threatened)

The coastal population of the western snowy plover was listed as threatened in the Federal Register on March 5, 1993, (58 FR 12864) and is a CSC. A recovery plan for this species was finalized in 2007 (USFWS 2007a). Designation of critical habitat was published in the Federal Register on December 7, 1999, (64 FR 68507) and last revised in 2005 (USFWS 2005b). This population is defined as those individuals that nest adjacent to tidal waters, and includes all nesting birds on the mainland coast, peninsulas, offshore islands, adjacent bays, estuaries, and coastal rivers. The breeding range of the threatened population extends along the Pacific coast of North America from southern Washington to southern Baja California, Mexico. The winter range is somewhat broader and may extend to Central America (Page et al. 1995); however, most plovers winter south of California.

The nesting habitat of the coastal population is mainly dune-backed beaches, barrier beaches, salt flats, and salt evaporation ponds. Habitat of wintering birds includes beaches where nesting is not known to occur. In the U.S., over 150 currently used or historical nesting and/or wintering areas have been identified, most of which (about 85 percent) are in California. Snowy plovers do not nest within the Project area, which consists of beaches subjected to a high degree of human use. San Onofre Beach, approximately 5 miles south of the proposed Project area, in northern San Diego County, has been designated as Critical Habitat for the western snowy plover (USFWS 2005b). Snowy plovers nest on MCBCP at White Beach (approximately 14 mi [22 km] south of the Project area) and the Santa Margarita River (about 16 mi [26 km] south of the beach fill area) (Powell et al. 2002).

The coastal population consists of both resident and migratory birds. Some birds winter in the breeding areas, while others migrate north or south to wintering areas. Current population data for California is 1,444 adult plovers.

Sea and Sage Audubon performed a 2010 winter survey; San Clemente Beaches were not included because beach habitat within the project placement footprint, as well as in Oceanside, are narrow and heavily used by people. Philip Unitt, San Diego Natural History Museum, Birds of San Diego County, Memoir 13, 1984, does not show snowy plovers in north portion of the county. California State Parks has tracked snowy plovers during winter window surveys and has driven San Clemente State Beach many times with zero plovers observed over the years (David Pryor, personal communication, February 2011).

4.4.3.7 Xantus' Murrelet (State Threatened)

Xantus' murrelet range from Baja California to Oregon and Washington (National Geographic 2001). Xantus' murrelets are common spring and summer residents to the Channel Islands and nearshore islands and offshore mainland waters (Lehman 1994). They nest colonially in only 12 to 15 locations, including Santa Barbara, Anacapa, San Miguel, Santa Catalina, San Clemente, and Santa Cruz islands. Santa Barbara Island contains the largest breeding concentration of this species in the world (McChesney et al. 2000, Burkett et al. 2003). An effort to remove black rats from Anacapa Island has re-established nesting by Xantus' murrelets there. This species forages throughout the SCB from these nest sites, particularly in the area between Santa Barbara and Santa Catalina islands and the mainland, but densities are low (Mills et al. 2005). They are rarely seen close to shore in Orange County (Hamilton and Willick 1996). Unitt (1984) mentions a few sightings off Point Loma that might be less than 0.5 mi (0.8 km) from shore, but it is not explicitly stated. Unitt states that many sightings are not distinguished between Xantus's and Craveri's murrelets, but it is most likely that they are Xantus's rather than Craveri's because Xantus's are much more common in the SCB (Harry Carter, pers. comm., 10 March 2008).

4.4.3.8 Listed Marine Mammals

Two species of pinniped designated as Federal Threatened and six species of Federal Endangered whales have an unlikely potential to occur in the nearshore waters off San Clemente and Oceanside. The threatened pinnipeds are the Guadalupe fur seal (*Arctocephalus townsendi*) and the Stellar sea lion (*Eumetopias jubata*). The Endangered whales are blue whale (*Balaenoptera musculus*), sei whale (*B. borealis*), fin whale (*B. physalus*), humpback whale (*Megaptera novaeangliae*), northern right whale (*Eubalaena glacialis*), and sperm whale (*Physeter macrocephalus*). The presence of any of these species within the project area is not expected.

4.4.4 Conservation/Habitat Management Plan

San Clemente is within the Orange County Southern Subregion Natural Communities Conservation Plan (NCCP). The purpose of the Southern NCCP is to protect designated open space and conserve identified listed and unlisted species (Covered Species) and associated vegetation communities, including upland, aquatic and riparian resources (Conserved Vegetation Communities), through the long-term management of the natural communities that provide habitat essential to the survival of these wildlife and plant species. The Southern NCCP/ Master Streambed Alteration Agreement/ Habitat Conservation Plan (Southern NCCP/MSAA/HCP) has been prepared by the County of Orange in cooperation with the CDFG and the USFWS in accordance with the provisions of the State Natural Community Conservation Planning Act of 1991, Sections 1600 et seq. of the California Fish and Game Code, and the Federal Endangered Species Act (ESA).

4.5 Cultural Resources

Cultural resources include prehistoric archaeological sites, historic archaeological sites, and historic structures, and consist of artifacts, food waste, structures, and facilities made by people in the past. Prehistoric archaeological sites are places that contain the material remains of activities carried out by the native population of the area (Native Americans) prior to the arrival of Europeans in southern California. Artifacts found in prehistoric sites include flaked stone tools such as projectile points, knives, scrapers, and drills; ground stone tools such as manos, metates, mortars, and pestles for grinding seeds and nuts; and bone tools, such as awls. Prehistoric sites and features include hearths, bedrock mortars, rockshelters, rock art, and burials.

Historic archaeological sites are places that contain the material remains of activities carried out by people during the period when written records were produced after the arrival of Europeans. Historic archaeological materials usually consist of refuse, such as bottles, cans, and food waste, deposited near structure foundations. Archaeological investigation of historic period sites is usually supplemented by historic research using written records. Historic structures include houses, commercial structures, industrial facilities, and other structures and facilities more than 50 years old.

4.5.1 Regulatory Setting

4.5.1.1 Federal Level

Section 106 of the National Historic Preservation Act of 1966 (NHPA) requires federal agencies to take into account the effects of their undertakings on cultural resources eligible for the National Register of Historic Places (National Register). The action must demonstrate compliance with the NHPA, Public Law 89-665; 16 U.S.C. 470-470m, as amended, 16 U.S.C. 460b, 470l-470n, and 36 CFR 800, as amended (August 5, 2004).

Cultural resources are identified using two principal methods. Before starting, a project, a records and literature search is conducted at repositories of archeological site records. The search may show that an archeological or historical survey has been conducted in the project area and that cultural resources have been identified. That information may be enough to proceed with the significance evaluation stage of the project. If no previous survey has been done, or if a previous survey was either out of date or inadequate, a pedestrian survey of the ground surface within the proposed project boundaries may be conducted. Subsurface testing may also be performed if deemed appropriate by the cultural resources professional.

After a cultural resource(s) has been identified during a survey or record and literature search the federal agency overseeing the undertaking proceeds to determine whether the cultural resource is eligible for listing in the National Register of Historic Places (National Register). Section 106 of the National Historic Preservation Act mandates this process. The Federal Regulation that guides the process is found at 36 CFR 800.

For a cultural resource to be determined eligible for listing in the National Register it has to meet certain criteria. The resource has to be either minimally 50 years old or exhibit exceptional importance. After meeting the age requirement, cultural resources are evaluated according to four criteria: a, b, c, and d. The National Register criteria for evaluation as defined in 36 CFR 60.4 are:

The quality of significance in American history, architecture, archeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association and

a. that are associated with events that have made a significant contribution to the broad patterns of our history; or
b. that are associated with the lives of persons significant in our past; or
c. that embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
d. that have yielded, or may be likely to yield, information important in prehistory or history.

After a cultural resource has been determined eligible for inclusion in the National Register, it is accorded the same level of protection as a property that is included. It then becomes formally known as a “historic property” regardless of age.

4.5.1.2 State Level

Like NEPA, the CEQA also considers the effects of a project on cultural resources. CEQA applies to all projects undertaken by a public agency (State or Local), any special district (e.g., a school district), and any public college or university. The CEQA Guidelines are the implementing measures for CEQA. The CEQA Guidelines §15064.5 (14 California Code of Regulations [CCR]) indicate a project may have a significant environmental effect if it causes “substantial adverse change” in the significance of an “historical resource” or a “unique archaeological resource” as defined or referenced in 14 CCR §15064.5(b,c) (1998). Such changes include “physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings such that the significance of an historical resource would be materially impaired” (14 CCR §15064.5 [b]).

Cultural resources are identified and evaluated for listing in the California Register of Historic Resources (California Register). Cultural resources that have been determined eligible for listing in the California Register are referred to as “historical resources”. CEQA (PRC Sections 21002(b), 21083.2, and 21084.1) recognizes historical resources as part of the environment. The California Register is an authoritative guide to the State’s historical resources and to which properties are considered significant for purposes of CEQA. The California Register Criteria of Significance are similar to that of the National Register. An historical resource must be significant at the Local, State, or national level, under one or more of the following four criteria:

1. It is associated with events that have made a significant contribution to the broad patterns of local or regional history, or the cultural heritage of California or the United States; or
2. It is associated with the lives of persons important to local, California, or national history; or
3. It embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of a master, or possesses high artistic values; or
4. It has yielded, or has the potential to yield, information important to the prehistory or history of the local area, California, or the nation.

4.5.1.3 Local Level

The City of San Clemente’s General Plan addresses historical resources in its Cultural Resources Element, adopted in 1993. The City of San Clemente also is a Certified Local Government under the NHPA. As a result, San Clemente is required to maintain a system for inventory and survey of historic properties that is consistent with the California Office of Historic Preservation guidelines. The City of San Clemente uses California Register criteria for making determinations of significance (http://san-clemente.org/sc/standard.aspx?pageid=439), accessed January 8, 2008).

4.5.2 Area of Potential Effects (APE)

For the purpose of identification of existing cultural resources for this Project, the Project’s APE includes three non-contiguous areas, which are located both onshore and offshore. The onshore portion of the APE includes the approximately 3,411 ft (1,040 m) long and 82 ft (25 m) wide strip of shoreline centered around the San Clemente Municipal Pier from approximately the Marine Safety Headquarters building to just south of the T-Street overpass. The offshore portion of the APE includes the offshore borrow site, Area 2, located off the coast of Oceanside.

Local prehistory and history are briefly summarized here in order to provide a context for further discussion of the known archaeological and historical remains within the APE and vicinity.

4.5.3 Cultural Context

This section summarizes the archaeology within and adjacent to the southern California coastline from Doheny State Beach to San Mateo Point. A variety of different regional chronologies, often with overlapping terminology, have been used in coastal southern California, and they vary from region to region. Today, the prehistory of Orange County is generally divided into three major temporal periods: Paleoindian, Archaic, and Late Prehistoric. These time periods are characterized by patterns in material culture that are thought to represent distinct regional trends in the economic and social organization of prehistoric groups. In addition, particular scholars referring to specific areas utilize a number of cultural terms synonymously with these temporal labels. For example, Warren (1968) in reference to the southern California coast and specifically Orange County prefers Encinitas Tradition for Archaic and Shoshonean for Late Prehistoric.

4.5.3.1 Paleoindian Period

The antiquity of human occupation in the New World has been the subject of considerable debate over the last few decades. The currently accepted model is that humans first entered the western hemisphere between 12,000 and 15,000 years B.P. (before present). There is currently no firm evidence of human occupation in coastal southern California prior to 12,000 B.P. Thus, this period begins with the first evidence of human occupation and ends with the extinction of Pleistocene game around 9,000 B.C. (before Christ). No Paleoindian period sites are known within Orange County, but several have been found in San Diego County. Warren (1968) named this local cultural tradition the San Dieguito Tradition. The artifact assemblage for this period consists mostly of lithic (stone/rock) artifacts: large projectile points, scrapers, and choppers. Paleoindian subsistence was based on the hunting of large Pleistocene game. Social groups/families would have stayed with a major kill as until it was depleted of all its nutritional and functional value. Researchers argue that such an economy could only support groups no larger than extended families. Around 9,000 B.C. the Pleistocene Epoch ended, and the large game animals became extinct. No longer able to continue their big game hunting tradition, the Paleoindian people were forced to utilize other resources to meet their economic needs.

4.5.3.2 Archaic Period

The Archaic period is commonly subdivided into Early (9,000-6,000 B.C.), Middle (6,000-4,000 B.C.), and Late Archaic period (4,000-2,000 B.C.). In addition, Wallace (1955) refers to this as Horizon II Milling Stone, and Warren (1968) calls it the Encinitas Tradition. Subsistence during the Early Archaic came primarily from plants and small animals, fishing, and shellfish. By the Middle Archaic, hard seeds were included in the diet as evidenced by the abundance of manos and metates found within these sites. By the Late Archaic, social groups grew in numbers and became more sedentary. Groups migrated seasonally depending on food availability rather than randomly following game animals.

4.5.3.3 Late Prehistoric Period

The Late Prehistoric period is generally considered to have begun between 1,300 and 800 years ago (Moratto 1984). In general, this period has been characterized by the appearance of small pressure flaked arrow points (Cottonwood Triangular and Desert Side-notched points) indicative of bow and arrow technology, the appearance of ceramics, the replacement of flexed inhumations with cremations, the possible appearance of the mortar and pestle, and an emphasis on inland plant food collecting and processing, especially of acorns. In addition, sedentary villages with populations of up to 1,500 persons along with decorated tools and ornaments are attributed to this period. Warren (1968) called this period Shoshonean; named after the migration of Shoshonean-speakers, known as the Shoshonean wedge, to mostly what is now Orange County from the inland deserts about 1,500 years ago. Researchers have recorded this migration to the origin of the Late Prehistoric period. Following this influx of new people, the tribal landscape in the Southern California Coastal regions was altered by differentiation of tribes into the discrete cultural groups that were present at the time of European contact (Wallace 1955).

4.5.3.4 Post-Contact Native American Ethnohistory

The Post-Contact period began in 1769 A.D. (after Christ), when Gaspar de Portola led an overland expedition from San Diego to Monterey, CA. The first permanent settlement in Orange County came when San Juan Capistrano was selected as the site for a mission in the spring of 1775. The establishment of the San Juan Capistrano Mission in 1776 and the San Luis Rey de Franciscan Mission in 1798 further impacted traditional coastal settlement systems. Acculturation, assimilation, and the introduction of Old World diseases greatly disrupted and reduced Native American populations, and by the early 1800s traditional coastal villages were largely abandoned.

This Project area falls primarily within the territory of the Juaneño Tribe. They are known as the Juaneño because of their association and proximity with the San Juan Capistrano Mission. According to Bean and Shipek (1978), the Juaneño and Luiseño are considered to be ethnologically and linguistically the same, but have been subdivided due to missionization during the Spanish period. Today, the Juaneño Indians have distinguished themselves by gaining State recognition and seeking Federal recognition as a discrete Indian tribe.

Our knowledge of California Indian life prior to European contact is based mostly on knowledge gained from archaeological investigations. Since California tribes were generally peaceful and did not offer warlike resistance to European settlers, they did not receive the notoriety more aggressive groups enjoyed. In addition, consequently American researchers became interested in Indian ethnohistory only after their pre-contact cultural traditions and languages were virtually destroyed. As a result, we know very little about traditional coastal life, except what can be gleaned from mission records. Nineteenth and Twentieth century ethnohistoric reconstructions provide only minimal insight into coastal adaptations.

Father Boscana’s “Chinigchinich” is, in the words of Kroeber, “the most intensive and best written account of the customs and religion of any group of California Indians in the mission days” (1925:636). The Juaneño practiced puberty rites and mourning rituals. Both these ceremonies were held within a sacred, enclosed structure called the Wankech. Uninitiated persons were not allowed to enter this structure, and once inside voices were kept to a whisper. The structure contained an altar consisting of an effigy of the god Chinigchinich and a sand painting. According to Brown, "the center of the Juaneño religion was Chinigchinich, the last of a series of heroic mythological figures. The heroes were originally from the stars, and the sagas told of them formed the Juaneño religious beliefs" (1997).

Puberty rites were practiced for both boys and girls. Male initiation included the use of datura, a hallucinogen, in order to "see" the animal that would help protect them from future dangers. The animal was usually a coyote, bear, crow or raven, or a rattlesnake. Female initiation required that the girl fast and lie in a pit lined with heated stones for several days while older women sang and younger women danced around her. The mourning ceremony consisted of cremating the decedent usually just hours after death. The pyre was lit by a designated individual who obtained this privilege by descent. The Juaneño had medicine men or shamans, but very little is known about them or their practices. In addition, the Juaneño used a calendar. According to Kroeber, "ten months were named…the year was definitely divided by the solstices…the month or moon in which the solstice fell was somewhat longer than the others, after which there followed four regular lunations…nothing like this attempt to combine a lunar and solar count has yet been reported from any other people in California" (1925:644). The office of chief was inherited from paternal lineage.

4.5.3.5 Euro-American History

The Hispanic era in California's history includes the Spanish Colonial (1769-1820) and Mexican Republic (1820-1846) periods. This era witnessed the transition from a society dominated by religious and military institutions consisting of missions and presidios to a civilian population residing on large ranchos or in pueblos.

By the early 1820s, California came under Mexico's rule, and in 1834 the missions were secularized. This resulted in political imbalance and Indian uprisings against the Mexican rancheros. Secularization of mission lands began shortly after the declaration of Mexican Independence in 1821. Nine thousand acres of land, including the area of San Clemente, were granted to Filipe Carrillo in 1846 as Rancho Los Desaechos (Brown 1997). Carrillo failed to submit his claim to the U.S. Land Commission after the United States took possession of the area from Mexico, and as a result the rancho changed hands several times (Brown 1997).

Named after one of the offshore southern Channel Islands, the city of San Clemente was founded by a former mayor of Seattle, Ole Hanson, in 1925 (Brock 1985). San Clemente was among the first master planned communities built from totally open land in the United States. Before erecting a single structure on the rolling coastal hills, Ole Hanson laid out an expansive plan based on the Spanish Colonial architectural style including restaurants, a clubhouse, residences, public parks, a public pool, a fishing pier, and even equestrian trails. Hanson's residential community, promoted as "The Spanish Village," featured wide, meandering streets that conformed to the contours of the hills, houses situated to provide an ocean view, and mandatory white stucco exteriors and red tile roofs for every building. San Clemente was incorporated in 1928 and grew rapidly until the Depression, when development halted. The growth rate picked up again during the 1950s and was later boosted by construction of the San Diego Freeway.

Today, the Spanish Village by the Sea is more heterogeneous than Hanson had envisioned, but historic homeowners and current planning and development all reflect increasing esteem for his red-roofed, white-walled Spanish architecture dream. Historic homeowners must abide by city codes that protect the aesthetic spirit and style of early San Clemente. New development east of the Interstate 5 freeway now elevates Spanish Colonial Revival architecture to new interpretations, incorporating red roofs, balconies, and promenades as the demographics of San Clemente shift and new residents are drawn to the Mediterranean charm of this community. Perhaps the best example of San Clemente's increasing appreciation for its past is the restoration underway at the Casa Romantica, which was Ole Hanson's bluff top home at the time of the City's founding. The Casa Romantica was completed in 1928, and after Hanson lost it to the bank during the Great Depression, the Casa passed through various owners. The wear and tear of time and neglect took its toll, and at one point the outstanding landmark seemed destined for demolition. Fortunately, a group of local activists pushed hard for the Casa Romantica's rescue and directed its destiny away from commercial alternatives and toward a use that will benefit all of the community—that of a Cultural Center and Gardens.

4.5.4 Records and Literature Search Results

In 2002, the USACE (Lydia Lopez-Cruz) conducted a cultural resources records search of the APE and vicinity through the California Historical Resources Information System at the South Central Coastal Information Center (CHRIS-SCCIC) at California State University, Fullerton, to determine if the APE (1) has been surveyed for cultural resources; and (2) contains any recorded cultural resources or historic properties. Ms. Lopez-Cruz reviewed the California Office of Historic Preservation's Historic Resources Inventory, which includes the National Register of Historic Places, California Register of Historical Resources, State Historic Landmarks, and Points of Historic Interest listings.

The records search results indicate that the APE has not been surveyed for cultural resources. In 1997, RMW Paleo Associates, Inc., conducted a cultural resources survey for the pedestrian and bicycle path located within the Atchison Topeka and Santa Fe Railroad right of way immediately adjacent to the APE (Brown 1997). No cultural resources were identified during this survey.

CHRIS-SCCIC records indicated that no recorded cultural resources or historic properties have been recorded within the APE. While no sites have been recorded within the Project area, three prehistoric shell midden sites (CA-ORA-101, -102, and -103) and one isolated piece of basalt flaked stone (30-100074) have been recorded within the Project area vicinity (

Table 4-15).

Table 4-15 Summary of Recorded Archaeological Resources within Project Vicinity

Resource	Description	Location (mi)*	Evaluated for NR?	Reference
CA-ORA-101	Shell midden	1.0 SE	No	Smethe 1954
CA-ORA-102	Shell midden, village site, manos, bowls	1.2 SE	No	Waldeck 1948
CA-ORA-103	Shell midden, hammerstone, manos	1.2 SE	No	Waldeck 1948
30-100074	Basalt denticular flake	1.6 NW	N/A	Maxon 1996

**Distance from San Clemente Municipal Pier*

In addition, the National Register lists two properties located in the Project area vicinity: Casa Romantica and San Clemente Beach Club. These historic properties are described in Table 4-16 below.

Table 4-16 Summary of National Register Properties within Project Vicinity

Resource	Address	Location (mi)*	Date listed on NR
Casa Romantica	415 Avenida Granada	0.2 N	1991-12-27
San Clemente Beach Club	Avenida Boca De La Playa	0.9 N	1981-04-09

**Distance from San Clemente Municipal Pier*

One locally significant historic resource is located within the Project area: the San Clemente Municipal Pier (Figure 4-11). The City's original pier was designed by engineer William Ayer and constructed by the City of San Clemente in 1928 (HRG 2006). This pier was demolished by storms in 1939. William Ayer designed a new pier which was built in 1940; this pier was severely damaged by storms in 1983. As a result, the pier was substantially reconstructed after this storm event. Therefore, the extant pier structure does not retain much original construction material, but it does retain the same form and appearance of the original 1928 pier. In 2006, the City of San Clemente commissioned a historic resources survey update in order to update its Historic Structures list (HRG 2006). At this time, the San Clemente Municipal Pier was formally recorded and evaluated by Historic Resources Group, Inc (HRG 2006). HRG determined that the Pier was eligible at the local level under criterion A, and it is listed on the City's Historic Structures List. The USACE has determined that Pier is not eligible for listing in the California Register or National Register.

Figure 4-11 Overview of San Clemente Municipal Pier (looking west)

In order to assess the cultural sensitivity of the offshore portions of the APE (i.e., Offshore Borrow Areas 1 and 2), the USACE (Amy M. Holmes) contacted nautical archeologist Heather MacFarlane of MacFarlane Archaeological Consultants in Ventura, California. Ms. MacFarlane consulted her personal database of submerged resource information for the southern California coast and consulted with Mr. Jeff Carothers of FUGRO West, a geosciences and marine survey firm. Areas 1 and 2 have not been surveyed for submerged cultural resources. In 2002, FUGRO West performed a borrow site survey for the USACE between the shore and the eastern edge of Area 1; this survey did not cover Area 1.

Area 1 has low sensitivity for submerged resources, as no known historic shipwrecks are within the boundaries of Area 1. Area 2 is moderately sensitive for submerged cultural resources, as there is a cluster of seven historic shipwrecks within Area 2 or its vicinity (Personal Communication, Heather MacFarlane, January 10, 2008).

4.5.5 Pedestrian Survey Results

On January 3, 2008, the USACE (Amy M. Holmes) conducted a pedestrian survey of the onshore part of the APE. This included an inspection of the beach shoreline and bike path from the San Clemente Metrolink Station south to the T-Street overpass. Ms. Holmes inspected the ground surface for cultural resources. In addition, Ms. Holmes inspected the San Clemente Municipal Pier and the proposed construction staging areas in its vicinity.

Besides the historic San Clemente Municipal Pier, no cultural resources were relocated or identified during the pedestrian survey of the onshore part of the APE. This area has been disturbed by the placement of imported beach sands, the railroad, and the hike and bike path, paved driveways, and other associated infrastructure such as utility lines.

4.5.6 Native American Consultation

On January 7, 2008, the USACE contacted the California Native American Heritage Commission (NAHC) requesting that they perform a search of their Sacred Lands File in order to identify any Native American cultural sites inside or within the vicinity of the APE. The NAHC provided a list of Native American contacts that are affiliated with the San Clemente area. Copies of the public draft of this document were sent to representatives of the Juaneño people named on NAHC's Native American Contact List for review and comment. No comments were received during the comment period.

4.5.7 Section 106 Consultation and Coordination

In accordance with 36 CFR 800.3, the USACE sent an initial letter, the Public Draft EIS/EIR, and will send the Final EIS/EIR to the California State Historic Preservation Officer (SHPO) and Native American Tribes, including the Juaneno Band of Mission Indians, named by the NAHC advising them of this proposed Project and the Corps' determinations.

4.6 Ground and Vessel Transportation

Local streets, roads and railway transport methods will not be used in the proposed Project except for construction crew commuting to and from the Project site. Instead, offshore collection locations of beach replenishment material will be made available via offshore gathering of oceanographic deposition. This will be accomplished utilizing collection barges.

4.6.1 Ground Transportation

4.6.1.1 Major Highways

Interstate 5 (I-5), which is a primary transportation link between Los Angeles and San Diego counties, runs in a north-south direction parallel to the coastline, ranging approximately 0.5 to 1.25 mi (0.8 to 2.01 km) inland from the coast. I-5 is designated a freeway through San Clemente and consists of eight travel lanes. El Camino Real (or U.S. Highway 101) runs parallel to the Pacific Ocean coastline in a north-south orientation ranging approximately 315 ft to 1,600 ft (96 to 483 m) from the coast. El Camino Real is a four-lane roadway designated a secondary roadway.

The principal access route to the San Clemente Pier from I-5 is via local streets, following either West Avenida Palizada or Avenida Presidio to El Camino Real to Avenida Victoria. Other local streets that lead to Avenida Victoria include Avenida Del Mar and Avenida Rosa. Principal access to Linda Lane Park (Park) (approximate northern boundary of Project site) is via West Avenida Palizada or Camino Del Mar to Encino Lane, with parking at the Park. Principal access to T-Street beach (approximate southern boundary of Project site) is via El Camino Real to Trafalgar Lane to Esplanade, with parking on West Paseo de Cristobal. Table 4-17 provides the average daily traffic for local roadways leading to the Project site.

Table 4-17 Average Daily Traffic (ADT) along Local Roadways

	ADT
El Camino Real	
Between Avenida Palizada and Avenida Cabrillo	19,000
Between Avenida Cabrillo and Avenida del Mar	17,000
Between Avenida del Mar and Paseo del Cristobal	15,000
Avenida Palizada	
Between I-5 and Avenida de la Estrella	22,000
Between Avenida de la Estrella and El Camino Real	19,000
Avenida del Mar Between El Camino Real and Ola Vista	6,000
Avenida Victoria Between El Camino Real and Ola Vista	5,000
Ola Vista Between Avenida Palizada and Paseo del Cristobal	3,000

Source: City of San Clemente 2007

4.6.1.2 Rail System

The rail corridor provides a major source of commuter travel for the entire South Pacific portion of southern California. Commuter rail stops at San Clemente Pier include two daily Amtrak trains between late April and October and weekend and holiday service year round, as well as two Metrolink weekend train stops. Presently, rail service safety requires occasional preventative maintenance in the form of monitoring the rail bed for erosion and utilizing riprap to prevent erosion. According to OCTA, it has been necessary to place riprap along the most critical segment between North Beach and the Marine Safety Building to decrease wave erosion impacts. Crews are dispatched during high tide and story conditions to visually inspect the track for damage that could cause derailment. This railroad is a vital transportation link for passenger and freight service. Furthermore, the Department of Defense has designated this right-of-way as a Strategic Rail Corridor with great significance to National Defense. Continued erosion along the San Clemente shoreline would lead to further disruption of rail service, National Security issues, and transportation delays.

4.6.2 Vessel Transportation

Commercial boats, fishing boats, and recreational vessels currently traverse the overall Project area between the coasts of Orange and San Diego counties. Most vessels operate out of Dana Point Harbor, approximately 5.5 mi (8.9 km) upcoast of the Project site, and Oceanside Harbor, approximately 20 mi (32 km) downcoast of the Project site.

4.7 Land Use and Policy

4.7.1 Land Use

The City of San Clemente, including the unincorporated area, is comprised primarily of residential, industrial, commercial, agricultural, and vacant properties. The proposed site is along the coast and within the "Pier Bowl" district of San Clemente. The Pier Bowl is a pedestrian-oriented, mixed-use center accommodating uses that support coastal recreational activities, including retail, restaurant, office, cultural, hotel/motel, bed and breakfast establishments, and residential.

The Pacific Ocean bounds the site to the west. The beach and Pier are public parks and publicly owned open space (OS1). No physical features exist that divide the existing land use along the San Clemente beaches. North and inland of the Pier, the proposed site is bordered by the Metrolink Station and parking lot, coastal related retail (CRC1-p-A), mixed-use including overnight accommodations (MU 4-3-p-A), mixed use including neighborhood and community serving commercial (MU 4-2-p-A), and public areas. South and inland of the Pier, the proposed site is bordered by public areas, mixed use including neighborhood and community serving commercial (MU 4-1-p-A), and coastal related retail (CRC1-p-A).

4.7.2 Policy

This section identifies the local land use policies, in particular the policies of the California Coastal Act (CCA), along with the adopted environmental plans and goals of the City of San Clemente in accordance with CEQA Guidelines 15125(b).

4.7.2.1 California Coastal Act

<u>CCA Policy 30251: Scenic and visual qualities.</u>
The scenic and visual qualities of coastal areas shall be considered and protected as a resource of public importance. Permitted development shall be sited and designed to protect views to and along the ocean and scenic coastal areas to minimize the alteration of natural land forms, to be visually compatible with the character of surrounding areas, and, where feasible, to restore and enhance visual quality in visually degraded areas.

<u>CCA Section 30230: Marine resources; maintenance.</u>

> Marine resources shall be maintained, enhanced, and where feasible, restored. Special protection shall be given to areas and species of special biological or economic significance. Uses of the marine environment shall be carried out in a manner that will sustain the biological productivity of coastal waters and that will maintain healthy populations of all species of marine organisms adequate for long-term commercial, recreational, scientific, and educational purposes.

<u>CCA Section 30231 Biological productivity; water quality.</u>
The biological productivity and the quality of coastal water, streams, wetlands, estuaries, and lakes appropriate to maintain optimum populations of marine organisms and for the protection of human health shall be maintained and, where feasible, restored through, among other means, minimizing adverse effects of waste water discharges and entrainment, controlling runoff, preventing depletion of ground water supplies and substantial interference with surface water flow, encouraging waste water reclamation, maintaining natural vegetation buffer areas that protect riparian habitats, and minimizing alteration of natural streams.

CCA Section 30240: Environmentally sensitive habitat areas; adjacent developments.

(a) Environmentally sensitive habitat areas shall be protected against any significant disruption of habitat values, and only uses dependent on those resources shall be allowed within those areas.

(b) Development in areas adjacent to environmentally sensitive habitat areas and parks and recreation areas shall be sited and designed to prevent impacts which would significantly degrade those areas, and shall be compatible with the continuance of those habitat and recreation areas. Coastal Plan Policy 9-1:

> Prior to the issuance of a development permit, all projects on parcels shown on the land use plan and/or resource maps with a Habitat Area overlay designation or within 250 ft of such designation or projects affecting an environmentally sensitive habitat area [ESHA] shall be found to be in conformity with the applicable habitat protection policies of the land use plan. All development plans, grading plans, etc., shall show the precise location of the habitat(s) potentially affected by the proposed project. Projects which could adversely impact an environmentally sensitive habitat may be subject to a site inspection by a qualified biologist to be selected jointly by the County and the applicant.

CCA Section 30235: Construction altering natural shoreline.

Revetments, breakwaters, groins, harbor channels, seawalls, cliff retaining walls, and other such construction that alters natural shoreline processes shall be permitted when required to serve coastal-dependent uses or to protect existing structures or public beaches in danger from erosion and when designed to eliminate or mitigate adverse impacts on local shoreline sand supply. Existing marine structures causing water stagnation contributing to pollution problems and fish kills should be phased out or upgraded where feasible.

CCA Section 30607.7: Coastal development permit for sand replenishment requirements.

(a) A coastal development permit for sand replenishment requires the project applicant to provide onsite monitoring and supervision during the implementation of the permit.

A permit subject to subdivision a) may not be issued until the project applicant provides the issuing agency a plan for onsite monitoring and supervision during the implementation of the permit.

CCA Section 30244: Where development would adversely impact archaeological or paleontological resources as identified by the State Historic Preservation Officer, reasonable mitigation measures shall be required.

CCA Section 30210: Development not to interfere with access.

In carrying out the requirement of Section 4 of Article X of the California Constitution, maximum access, which shall be conspicuously posted, and recreational opportunities shall be provided for the people consistent with public safety needs and the need to protect public rights, rights of property owners, and natural resource areas from overuse.

CCA Section 30214: Implementation of public access policies; legislative intent.
The public access policies of this article shall be implemented in a manner that takes into account the need to regulate the time, place, and manner of public access depending on the facts and circumstances of each case including, but not limited to, the following: "…(2) The capacity of the site to sustain use and at what level of intensity, (3) The appropriateness of limiting public access to the right to pass and repass depending on such factors as the fragility of the natural resources in the area…"

CCA Section 30220: Protection of certain water-oriented activities.
Coastal areas suited for water-oriented recreational activities that cannot readily be provided at inland water areas shall be protected for such uses.

CCA Section 30221: Oceanfront land; protection for recreational use and development.
Oceanfront land suitable for recreational use shall be protected for recreational use and development unless present and foreseeable future demand for public or commercial recreational activities that could be accommodated on the property is already adequately provided for in the area.

CCA Section 30233: Diking, filling or dredging; continued movement of sediments and nutrients.
(a) The diking, filling, or dredging of open coastal waters, wetlands, estuaries, and lakes shall be permitted in accordance with other applicable provisions of this division, where there is no feasible, less environmentally damaging alternative, and where feasible mitigation measures have been provided to minimize adverse environmental effects, and shall be limited to the following…
    (1) incidental public services (e.g., burying cables and pipes);
    (2) mineral extraction, including sand for restoring beaches, except in environmentally sensitive areas;
    (3) restoration purposes;
(b) Dredging and spoils disposal shall be planned and carried out to avoid significant disruption to marine and wildlife habitats and water circulation. Dredge spoils suitable for beach replenishment should be transported for such purposes to appropriate beaches or into suitable longshore current systems.

4.7.2.2 Coastal Element of San Clemente General Plan

302.V.1: Designate lands for the provision of recreational open spaces on the Coastal Land Use Plan Map which are sufficient to meet the needs of existing and future residents (GP Policy 1.9.1).

302.V.2 Designate lands for the provision of passive and visual open space on the Coastal Land Use Plan Map, which provide a balance to the urban and suburban development of the City (GP Policy 1.9.2).

302.V.3: Designate lands for the protection of significant environmental resources and protection of life and property from environmental hazards on the Coastal Land Use Plan Map (GP Policy 1.9.3).

302.V.4: Provide for the development of additional open spaces for recreational purposes in accordance with the Parks and Recreation Element and Master Plan of Parks and Recreation (GP Policy 1.9.10).

302.VII.3: The scenic and visual qualities of coastal areas shall be considered and protected as a resource of public importance. Permitted development shall be sited and designed:

a. To protect public views to and along the ocean and scenic coastal area.

b. To minimize the alteration of coastal bluffs and canyons.

c. Where feasible, to restore and enhance visual quality in visually degraded areas (PRC 3025 1).

d. Require that projects be designed and developed to achieve a high level of quality, distinctive character, and compatibility with existing uses and development in accordance with this Element and the Urban Design Element (GP Policy 1.3.6).

302.VII.6: Where development would adversely impact archaeological or paleontological resources, as identified by the State Historic Preservation Officer, reasonable mitigation measures shall be required (PRC 30244).

302.VI1.10: Require a Biological Assessment Report for any development located along a coastal canyon or bluff when the development results in the removal of any native vegetation and when an Initial Study has determined that there is a potential for a significant adverse impact to biological resources. The Biological Assessment Report shall:

a. Be prepared by a qualified professional and addresses the proposed project's impact on State and Federally listed and candidate plants and animals; California Department of Fish and Game (CDFG) Special Animals; natural communities of high inventory priority with the CDFG's Nongame Heritage Program, and any other special interest species or communities identified in the General Plan Technical Background Report, or those hereafter named by State or Federal trustee agencies;

b. Identify mitigation measures necessary to eliminate significant adverse impacts to sensitive biological resources; and

c. Define a program for monitoring and evaluating the effectiveness of the specified mitigation measures (GP Policy 10.1.3).

303.IX.1: Improvements to beach facilities and beach access points which are administered by the City of San Clemente shall specifically be intended to provide for the maintenance and enhancement of maximum public use of the beach and ocean.

303.IX.4: The maintenance and enhancement of public non-vehicular access to the shoreline shall be of primary importance when evaluating any future public or private improvements in the Coastal Zone.

303.IX.5: The City's five primary beach access points are:
- San Clemente Beach Club
- Linda Lane
- Municipal Pier
- T-Street
- Avenida Calafia (San Clemente State Beach)

303.IX.6: Develop a comprehensive network of improved beach access facilities at all designated primary beach access points which will ultimately provide safe access to all City owned beaches (GP Policy 8.10).

303.IX.7: The City of San Clemente shall promote not only increased access to the shoreline, but increased safety of access. Improved access for the handicapped shall be provided at least one of the primary access points administered by the City.

303.IX.14: Public access from the nearest public roadway to the shoreline and along the coast shall be provided in new development projects except where:

a. It is inconsistent with public safety, military security needs or the protection of fragile coastal resources;

b. Adequate access exists nearby; or

c. Agriculture would be adversely affected.

303.IX.16: For purposes of this section, "new development" does not include: d. Any repair or maintenance activity for which the Coastal Commission has determined, pursuant to Section 30601, that a coastal development permit will be required unless the Commission determines that such activity will have an adverse impact on lateral public access along the beach.

304.XI.1: Coastal areas suited for water oriented recreational activities, including surfing, body boarding, body surfing and other activities that can not readily be provided at inland water areas shall be protected for such uses (PRC 30220).

304.XI.3: Designate lands for the provision of recreational open spaces on the Coastal Land Use Plan Map which are sufficient to meet the needs of existing and future residents (GP Policy 1.9.1).

304.XI.4: Protect the City's recreational resources including the recreational facilities, parks, surfing areas, and community events identified in section 207 of this plan.

304.XI.5: Provide for the acquisition and development of parks and recreational lands and facilities in accordance with the Growth Management Element (I 1.1, I 1.2, I 1.6, and I 1.7).

304.XI.6: Expand and continue existing public and private cultural and fine art facilities and activities (GP Policy **7**.12).

304.XI.9: Increase the community's involvement in the use of recreational spaces encouraging recreational opportunities unique to San Clemente which will contribute to continuing visitation and economic development (GP Policy 8.1).

304.XI.10: Maintain the valuable beach resources as a fundamental element to conserve and develop sensitively, thus enhancing the quality and livability of the City of San Clemente (GP Policy 8.7).

304.XI.11: Locate and enhance the beach areas that will accept limited recreational development without destroying existing natural beauty (GP Policy 8.7.2).

304.XI.13: Emphasize the protection, enhancement, and sensitive development of park and open space areas which possess great scenic, environmental, historic, and cultural values.

305.XII.5: Preserve the aesthetic resources of the City, including coastal bluffs, visually significant ridgelines, and coastal canyons, and significant public views (GP Policy 10.2).

305.XII.8: Work in conjunction with the California Coastal Commission with the expressed intent to develop implementation programs that will preserve and maintain the physical features of the Coastal Zone including bluffs, canyons and beaches (GP Policy 10.2.5).

305.XI1.9: Promote the preservation of significant public view corridors to the ocean (GP Policy 10.2.7).

306.XIV.l: Marine resources shall be maintained, enhanced, and where feasible, restored. Special protection shall be given to areas and species of special biological or economic significance. Uses of the marine environment shall be carried out in a manner that will sustain the biological productivity of coastal waters and that will maintain healthy populations of all species of marine organisms adequate for long-term commercial, recreational, scientific and educational purposes (PRC *30230).*

306.XIV.2: The biological productivity and the quality of coastal waters,…appropriate to maintain optimum populations of marine organisms and for the protection of human health shall be maintained and, where feasible, restored through, among other means, minimizing adverse effects of wastewater discharges and entrainment, controlling runoff, preventing; depletion of ground water supplies and substantial interference with surface waterflow and encouraging wastewater reclamation (PRC *3023* 1).

306.XIV.3: The diking, filling or dredging of open coastal waters, wetlands, estuaries, and lakes shall be permitted in accordance with other applicable provisions of the California Coastal Act and the City of San Clemente Coastal Element, where feasible mitigation measures have been provided to minimize adverse environmental effects, and shall be limited to the following:

- In open coastal waters, for new or expanded boating facilities and/or placement of structural pilings for public recreational piers that provide public access and public recreational opportunities.
- Incidental public service purposes, including, but not limited to, burying cables and pipes or inspection of piers and maintenance of existing intake and outfall lines.
- Mineral extraction on City beaches shall be prohibited except for sand used for restorative purposes.
- Restoration purposes.
- Nature study, aquaculture, or similar resource dependent activities.

Dredging and soils disposal shall be planned and carried out to avoid significant disruption to marine and wildlife habitats and water circulation. Dredge soils suitable for beach replenishment should be transported for such purposes to appropriate beaches or into suitable longshore current systems. Revetments, breakwaters, groins, harbor channels, seawalls, cliff retaining walls, and other such construction that alters natural shoreline processes shall be permitted when required to serve coastal dependent uses or protect existing structures or public beaches in danger from erosion and when designed to eliminate or mitigate adverse impact on local shoreline sand supply. Existing marine structures causing water stagnation contributing to pollution problems and fish kills should be phased out or upgraded, where feasible (PRC 30235).

306.XIV.4: Provide a clean and enjoyable marine environment that sufficiently meets the needs of beach users (GP Policy 7.7).

306.XIV.5: Maintain and enhance the City's beaches and marine resources (GP Policy 7.8).

306.XIV.6: Provide adequate marine safety and medical aid services (GP Policy 7.6).

306.XIV.7: Continue monitoring sand movement, researching the impacts of coastal erosion and methods of mitigating further coastal damage to San Clemente's beaches environment (GP Policy 7.8.1).

306:XIV.8: Maintain a healthy coastline, preventing degradation of the community's visual and environmental resources (GP Policy 7.9).

306.XIV.10: Continue to support the creation of a wildlife sanctuary for various habitats along the coast to preserve and protect the natural beach environment (GP Policy 7.9.2).

306.XIV.11: Permit extraction of significant mineral resources, such as borrow material, which may be used for beach replenishment, as an interim use prior to development (GP Policy 10.7).

306.XIV.12: Despite the fact that much of the responsibility for protection of water resources lies with regional and State agencies, there are several measures the City can take to help further protect coastal waters. These include the following:

h. The construction of revetments, breakwaters, groins, harbor channels, seawalls, cliff retaining walls and other protective devices are discouraged and shall be permitted only when such construction is required to serve coastal dependent uses or to protect existing structures or public beaches in danger from erosion. In no way shall such structures prohibit or impact coastal access, beaches or coastal recreational areas.

307.XV.1 Encourage activities which improve the natural biological value, integrity and corridor function of the coastal canyons through vegetation restoration, control of alien plants and animals, and landscape buffering (GP Policy 10.1.9).

307.XV.2: Environmentally sensitive habitat areas shall be protected against any significant disruption of habitat values, and only uses dependent on such resources shall be allowed within such areas. "Environmentally sensitive area" means any area in which plant or animal life or their habitats are either rare or especially valuable because of their special nature or role in an ecosystem and which could be easily disturbed or degraded by human activities and developments (PRC 30240(a)).

307.XV.3: Development in areas adjacent to environmentally sensitive habitat areas and parks and recreation areas shall be sited and designed to prevent impacts which would significantly degrade such areas, and shall be compatible with the continuance of such habitat areas (PRC 30240(b)).

307.XV.4: Designate lands for the protection of significant environmental resources and protection of life and property from environmental hazards on the Coastal Land Use Plan Map (GP Policy 1.9.3).

307.XV.6: Require that applications for development in the areas which an Initial Study has determined there is potential for significant adverse impacts to biological resources [therefore requiring an Environmental Impact Report (EIR) or Mitigated Negative Declaration (MND)] shall include a Biological Assessment Report which:

a. Is prepared by a qualified professional which addresses the proposed project's impact on State and Federally listed and candidate plants and animals; California Department of Fish and Game (CDFG) Special Animals; natural communities of high inventory priority with the CDFG's Nongame Heritage Program, and any other special interest species or communities identified in the General Plan Technical Background Report, or those hereafter named by State or Federal trustee agencies;

b. Identifies mitigation measures necessary to eliminate significant adverse impacts to sensitive biological resources; and

c. Defines a program for monitoring and evaluating the effectiveness of the specified mitigation measures (I 10.2, I 10.3, and I 10.9).

307.XV.7: Review of all projects within the Coastal Zone shall include an assessment of the potential impact on natural habitat areas.

307.XV.8: The City shall pursue grants and other funding sources to perform a biological study of the designated natural habitat areas in the Coastal Zone.

307.XV.10: The analysis and evaluation of large-scale development projects shall include a comprehensive inventory of biologic resources prepared by a qualified biologist. A determination should be made of the area's importance as a native habitat, including identification of rare and endangered species.

307.XV.15: Identify the key beach areas which are important to protect through land use regulation because of their inherent environmental, ecological, and/or aesthetic contributions.

307.XV.16: Maintain the presence of parklands and open space in the Coastal Zone in order to conserve and enhance the natural environment thereby improving the quality and livability of the City of San Clemente.

307.XV.17: Identify those major areas of the City which are important to protect through land use regulation or public ownership because of their inherent environmental, ecological, and/or aesthetic contribution to the scenic and natural qualities of San Clemente.

307.XV.18: Operate and maintain San Clemente Park and Recreation facilities through programs that are designed for the most effective use and enhancement of the park site at the minimum possible cost.

4.7.2.3 San Clemente General Plan

GP 1.7.1: Designate lands for the development of coastal related commercial, recreational, lodging, and supporting uses on the Land Use Plan Map and establish standards to ensure their compatibility with adjacent residential neighborhoods and commercial districts (*I 1.1, I 1.3, and I 1.5*).

GP 1.7.3: Allow for the continued use of the City's public beaches for coastal recreational uses *(I 1.1 and I 1.3)*

GP 1.9.3: Designate lands for the protection of significant environmental resources and protection of life and property from environmental hazards on the Land Use Plan Map *(I 1.1, I 1.3, and I 1.5).*

GP 1.9.4: Accommodate active parklands, beaches, or other open space uses in areas designated as "OS 1" (encompasses publicly owned properties) in accordance with the standards stipulated in Table 1-3 of the General Plan *(I 1.1, I 1.2, I 1.3, I 1.5, and I 1.6).*

GP 1.14.8: Accommodate the development of public recreational uses *(I 1.1, I 1.5, and I 1.8).*

GP 4.3.1: Maintain a city-wide level of service (LOS) not exceeding LOS "D" for intersections during the peak hours, with the exception of the intersection of the I-5 southbound ramps at Avenida Pico, unless the City determines an exception is warranted on an interim basis in accordance with the adopted "exception process" specified in the Growth Management Element (I 4.2).

GP 4.3.2: Maintain a city-wide level of service (LOS) for links not to exceed LOS "C" for Primary arterials, Secondary arterials and Local streets; not to exceed LOS "D" for Major arterials; and not to exceed LOS "E" for Commercial facilities (I 4.2).

GP 6.1.1: Require that new development does not degrade surface or groundwater (*I 6.1, I 6.3, I 6.4 and I 6.5*).

GP 7.8.1: Continue monitoring sand movement, researching the impacts of coastal erosion and methods of mitigating further coastal damage to San Clemente's beaches environment (*I 7.18*).

GP 7.9.2: Continue to support the creation of a wildlife sanctuary for various habitats along the coast to preserve and protect the natural beach environment (*I 7.21*).

GP 8.7.1: Identify the key beach areas which are important to protect through land use regulation because of their inherent environmental, ecological and/or aesthetic contributions (*I 8.16, I 8.17 and I 8.35*).

GP 8.7.2: Locate and enhance the beach areas that will accept limited recreational development without destroying existing natural beauty (*I 8.21*).

GP 8.7.3: Enhance the Pier and North Beach area to function as the "hubs" of San Clemente beach facilities (*I 8.21*).

GP 8.8.1: Identify those major areas of the City that are important to protect through land use regulation or public ownership because of their inherent environmental, ecological and/or aesthetic contribution to the scenic and natural qualities of San Clemente (*I 8.16, I 8.17 and I 8.35*).

GP 8.8.2: Provide cooperative leadership between private interests and other public agencies to protect and enhance both land and water resources (*I 8.22*).

GP 10.1.1: Acquire and maintain the most current information available regarding the status and location of sensitive biological elements (species and natural communities) within the City (*I 10.1*).

GP 10.1.3: Require that applications for development in the UA, and for areas which an Initial Study has determined there is potential for significant adverse impacts to biological resources [therefore requiring an Environmental Impact Report (EIR) or Mitigated Negative Declaration (MND)] shall include a Biological Assessment Report which:

a. Is prepared by a qualified professional which addresses the proposed project's impact on State and Federally listed and candidate plants and animals; California Department of Fish and Game (CDFG) Special Animals; natural communities of high inventory priority with the CDFG's Nongame Heritage Program, and any other special interest species or communities identified in the General Plan Technical Background Report, or those hereafter named by State or Federal trustee agencies;

b. Identifies mitigation measures necessary to eliminate significant adverse impacts to sensitive biological resources; and

c. Defines a program for monitoring and evaluating the effectiveness of the specified mitigation measures (*I 10.2, I 10.3, and I 10.9*).

GP 10.1.4: Review proposed projects in the UA to evaluate their conformance with the following policies and standards.

a. The development plan shall fully consider the nature of biological resources present, and all reasonable measures shall be taken to avoid significant impacts, including retention of sufficient natural space where appropriate.

b. The development plan shall retain watercourses, riparian habitat, and wetlands in natural condition to the maximum extent feasible.

c. The development shall incorporate habitat linkages (wildlife corridors) to adjacent open spaces, as appropriate.

d. The development shall incorporate fences, walls, or vegetative cover to buffer habitat areas, linkages or corridors from development, as appropriate.

e. Roads and utilities shall be located and designed such that conflicts with biological resources, habitat areas, linkages or corridors are minimized.

f. The development shall utilize appropriate open space or conservation easements when necessary in order to protect sensitive species or their habitats.

g. The development shall mitigate unavoidable adverse impacts to sensitive habitats by replacement on an in-kind basis, i.e.; riparian habitat is to be replaced by riparian habitat of the same type. Furthermore, replacement shall be based on a ratio determined by the California State Fish and Game Department and/or USFWS in order to account for the potentially diminished habitat values of replacement habitat. Such replacement should occur on the original development site whenever possible. Alternatively, replacement can be effected by protection of similar intact habitats elsewhere (off-site but preferably within the City's Sphere of Influence) in perpetuity through acquisition and provision for an appropriate conservation easement or dedication (*I 10.2, I 10.3, and I 10.9*).

GP 10.1.8: Preserve, where possible, the habitat of several in-fact endangered species, including those listed in Table 10-1 (of the General Plan) and those which may be considered by the City in the future (*I 10.2, and I 10.3*).

GP 10.1.10: Continue to support the City's participation and enrollment in the State's Natural Communities Conservation Planning Program (NC.P.) (*I 10.4*).

GP 10.3.3: Continue the implementation of the City's existing ordinance for preservation of designated historic sites and structures. Adopt a Preservation Ordinance that will authorize the City to designate any vegetation or archaeological site deemed to be of historical, archaeological, or cultural significance a San Clemente City Historical Point, Site or District. Such ordinance shall conform to State and Federal criteria for establishing a preservation ordinance *(I 10.16).*

GP 10.3.7: Require that all City-owned properties designated as historic resources are maintained in a manner that is aesthetically and/or functionally compatible with such resources *(I 10.18 and I 10.19).*

GP 10.9.1: Require that new development utilize appropriate AQMD air quality mitigation measures (SMMs and BAMMs) *(I 10.32).*

GP 13.3.1: Identify tsunami susceptible areas, and require that specific measures be taken by the developer, builder or property owner, as necessary, to prevent or reduce damage from these hazards and the risks upon human safety (*I 13.1 and I 13.4*).

GP 13.3.2: Consider the City's participation in and, receipt of, information from the National Weather Service's Weather Wire System for Local Tsunami Warnings (*I 13.5*).

GP 14.2.1: Require that in areas where existing or future noise levels exceed an Ldn of 60 dB (A) exterior and an Ldn of 45 dB (A) interior, all development of new housing, health care facilities, schools, libraries, religious facilities, and other "noise sensitive" land uses include appropriate buffering and/or construction mitigation measures that will reduce noise exposure to levels within acceptable limits (*I 14.3, I 14.4 and I 14.5*).

GP 14.2.2: Require new industrial, commercial, and related land uses, or the expansion of existing land uses demonstrate that such new or expanded uses would not be directly responsible for causing ambient noise levels to exceed and Ldn of 65 dB (A) exterior upon areas containing housing, schools, health care facilities, or other "noise sensitive" land uses as depicted in the General Plan) (*I 14.4 and I 14.7*).

GP 14.2.3: Require development in all areas where the ambient noise level exceeds an Ldn of 60 dB (A) to conduct an acoustical analysis and incorporate special design and construction measures in their construction, as necessary, to reduce interior noise levels to within the 45 dB (A) Ldn level (*I 14.3*).

GP 14.3.3: Require that any municipal vehicles or noise-generating mechanical equipment purchased or used by the City of San Clemente comply with noise performance standards consistent
with the best available noise reduction technology (*I 14.10*).

GP 14.6.1: Ensure that the prohibitions relative to legal hours of operation for construction activities contained within the existing City of San Clemente Noise Ordinance and/or any future/revised Noise Ordinance be strictly adhered to and enforced (*I 14.15*).

GP 14.6.2: Require that construction activities adjacent to residential land uses and dwelling units be regulated, as necessary, to prevent the generation of adverse and/or excessive noise impacts (*I 14.15*).

GP 14.6.3: Require construction activities to employ feasible and practical techniques and practices which minimize the generation of adverse and/or excessive noise impacts on adjacent land uses (*I 14.15*).

4.7.2.4 Local Coastal Program

GP I 1.3 On adoption of the updated General Plan, it will be necessary to revise the City of San Clemente's Local Coastal Element, LCP (as required by the California Coastal Act) to ensure consistency between the two documents. The LCP Land Use Plan was adopted in 1984 and updated in 1988 and the Local Implementing Ordinance has not been finalized. Land use provisions of the LCP will need to be adjusted to reflect the Land Use Element, including the use of common classification and development standards. Among the policies which will necessitate review of the LCP are those for the Pier Bowl and North Beach which permit some intensification of coastal-related visitor-serving uses. Policies and standards pertaining to open space, biological resource management, and environmental hazards will also require review and potential modification to reflect the Land Use Element and Environmental Resources and Hazards Sections. In concert, it will be necessary to complete the (unfinished) Local Implementing Ordinance. Both documents shall be submitted to the California Coastal Commission for review and certification.

4.8 Noise

The Project beach site is currently beach property. Residential land uses exist approximately 200 ft (60 meters) north-northeast along the majority of the Project length interspersed with minimal amount of commercial property. The beach continues to meander along the shore generally northwest and southeast of the Project site, and the San Clemente Pier and Pacific Ocean are adjacent to the Project site to the west. The Project's borrow pit site is approximately 2,624 ft (800 m) offshore of the coast of Oceanside Harbor. The nearest residential properties are located approximately 4,265 ft (1,300 m) east of the borrow pit location.

4.8.1 Noise Terminology

Noise is defined as unwanted or objectionable sound. The effects of noise on people can include general annoyance, interference with speech communication, sleep disturbance and, in the extreme, hearing impairment. The unit of measurement used to describe a noise level is the decibel (dB). The human ear is not equally sensitive to all frequencies within the sound spectrum. Therefore, the "A weighted" noise scale, which weights the frequencies to which humans are sensitive, is used for measurements. Noise levels using A weighted measurements are written dB(A) or dBA. Decibels are measured on a logarithmic scale, which quantifies sound intensity in a manner similar to the Richter scale used for earthquake magnitudes. Thus, a doubling of the energy of a noise source, such as doubling a traffic volume, would increase the noise level by 3 dBA; a halving of the energy would result in a 3-dBA decrease. Table 4-18 shows the relationship of various noise levels to commonly experienced noise events.

Table 4-18 Sound Levels of Typical Noise Sources and Noise Environments

Noise Source (at a Given Distance)	Scale of A-Weighted Sound Level in Decibels	Noise Environment	Human Judgment of Noise Loudness (Relative to a Reference Loudness of 70 Decibels*)
Military Jet Take-off with After-burner (50 ft [15m]) Civil Defense Siren (100 ft [30 m])	130	Carrier Flight Deck	
Commercial Jet Take-off (200 ft [61 m])	120	Airport Runway	Threshold of Pain *32 times as loud
Pile Driver (50 ft [15 m])	110	Rock Music Concert	*16 times as loud
Ambulance Siren (100 ft [30 m]) Newspaper Press (5 ft [1.5 m]) Power Lawn Mower (3 ft [0.9 m]) Motorcycle (25 ft [8 m]) Propeller Plane Flyover (1,000 ft [305 m]) Diesel Truck, 40 mph (64 kmph) (50 ft [15 m]) Garbage Disposal (3 ft [0.9 m])	100 90 80	Boiler Room Printing Press Plant High Urban Ambient Sound	Very Loud *8 times as loud *4 times as loud *2 times as loud
Passenger Car, 65 mph (105 kmph) (25 ft [8 m]) Living Room Stereo (15 ft [5 m]) Vacuum Cleaner (3 ft [0.9 m]) Electronic Typewriter (10 ft [3 m])	70	Busy Shopping Mall Indoor Sports Park	Moderately Loud *70 dB (Reference Loudness)
Normal Conversation (5 ft [1.5 m]) Air Conditioning Unit (100 ft [30 m])	60	Data Processing Center Department Store	*1/2 as loud
Light Traffic (100 ft [30 m])	50	Private Business Office	*1/4 as loud
Bird Calls (distant)	40	Lower Limit of Urban Ambient Sound	Quiet *1/8 as loud
Soft Whisper (5 ft [1.5 m])	30 20 10	Rural Residential Area Quiet Bedroom	Just Audible Threshold of Hearing

Average noise levels over a period of minutes or hours are usually expressed as dB Leq, or the equivalent noise level for that period of time. For example, Leq(3) would represent a three-hour average. When no period is specified, a one-hour average is assumed. Noise standards for land use compatibility, which are addressed in the Hesperia General Plan Noise Element, are stated in terms of the Community Noise Equivalent Level (CNEL), Equivalent Noise Level (LEQ), and the Day-Night Average Noise Level (Ldn). CNEL is a 24-hour weighted average measure of community noise. The computation of CNEL adds 5 dBA to the average hourly noise levels between 7 p.m. and 10 p.m. (evening hours), and 10 dBA to the average hourly noise levels between 10 p.m. and 7:00 a.m. (nighttime hours). This weighting accounts for the increased human sensitivity to noise in the evening and nighttime hours. Ldn is a very similar 24-hour weighted average that weights only the nighttime hours and not the evening hours.

It is widely accepted that the average healthy ear can barely perceive changes of 3 dBA, increases or decreases; that a change of 5 dBA is readily perceptible, and that an increase (decrease) of 10 dBA sounds twice (half) as loud (Caltrans 1998).

4.8.2 Regulatory Setting

The City of San Clemente noise standards are identified in the City's Municipal Code (Ch 8.48 Noise Control). The Municipal Code states that ambient noise levels shall be no greater than the noise levels identified for each land use. Table 4-19 is a re-creation of the City of San Clemente's Noise Standard Table.

Table 4-19 San Clemente Noise Standards

	7:00 A.M. to 10:00 P.M.	10:00 P.M. to 7:00 A.M.
Residential		
Exterior	55 dBA	50 dBA
Interior	50 dBA	40 dBA
Commercial	65 dBA	60 dBA
Industrial	70 dBA	70 dBA

Sensitive Receptors

Also of concern are project-generated impacts to sensitive receptors in the Project area. Sensitive receptors of noise include residences and schools. Noise generated on the proposed beach nourishment property that impacts noise sensitive receptors are subject to the Exterior Noise Standards cited above. Sensitive receptors are activities or land uses that may be subject to the stress of significant interference from noise. Land uses associated with sensitive receptors often include residential dwellings, mobile homes, hospitals, nursing homes, education facilities, and libraries. Existing residential units approximately 190 feet (58 meters) to the north-northeast of the beach restoration site, 2,500 ft (762 m) from the dredge (while traveling between borrow pit and beach site), and 4,200 ft (1,280 m) to the east of the borrow pit area are the closest sensitive receptors in the Project area.

4.9 Recreation

This section presents information on recreational activities and opportunities within the San Clemente Beach area, and summarizes the recreation setting. Residential and open space (including recreation) are the predominant land uses within the study area. The Beaches, Parks and Recreation Department are responsible for citywide maintenance and management of recreational programs and facilities. Its operating divisions include, among others: Marine Safety, Beaches and Parks Maintenance, and Recreation.

4.9.1 Beaches

San Clemente is home to 4.7 miles (7.6 km) of white, sandy beaches that parallel the southwest side of the City. Popular activities for beachgoers are surfing, sunbathing, jogging, skin diving, swimming, body surfing, picnicking, camping, and hiking along the many trails located on the bluffs overlooking the beach. Because there are no paved paths on the beach, beach wheelchairs are available at the lifeguard station at the Pier. Within a mile of the borrow site are Camp Pendleton and Oceanside Beaches.

4.9.1.1 Linda Lane

Linda Lane Park is the approximate northern boundary of the Project site and is located at the end of Linda Lane. It has beach access through a short tunnel under the railroad tracks, a children's play area, a grassy area, an ocean view, and picnic tables, but no restrooms. Linda Lane has a metered parking area available between 9 a.m. and 7 p.m.

4.9.1.2 San Clemente Beach and Pier

The San Clemente City Beach and Fishing Pier (Pier Bowl) is accessible through a tunnel under the railroad tracks from the large public parking lot at the bottom of Avenida Del Mar. Surfing is more popular on the immediate north side of the Pier than the south. However, immediately south of the Pier is popular with swimmers and bodyboarders. T-Street, further south of the Pier, is a more popular surfing location within the Project area. The beach near the Pier provides lifeguards, bus stop, food stands, picnic tables, rentals, showers, basketball courts, volleyball, firepits, and easy access to the Amtrak station platform and shopping. The beach at the Pier Bowl has a parking lot with free parking available between 5 p.m. and 10 a.m. and paid parking between 10 a.m. and 5 p.m., as well as parking meters from 9 a.m. to 7 p.m. Parking on residential streets also is available for beachgoers.

San Clemente Pier is an approximately 1,296 ft (395 m) long pier with fantastic views of the Pacific Ocean. The Pier was built by Ole Hanson in 1928. In 1939, and again in 1983, strong storms damaged the Pier, which required it to be rebuilt in both instances. The Pier offers free fishing, has indoor/outdoor restaurant dining, restrooms, a bait and tackle shop, fish cleaning sinks, and is a great location to watch sports activities, such as surfing competitions. Anglers fishing from the Pier have caught small sharks, halibut, sand bass, sculpin, barracuda, and small yellowtail. Parque del Mar is located across the railroad tracks from the Pier at Avenida del Mar and Alameda Lane and provides easy beach access, walking/jogging opportunities, a grassy area, an ocean view, and picnic area/tables/benches.

4.9.1.3 T-Street

T-Street is the approximate southern boundary of the Project site and is located at the end of Esplanade following Trafalgar Lane. Access to the beach is by an overpass to the train tracks and a flight of stairs. A large sand bar makes the water shallow and the beach popular for most beachgoers. This beach also provides a snack bar, restrooms, lifeguard tower, and easy access to shopping. T-Street has a metered parking area available between 9 a.m. and 7 p.m.

4.9.2 Annual Events

San Clemente hosts many yearly events. The San Clemente Ocean Festival is held annually in July. It includes activities and events, such as waterman and waterwoman competitions, surfing contests, a sand castle building competition, and fishing. The Festival also includes a woody car exhibit, art show, and a free concert. Another annual event is the Fourth of July fireworks show located at the San Clemente Pier. Finally, San Clemente hosts a Seafest every October. The Seafest features a chowder cook-off with the whole community competing for the best chowder, as well as a surf contest, business expo, and arts & crafts show. Oceanside Harbor Days are held annually at the end of September/beginning of October.

4.9.3 Beaches, Parks and Recreation Department

4.9.3.1 Marine Safety

The Marine Safety Division is responsible for the lifeguard operation on the City's 20 acres (8 hectares) of sand beach. In addition, the division manages seven snack bars, restaurants (including the Fisherman's Restaurant), bait and tackle shops, and pier telescope concession operations. This division provides ocean rescue, first aid, law enforcement and various public education programs including a junior lifeguard and instructional surfing. Other duties include monitoring related environmental issues such as offshore oil and coastal erosion and water quality monitoring on an ongoing basis. The division also assists in planning related capital improvement projects. The Marine Safety Division also manages beach-related special events.

4.9.3.2 Beach and Park Maintenance

The Beaches and Parks Maintenance Division promotes, provides and facilitates park and recreational services. The department is responsible for the maintenance of the City's 20 acres (8 hectares) of beach, which is the primary attribute within the Project area. The department is also responsible for other recreational type facilities, including 147.77 acres (59.8 hectares) at 25 parks and beach accesses, trees located in parks and on the beaches, and the San Clemente Pier.

4.10 Aesthetics

The views to the west of the entire Project site are of the Pacific Ocean. Nearly the entire Project site is lined with palm trees beachside of the railroad tracks. At the northern portion of the Project site, the Project site is viewable from adjacent beach areas, residential areas located atop the bluffs adjacent to the beach, visitors at Linda Lane Park, and the Pier. At the center of the Project site, the Project site is viewable from the Pier, from commercial businesses, located both on the Pier and east of the railroad tracks, residences, and visitors at Parque del Mar and Linda Lane Park. At the southern end of the Project site, the Project site is viewable from adjacent beach areas, the parking meters at West Paseo de Cristobal, pedestrians on the overpass, residential areas located atop the bluffs adjacent to the beach, and the Pier. In addition, the entire Project site is visible to nearshore and offshore recreational users, as well as to passengers on passing trains.

The California Coastal Act includes the protection of the scenic and visual qualities of coastal areas, including the protection of views to and along the ocean, minimization of the alteration of natural landforms, and necessary actions to restore and enhance visual quality in visually degraded areas. The Project is consistent with Policy 10.2.5 of the City of San Clemente General Plan Natural and Historic/Cultural Resources Element, which promotes development of programs "that will preserve and maintain the physical features of the coastal zone including bluffs, canyons, and beaches."

4.11 Public Health and Safety

For purposes of this EIS/EIR, public health and safety issues are defined as those that directly affect the continued ability to protect and preserve life and property at locations along the proposed Project site. Specifically, these issues are lifeguard services, recreational safety, and vessel safety. Sediment and chemical comparisons of dredged material and the Project site have been completed and there would be no risk to health or safety. This issue is not addressed further.

The lifeguards are responsible for all recreational safety measures along the beach. Safety measures include manned lifeguard towers and regular vehicle patrols during the summer months. The Marine Safety Division is normally staffed from 8:00 am until dusk (changes seasonally). The main lifeguard tower on the Pier is normally manned by 8:20 each morning, with lifeguard towers on the beach staffed as needed during the off-season. Lifeguard towers are typically more heavily staffed on weekends during summer months. Normal summer staffing for the Project site is listed below. Lifeguard towers between those listed below open later and close earlier, depending upon crowd conditions.

Tower 4 (Linda Lane) – 10 a.m. until 6 p.m.

Tower 1 (South side of Pier) – 10 a.m. until 6 p.m.

Tower 5 (T-Street) – 9 a.m. until 7 p.m.

4.12 Socioeconomics/Environmental Justice

4.12.1 Local Socioeconomic Conditions

Socioeconomic data for the City of San Clemente are sourced from the City of San Clemente Housing Element of the General Plan, last updated in June 2002. San Clemente is the southern-most city in Orange County. Its coastal setting, Mediterranean climate, and rolling hills provide a unique and attractive living environment. This resort setting affects the City's employment characteristics and economic base.

San Clemente has been one of the fastest growing cities in Orange County (County) since 1980. This growth peaked by 1985 and 1990 with a 6.7 percent annual growth rate compared to

1.7 percent for the rest of the County, and although growth slowed following this period, San Clemente's average annual growth rate has been slightly higher than the County's growth rate to the present. Since 1980, the City's population nearly doubled from 27,322 persons to 50,032 persons in 2000.

Housing development grew proportionately with this fast pace of growth. The City's housing stock grew from 13,233 units in 1980 to 20,872 units in 2000, with the largest increase in housing growth occurring between 1985 and 1990. Based on the Department of Housing and Urban Development (HUD) Income Categories for Orange County in 2000, 54 percent of San Clemente households ranged in the very low ($34,800) to moderate (up to $83,500) income categories. Based on the 1990 Census, the ratio of owner to renter in San Clemente was 59 percent to 41 percent. Households consisted of 66 percent families, 24 percent single persons, and 10 percent other. The race/ethnicity ratio of San Clemente residents based on the 1990 Census was 84 percent Caucasian, 12 percent Hispanic, 6 percent Black, 3 percent Asian, and 4 percent Other.

San Clemente is located within relatively easy commuting distances from employment centers in Los Angeles and Orange counties, as well as fast-growing northern San Diego County and Camp Pendleton. Based on the 1990 Census, 68 percent of San Clemente residents were employed in either managerial/professional, technical, sales, or administrative occupations. In contrast, the labor market within San Clemente in 1996 was predominantly retail (24 percent) or services (30 percent). Due to the higher wages offered in nearby areas and the relatively low cost of living in San Clemente, the City hosts a large number of commuters. However, a need for lower-wage labor in the commercial and service centers continues to increase in San Clemente, especially in relation to the tourism industry.

In a study by King and Symes (2003), nine California beaches were evaluated based on their economic impact on California. King and Symes (2003) suggest that the California economy would suffer a net loss of billions of dollars if California beaches were to decline to the point where tourism was significantly affected. Beach visitors help create employment at the beach and other facilities used by visitors. Given the importance of tourism in California, tens of millions of visits and billions of dollars per year depend on beaches (King and Symes 2003).

4.12.2 Onsite Socioeconomic Conditions

The Project area is located along the San Clemente shoreline, which is characterized by narrow, linear sandy beach, backed by high coastal bluffs. Thus, development within the confines of the Project area boundaries is generally limited.

Several commercial structures are located along the shoreline and within the Project area. The focal point of the beach is a 1,312 ft (400m) fishing pier, which houses a bait-and-tackle shop and a full-service restaurant. Semi-permanent rental shops, which offer umbrellas, surfboards, body boards, and other beach accessories, are also located along the beach. Several fast-food restaurants are located at T-Street Beach. These commercial uses provide employment opportunities, mostly in the relatively low-paying retail and service sectors. Most of these commercial uses are directly related to the tourist trade associated with beach visitors.

Public facilities within the Project area are operated and maintained by the City of San Clemente and the Orange County Department of Harbors, Beaches, and Parks. These facilities include the Marine Safety Building, public restroom facilities, lifeguard stations, parking areas, and paving near the Pier. These facilities also provide employment opportunities similar to the commercial uses and directly related to beach visitors.

Surfing as well as camping, picnicking, and other dispersed recreation are a large recreational economic base to the local and, in particular, to the City of San Clemente economies. Surfing is a major component of San Clemente's recreational base. Surfing has been recorded at the north side and south side of San Clemente Pier, including T-Street since the early 1960s.

5.0 ENVIRONMENTAL CONSEQUENCES OF PROPOSED ACTION AND ALTERNATIVES

5.1 Air Quality and Meteorology

5.1.1 Significance Criteria

Projected air emissions are prepared in accordance with the methodologies provided by the South Coast Air Quality Management District (SCAQMD) as included in its *CEQA Air Quality Handbook, April 1993* (*Handbook*) as well as its Internet updates included on its web site. For the purposes of this analysis, construction is estimated to occur in 2012 with the 50 ft (15 m) Beach Width Alternative taking approximately 46 working days and the 115 ft (35 m) Beach Width Alternative taking 108 working days. This analysis also considered the on-going, daily operations of the railroad.

Thresholds of significance for individual projects used the SCAQMD *Handbook* as well as updates included on the SCAQMD Internet Web site. The *Handbook* recommends assessing emissions of reactive organic compounds (ROG) as an indicator of ozone. For ease of the reader, the included analysis follows the outline of the CEQA Checklist.

The San Diego Air Pollution Control District does not provide quantitative thresholds for determining the significance of construction or mobile source-related impacts. However, the District specifies Air Quality Impact Analysis (AQIA) trigger levels for new or modified stationary sources. If these incremental levels for stationary sources are exceeded, an AQIA must be performed for the proposed new or modified source. Although these trigger levels do not generally apply to mobile sources or general land development projects, for comparative purposes San Diego County has established AQIAs as screening-level thresholds (SLTs). The County has stated that the SLTs may used to evaluate the increased emissions which would be discharged to the SDAB from proposed land development projects.

The information on San Diego’s thresholds are presented for informational purposes since all on-shore emissions are located in the SCAB and off-shore sources are not under the jurisdiction of the local air district’s, therefore not subject to thresholds.

5.1.1.3 Regional Thresholds of Significance

The following significance thresholds (Table 5-1) for air quality have been established by the SCAQMD on a daily basis for construction and operations emissions and Table 5-1 also shows the SLTs for San Diego County:

Table 5-1 Thresholds of Significance

	SCAG Regional		SDAG Screening Level		
Pollutant	**Construction Emissions (lbs/day)**	**Operations Emissions (lbs/day)**	**Total Emissions (lbs/hr)**	**Total Emissions lbs/day**	**Total Emissions tons/year**
ROG	75	55			
NOx	100	55	25	250	40
CO	550	550	100	550	100
PM10	150	150	----	100	15
PM2.5	55	55	----	55	10
SOx	150	150	25	250	40
Lead and lead compounds	NA	NA	----	3.2	0.6
VOC	NA	NA	----	75	13.7

During construction or operation, if any of the identified daily SCAG air pollutant thresholds are exceeded by the proposed Project, then the project's air quality impacts may be considered significant. The SCAQMD indicates in Chapter 6 of its *Handbook* that it considers a project to be mitigated to a level of insignificance if its primary effects are mitigated below the thresholds provided above.

In the SDAG, in the event that project emissions exceed the SLTs, specific modeling will be required for NO_2, SO_2, CO, and lead to demonstrate that the project's ground-level concentrations, including appropriate background levels, do not exceed the NAAQS and CAAQS. For ozone precursors, PM_{10} and $PM_{2.5}$, exceedances of the SLTs results in a significant impact.

5.1.1.4 Localized Thresholds of Significance (LST)

In addition to the mass daily threshold values presented above, the SCAQMD has established the following threshold criteria to determine if a project has the potential to contribute to an exceedance of the State Ambient Air Quality Standards as included in Table 4-2.

- California State 1-hour CO standard of 20.0 ppm
- California State 8-hour CO standard of 9.0 ppm
- California State 1-hour NO_2 standard of 0.25 ppm
- SCAQMD 24-hour construction PM_{10} LST of 10.4 $\mu g/m^3$
- SCAQMD 24-hour construction $PM_{2.5}$ LST of 10.4 $\mu g/m^3$
- SCAQMD 24-hour operational PM_{10} LST of 2.5 $\mu g/m^3$
- SCAQMD 24-hour operational $PM_{2.5}$ LST of 2.5 $\mu g/m^3$

The significance of localized emissions impacts depends on whether ambient levels in the vicinity of the project are above or below State standards. In the case of CO and NO_2, if ambient levels are below the standards, a project is considered to have a significant impact if project emissions result in an exceedance of one or more of these standards. If ambient levels already exceed a State or federal standard, then project emissions are considered significant if they increase ambient concentrations by a measurable amount. This would apply to both PM_{10} and $PM_{2.5}$; both of which are non-attainment pollutants. In these cases, local emissions are considered significant if they exceed 10.4 $\mu g/m^3$ during construction or 2.5 $\mu g/m^3$ during the subsequent operation of the site, both as measured at the proximate sensitive receptor locations.

5.1.1.5 Additional Indicators

The SCAQMD recommends that "additional indicators" should be used as screening criteria with respect to air quality. Additional factors relevant to the Project at hand identified in the *Handbook* include the following significance criteria:

- Interference with the attainment of the federal or State ambient air quality standards by either violating or contributing to an existing or projected air quality violation.
- Emit carcinogenic or toxic contaminants that exceed the maximum individual cancer risk of 10 in one million.

Again, the SCAQMD indicates in Chapter 6 of its *Handbook* that it considers a project to be mitigated to a level of insignificance if its effects are mitigated below the thresholds provided above.

5.1.2 Impacts Related to the 50 ft (15 m) Beach Width Alternative

Impact AQ-50-1: *Conflict with or obstruct implementation of the applicable air quality plan*

The Project action represents the placement of sand on the beach. The Project would not result in significant localized air quality impacts at the proximate receptor locations and would implement those measures included in the AQMP considered as feasible and, as such, the Project is consistent with the goals of the AQMP and does not present a significant impact.

Mitigation Measures: None

Summary of Significant Unavoidable Impacts: None

Impact AQ-50-2: *Violate any air quality standard or contribute substantially to an existing or projected air quality violation*

Air quality impacts may occur during site preparation, grading, and sporadic maintenance activities required for implementation of the proposed land use. Maintenance could take place once every 6 years depending on need and financial ability. Maintenance would result in a repetition of the initial construction activities. The Project involves approximately 4 ac of resultant dry beach nourishment for the 50 ft Beach Width Alternative. There are no building construction or paving activities associated with this Project. Construction would occur over approximately 46 working days over a four month period. Values used for analysis are included in Appendix C.

Localized Construction Impacts

In addition to the mass Project and daily regional thresholds, Project construction has the potential to raise local ambient pollutant concentrations, which are existing pollutant concentrations within the Project area, not including the construction activities of the Project (e.g., exhaust from regular traffic to/from the beach, along the highways, etc). This could present a significant impact if these concentrations were to exceed the allowable emissions as a function of receptor distance from the site boundary.

The analysis makes use of methodology included in the SCAQMD *Final Localized Significance Threshold Methodology* (*Methodology*). In accordance with the *Methodology*, analysis is only to include exhaust and dust emissions associated with those pieces of equipment that actually operate onsite and omits vehicle trips that are distributed over a large area. In the *Methodology*, the SCAQMD notes receptor locations as "offsite locations where persons may be exposed to the emissions from project activities. Receptor locations include residential, commercial, and industrial land use areas; and any other areas where persons can be situated for an hour or longer at a time."

In accordance with the *Methodology*, receptor locations are to consider the actual location of the receptors. If these locations are unknown, or varied, they may be assumed to be located at distances of 82, 164, 328, 656, and 1,640 feet (25, 50, 100, 200, and 500 m). In cases where proximate receptors may be closer than 82 ft (25 m), as per the *Methodology*, a value of 82 ft (25 m) is to be used in the analysis as a worst-case scenario. Because the closest receptor to the Project area is approximately 180 ft (55 m) away, the recommended SCAQMD default distance is used for this analysis comparison.

In the cases of CO and NO_2, the projected concentration is then added to an assumed ambient concentration in order to determine if the CAAQS would be exceeded. This ambient concentration is source-area dependant and is based on the peak value observed over the last three years of accumulated data at the nearest air monitoring station (previously provided in Table 4.1). Because PM_{10} and $PM_{2.5}$ are non-attainment pollutants, no ambient concentration is added. Instead, in both cases, a short-term construction standard defined as a measurable increase of 10.4 $\mu g/m^3$ is to be applied at the proximate sensitive receptor locations. Table 5-2 presents the daily projected emissions from onsite construction as well as the projected concentrations at the various default and actual receptor distances. Note that all concentrations are within their respective criteria and the impact is less than significant.

Table 5-2
Localized Construction Emissions Concentrations[1]

Distance	CO (1-Hr Conc.)[2]	CO (8-Hr Conc.)[3]	NO_2 (1-Hr Conc.)[4]	PM_{10} (24-Hr Conc.)	$PM_{2.5}$ (24-Hr Conc.)
Peak Daily On-site Emissions (lb/day)	43.6	43.6	94.9	9.7	4.0
Concentration at 25 m	3.08	2.16	0.11	10.31	3.83
Concentration at 50 m	3.07	2.15	0.11	8.50	3.31
Concentration at 55 m (Nearest Actual Receptor)	3.07	2.15	0.11	8.20	3.21
Concentration at 100 m	3.06	2.14	0.11	6.25	2.51
Concentration at 200 m	3.04	2.13	0.11	4.10	1.67
Concentration at 500 m	3.02	2.11	0.11	1.91	0.78
Ambient Air Quality Standard	20 ppm	9.0 ppm	0.18 ppm	10.4 $\mu g/m^3$	10.4 $\mu g/m^3$
Exceeds Standard?	**NO**	**NO**	**NO**	**NO**	**NO**

[1] CO and NO_2 are in ppm, PM_{10} and $PM_{2.5}$ are in $\mu g/m^3$.
[2] Includes a background concentration of 3.0 ppm.
[3] Includes a background concentration of 2.1 ppm.
[4] Includes a background concentration of 0.10 ppm.

Mitigation Measures: None

Summary of Significant Unavoidable Impacts: None

Impact AQ-50-3: *Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is in non-attainment under an applicable Federal or State ambient air quality standards.*

Site Construction Impacts

Emissions associated with on-shore heavy equipment are based on the OffRoad2007 model runs as provided by the SCAQMD on their Internet web site for year 2010 construction equipment. The SCAQMD presents emissions for most pieces of heavy construction equipment at differing horsepower levels generated using the OffRoad2007 Computer Model. The actual horsepower of the anticipated pieces of equipment (e.g., Cat D10 dozers at 580 hp and 988 Front-end loaders at 430 hp) were then extrapolated from the two pieces of similar equipment with the nearest horsepower ratings above and below the expected piece of equipment.

Some dust with its attendant PM_{10} and $PM_{2.5}$ would also be generated from the onshore movement of sand. The 50 ft Beach Width Alternative would result in approximately 4 ac dry beach. The area of disturbance would occur over approximately 46 work days.

The URBEMIS2007 model developed to determine the emissions associated with land-use projects estimates that each acre disturbed generates 20 pounds of PM_{10} and that 25 percent of the construction area is active at any one time. As such, using the URBEMIS model would result in 1 acre of disturbance daily for the 50 ft Beach Width Alternative. As a conservative approach, this analysis assumes that 25 percent of the larger area is disturbed for either alternative resulting in a disturbance of approximately 2.25 acres daily and, in the absence of any dust suppression, 45 pounds of PM_{10}.

Like all projects in the South Coast Air Basin, the construction would be subject to SCAQMD Rule 403 requiring dust control. The URBEMIS2007 model estimates that twice daily watering reduced the dust by about 50 percent whereas thrice daily watering raises this value to about 65 percent. The materials to be placed on the beach are ocean bottom sediment and are pumped onto the beach as a slurry. Because the material is totally saturated, little if any dust is released during its movement. As such, a control efficiency value of 85 percent was assumed for dust suppression as a conservative estimate.

In accordance with Rule 403, the SCAQMD requires that contractors implement Best Available Control Technology (BACT) for construction activities. Rule 403 identifies a set of specific measures for projects less than 50 acres. These requirements, as applicable to this Project, are included in Table 5-3 Note that these measures are regulatory requirements and as such, do not constitute mitigation under CEQA. The conditions included in Table 5-3 apply to construction activities conducted during normal wind conditions (i.e., with wind gusts less than 25 mph). The contingency measures, included in Table 5-4, shall be applied to those periods when instantaneous wind gusts meet or exceed 25 mph.

Data and emissions for the watercraft are based on data supplied by Moffatt & Nichol. The barge is estimated at approximately 4,300 hp for propulsion and 1,700 hp for the dredge pump. Additionally, a generator and auxiliary power source would also be used and are each rated at 565 hp. A tug would assist unloading operations and is estimated at 4,268 hp.

Emissions would also be generated from the construction crew in their daily commutes and by the onsite use of two pick-up trucks. Emissions for these vehicles were based on the EMFAC2007 computer model and assume Year 2010 emission factors. The total daily emissions generated by vehicle travel in Orange County projected by the EMFAC2007 model was divided by the total number of daily miles by vehicle type and a grams-per-mile by vehicle type is determined. Members of the construction crew are each estimated to travel 25.4 miles round-trip in accordance with the URBEMIS2007 computer model for home-to-work travel distances in Orange County.

Table 5-3
Required Best Available Control Measures for Fugitive Dust
(Applicable to All Construction Activity Sources)

Source Category	Control Measures	Guidance
Disturbed soil	• Stabilize disturbed soil throughout the construction site; and • Stabilize disturbed soil between structures.	• Limit vehicular traffic and disturbances on soils where possible; • If interior block walls are planned, install as early as possible; • Apply water or a stabilizing agent in sufficient quantities to prevent the generation of visible dust plumes; and • This measure applies to both inactive and active sites, during workdays, weekends, holidays, and windy conditions.
Earth-moving activities	• Pre-apply water to depth of proposed cuts; • Re-apply water as necessary to maintain soils in a damp condition and to ensure that visible emissions do not exceed 100 feet in any direction; • Stabilize soils once earth-moving activities are complete; and • Limit speed of earthmoving equipment to 10 mph.	• Grade each project phase separately, timed to coincide with construction phase; • Upwind fencing can prevent material movement on site; and • Apply water or a stabilizing agent in sufficient quantities to prevent the generation of visible dust plumes.
Staging areas	• Stabilize staging areas during use; and • Stabilize staging area soils at project completion. • Locate construction equipment and staging zones away from sensitive receptors and fresh air intakes to buildings and air conditioners.	• Limit size of staging area; • Limit vehicle speeds to 15 miles per hour (24 kilometers per hour); and • Limit number and size of staging area entrances/exits.
Paved road track-out	• Cover all haul vehicles	• Comply with the vehicle freeboard requirements of Section 23114 of the California Vehicle Code for

		both public and private roads.
Traffic areas for construction activities	• Stabilize all off-road traffic and parking areas; • Stabilize all haul routes; • Direct construction traffic over established haul routes; and • Limit speeds to 15 miles per hour (mph).	• Apply gravel/paving to all haul routes as soon as possible to all future roadway areas; and • Barriers can be used to ensure vehicles are used only on established parking areas/haul routes.

Table 5-4
Contingency Control Measures for Fugitive Dust During High Winds in Excess of 25 MPH

Fugitive Dust Source Category	Control Measures
Earth-moving	• Cease all active operations; or • Apply water to soil not more than 15 minutes prior to moving such soil.
Disturbed surface areas	• Apply water to all unstabilized disturbed areas three times per day. If there is any evidence of wind-driven fugitive dust, watering frequency is increased to a minimum of four times per day.
Unpaved roads	• Apply water twice per hour during active operation.
Open storage piles	• Apply water twice per hour; or • Install temporary coverings.
All categories	Executive Officer and the USEPA as equivalent to the methods specified in this table may be used.

In this case, the total number of vehicles was raised from 10 to 12 to account for the use of two onsite pick-up trucks during the day. Actual miles for these two pick-ups would be less than the 25.4-mile value used in the analysis, but these emissions are minimal relative to those of the offshore and heavy equipment and more accurate data as to their use would not change the outcome of the analysis.

The 50 ft Beach Width Alternative would use the same level of equipment on a daily basis. As shown in Table 5-5, NOx, ROG, and $PM_{2.5}$ emissions for on-shore sources would not exceed their respective thresholds of 100, 75, and 55 pounds per day. Other on-shore sources in the project area include the railroad operations (an off-road source); project emissions would not cumulatively contribute to these background emissions due to the infrequent stops at this particular unstaffed, platform station. Project emissions, therefore, would not be significant. For informational purposes, the off-shore source emissions would be divided into 68 percent in the SDAB and 32 percent in the SCAB. Model results appear in Appendix C. Because this alternative will not exceed criteria pollutant thresholds, no cumulatively considerable net increase of any criteria pollutant would be anticipated. In addition, this alternative does not exceed the general conformity *de minimis* levels, identifying it as a conforming project and does not need a Conformity Determination.

Mitigation Measures: Site construction may approach the daily threshold for NO_x emissions. Applicable mitigation for NO_x is included below. The included measures would also reduce ROG and $PM_{2.5}$ for on-shore heavy equipment exhaust.

MM-AQ-50-3.1: The construction contractors shall use on-shore heavy equipment that meets Tier II or higher air pollutant emission standards where these standards are applicable and equipment available.

Table 5-5 Comparison of Unmitigated Projected Construction Emissions and Criteria Values for 50 ft Beach Width Alternative

	CO	NOx	ROG	SO_X	Total PM_{10}[1]	Total $PM_{2.5}$[2]	CO_2
Lbs/Day							
On Shore Equipment	43.2	94.9	12.4	0.1	3.9	3.4	8,277.0
Dust	0	0	0	0	6.8	1.4	0
On Shore Vehicles	2.5	0.2	0.3	0.0	0.0	0.0	291.8
Off Shore Sources	327.4	2,185.5	63.9	140.4	66.2	58.9	108,722.6
All Sources	373.1	2,280.6	76.6	140.5	76.98	63.7	117,291.4
On Shore Sources	**45.7**	**95.1**	**12.7**	**0.1**	**10.7**	**4.8**	**8,568.8**
Daily Threshold[4]	550	100	75	150	150	55	NT[3]
Significant?	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**
Tons/year presented for Conformity purposes							
On Shore Sources	1.1	2.2	0.3	0.0	0.1	0.1	197.1
De minimis level[5]	100	10	10	NT[3]	70	NT[3]	NT[3]
Significant?	**NO**	**NO**	**NO**	**---**	**NO**	**---**	**---**

[1] Assumes 85 percent control efficiency for wet material.
[2] Based on 99 percent of the PM_{10} for on-road emissions, 89 percent of the PM_{10} for off-road emissions, and 21 percent of the PM_{10} for fugitive dust.
[3] NT – No Threshold.
[4] Thresholds apply only to onshore sources.
[5] General conformity *de minimis* levels

MM-AQ-50-3.2: All heavy equipment shall be maintained and tuned per manufacturer's specifications to perform at California Air Resources Board (CARB) and/or EPA certification, where applicable, levels and to perform at verified standards applicable to retrofit technologies.

The requirement for Tier II heavy equipment, where applicable, could reduce NO_x emissions by about 40 percent and particulate emissions by about 25 percent over Tier I equipment levels. A higher percentage reduction would be achieved over the use of equipment-produced prior to Tier I requirements. Because the status of the actual equipment assemblage, as well as those pieces subject to Tier II requirements, is variable, the overall reduction in NO_x emissions could be less than the 40 percent reduction noted for the use of Tier II equipment. $PM_{2.5}$ emissions, assuming TIER II equipment, reduces particulate levels by 25 percent.

CO and ROG levels associated with on-shore heavy equipment construction would also be reduced. If the 40 percent reduction associated with NO_x control is also applied to ROG, on-shore heavy equipment ROG would be reduced from 12.4 to 7.4 pounds per day.

Table 5-6 presents the results of the mitigation. Modeling details are included as Appendix C.

Table 5-6 Comparison of Mitigated Construction Emissions and Criteria Values for the 50 ft Beach Width Alternative

	CO	NOx	ROG	SO_X	Total PM_{10}[1]	Total $PM_{2.5}$[2]	CO_2
Lbs/Day							
On Shore Equipment	43.2	56.9	7.4	0.1	2.9	2.6	8,277.0
Dust	0	0	0	0	6.8	1.4	0
On Shore Vehicles	2.5	0.2	0.3	0.0	0.0	0.0	291.8
Off Shore Sources	327.4	2,185.5	63.9	140.4	66.2	58.9	108,722.6
All Sources	373.1	2,242.6	71.6	140.5	75.98	62.9	117,291.4
On Shore Sources	**45.7**	**57.1**	**7.7**	**0.1**	**9.7**	**4.0**	**8,568.8**
Daily Threshold[6]	550	100	75	150	150	55	NT[3]
Significant?	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**
Tons/year presented for Conformity purposes							
On Shore Sources	1.1	1.3	0.2	0.0	0.1	0.1	197.1
De minimis level[5]	100	10	10	NT[3]	70	NT[3]	NT[3]
Significant?	**NO**	**NO**	**NO**	**---**	**NO**	**---**	**--**

[1] Assumes 85 percent control efficiency for wet material.
[2] Based on 99 percent of the PM_{10} for on-road emissions, 89 percent of the PM_{10} for off-road emissions, and 21 percent of the PM_{10} for fugitive dust.
[3] NT – No Threshold.
[4] Based on 46 working days.
[5] Based on 108 working days.
[6] Thresholds apply only to onshore sources.

Summary of Significant Unavoidable Impacts: None

Impact AQ-50-4: *Expose sensitive receptors to substantial air pollutant concentrations*

As demonstrated in Section 4.2.1, daily emissions for CO, NOx, PM_{10}, and $PM_{2.5}$ were modeled to determine their concentration and contribution to the ambient concentrations within the Project vicinity and as shown in Table 5-2, the concentrations of emissions are below the localized significance threshold criteria. As such, construction activities will not result in potential exposure of sensitive receptors to substantial pollutant concentrations.

Mitigation Measures: None

Summary of Significant Unavoidable Impacts: None

Impact AQ-50-5: *Create objectionable odors affecting a substantial number of people*

Project construction would involve the use of heavy equipment creating exhaust pollutants from onsite earth. With regards to nuisance odors, any air quality impacts will be confined to the immediate vicinity of the equipment itself. By the time such emissions reach any sensitive receptor sites away from the Project site, they will be diluted to well below any level of air quality concern.

Sediments to be placed on the beach would not contain a high level of organic debris and thus, while an odor may be noted, it would be typical of any odor associated with low tide conditions. This impact is, therefore, considered not significant.

Mitigation Measures: None

Summary of Significant Unavoidable Impacts: None

Impact AQ-50-6: *Generate greenhouse gases*

At this time, greenhouse gases (primarily CO_2) are not regulated as a criteria pollutant and there are no significance criteria for these emissions. Furthermore, the Final 2007 AQMP does not set CEQA targets that can be used to determine any potential threshold values. Nevertheless, in order to provide decision-makers with as much information as possible, this analysis quantifies, to the extent feasible, potential greenhouse gas emissions associated with the proposed development.

Construction activities would consume fuel and result in the generation of greenhouse gases. Construction CO_2 emissions associated with the use of on-shore heavy equipment are as projected by the OffRoad2007 model included on the SCAQMD Internet web site. CO_2 emissions for the ocean-going vessels are based on fuel use factors included in Table A9-3-E (Fuel Use Estimates Per Horsepower Hour) of the SCAQMD *Handbook* and CO_2 emissions are based on the BAAQMD document, Source Inventory of Bay Area Greenhouse Gas Emissions, Table B: Generalized GHG Emission Factors (Lbs/Usage Unit) and are included in Table 5-5. In accordance with the construction schedule, approximately 5,395,405.4 lbs (2,697.7 tons) of CO_2 would be produced during the 46 working days associated with the 50 ft Beach Width Alternative.

In accordance with the 2007 AQMP, the emission levels in California are estimated to be 532 million metric tons (568.4 short tons) CO_2 equivalent for 2010. At approximately 2,697.7 tons, the 50 ft Beach Width Alternative represents about 0.0005 percent of this State's annual CO_2 emissions budget.

Mitigation Measures: None

Summary of Significant Unavoidable Impacts: None

5.1.3 Impacts Related to the 115 ft (35 m) Beach Width Alternative

Impact AQ-115-1: *Conflict with or obstruct implementation of the applicable air quality plan*

The Project action represents the placement of sand on the beach. The Project would not result in significant localized air quality impacts at the proximate receptor locations and would implement those measures included in the AQMP considered as feasible and, as such, the Project is consistent with the goals of the AQMP and does not present a significant impact.

Mitigation Measures: None

Summary of Significant Unavoidable Impacts: None

Impact AQ-115-2: *Violate any air quality standard or contribute substantially to an existing or projected air quality violation*

As with the 50 ft Beach Width Alternative, air quality impacts may occur during site preparation, grading, and sporadic maintenance activities required for implementation of the proposed land use. Maintenance could take place once every 10 years depending on need and financial ability. Maintenance would result in a repetition of the initial construction activities. The Project involves approximately 9 ac of resultant dry beach nourishment for the 115 ft Beach Width Alternative. No building construction or paving activities are associated with this Project. Construction would occur over approximately 108 working days over a four month period. Values used for analysis are included in Appendix C.

Localized Construction Impacts

As with the 50 ft Beach Width Alternative, Project construction has the potential to raise local ambient pollutant concentrations, which are existing pollutant concentrations within the Project area, not including the construction activities of the Project (e.g., exhaust from regular traffic to/from the beach, along the highways, etc). This could present a significant impact if these concentrations were to exceed the allowable emissions as a function of receptor distance from the site boundary. Because construction equipment will be similar to the 50 ft Beach Width Alternative on a daily basis, all concentrations are within their respective criteria and the impact is less than significant.

Mitigation Measures: None

Summary of Significant Unavoidable Impacts: None

Impact AQ-115-3: *Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is in non-attainment under an applicable Federal or State ambient air quality standards.*

Site Construction Impacts

As with the 50 ft Beach Width Alternative, emissions associated with on-shore heavy equipment are based on the OffRoad2007 model runs as provided by the SCAQMD on their Internet web site for year 2010 construction equipment. The actual horsepower of the anticipated pieces of equipment (e.g., Cat D10 dozers at 580 hp and 988 Front-end loaders at 430 hp) for this Project were then extrapolated from the two pieces of similar equipment with the nearest horsepower ratings above and below the expected piece of equipment. Some dust with its attendant PM_{10} and $PM_{2.5}$ would also be generated from the onshore movement of sand. The 115 ft Beach Width Alternative would result in approximately 9 ac dry beach. The area of disturbance would occur over approximately 108 work days.

The URBEMIS2007 model developed to determine the emissions associated with land-use projects estimates that each acre disturbed generates 20 pounds of PM_{10} and that 25 percent of the construction area is active at any one time. As such, using the URBEMIS model would result in 2.25 acre of disturbance daily for the 115 ft Beach Width Alternative. As a conservative approach, this analysis assumes a disturbance of approximately 2.25 acres daily and, in the absence of any dust suppression, 45 pounds of PM_{10}.

Like all projects in the South Coast Air Basin, the construction would be subject to SCAQMD Rule 403 requiring dust control. The URBEMIS2007 model estimates that twice daily watering reduced the dust by about 50 percent whereas thrice daily watering raises this value to about 65 percent. The materials to be placed on the beach are ocean bottom and are pumped onto the beach as a slurry. Because the material is totally saturated, little if any dust is released during its movement. As such, a control efficiency value of 85 percent was assumed for dust suppression as a conservative estimate.

Data and emissions for the watercraft are based on data supplied by Moffatt & Nichol. The initial beach nourishment would involve a barge and associated tow boats traveling from Oceanside Harbor to the Project site. The hopper dredge will be filled at the designated borrow site approximately one mile offshore of Oceanside and hauled approximately 21 miles (35 km) to San Clemente. The barge is estimated at approximately 4,300 hp for propulsion and 1,700 hp for the dredge pump. Additionally, a generator and auxiliary power source would also be used and are each rated at 565 hp. A tug would assist unloading operations and is estimated at 4,268 hp.

Since the borrow site is in the SDAB and the project site is in the SCAB, emissions were assigned to the separate basins by assigning all of the loading emissions, half of the idling emissions and 81 percent of the vessel travel emissions to the SDAB and all of the unloading emissions, half of the idling emissions, 19 percent of the vessel travel emissions and all of the on-shore emissions to the SCAB. In total, all the on-shore and 32 percent of the off-shore emissions will be in the SCAB and the other 68 percent of the off-shore emissions would be in the SDAB.

Emissions also would be generated from the construction crew in their daily commutes and by the onsite use of two pick-up trucks. Emissions for these vehicles were based on the EMFAC2007 computer model and assume Year 2010 emission factors. The total daily emissions generated by vehicle travel in Orange County projected by the EMFAC2007 model was divided by the total number of daily miles by vehicle type and a grams-per-mile by vehicle type is determined. Members of the construction crew are each estimated to travel 25.4 miles round-trip in accordance with the URBEMIS2007 computer model for home-to-work travel distances in Orange County.

In this case, the total number of vehicles was raised from 10 to 12 to account for the use of two onsite pick-up trucks during the day. Actual miles for these two pick-ups would be less than the 25.4-mile value used in the analysis, but these emissions are minimal relative to those of the offshore and heavy equipment and more accurate data as to their use would not change the outcome of the analysis.

The 115 ft Beach Width Alternative would use the same level of equipment on a daily basis. As shown in Table 5-7, NOx, ROG, and $PM_{2.5}$ emissions for onshore sources would not exceed their respective thresholds of 100, 75, and 55 pounds per day. Other on-shore sources in the project area include the railroad operations (an off-road source); project emissions would not cumulatively contribute to these background emissions due to the infrequent stops at this particular unstaffed, platform station. Project emissions, therefore, would not be significant. Model results appear in Appendix C. Because this alternative will not exceed criteria pollutant thresholds, no cumulatively considerable net increase of any criteria pollutant would be anticipated.

Mitigation Measures: Implement MM-AQ-50-3.1 and MM-AQ-50-3.2.

The requirement for Tier II heavy equipment, where applicable, could reduce NO_x emissions by about 40 percent and particulate emissions by about 25 percent over Tier I equipment levels. A higher percentage reduction would be achieved over the use of equipment-produced prior to Tier I requirements. Because the status of the actual equipment assemblage, as well as those pieces subject to Tier II requirements, is variable, the overall reduction in NO_x emissions could be less than the 40 percent reduction noted for the use of Tier II equipment. $PM_{2.5}$ emissions, assuming use of TIER II equipment, reduces particulate levels by 25 percent. In addition, this alternative does not exceed the general conformity *de minimis* levels, identifying it as a conforming project and does not require a Conformity Determination.

CO and ROG levels associated with on-shore heavy equipment construction would also be reduced. If the 40 percent reduction associated with NO_x control is also applied to ROG, on-shore heavy equipment ROG would be reduced from 12.4 to 7.4 pounds per day.

Table 5-8 presents the results of the mitigation. Modeling details are included as Appendix C.

Summary of Significant Unavoidable Impacts: None

Table 5-7 Comparison of Unmitigated Projected Construction Emissions and Criteria Values for 115 ft Beach Width Alternative

	CO	NOx	ROG	SO_X	Total PM_{10}[1]	Total $PM_{2.5}$[2]	*CO_2*
Lbs/Day							
On Shore Equipment	43.2	94.9	12.4	0.1	3.9	3.4	8,277.0
Dust	0	0	0	0	6.8	1.4	0
On Shore Vehicles	2.5	0.2	0.3	0.0	0.0	0.0	291.8
Off Shore Sources	327.4	2,185.5	63.9	140.4	66.2	58.9	108,722.6
All Sources	373.1	2,280.6	76.6	140.5	76.98	63.7	117,291.4
On Shore Sources	**45.7**	**95.1**	**12.7**	**0.1**	**10.7**	**4.8**	**8,568.8**
Daily Threshold[4]	550	100	75	150	150	55	NT[3]
Significant?	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**
Tons/year presented for Conformity purposes							
On Shore Sources	2.5	5.1	0.7	0.0	0.2	0.2	462.7
De minimis level[5]	100	10	10	NT[3]	70	NT[3]	NT[3]
Significant?	**NO**	**NO**	**NO**	**---**	**NO**	**---**	**---**

[1] Assumes 85 percent control efficiency for wet material.
[2] Based on 99 percent of the PM_{10} for on-road emissions, 89 percent of the PM_{10} for off-road emissions, and 21 percent of the PM_{10} for fugitive dust.
[3] NT – No Threshold.
[4] Thresholds apply only to onshore sources.
[5] General conformity *de minimis* levels

Table 5-8 Comparison of Mitigated Construction Emissions and Criteria Values

	CO	NOx	ROG	SO_X	Total PM_{10}[1]	Total $PM_{2.5}$[2]	*CO_2*
Lbs/Day							
On Shore Equipment	43.2	56.9	7.4	0.1	2.9	2.6	8,277.0
Dust	0	0	0	0	6.8	1.4	0
On Shore Vehicles	2.5	0.2	0.3	0.0	0.0	0.0	291.8
Off Shore Sources	327.4	2,185.5	63.9	140.4	66.2	58.9	108,722.6
All Sources	373.1	2,242.6	71.6	140.5	75.98	62.9	117,291.4
On Shore Sources	**45.7**	**57.1**	**7.7**	**0.1**	**9.7**	**4.0**	**8,568.8**
Daily Threshold:	550	100	75	150	150	55	NT[3]
Significant?	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**
Tons/year presented for Conformity purposes							
On Shore Sources	2.5	3.1	0.4	0.0	0.2	0.1	462.7
De minimis level[5]	100	10	10	NT[3]	70	NT[3]	NT[3]
Significant?	**NO**	**NO**	**NO**	**---**	**NO**	**---**	**---**

[1] Assumes 85 percent control efficiency for wet material.
[2] Based on 99 percent of the PM_{10} for on-road emissions, 89 percent of the PM_{10} for off-road emissions, and 21 percent of the PM_{10} for fugitive dust.
[3] NT – No Threshold.
[4] Thresholds apply only to onshore sources.
[5] General conformity *de minimis* levels

Impact AQ-115-4: *Expose sensitive receptors to substantial air pollutant concentrations*

As demonstrated in Section 4.1.3 above, daily emissions for CO, NOx, PM_{10}, and $PM_{2.5}$ were modeled to determine their concentration and contribution to the ambient concentrations within the Project vicinity and as shown in Table 5-2, the concentrations of emissions are below the localized significance threshold criteria. As such, Project construction activities will not result in potential exposure of sensitive receptors to substantial pollutant concentrations.

Mitigation Measures: None

Summary of Significant Unavoidable Impacts: None

Impact AQ-115-5: *Create objectionable odors affecting a substantial number of people.*

Project construction would involve the use of heavy equipment creating exhaust pollutants from onsite earth. With regards to nuisance odors, any air quality impacts will be confined to the immediate vicinity of the equipment itself. By the time such emissions reach any sensitive receptor sites away from the Project site, they will be diluted to well below any level of air quality concern.

Sediments to be placed on the beach would not contain a high level of organic debris and thus, while an odor may be noted, it would be typical of any odor associated with low tide conditions. This impact is therefore considered not significant.

Mitigation Measures: None

Summary of Significant Unavoidable Impacts: None

Impact AQ-115-6: *Generate greenhouse gases*

As with the 50 ft Beach Width Alternative, construction activities would consume fuel and result in the generation of greenhouse gases. In accordance with the Project construction schedule, approximately 582,703,786.0 lbs (291,351.9 tons) would be produced during the 108 working days associated with the 115 ft Beach Width Alternative.

In accordance with the 2007 AQMP, the emission levels in California are estimated to be 532 million metric tons (568.4 short tons) CO_2 equivalent for 2010. At about 291,351.9 tons, the 115 ft Beach Width Alternative represents about 0.05 percent if the State's annual CO_2 emissions budget.

Mitigation Measures: None

Summary of Significant Unavoidable Impacts: None

5.1.4 Impacts of the No Action Alternative

The No Action Alternative would not involve any dredging or beach nourishment activity and no impacts to air quality would occur from the lack of these construction activities. However, under the No Action Alternative, potential maintenance activities by SCRRA may create emissions associated with equipment used to maintain and protect the railroad ballast and tracks, such as emergency seawalls.

5.2 Geology and Topography

5.2.1 Significance Criteria

An impact to geology and topography will be considered significant if a project alternative results in:

- Substantial adverse modification of any unique geologic features;
- Substantial adverse increase in coastal erosion; and/or
- Substantial adverse modification of beach or nearshore topography.

5.2.2 Impacts Related to the 50 ft (15 m) Beach Width Alternative

Impact ER-50-1: *Substantial adverse modification of any unique geologic features.*

The 50 ft Beach Width Alternative will alter topography by excavating soft bottom offshore of Oceanside and placing the sediment on the beach at San Clemente to widen the beach. Neither the relatively featureless ocean bottom offshore Oceanside or the sand beach at San Clemente is a unique geologic feature. Subtidal soft bottom areas and sandy beaches are widespread in southern California. Therefore, the 50 ft Beach Width Alternative would not result in substantial adverse modification of any unique geologic feature.

Mitigation Measures: None

Summary of Significant Unavoidable Impacts: None

Impact ER-50-2: *Substantial adverse increase in coastal erosion.*

Currently, beach erosion threatens City facilities and private properties as well as the railroad. The proposed action would provide sand to San Clemente beach to offset beach erosion and protect structures. Therefore, the impacts of the 50 ft Beach Width Alternative would offset coastal erosion and would be beneficial.

Mitigation Measures: None

Summary of Significant Unavoidable Impacts: None

Impact ER-50-3: *Substantial adverse modification of beach or nearshore topography.*

Dredging at the Oceanside source site would deepen the bathymetry of a portion of the site by several feet. The proposed dredging would follow accepted marine engineering practices regarding construction and geotechnical limitation associated with borrow site cut slopes. The proposed borrow site has been previously dredged for beach sand. The site is outside the depth of closure and, therefore, the pit would not intercept the littoral sand that typically rebuilds beaches in the summer. Excavation of sand offshore Oceanside would not result in a substantial adverse modification of nearshore bathymetry. The impacts to geology and topography of dredging would not be significant.

The 50 ft Beach Width Alternative would use the dredged sand to widen approximately 3,411 ft (1,040 m) of San Clemente Beach coastline. The immediate post-construction width of the beach would be approximately 76 ft (23 m), but through winnowing and adjustment the eventual beach width would be about 50 ft (15 m). Figure 3-2 shows the construction footprint and the equilibrium footprint of the 50 ft Beach Width Alternative. The construction footprint for this alternative would be approximately 28 acres (ac) (113,242 m^2). The equilibrium footprint, resulting from some of the placed sand moving offshore, would be approximately 124 ac (499,286 m^2).

The proposed fill would be expected to have varying levels of burial impacts due to seasonal crossshore movement of sediment (Appendix D). During the summer months, the equilibrium profile is expected to be biased towards the shoreline. During the summer, when lower wave energy conditions are prevalent, sediment typically migrates across the profile from deeper water to shallower water, resulting in a net accumulation of sediment in the foreshore. During the winter months, the equilibrium profile would be biased toward the offshore bar. Higher energy winter wave conditions cause sediment to move across the profile from shallower water to deeper water, resulting in a net gain of sediment towards the offshore tail of the profile.

The beach fill proposed for San Clemente would be expected to perform in a manner consistent with other recent beach fills. Figure 5-1 shows the profile for a recent fill by SANDAG of 421,000 cy (319,960 m^3) along 4,400 ft (1,321 m) of beach at Oceanside. This profile shows a movement of up to 6 ft (2 m) of thickness across the profile. In general, beyond about 0 MLLW, the post beach fill profiles were within the range observed prior to the beachfill. Figure 5-2 shows the cross sectional distribution of this sediment for the 50 ft Beach Width Alternative.

These temporary burial impacts in the nearshore area could result in temporary adverse effects, including partial burial of T-Street reef. Although these effects would be adverse, because they would be short-term and only would occur in the inshore portions of the reef, they would not result in a substantial adverse modification of nearshore topography.

Mitigation Measures: None

Summary of Significant Unavoidable Impacts: None

Figure 5-1 SANDAG Oceanside Beach Fill Profiles (Before and After Construction)

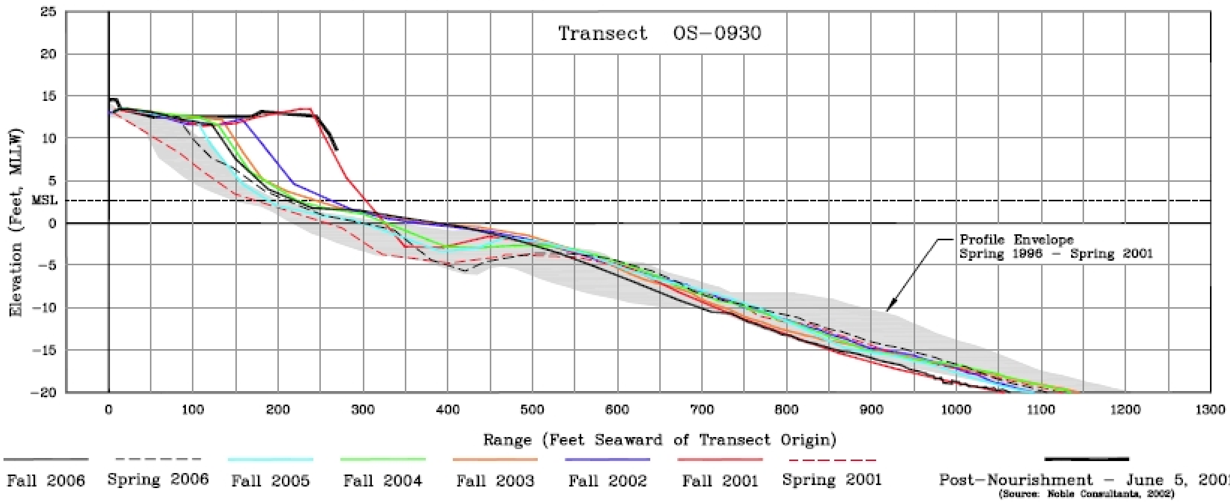
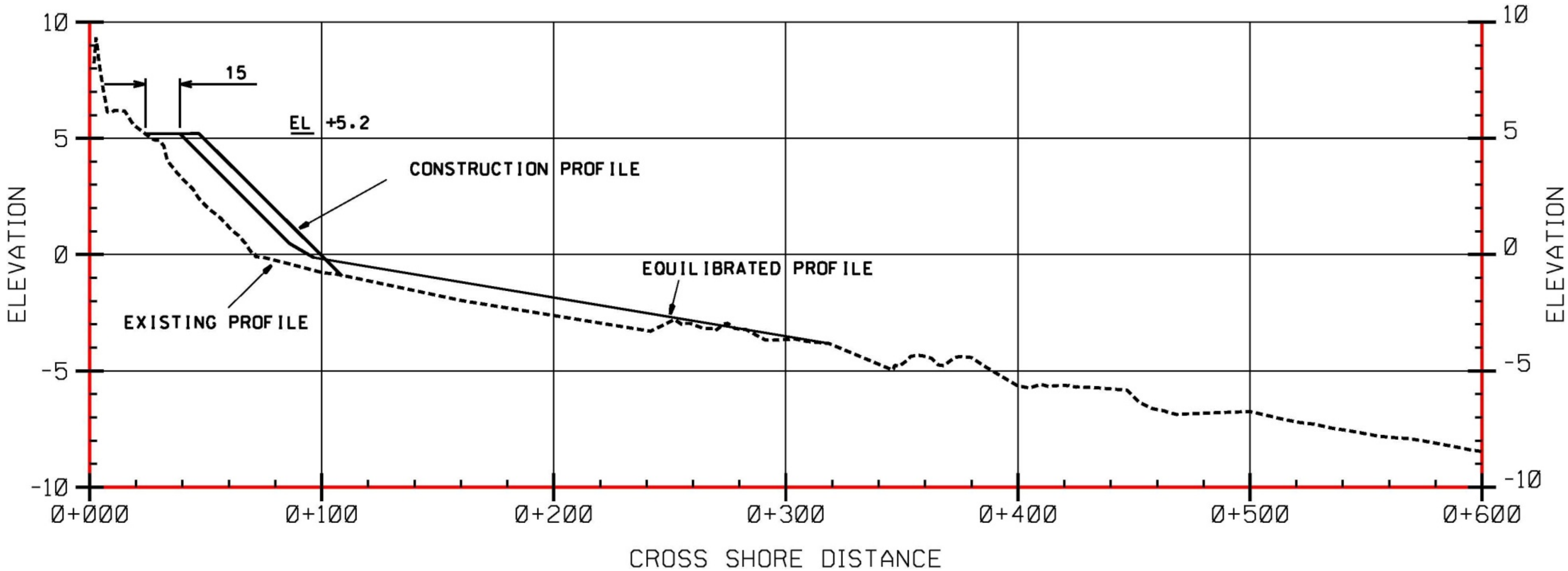


Figure 5-2 Cross Section Profile of the 50 ft Beach Width Alternative



5.2.3 Impacts Related to the 115 ft (35 m) Beach Width Alternative

Impact ER-115-1: *Substantial adverse modification of any unique geologic features.*

The 115 ft Beach Width Alternative will alter topography by excavating soft bottom offshore of Oceanside and placing the sediment on the beach at San Clemente to widen the beach. Neither the relatively featureless ocean bottom offshore Oceanside or the sand beach at San Clemente is a unique geologic feature. Subtidal soft bottom areas and sandy beaches are widespread in southern California. Therefore, the 115 ft Beach Width Alternative would not result in substantial adverse modification of any unique geologic feature.

Mitigation Measures: None

Summary of Significant Unavoidable Impacts: None

Impact ER-115-2: *Substantial adverse increase in coastal erosion*

Currently, beach erosion threatens City facilities and private properties as well as the railroad. The 115 ft Beach Width Alternative would provide sand to San Clemente beach to offset beach erosion and protect structures. Therefore, the impacts of this alternative would be beneficial. Because the 115 ft Beach Width Alternative would provide a wider beach than the 50 ft Beach Width Alternative, the 115 ft Beach Width Alternative would be more effective in off-setting the impacts of beach erosion.

Mitigation Measures: None

Summary of Significant Unavoidable Impacts: None

Impact ER-115-3: *Substantial adverse modification of beach or nearshore topography*

Dredging at the Oceanside source site for the 115 ft Beach Width Alternative would deepen the bathymetry of a portion of the site by several feet. The proposed dredging would follow accepted marine engineering practices regarding construction and geotechnical limitation associated with borrow site cut slopes. The proposed borrow site has been previously dredged for beach sand. The site is outside the depth of closure and, therefore, the pit would not intercept the littoral sand that typically rebuilds beaches in the summer. Excavation of sand offshore Oceanside would not result in a substantial adverse modification of nearshore bathymetry. The impacts to geology and topography of dredging would not be significant.

To achieve a design beach width of 115 ft (35 m), the construction beach width would be 174 ft (53 m). This sand will move alongshore (primarily downcoast) and offshore. For the 115 ft Beach Width Alternative, the sand would cover an area of approximately 39 ac (158, 248 m^2) after construction. At equilibrium, the sand would cover a footprint of 205 ac (828, 281 m^2) (Figure 3-3). Figure 5-3 shows the cross sectional distribution of this sediment for the 115 ft Beach Width Alternative. At equilibrium, the depth of burial would be greatest at the shoreline where it would be up to 19 ft (6 m) thick. At the seaward toe of the equilibrium profile, burial would range between 1 to 3 ft (0.3 and 1.0 m) thick (Appendix D). The sediment would be expected to gradually move out of the project area within 10 years.

As shown in Figure 5-3, the 115 ft Beach Width Alternative would result in substantial burial impacts to T-Street reef. The 115 ft Beach Width Alternative also would bury other shallow rocky habitat within the Project area. The burial of T-Street reef would be expected to result in adverse impacts for up to 10 years. In addition, the 115 ft Beach Width Alternative would result in likely sedimentation of offshore reefs that support biological resources. Monitoring efforts of a slightly smaller beach fill project off the coast at Oceanside (SANDAG project) indicated that below a water depth of 0 MLLW, the profiles after the fill event were within the same range of profiles observed prior to the fill event, which was in water depths up to about -10 ft (-3 m). Some of the post-fill profiles were within the upper range of pre-fill depths observed. It is possible that the greater volume of fill proposed for the 115 ft Beach Width Alternative (448,000 m^3 for this Project compared to 319,960 m^3 for SANDAG) could result in burial beyond existing profiles. If the 115 ft Beach Width Alternative modifies nearshore bathymetry in such a way as to result in burial and degradation of rocky subtidal habitat, it would have a significant adverse impact on geology and topography.

Mitigation Measures:

MM-ER-115-2.1: Sediment profiles shall be monitored following the beach fill. If significant burial of natural reef occurs, future fill events beyond the initial fill shall not occur. If the reef does not return, an equivalent amount of mitigation reef shall be constructed at a water depth that would create nearshore topography similar to that of T-Street reef.

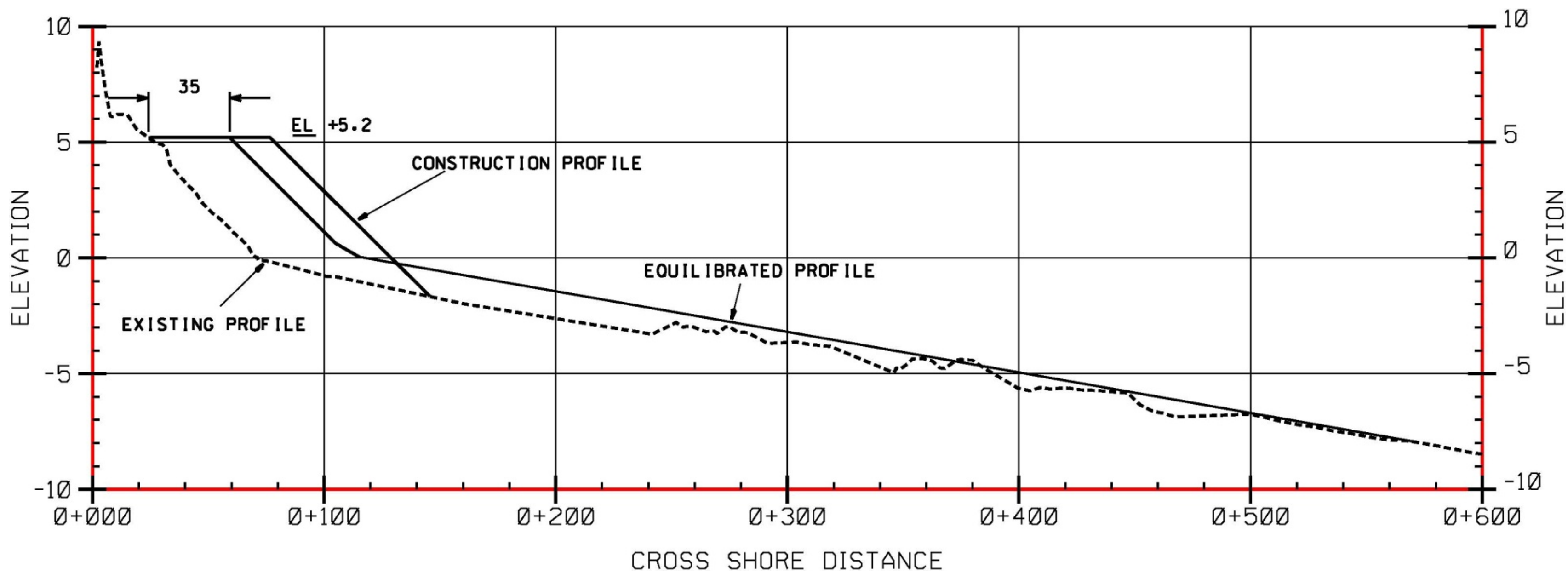
Summary of Significant Unavoidable Impacts: The 115 ft Beach Width Alternative would result in substantial burial of reef that would result in modification of the nearshore topography. These impacts would occur for up to 10 years. Monitoring and documentation of impacts and the avoidance of future beach fills would allow the reefs off San Clemente to eventually recover to their existing values. Creation of a mitigation reef would replicate some of the topography lost to the beach fill, but a mitigation reef may not support the biological or recreational uses it currently sustains.

5.2.4 Impacts Related to the No Action Alternative

Under the No Action alternative, there would be no alteration of bathymetry and topography by dredging sand from offshore Oceanside and placing it on the beach near San Clemente Pier. The sediment at the Oceanside borrow site may be dredged for other projects.

Under the No Action alternative, the beach at San Clemente would continue to erode, resulting in a further loss of sand depth and width. The denuded beach would provide little protection for the railroad and to public and private structures. Damage to structures may occur under high wave conditions. The narrow beach would limit recreational opportunities for beachgoers and would provide little foraging area for shorebirds and spawning area for grunion. Continued erosion of San Clemente Beach would be a substantial adverse modification of beach or nearshore topography and, therefore, a significant impact.

Figure 5-3 Cross Section Profile of 115 ft (35 m) Beach Width Alternative



Under the No Action alternative, emergency seawalls may be constructed to protect structures from wave damage. Construction of seawalls would be an adverse modification of beach topography. However, because a relatively small amount of beach would be affected, the impact would not be substantial and would not be considered significant.

5.3 Water Resources (Water Quality, Sediments, and Oceanography)

5.3.1 Significance Criteria

Impacts to marine water quality are considered significant if any of the following apply:

- The water quality objectives in the California Ocean Plan (SWRCB 2005) are violated; and/or
- Project operations or discharges that change background levels of chemical and physical constituents or elevate turbidity would produce long-term changes in the receiving environment of the site, area, or region that would impair the beneficial uses of the receiving water.

Impacts are considered less than significant if the project would result in elevation of contaminants, but the levels remain below water quality criteria or if elevation of contaminant concentrations above criteria occurs only within a couple of hundred feet or less of the point of discharge for a few hours or less.

An impact to oceanographic conditions or coastal processes would be considered significant if any of the following apply:

- Nearshore wave characteristics are substantially and adversely altered;
- Nearshore sediment transport is substantially and adversely altered; and/or
- Shoreline erosion is substantially increased.

5.3.2 Impacts Related to the 50 ft (15 m) Beach Width Alternative

Impact WR-50-1: *The water quality objectives in the California Ocean Plan (SWRCB 2005) are violated.*

As described in Section 4.3 and shown in Table 4-6, the sediment at the Oceanside borrow site has very low levels of contaminants. Therefore, resuspension of sediments during dredging and run-off into the ocean from sediments placed on the beach at San Clemente would not result in an increase in the concentration of contaminants in ocean waters or cause a violation of any water quality objective related to contaminants.

Dredging and beach construction activities will involve the use of vessels and construction vehicles on and near the ocean. An accident or the improper handling of materials could result in the introduction of fuels or other hazardous material to the ocean. The introduction of fuels or other contaminants to marine waters would be a potentially significant impact. Impacts may be reduced to not significant through adherence to a Stormwater Pollution Prevention Plan (SWPPP) and an Oil Spill Prevention and Response Plan (OSPRP).

The primary potential for degradation of water quality from the proposed beach nourishment is through the generation of turbidity during dredging and sediment discharge to the beach. The California Ocean Plan states "Natural light shall not be significantly reduced at any point outside the initial dilution zone as the result of the discharge of waste." The sediment at the Oceanside source site is generally fine-grained sands with local silty intervals (USACE 2005b). The calculated fines content of the composite gradation is 8.0 percent. Because the material at the borrow site consists primarily of sand-sized particles that settle rapidly, these plumes would not be extensive. As material is loaded into the hopper bins, the dredge may overflow elutriate down the center of the hull through vertical overflow pipes. Thus, the hopper dredge may create a surface turbidity plume, which, under worst-case conditions, may extend for 1,000 ft (300 m) or more. SANDAG estimated the average turbidity plumes expected from dredging at the Oceanside borrow site using the overall mean grain size diameter and the average current speed (SANDAG 2000). The estimated average down current distance of the turbidity plume was estimated to be 272 to 329 ft (82 to 99 m) (SANDAG 2000). Turbidity monitoring of dredging with a hopper dredge during the SANDAG Regional Beach Sand project identified only small plumes in the vicinity of the dredge (AMEC 2002); plumes did not exceed 2,700 yd^2 (2,100 m^2). Therefore, the amount of turbidity expected during dredging at the Oceanside source site is expected to be minor. However, in a worst-case scenario, if a silt layer is encountered during conditions of high currents, the creation of extensive turbidity plumes during dredging would be a significant impact.

Turbidity plumes generated during discharge of offshore sediments to receiver sites also have the potential to degrade nearshore waters. However, turbidity plumes would be expected to be confined primarily to the naturally turbid surf zone and associated rip currents. Construction monitoring during the SANDAG project in San Diego County documented that beach fill operations generated turbidity plumes that ranged between 2,640 and 10,000 ft (800 and 3,000 m) and were greatly influenced by rip currents. The turbidity plumes remained in the surf zone unless rip currents carried them offshore (SANDAG 2002). The proposed Project method of discharging the sediments behind an L-shaped berm allows fine particles to settle prior to introduction to the ocean and reduces the potential for nearshore turbidity. Because turbidity plumes generated during initial placement of sediments on receiver beaches would primarily be confined to the surf zone and rip currents, areas that are naturally turbid, degradation of coastal waters by turbidity from the proposed Project would not be expected to occur. However, should a worst-case scenario of more extensive turbidity plumes be created during beach construction, impacts would be significant.

Water quality impacts due to turbidity at the borrow site during construction are expected to be minor and temporary. The geotechnical analysis indicates that variations in sediment quality occur within the borrow sediments. The borrow area tends to have small pockets and/or lenses of sediment that contain higher fines content than are customarily acceptable as beach fill. However, the overall gradation of the borrow area as a unit indicates the borrow area is acceptable for beach placement. It is expected that this project will be constructed by hopper dredge methods instead of hydraulic cutter head methods. Hopper dredge methods result in shallow excavations as opposed to excavating the borrow area as a larger unit that can be achieved by hydraulic cutter head. Thus, the pockets and/or lenses of finer grained materials will tend to be delivered to the fill site. The simplifying assumption was made that the fill will be comprised of a blended mix of sediments represented by the mean grain size of the borrow materials. Observations from numerous nearshore and beach fill construction projects within the Los Angeles District indicate a significant percentage of borrow material fines are winnowed immediately during placement operations in the surf zone. Standard construction practice includes turbidity monitoring both updrift and downdrift of the dredge. Due to rapid winnowing and naturally elevated ambient turbidity levels within the surf zone, insignificant turbidity impacts from dredging/fill operations are typically the rule rather than the exception. Therefore, construction related turbidity impacts are expected to be temporary.

Impacts to water quality during periodic maintenance renourishment would be similar to those for initial beach construction. Each renourishment event would involve approximately 251,000 cy (192,000 m^3) every six years for an estimated eight renourishment cycles over the Project life. Degradation of water quality due to periodic maintenance is not expected to occur; however, if extensive turbidity were to occur, the impact would be potentially significant, but temporary.

Mitigation Measures:

MM-WR-50-1.1: A SWPPP and an OSPRP shall be prepared for all construction activities. These plans shall specify specific measures that shall be taken during dredging and beach construction to avoid introducing contaminants to the ocean via leaks and spills. All measures shall be adhered to during Project construction.

MM-WR-50-1.2: Turbidity shall be monitored during dredging. If a visible turbidity plume is observed beyond the immediate dredging area, dredging activities shall be modified (e.g., decrease the rate of dredging, move to a new dredge location) until the turbidity plume disperses. Turbidity also shall be monitored during beach fill operations. If significant turbidity (i.e., a visible turbidity plume beyond the surf zone or rip current area) is observed, beach fill operations shall be modified (e.g., by slowing the rate of fill) until the turbidity plume disperses.

Summary of Significant Unavoidable Impacts: None

Impact WR-50-2: *Project operations or discharges that change background levels of chemical and physical constituents or elevate turbidity would produce long-term changes in the receiving environment of the site, area, or region that would impair the beneficial uses of the receiving water.*

Beneficial uses of ocean waters off San Clemente and Oceanside include marine habitat, wildlife habitat, navigation, water-related recreation that involves body contact with water, non-contact water recreation, and habitat for threatened and endangered species, (RWQCB 1994). The sediment that will be dredged at the Oceanside source site and discharged on San Clemente

Beach will not expose wildlife, marine life, or recreational ocean users to elevated levels of pollutants.

Based on information discussed above under Impact WR-50-1, turbidity during dredging at the Oceanside source site is expected to be minimal, and turbidity during discharge of sediments to the beach is expected to be confined to the surf zone and rip currents. The proposed Project is scheduled to occur between late August/early September through March, outside of the least tern breeding and grunion spawning seasons. The closest breeding colony to the San Clemente Beach receiver site is at Red Beach, approximately 12 mi (19 km) south of the receiver site. The large least tern nesting colony at the Santa Margarita River is within about 1.5 mi (2.4 km) from the Oceanside borrow site. Turbidity generated during sand placement on San Clemente Beach would have little effect on the foraging activity of least terns, but turbidity generated during excavation of sediment at the Oceanside borrow site would be within the foraging range of nesting least terns. However, because the proposed Project is scheduled to occur outside of the California least tern breeding season, there would be no impact on breeding least terns. In addition, if turbidity plumes were to occur at the Project site, any least terns foraging in the Project area would be expected to move to a nearby, more suitable foraging site. Therefore, impacts to California least tern due to turbidity would be less than significant.

Mitigation Measure: Implement MM-WR-50-1.2.

Summary of Significant Unavoidable Impacts: None

Impact WR-50-3: *Nearshore wave characteristics are substantially and adversely altered.*

Dredging at an offshore borrow site may have the potential to alter the nearshore wave conditions over the depression. Theoretically, waves passing over the deepened pit could increase or decrease in height compared to the existing condition. However, the proposed dredge borrow area has a very small footprint in relation to the overall bathymetric field traversed by waves approaching shore (USACE 2005, Chambers Group 2007). Therefore, the dredge pit will function as a nearly imperceptible variation to approaching waves. Similar offshore dredging projects have occurred off Southern California with no impacts to waves (Chambers Group 2007). For example, the USACE regularly dredges sand for beach nourishment at Surfside and Sunset Beaches in Orange County from a borrow area at similar depth to the Oceanside source site. No perceptible effects have been documented to waves traversing the site (Patterson and Young 1989).

Another concern is that erosion of sediment from the beach fill will alter nearshore bathymetry and change wave characteristics. T-Street is a popular surfing site located immediately south of San Clemente Pier and directly offshore of the T-Street overpass. The T-Street break is due to a permanent, hard bottom reef that rises above the seabed (Appendix D). Figure 5-4 is a plan view plot of the bathymetric contours that show this seabed feature. The immediately adjacent contours are straight and parallel, while the reef at T-Street is a seabed perturbation such that its elevation, shape, and orientation to incoming waves are a unique combination that tends to shoal waves to a peak with a resulting plunging "left" (from the ocean facing the shore, wave that breaks from right to left) and "right" (from the ocean facing the shore, wave that breaks from left to right). The slope of the beach and the types of waves approaching the surf zone determine which type of breaker (i.e., form of the wave at breaking) will be predominant. Because of the hard bottom bathymetry, there is a wide range of incident wave conditions (Appendix D). The configuration and orientation of the reef to incoming waves create consistent surfing waves, making T-Street a popular break in the Orange County coastal area. High steepness waves result in plunging breakers, which are associated with beaches with steeper gradients. Types of breakers identified by Galvin (1968) that are discussed for this Project include spilling and plunging breaks. Spilling breakers occur gradually over a distance, where the wave crest becomes unstable and cascades ("spills") down the shoreward face of the wave producing a foamy, white water surface. Plunging breakers are waves that occur when the crest advances faster than the base of the breaker, curls over the shoreward face of the wave, and then falls forward into the trough of the wave, resulting in a high splash.

Figure 5-5 is a cross section plot of the bathymetric contours at T-Street. The measured bathymetry data indicate that the reef extends from the shoreline to approximately 1,200 ft (400 m) offshore. The surfing extends from the beach to about 600 ft (200 m) offshore and typically is in water depths less than 15 ft (5 m). The surfing area is closer to the beach than the actual reef location, as incoming waves require time and space to be transformed by the reef bathymetry.

Some of the sand placed on the beach for the 50 ft Beach Width Alternative would move offshore. At T-Street reef, most of this sand would accumulate in the shallower portions of the reef. The potential effects on the nearshore wave characteristics could be considered adverse depending on the wave use under consideration (e.g., surfing or sand transport). Sand from the 50 ft Beach Width Alternative would be present for up to 6 years, however, the level of burial is expected to steadily decrease during this time at about a 13 ft (4.0 m) loss per year erosion rate. Similar impacts would be expected to occur during each nourishment event. The impacts to wave characteristics, although potentially adverse, would be relatively short-term and less than significant for each nourishment cycle.

The impacts to surfing from this sand movement are not rigorously quantifiable. Because the equilibrium footprint would not extend into the offshore portions of the reef, it would not be likely to modify significantly the refractive abilities of the most seaward extent to the reef. However, the 50 ft Beach Width Alternative may have impacts to the surf zone region between the shoreline and the "take-off" zone, or the area where surfers start their ride as the surfboard is propelled by the wave. The surfing experience might consist of a normal "take-off," but then "close-out" as the wave encounters the straightened bathymetric contours inshore (Appendix D); a "close-out" condition is when a wave breaks along its entire length at once. Although impacts due to the wider beach may occur, historic aerial photographs of San Clemente Beach at the Pier (Figure 5-6) indicate that the beach width in 1990 was approximately 55 ft (17 m) wide and no records have been found that indicate surfing ceased within the Project area during that time.

Figure 5-4 Plan View of T-Street Surf Break Bathymetry

Figure 5.3-1
Plan View of T-Street
Surf Break Bathymetry

Figure 5-5 Cross Section of T-Street Surf Break Bathymetry (Distances in Feet)

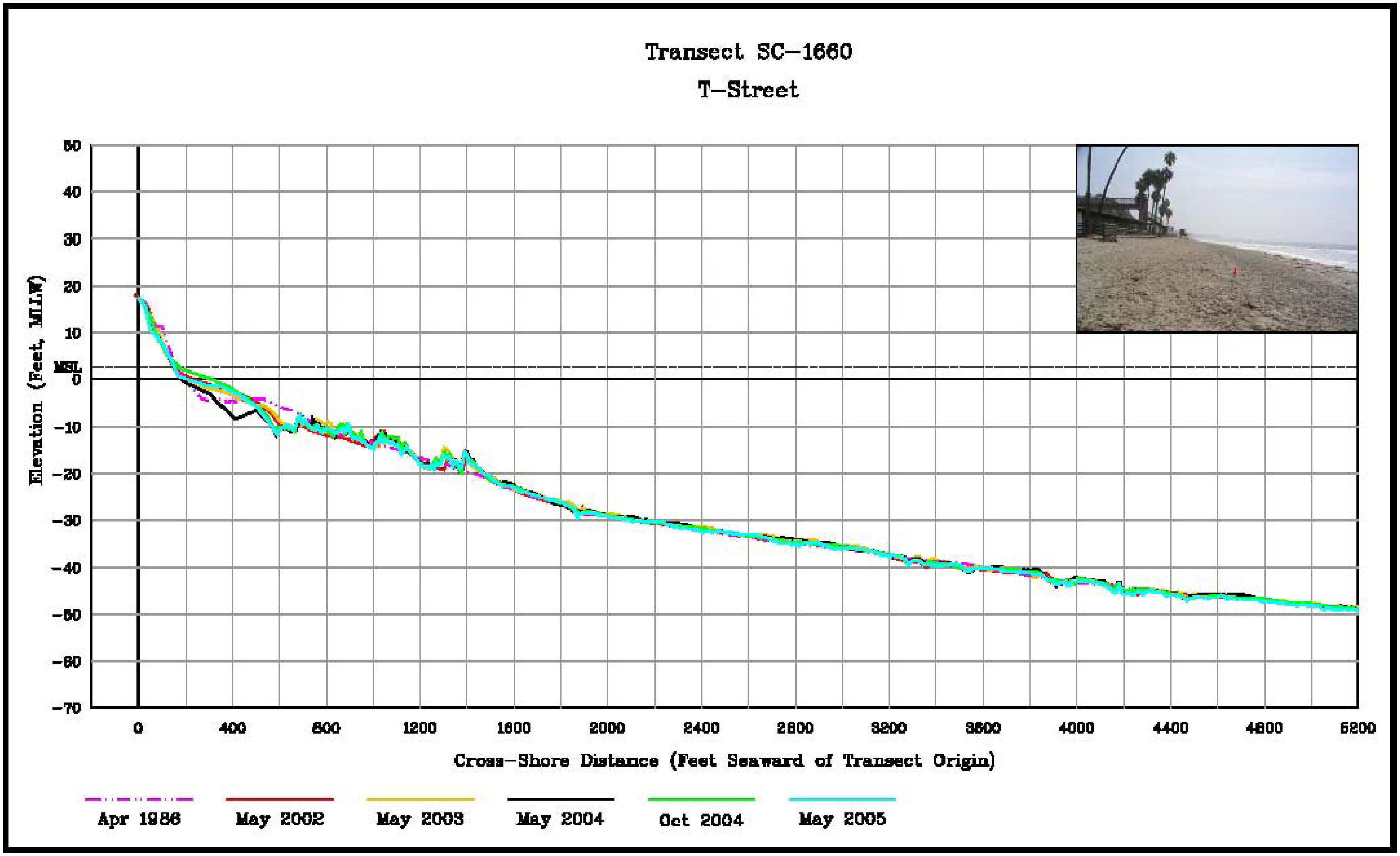


Figure 5-6 Historic Aerial Photograph of San Clemente Pier Shoreline

Mitigation Measures: None.

Summary of Significant Unavoidable Impacts: None

Impact WR-50-4: *Nearshore sediment transport is substantially and adversely altered.*

The proposed borrow/dredge site offshore of Oceanside Harbor is at a water depth beyond the depth of closure for sediment transport off Oceanside (SANDAG 2000). Therefore, deepening the area to obtain sand will not interrupt the littoral transport of sand.

It is possible that by widening the beach at San Clemente Pier, a sand groin could be created and sand moving downcoast by littoral transport could be blocked resulting in erosion of downcoast beaches (USACE 2005b). However, any sand blocked on the upcoast beach would be compensated on the downcoast beach by the erosion and downcoast transport of the beach fill. Conclusions drawn from the SANDAG monitoring data of the Oceanside Beach fill suggests the proposed Project beach fill will erode primarily in the south longshore direction (Appendix D). The SANDAG long-term monitoring data indicates that beaches in the south Oceanside and north Carlsbad regions gained significantly since project construction. The data further suggests that the Oceanside fill has merged with the adjacent Carlsbad fill. Considering that Carlsbad Beach is south of Oceanside Beach and that the longshore drift is primarily in the southern direction, the beach width increase can be directly attributed to south directed longshore sediment transport of the fill material. Therefore, even if the widened beach at San Clemente intercepted the downcoast transport of sand, no adverse effects would occur because erosion of the San Clemente Beach fill would nourish downcoast beaches.

Mitigation Measure: None.

Summary of Significant Unavoidable Impacts: None

Impact WR-50-5: *Shoreline erosion is substantially increased*

As discussed above under Impact WR 5.3.2-4, the sand source site will not rob the littoral cell of sediment because it is located beyond the depth of closure, and the widening of the beach in San Clemente is expected to nourish downcoast beaches, not cause erosion. The beach nourishment is designed to offset problems caused by beach erosion in San Clemente. The proposed beach fill would protect structures and the railroad and would be a benefit.

Mitigation Measures: None.

Summary of Significant Unavoidable Impacts: None

5.3.3 Impacts Related to the 115 ft (35 m) Beach Width Alternative

Impact WR-115-1: *The water quality objectives in the California Ocean Plan (SWRCB 2005) are violated.*

The 115 ft Beach Width Alternative would not be expected to result in an elevation of contaminants in the Project area. The sediment at the Oceanside borrow site has very low levels of contaminants. Adherence to a SWPPP and OSPRP would prevent the introduction of fuels or other hazardous materials to the ocean during Project construction.

The primary potential for degradation of water quality from the 115 ft Beach Width Alternative would be through the generation of turbidity during dredging and sediment discharge to the beach. Impacts of turbidity for the 115 ft Beach Width Alternative would be similar to those described above for the 50 ft Beach Width Alternative. The only difference between the two beach width alternatives with respect to turbidity is that the 115 ft Beach Width Alternative would take 108 days to construct compared to 46 days for the 50 ft Beach Width Alternative. Therefore, potential turbidity impacts would occur over a greater period of time for the 115 ft Beach Width Alternative. Turbidity during dredging would be expected to be minor at the Oceanside dredge site, and would be confined to the naturally turbid surf zone at the beach site. However, should a worst-case scenario of more extensive turbidity plumes be created during beach construction, impacts would be significant.

Mitigation Measures: Implement MM-WR-50-1.1 and MM-WR-50-1.2.

Summary of Significant Unavoidable Impacts: None

Impact WR-115-2: *Project operations or discharges that change background levels of chemical and physical constituents or elevate turbidity would produce long-term changes in the receiving environment of the site, area, or region that would impair the beneficial uses of the receiving water.*

The 115 ft Beach Width Alternative would not be expected to cause long-term changes in water column characteristics that would impair the beneficial uses of the receiving waters. The 115 ft Beach Width Alternative may elevate turbidity during the approximately four months of beach construction.

Mitigation Measure: Implement MM-WR-50-1.1.

Summary of Significant Unavoidable Impacts: None

Impact WR-115-3: *Nearshore wave characteristics are substantially and adversely altered*

Dredging for the 115 ft Beach Width Alternative at the Oceanside borrow site would not be expected to alter wave characteristics. The dredge pit will function as a nearly imperceptible variation to approaching waves.

However, the 115 ft Beach Width Alternative could have significant effects on the wave breaking characteristics at the T-Street reef. Figure 5-3 shows the expected equilibrium profile of the 115 ft Beach Width Alternative at T-Street reef. Natural seasonal cross-shore transport mechanisms potentially could change the seabed up to 6 ft (2 m). A sand layer of 6 ft thickness on T-Street reef could have unquantifiable, but significant effects to the wave breaking characteristics (Appendix D). As the reef fills in from the sand, the characteristic reef shape could be modified and/or lost as it becomes covered by a sand bar. The refractive abilities of the reef may be modified or lost, lessening the focusing effect of the reef and changing the point break characteristics of T-Street. As the reef continues to fill in, the overall bathymetry of the area may begin to become straight and parallel and the wave will lose its ability to "feel" the reef. The wave may begin to exhibit more spilling characteristics normally associated with beach breaks. The consolidated "take-off" zone may be replaced by a more disorganized situation containing many "take-off" zones with shorter, more varied break directions. The straightening contours may cause the wave to tend to break all at once, creating a "close out" condition. Flattening of the slope in the reef area due to sedimentation ultimately has the potential to change the characteristic plunging point break to a quasi-spilling beach break. The sediment from the 115 ft Beach Width Alternative would erode from the reef over time, but would take up to 10 years to disappear from the equilibrium footprint. Substantial alteration of the wave characteristics at T-Street reef for up to 10 years would be a significant adverse impact.

Mitigation Measure:

MM-WR-115-3.1: Wave characteristics at T-Street should be monitored before and after beach construction. If surfing is degraded and does not recover within 10 years, future nourishment events should not occur. If surf characteristics still do not recover after 10 years, a mitigation surfing reef shall be constructed.

Summary of Significant Unavoidable Impacts: The 115 ft Beach Width Alternative would result in substantial burial of T-Street reef and adverse modification of the wave characteristics there. The sediment from the beach fill would gradually erode from the reef throughout a ten year period. It is unknown precisely when during this period the surf would regain its pre-project characteristics. Monitoring and documentation of impacts and the avoidance of future beach fills, would allow the wave characteristics to recover. Creation of a mitigation surfing reef similar in size to the T-Street reef would replicate some of the surfing values, but a mitigation surfing reef may not generate wave profiles equivalent to those at T-Street reef.

Impact WR-115-4: *Nearshore sediment transport is substantially and adversely altered.*

The proposed borrow/dredge site offshore of Oceanside Harbor is at a water depth beyond the depth of closure for sediment transport off Oceanside. Therefore, deepening the area to obtain sand will not interrupt the littoral transport of sand.

As described for the 50 ft Beach Width Alternative, widening of the beach near San Clemente Pier would not result in the erosion of downcoast beaches. Even if the widened beach at San Clemente intercepted the downcoast transport of sand, no adverse effects would occur because erosion of the San Clemente Beach fill would nourish downcoast beaches.

Mitigation Measure: None.

Summary of Significant Unavoidable Impacts: None

Impact WR-115-5: *Shoreline erosion is substantially increased*

As discussed above, the sand source site will not rob the littoral cell of sediment because it is located beyond the depth of closure, and the widening of the beach in San Clemente is expected to nourish downcoast beaches, not cause erosion. The 115 ft Beach Width Alternative is designed to offset problems caused by beach erosion in San Clemente. The proposed beach fill would protect structures and the railroad.

Mitigation Measures: None.

Summary of Significant Unavoidable Impacts: None

5.3.4 Impacts Related to the No Action Alternative

Under the No Action Alternative**,** there would be no additional turbidity in the Project area caused by dredging off Oceanside and discharging the sediments to San Clemente Beach. Under the No Action Alternative, the Project area would still experience elevated turbidity at times from storm runoff from rivers and flood control channels and resuspension of sediments by wave action.

Under the No Action alternative, there would be no alteration of bathymetry by dredging sand from offshore Oceanside or discharging sand at San Clemente and, therefore, no potential to alter wave characteristics. The sediment at the Oceanside borrow site may be dredged for other projects.

Under the No Action alternative, the beach at San Clemente would continue to erode resulting in a further loss of sand depth and width. The denuded beach would provide little protection for the railroad and to public and private structures. Damage to structures may occur under high wave conditions.

Under the No Action alternative, emergency seawalls may be constructed to prevent surf damage to structures. These sea walls may have minor effects on nearshore sediment transport, but these effects would not be substantial. The impacts of sea walls on sediment transport would not be significant.

5.4 Biological Resources

5.4.1 Significance Criteria

An impact to biological resources will be considered significant if a project alternative results in:

- A direct adverse effect on the population of a threatened or endangered species or the loss or disturbance of important habitat for a listed species;

- A long-term net loss in the habitat value of a sensitive biological habitat. For the purposes of this analysis, kelp beds, and well developed rocky intertidal and surfgrass beds are considered sensitive biological habitats;
- Substantial impedence to the breeding, movement or migration of fish or wildlife;
- Substantial loss to the population of any native fish, wildlife or vegetation. For the purpose of this analysis, substantial is defined as a change in a population that is detectable over natural variability for a period of five years or more; and/or
- Substantial adverse impact on Essential Fish Habitat.

5.4.2 Impacts Related to the 50 ft (15 m) Beach Width Alternative

Impact BR-50-1: *A direct adverse effect on the population of a special status listed species or the loss or disturbance of important habitat for a listed species.*

As discussed in Section 4.4, the listed species are unlikely to occur in the Project area, including white abalone, southern steelhead, western snowy plover, and eight species of marine mammals. For these species, the Project area specifically does not include appropriate primary constituent habitat elements. These taxa would not be impacted by the project implementation.

Least terns breed at Camp Pendleton between mid-April and early August. The proposed Project is scheduled to occur between late August/early September through March. The closest breeding colony to the San Clemente Beach receiver site is at Red Beach, approximately 12 mi (19 km) south of the receiver site. The large least tern nesting colony at the Santa Margarita River is within about 1.5 mi (2.4 km) from the Oceanside borrow site. Turbidity generated during sand placement on San Clemente Beach would have little effect on the foraging activity of least terns, but turbidity generated during excavation of sediment at the Oceanside borrow site would be within the foraging range of nesting least terns. However, because the proposed Project is scheduled to occur outside of the California least tern breeding season, there would be no impact on breeding least terns.

Federal threatened western snowy plovers do not breed in the vicinity of San Clemente Beach and have rarely, if ever, been noted foraging in the Project area during the winter. This is based upon several wintering plover surveys, most recently in 2006, in which no snowy plovers were observed. The USACE LAD has conducted several beach and surf zone disposal operations within snowy plover habitat during both nesting and wintering seasons without any observed negative impact (USACE 2001). Because San Clemente Beach is not an important habitat for snowy plovers, temporary disturbance is not considered a significant impact.

Sea and Sage Audubon performed a 2010 winter survey; San Clemente Beaches were not included because beach habitat within the project placement footprint, as well as in Oceanside, are narrow and heavily used by people. Philip Unitt, San Diego Natural History Museum, Birds of San Diego County, Memoir 13, 1984, does not show snowy plovers in north portion of the county. California State Parks has tracked snowy plovers during winter window surveys and has driven San Clemente State Beach many times with zero plovers observed over the years (David Pryor, personal communication, February 2011).

Mitigation Measures: None

Summary of Significant Unavoidable Impacts: None

Impact BR-50-2: *A long-term net loss in the habitat value of a sensitive biological habitat. For the purposes of this analysis, kelp beds, surfgrass beds, and well developed rocky intertidal are considered sensitive biological habitats.*

Figure 4-10 shows the construction and equilibrium footprints for the 50 ft Beach Width Alternative in relationship to surfgrass and kelp in the Project area. The sand placement footprint does not include any kelp beds, surfgrass, or rocky intertidal areas. Therefore, no direct impacts to sensitive habitats would occur from the placement of sand on the beach. In addition, the proposed Project would not place anchors for the mono buoy, where the hopper dredge will moor while it discharges sand to the beach, or place the sinker pipeline that will pump the sediment to shore from the hopper dredge on any sensitive habitat. The construction contractor shall avoid placement of anchors or the submerged pipeline onto reef habitat, which could crush attached organisms. The construction contractor shall also avoid side to side movement of the anchors or pipeline as they are placed, which could abrade surfgrass, algae, or attached invertebrates. If a substantial amount of surfgrass or kelp were affected by placement and removal of anchors and pipelines, the impact would be considered significant. These impacts would be avoided and minimized by performing a pre-construction survey to identify anchor and pipeline locations that would avoid sensitive resources. Because most of the surfgrass in the Project area grows on T-Street reef, it is possible to avoid surfgrass by avoiding the reef when laying the pipeline. In addition, to avoid impacts to reefs that support kelp and other sensitive species such as gorgonians and surfgrass, the hopper dredge should moor inshore of these reefs, which are located approximately 1,000 to 1,300 ft (300 to 400 m) from the beach.

Following initial placement, a portion of the sand may move upcoast, downcoast, and offshore depending on the magnitude, direction, and period of waves. Most of the sand movement is expected to be downcoast and offshore. The nearest significant rocky intertidal area to the proposed beach fill location is at Mariposa Point, approximately 1,600 ft (485 m) north of the northern end of the beach fill site at Linda Lane. The net movement of beach sands in the Project area is expected to be southerly, but some northerly movement may occasionally occur. Based on monitoring of the SANDAG beach fill project at Oceanside, most sand movement is expected to be toward the south (Appendix D). Therefore, it is unlikely that significant quantities of sand will be transported to the north to the rocky intertidal habitat at Mariposa Point. The equilibrium footprint for the 50 ft Beach Width Alternative indicates that sand will not extend as far upcoast as Mariposa Point (Figure 3-2). Therefore, the proposed action would not be expected to result in the net loss of habitat value of sensitive rocky intertidal habitat, and impacts to rocky intertidal habitat would not be significant.

The available evidence also suggests that the proposed action will not result in a long-term net loss in habitat value of surfgrass beds. Figure 5-2 shows the predicted equilibrium cross-section footprint of the 50 ft Beach Width Alternative at T-street reef. This profile suggests that most of the sediment accumulation will occur in the inshore area. Surfgrass in this area grows on 1 to 2 ft (0.3 to 0.6 m) boulders and has average blade lengths of 2 to 3 ft (0.6 to 0.9 m). Therefore, the equilibrium footprint of the 50 ft Beach Width Alternative likely would result in a range of impacts between no burial of surfgrass on the larger rocks and partial burial on the smaller boulders. Burial of surfgrass on the outer portions of T-street reef would be minimal. Surfgrass is adapted to partial sand burial, routinely survives seasonal sand burial of part of its blades, and can recover quickly via regrowth if the root system is intact; however, the degree of sand burial surfgrass can withstand is not well documented (SANDAG 2000). CRM (2000) observed surfgrass in the deepest portion of T-Street reef with 2/3 of its blades covered with sand, which suggested surfgrass could withstand temporary burial of up to 2/3 of its blade length.

To predict the potential burial of surfgrass at San Clemente, CRM and Moffatt and Nichol analyzed impacts to surfgrass from a similar proposed beach fill project at Linda Lane and T-Street (CRM 2000). Their analysis predicted that placement of 175,000 cy (133,000 m^3) of sand at Linda Lane and T-Street would result in a maximum 1 ft (0.3 m) burial of surfgrass for less than six months. Approximately 1 ft (0.3 m) of burial would bury less than 50 percent of the surfgrass blade length at these sites. Based on observation of burial of existing offshore surfgrass in the area, CRM (2000) proposed a criterion of sand burial of no more than 2/3 of the blade length for six months or less as a level that surfgrass can withstand, and concluded that burial of less than half the blade lengths for less than six months would not be expected to result in long-term damage (CRM 2000).

A recent laboratory study of *Phyllospadix scouoleri* suggested that short term sand burial may result in shoot mortality, decreased shoot counts, and reduced growth of surfgrass (Craig et al. 2008). The study found that shoot density decreased compared to controls for a burial depth of 0.8 feet (25 cm), but not shallower burial depths. Mean shoot growth rate decreased in all burial treatments. Therefore, the 50 ft Beach Width Alternative may result in some degradation of the shallower portion of the surfgrass habitat, but would not result in a significant loss of surfgrass. For the 50 ft Beach Width Alternative, the sand from the beach fill is predicted to move out of the equilibrium footprint within 6 years.

Considerable reef habitat that supports giant kelp, feather boa kelp, gorgonians, palm kelp, and sparse surfgrass is located approximately 1,000 to 1,300 ft (300 to 400 m) from shore. Little or none of the fill from the 50 ft Beach Width Alternative is expected to reach this area. The CRM and Moffatt & Nichol analysis predicted that less than 0.2 ft (0.06 m) of sand from the San Clemente beach fill would accrete in the kelp beds (CRM 2000). Similarly, beach profile monitoring of a somewhat larger volume of sand placed on the beach at Oceanside detected very little movement of the sand at 1,000 ft (300 m) or more from shore (Appendix D). Based on this information, it is unlikely that the proposed action would result in the transport of enough sand into kelp bed areas to result in a long-term net loss of the habitat.

Biological monitoring of sensitive habitats, including rocky intertidal, shallow subtidal reefs, and kelp forests, was conducted following implementation of the SANDAG Regional Beach Sand project, which placed sand on several beaches in San Diego County (AMEC 2005). Beach profile and biological monitoring data indicated a great deal of spatial and temporal variability in sediment transport. High sand levels were observed in the intertidal 15 months after the placement of 101,000 cy (76,760 m^3) of sand on Cardiff State Beach, but the sand deposition was apparently unrelated to the beach nourishment event because similarly high sand levels were documented at the control site. There was no evidence of sand burial or scour effects at either the site near the beach fill or the control site except for a few buried mussels at the offshore reef at the Cardiff site.

Of 18 shallow subtidal reef locations monitored to assess potential impacts of the SANDAG project, only three showed an increase in sediment cover that may have been a result of the project (AMEC 2005). A monitoring site near Batiquitos Lagoon showed increased sedimentation two years following the SANDAG beach fill, suggesting a cause and effect relationship, but the increased sand levels were within variation observed during monitoring of the site before the beach fill. The increase in sediment cover at this site did not appear to have any biological effects because the cover and abundance of indicator species did not change. A monitoring site in North Carlsbad showed an increase in cover following the SANDAG beach fill and an associated decrease in surfgrass cover. However, there were multiple sources of sediment near this site and it is unclear to what extent the observed effects were related to the SANDAG project. The third site that showed a significant increase in sedimentation following the SANDAG beach fill was at Solana Beach. The SANDAG project was the only apparent source of sediment at this site. The increased sedimentation did not appear to affect surfgrass cover, but shoot density declined, possibly in response to the increased sedimentation.

Of the kelp bed sites monitored as part of the SANDAG program, some showed relatively constant sand cover, and some showed an increase in sediment cover following the SANDAG beach fill (AMEC 2005). The sand cover observed at the sites with increased sedimentation was within levels observed during pre-project monitoring, suggesting natural variation. The increases in sand cover did not appear to affect the distribution and abundance pattern of kelp bed indicator species. Giant kelp recruitment and persistence either increased or remained stable during the period following the SANDAG Regional Beach Sand project.

Monitoring of shallow subtidal kelp beds and lower intertidal surfgrass in Santa Barbara County indicated similar effects to those observed after the SANDAG project following a beach fill project at Goleta Beach (Chambers Group 2007). Approximately 77,526 cy (58,920 m^3) of sand was placed on Goleta Beach in 2003. The rocky intertidal areas downcoast from Goleta Beach increased in sand cover and depth and decreased in surfgrass cover in the winter following the beach nourishment project. These changes may have been related to sand from beach nourishment. However, surfgrass and sand cover following the beach nourishment event were within the variability shown at the site prior to beach nourishment. Surfgrass cover recovered rapidly later in 2004 as sand moved out of the area, indicating that the sand deposition was a brief occurrence.

No effects of the Santa Barbara beach nourishment project were observed on the Goleta Bay kelp beds until April 2005, 2-1/2 years following the beach fill (Chambers Group 2007). In April, 2005, following a wet winter storm season, sand increased on all Goleta Bay transects, and kelp declined. Although some of the sediment observed in the Goleta kelp beds probably came from the beach nourishment project, the sediment from the beach fill project was dwarfed by other inputs, including discharge of material dredged from sloughs by the Flood Control District into the surf zone and sediment input from Goleta Slough during and following the storms. By

September 2006, sand decreased on two of the shallow subtidal transects, and kelp was at pre-project densities. The most downcoast transect continued to be buried by sand. By August 2007, sediment decreased on the most downcoast transect, although sediment was still above pre-beach fill levels; and kelp density, although increasing, was still low. The kelp monitoring indicated that sedimentation (from beach fill in conjunction with other sources) may affect shallow kelp beds but that recovery occurs within about two to three years.

All of the available evidence indicates that the proposed action will have minor transitory effects, if any, on sensitive habitats in the vicinity of San Clemente Beach. The proposed beach fill is unlikely to result in a long-term net loss of a sensitive biological habitat. However, in a worst-case scenario, it is possible that the sand might not behave as predicted and that a large volume of sand could move into a sensitive biological habitat for a period that was long enough to result in permanent surfgrass loss or long-term cover of reefs. Therefore, shallow subtidal surfgrass beds off San Clemente Beach shall be monitored to document whether any long-term degradation that can be attributed to the proposed action occurs.

In addition to partial burial of surfgrass, offshore movement of sediment may result in filling in some holes and crevices in the shallow subtidal that are used by lobsters. These shallow subtidal reef areas are periodically covered and uncovered by sand naturally (i.e., in the absence of a beach nourishment project). The beach fill from this alternative would have only minimal effects on the considerable reef area near the end of San Clemente Pier and would not degrade that habitat for lobsters. Temporary degradation of a limited amount of inshore lobster habitat would not be significant.

Because the movement of sediment in the Oceanside littoral cell is primarily downcoast, burial of rocky intertidal habitat at Mariposa Point is highly unlikely. Similarly, the kelp bed areas are far enough offshore that little sediment from the proposed beach fill would be likely to reach them. Impacts to rocky intertidal habitat or kelp beds is expected to be less than significant.

Periodic renourishment at San Clemente would occur approximately every 6 years. The impacts of renourishment to sensitive habitats would be similar to those of initial placement. Effects, if any, are expected to be transitory and within natural variation. Because observations of other beach fill projects have documented that observed effects on sensitive habitats last between six months and two years, maintenance renourishment at a frequency of every 6 years would not be expected to result in permanent degradation of sensitive habitats. Sensitive habitats should be monitored to document any effects that may occur from beach renourishment. If impacts to surfgrass are observed, subsequent nourishment activities will be modified. If long-term impacts still are observed after modifying renourishment, then renourishment would not occur again until impacted surfgrass has recovered or mitigation is implemented.

Mitigation Measures:

MM-BR-50-2.1: An underwater survey for kelp and surfgrass shall be conducted by marine biologists prior to the initiation of beach fill activities. Based on the survey, a mooring location and a pipeline route shall be selected that minimizes contact with surfgrass and kelp habitat. If kelp and surfgrass cannot be avoided completely, immediately following beach fill activities, another survey of the mooring and pipeline areas shall be conducted to determine whether kelp and surfgrass were damaged. If substantial damage to surfgrass or kelp occurs, an additional survey shall be conducted six months after the beach fill to determine if kelp and surfgrass have recovered. If substantial damage to kelp and eelgrass is still observed, restoration of habitat shall be implemented in consultation with the resource agencies.

MM-BR-50-2.2: Shallow subtidal surfgrass beds in the vicinity of San Clemente Beach shall be monitored to determine whether the proposed action adversely affects shallow subtidal reefs and surfgrass. Underwater transects shall be established offshore and downcoast from the proposed receiver beach. Control transects also shall be established upcoast of the project area. The transects shall be monitored by qualified biologists before and after the proposed action to determine whether the beach fill results in a long-term loss of surfgrass and/or reef habitat. The mitigation and monitoring plan is included as Appendix B. If adverse significant impacts to surfgrass and/or reef habitat compared to controls and baseline conditions are observed from the monitoring, subsequent nourishment activities will be modified to avoid or minimize these impacts as part of adaptive management. If adverse significant impacts still are observed after all reasonable attempts to avoid or minimize impacts have been exhausted, additional renourishment would not occur until impacted surfgrass has recovered or compensatory mitigation is completed. Compensatory mitigation will consist of the creation of shallow rocky habitat in the Project area at a site to be determined in consultation with NOAA Fisheries and CDFG. Rocky reef habitat will be created in the Project area at a ratio of 1 acre of rocky reef habitat created for 1 acre of rocky reef habitat buried. If the monitoring determines that surfgrass has been affected by the Project, an experimental surfgrass restoration will be implemented. A successful method to transplant surfgrass has not been demonstrated, but recent studies by researchers at the University of California, Santa Barbara, have demonstrated some success restoring surfgrass using sprigs (Bull et al 2004).

Summary of Significant Unavoidable Impacts:

If a substantial amount of surfgrass were lost, impacts may remain significant even with mitigation. Although the beach fill sand would be expected to move out of the equilibrium footprint within 6 years, because models are not precise, it is not clear if surfgrass would recover. If adverse significant impacts to surfgrass are observed from the monitoring, subsequent nourishment activities will be modified to avoid or minimize these impacts as part of adaptive management. If adverse significant impacts still are observed after all reasonable attempts to avoid or minimize impacts have been exhausted, additional renourishment would not occur until impacted surfgrass has recovered or and compensatory mitigation is completed. A consistently successful method to transplant surfgrass has not yet been devised, although recent experiments may provide new options. Potential mitigation, if necessary, is described in the Mitigation Monitoring and Reporting Plan (Appendix B).

Impact BR-50-3: *Substantial impedance to the breeding, movement or migration of fish or wildlife.*

The waters offshore San Clemente Beach are used for migration by gray whales. It is expected that gray whales would avoid the immediate vicinity of the dredge area. There is evidence of marine mammals avoiding dredging operations (Richardson et al. 1995). Because the noise, turbidity and disturbance of dredging would be limited the immediate area surrounding the dredging activities, the area gray whales will avoid would consist of a small portion of the gray whale migration area. Therefore, dredging would not result in a substantial impedance to the movement or migration of gray whales or other marine mammals that may be migrating through the area.

Grunion may use the beach at San Clemente for spawning. This fish lays its eggs in the high intertidal zone between March and August. The beach fill will not occur during the grunion spawning season. Therefore, beach construction would not impact grunion.

Mitigation Measures: None

Summary of Significant Unavoidable Impacts: None

Impact BR-50-4: *Substantial loss to the population of any native fish, wildlife or vegetation. For the purpose of this analysis substantial is defined as a change in a population that is detectable over natural variability for a period of five years or more.*

Offshore Dredging

Most of the benthic invertebrates within the area dredged from offshore Oceanside would be killed by the dredging. The borrow sites demensions are large enough in which benthics invertebrates will ingress from other near source populations. The borrow site (Borrow Area 2), located offshore Oceanside (shown in Figure 3-1) is approximately 940 acres, with a 128 acre area instead the borrow site (Borrow Area 2A) that contains the more desirable material. Some mobile organisms such as crabs may escape the dredge. Recovery of the benthic invertebrate community would be expected to begin almost immediately with settlement of larvae and immigration of mobile species from nearby unaffected areas. Recovery of the infaunal community to values comparable to pre-dredging levels may occur in as little time as six months or as long as two years, with an average of about one year (CSLC, USFWS, and USACE 2001). In some studies, diversity and abundance of benthic invertebrates increased after dredging after a short recovery period. Periodic sampling following the 1990 dredging of the Surfside/Sunset borrow site off Orange County initially found fewer macroinvertebrates than undredged control areas, but within less than 1 year there were no differences compared to control areas (Chambers Group 1992). The Surfside/Sunset borrow site was excavated again in 1997. Biological sampling of the site in 1999 observed more macroinvertebrate species and a greater abundance of organisms at the borrow site compared to nearby control areas (D. Diener, MEC Analytical Systems, personal communication 2000). Chambers Group (1996) sampled a borrow pit within Long Beach Harbor and found that the abundance, number of taxa, and species composition within the borrow site was similar to that in shallower areas outside the pit. The impact of dredging on invertebrates is not significant because the affected area would be small and the biota would recover quickly. There would not be a discernible impact on the population of any species.

Fishes would be expected to avoid the dredging area during dredging operations. Fish sampling was conducted following dredging in Marina del Rey Harbor and an unusually low number of fish species was collected compared to pre-dredging surveys (Soule et al. 1993). The investigators concluded that the dredging had disturbed the fishes. Within a few months, the number of fish species collected returned to pre-dredging levels. Laboratory studies have found that all life stages of estuarine and coastal fishes can survive high levels of turbidity for 24 hours or more (La Salle et al. 1991, Clarke and Wilber 2000). Fishes within the Oceanside source site would not be expected to be exposed to high enough sediment concentrations for long enough duration to suffer lethal or sublethal effects. Avoidance of the immediate dredging area and the turbidity plume generated during dredging would not be a significant impact on fishes. There would be no discernible impact on the population of any fish species.

Dredging at the Oceanside borrow site will temporarily reduce the invertebrate prey base for fishes such as turbots and white croakers that feed on benthic invertebrates. Recovery of the benthic invertebrate community is expected to take less than a year. Temporary degradation of a relatively small amount of foraging habitat is not expected to have a significant impact on fishes. Surveys of the Surfside/Sunset borrow site off Orange County found fewer fish immediately following a 1990 dredging episode, but within less than a year there were no differences compared to control areas (Chambers Group 1992). Sampling of the Surfside/Sunset borrow area in 1999 following a 1997 dredging episode detected a greater number of fish species, but lower total fish abundance at the borrow site compared to control areas (D. Diener, MEC Analytical Systems, personal communication 2000). Temporary reduction of the prey base within a small portion of the foraging habitat for bottom-feeding fishes would not be a significant impact. There would be no discernible impact on the population of any fish species.

The Oceanside borrow site is not located near any marine mammal breeding sites or important haul out, foraging, or congregating areas. The offshore habitat in the vicinity of Oceanside experiences a high level of vessel activity and considerable natural turbidity. Temporary disturbance to a small portion of the habitat of marine mammals would not have a significant impact. There would be no discernible impact on the population of any marine mammal species.

Sand Placement

Discharge of offshore sand onto receiver beaches would bury intertidal invertebrates living in the sand of receiver beaches. Most studies have found that the diversity, biomass, and abundance of sandy intertidal invertebrates declines following beach nourishment but that the community recovers within a few months (Ray and Clarke 2001, Parr et al 1978). Therefore, the effects of beach nourishment on sandy intertidal invertebrates would not be expected to be significant.

The proposed placement of sediments behind a dike would reduce the suspended sediment concentrations in the discharge. Nearshore fishes are highly unlikely to be exposed to suspended sediment concentrations that would have lethal or sublethal effects. Because the turbidity would be limited in extent and would be confined to the naturally turbid surf zone and rip current areas, significant impacts of turbidity to nearshore fishes are unlikely. Some fishes may avoid the turbid areas. Temporary turbidity within a limited area in the vicinity of the surf zone would not have a discernible impact on the population of any fish species, and impacts would not be significant.

It is expected that shorebirds will avoid the immediate areas where people and equipment are constructing the beach. Chambers Group (2005) monitored dredging of a sand bar in the Talbert Channel in Huntington Beach and placement of the dredged sand in the upper intertidal of the adjacent beach. Shorebirds avoided the immediate areas where the dredging and disposal activities were occurring but foraged undisturbed in the mid- to lower intertidal on the adjacent beaches. However, AMEC (2002) noted that during the SANDAG project some shorebirds (e.g., sandpipers, godwits, curlews) were present on the receiver sites during beach discharge of sediments. Gulls were attracted to the discharge and fed on invertebrates and fishes that were in the dredged material as it was being pumped to the beach. Because beach nourishment activities would be confined to the immediate vicinity of construction activities within a limited beach fill area, avoidance of the beach fill area by shorebirds would not be a significant impact. There would be no discernible impact to the population of any species.

Turbidity plumes generated during beach fill operations at the receiver sites could interfere with foraging by visually-feeding birds such as gulls, terns, pelicans and cormorants. However, turbidity plumes would be expected to be confined primarily to the naturally turbid surf zone and associated rip currents. Therefore, the impacts of turbidity from the discharge of sediments to receiver beaches would not be expected to be significant.

Shorebirds that forage in the intertidal could be affected if beachfill resulted in a substantial loss of their invertebrate prey base. However, as discussed above, the sandy intertidal invertebrate community has been observed to recover from sand burial within a few months (Ray and Clarke 2001, Parr et al. 1978). Beach fill would occur only on a limited portion of the available sandy beach in the San Clemente area. Therefore, the proposed action is not expected to have a significant impact on the prey base for shorebirds. The greater amount of sand on San Clemente Beach following beach nourishment would be expected to have a beneficial effect on marine birds by increasing resting habitat. The SANDAG project appeared to have had a positive effect on bird use of receiver beaches in Encinitas (SAIC 2005). Prior to beach nourishment, few birds were observed on beaches with extensive cobble cover or shallow sand depths in the upper and middle intertidal zones. Following beach nourishment, the total number of bird species and bird abundance increased on receiver sites and was higher than on non-receiver sites. The increase in bird use at the sand placement sites following beach nourishment was thought to be a result of the greater beach widths created by the beach nourishment project. Similarly CZR Incorporated (2003) found that resting behavior of laughing gulls and royal terns increased following beach nourishment in North Carolina, although feeding behavior by gulls and terns did not change following beach nourishment. The behavioral data suggested that gulls and terns increased the percentage of their time spent resting after beach nourishment probably because of the greater available beach space. However, CZR Incorporated found little evidence that the North Carolina beach nourishment project affected shorebird abundance.

Most of the turbidity would be confined to the naturally turbid surf zone and associated rip currents. Bottlenose dolphins are the marine mammal most likely to occur within the surf zone. Because of the limited area affected by Project-generated turbidity plumes in relationship to the much wider foraging area of marine mammals, beach nourishment at the receiver sites would not have a significant impact on marine mammals.

Impacts to marine organisms from renourishment, approximately every 6 years, would be similar to those of initial beach construction. Each renourishment event would involve approximately 251,000 cy (192,000 m^3) for an estimated eight renourishment cycles over the Project life. Because invertebrate communities in the dredge and beach placement areas would be expected to recover in between six months and two years, a substantial loss in these invertebrate populations would not be expected to occur. Other impacts of dredging and beach fill, including temporary disturbance and turbidity, are short term and would not cause substantial population losses. The impacts of renourishment on marine populations would not be significant.

Mitigation Measure: None.

Summary of Significant Unavoidable Impacts: None

Impact BR-50-5: *Substantial adverse impact on Essential Fish Habitat*

As discussed in Section 4.4.2.5, the Project area includes Essential Fish Habitat that supports numerous species managed under the Magnuson-Stevens Fishery Management and Conservation Act. Surfgrass and kelp forests are particularly important habitats for many fishes because these areas provide food and shelter. Potential impacts of the proposed action to these sensitive biological habitats were discussed under Impact BR-50-2. Mitigation Measure MM-BR-50-2.1 would insure that mooring of the hopper dredge and temporary placement of a pipeline to pump sand to the beach would not occur within significant kelp or surfgrass habitat.

Cross shore movement of sand from the 50 ft Beach Width Alternative would not impact kelp habitat, but may have some impacts to surfgrass. The predicted sand increase from the 50 ft Beach Width Alternative likely would be within the range tolerated by surfgrass without substantial loss. However, Mitigation Measure BR-50-2 would be implemented to monitor surfgrass and mitigate impacts if any occur.

Impact BR-50-3 discusses potential impact of beach construction to grunion spawning. The proposed beach construction would not impact grunion spawning because it would occur outside the grunion spawning season of March to August.

The impacts to fishes of dredging at the Oceanside borrow site and turbidity that may occur in nearshore waters during discharge of dredged sediments to the beach are discussed under Impact BR-50-4. Impacts to EFH of these activities would be of short duration and limited spatial extent. The benthic invertebrate community, which is the prey base for many fish species, would recover in-between renourishment events, which would occur approximately every 6 years. A substantial adverse impact on EFH would not occur and impacts would not be significant.

Mitigation Measures: Implement MM-BR-50-2.1 and MM-BR-50-2.2.

Summary of Significant Unavoidable Impacts:

If a substantial amount of surfgrass were lost, impacts may remain significant even with mitigation. Although the beach fill sand would be expected to move out of the equilibrium footprint within 6 years, it is not clear if surfgrass would recover. If adverse significant impacts to surfgrass are observed from the monitoring, subsequent nourishment activities will be modified to avoid or minimize these impacts as part of adaptive management. If adverse significant impacts still are observed after all reasonable attempts to avoid or minimize impacts have been exhausted, additional renourishment would not occur until impacted surfgrass has recovered or compensatory mitigation is completed. A consistently successful method to transplant surfgrass has not yet been devised, although recent experiments may provide new options. Potential mitigation, if necessary, is described in the Mitigation Monitoring and Reporting Plan (Appendix B).

5.4.3 Impacts Related to the 115 ft (35 m) Beach Width Alternative

Impact BR-115-1: *A direct adverse effect on the population of a special status listed species or the loss or disturbance of important habitat for a listed species.*

Impacts of the 115 ft Beach Width Alternative on special status species would be similar to those of the 50 ft Beach Width Alternative. Turbidity potentially could affect foraging by California least terns. California least terns breed on the beaches of Camp Pendleton near the Oceanside borrow area. Because the Project would occur outside of the least tern breeding season, turbidity generated during dredging would not affect them.

Western snowy plovers do not breed near San Clemente Beach and rarely forage there. Because San Clemente Beach is not important habitat for snowy plovers, if one or two individuals were temporarily disturbed by beach construction, the impact would not be significant.

Mitigation Measures: None.

Summary of Significant Unavoidable Impacts: None

Impact BR-115-2: *A long-term net loss in the habitat value of a sensitive biological habitat. For the purposes of this analysis, kelp beds, surfgrass beds, and well developed rocky intertidal are considered sensitive biological habitats.*

Figure 4-10 shows the construction and equilibrium footprints for the 115 ft Beach Width Alternative in relationship to surfgrass and kelp in the Project area. The sand placement footprint does not include any kelp beds, surfgrass, or rocky intertidal areas. Therefore, no direct impacts to sensitive habitats would occur from the placement of sand on the beach. Like the 50 ft Beach Width Alternative, placement of a mono buoy and a temporary pipeline on the bottom potentially could damage sensitive biological resources like kelp and surfgrass. Impacts may be reduced to not significant by avoiding the placement of these temporary structures in sensitive habitats.

Following initial placement, a portion of the sand may move upcoast, downcoast, and offshore depending on the magnitude, direction, and period of waves. Figure 3-3 shows the equilibrium footprint of the 115 ft Beach Width Alternative. Beach fill from the 115 ft Beach Width Alternative is not expected to extend upcoast as far as the significant rocky intertidal habitat at Mariposa Point. Therefore, like the 50 ft Beach Width Alternative, the 115 ft Beach Width Alternative would not have a significant impact to rocky intertidal habitat.

Figure 5-3 shows the cross-section of the equilibrium footprint of the 115 ft Beach Width Alternative at T-Street reef. The equilibrium profile suggests that the 115 ft Beach Width Alternative will result in burial impacts of the entire reef. The shallow portions of the reef may be buried by over a meter of sand (about 4 feet). This level of sedimentation would result in at least partial burial of all of the shallow surfgrass in the inshore portions of the reef. On the offshore portions of the reef, burial impacts would be expected to range from partial burial to complete burial. Therefore, the 115 ft Beach Width Alternative has the potential to result in substantial burial of surfgrass over the entire reef with likely significant impacts on the surfgrass habitat. The sediment from the 115 ft Beach Width Alternative would move out of the area in about 10 years. It is not known to what extent surfgrass would eventually recover if renourishment did not occur.

The 115 ft Beach Width Alternative also would result in sedimentation of considerable reef habitat that supports giant kelp, feather boa kelp, gorgonians, palm kelp and sparse surfgrass. The burial of up to a meter or more of reef habitat may include some of the smaller rocks and prevent the recruitment of kelp. The sedimentation also may kill gorgonians and fill in crevices used by lobster. The 115 ft Beach Width Alternative, thus, has the potential to result in significant degradation of high-value nearshore reef habitat. Degradation of reef habitat that supports sensitive biological resources would be a significant adverse impact.

Although biological monitoring of beach fill projects has indicated that previous beach fills have resulted in minor temporary impacts on sensitive habitat, the monitored projects involved beach fills with substantially smaller volumes of sediment than the 115 ft Beach Width Alternative that would place 586,000 cy (448,000 m^3) on San Clemente Beach. It is likely that the greater volume of sediment would result in greater impacts and that those impacts may be more persistent. It is not known to what extent resources would recover, if at all, between maintenance events scheduled to occur every 10 years for the 115 ft Beach Width Alternative. Even if renourishment did not occur, the ability of resources to recover from the predicted burial impacts is unknown.

Mitigation Measures: Implement MM-BR-50-2.1 and MM-BR-50-2.2

Summary of Significant Unavoidable Impacts

If a substantial amount of surfgrass were lost or if significant burial occurred within the kelp bed near San Clemente Pier, impacts may be significant even with mitigation. Although the beach fill sand would be expected to move out of the equilibrium footprint within 10 years, because models are not precise, it is not clear if surfgrass and high value reef habitat would recover. If adverse significant impacts to surfgrass are observed from the monitoring, subsequent nourishment activities will be modified to avoid or minimize these impacts as part of adaptive management. If adverse significant impacts still are observed after all reasonable attempts to avoid or minimize impacts have been exhausted, additional renourishment would not occur until impacted surfgrass has recovered or compensatory mitigation is completed. A consistently successful method to transplant surfgrass has not yet been devised, although recent experiments may provide new options. Potential mitigation, if necessary, is described in the Mitigation Monitoring and Reporting Plan (Appendix B).

Impact BR-115-3: *Substantial impedance to the breeding, movement or migration of fish or wildlife.*

Like the 50 ft Beach Width Alternative, the 115 ft Beach Width Alternative would not interfere with the migration of whales or other marine mammals. Because beach construction would not occur during the grunion spawning season of March through August, the Project would not impact grunion spawning.

Mitigation Measures: None

Summary of Significant Unavoidable Impacts: None

Impact BR-115-4: *Substantial loss to the population of any native fish, wildlife or vegetation. For the purpose of this analysis substantial is defined as a change in a population that is detectable over natural variability for a period of five years or more.*

With the exception of impacts to surfgrass and high value reefs discussed under Impact BR 5.4.3-2, the impacts of offshore dredging and sand placement on fish, wildlife and vegetation would be the same for the 115 ft Beach Width Alternative as for the 50 ft Beach Width Alternative. Dredging at the Oceanside borrow side and placement of sand on the beach at San Clemente would be a temporary disturbance that would not result in substantial loss to the population of any native fish wildlife or vegetation. The 115 ft Beach Width Alternative would require a longer construction period than the 50 ft Beach Width Alternative, but renourishment would occur less frequently (every 10 years compared to every 6 years for the 50 ft Beach Width Alternative).

Mitigation Measures: None.

Summary of Significant Unavoidable Impacts: None

Impact BR-115-5: *Substantial adverse impact on Essential Fish Habitat*

Surfgrass and kelp forests are particularly important habitats for many fishes because these areas provide food and shelter. Potential impacts of the proposed action to these sensitive biological habitats were discussed under Impact BR-50-2. Mitigation Measure MM-BR-50-2.1 would insure that mooring of the hopper dredge and temporary placement of a pipeline to pump sand to the beach would not occur within significant kelp or surfgrass habitat.

The offshore movement of the sand placed on the beach for the 115 ft Beach Width Alternative is likely to result in significant burial impacts to surfgrass and high value reef habitat that supports kelp beds. Mitigation Measure MM-BR-50-2.2 would provide for monitoring and mitigation to address those impacts. However, it is unknown if the affected habitats would fully recover and if the mitigation (creation of reef habitat and an experimental surfgrass transplant) would fully replace the lost habitats especially surfgrass, which is difficult to restore.

Impact BR-115-3 discusses potential impact of beach construction to grunion spawning. The proposed beach construction would not impact grunion spawning because it would occur outside the grunion spawning season of March to August.

The impacts to fishes of dredging at the Oceanside borrow site and turbidity that may occur in nearshore waters during discharge of dredged sediments to the beach are discussed under Impact BR-115-4. Impacts to EFH of these activities would be of short duration and limited spatial extent. The benthic invertebrate community, which is the prey base for many fish species, would recover in-between renourishment, which would occur approximately every 10 years. A substantial adverse impact on EFH would not occur and impacts would not be significant.

Mitigation Measures: Implement MM-BR-50-2.1 and BR-50-2.2.

Summary of Significant Unavoidable Impacts:

If a substantial amount of surfgrass were lost or if significant burial occurred within the kelp bed near San Clemente Pier, impacts may remain significant even after mitigation. Although the beach fill sand would be expected to move out of the equilibrium footprint within 10 years, it is not clear if surfgrass and high value reef habitat would recover. If adverse significant impacts to surfgrass are observed from the monitoring, subsequent nourishment activities will be modified to avoid or minimize these impacts as part of adaptive management. If adverse significant impacts still are observed after all reasonable attempts to avoid or minimize impacts have been exhausted, additional renourishment would not occur until impacted surfgrass has recovered or compensatory mitigation is completed. A consistently successful method to transplant surfgrass has not yet been devised, although recent experiments may provide new options. Potential mitigation, if necessary, is described in the Mitigation Monitoring and Reporting Plan (Appendix B).

5.4.4 Impacts Related to the No Action Alternative

Under the No Action alternative, none of the impacts associated with offshore dredging and beach construction would occur. There would be no potential for turbidity plumes that may be generated during Project-related dredging off Oceanside or beach placement to temporarily impact bird foraging. Under the No Action Alternative, there would be no potential for organisms at the borrow site or on the beach at San Clemente to be disturbed temporarily by beach nourishment activities.

Under the No Action Alternative, there would be no potential for sensitive surfgrass or kelp habitat to be damaged by the placement of mooring anchors or the submerged pipeline. Under the No Action Alternative, there would be no potential for sediment dredged off Oceanside and placed on the beach at San Clemente to migrate into sensitive shallow subtidal habitats and bury rocks and surfgrass. However, rocks and surfgrass in the San Clemente area still could be subjected to sand inundation from natural sediment movement and/or other projects that discharge sediment to the beach or nearshore zone.

Under the No Action Alternative, the beach area in the vicinity of San Clemente would continue to be depleted of sand. The narrow beach would reduce foraging opportunities for the western snowy plover and other shorebirds. The impacts of a reduced beach width would not be significant because snowy plovers do not breed near San Clemente, and San Clemente Beach is not an important wintering habitat for them. The reduced beach width would not have a discernible impact on the population of any shorebird species. A narrow beach at San Clemente also would reduce the amount of spawning habitat available for grunion. Although opportunities for grunion spawning are limited, it is unlikely that narrowing of the beach at San Clemente would have a discernible impact on the grunion population.

Under the No Action Alternative, it is likely that emergency seawalls would be constructed to protect structures. These emergency seawalls would result in a reduction of beach space for birds and upper beach invertebrates. This limited loss of beach space for bird foraging and roosting and invertebrates would not be a significant impact.

5.4.5 Summary of Biological Resources Effects and Issues

During the DEIS/R review process, and in preparing the FWCA CAR, several issues were raised by regulatory resources agencies: FWS/Carlsbad, NMFS/Long Beach, CDFG/Region V Marine Division, and EPA. The most important of these, discussed below, are:

1. Baseline biological surveys
2. Mitigation ratios
3. Opportunistic beach nourishment
4. Upfront mitigation funds and implementation

5.4.5.1 Baseline biological surveys

The FEIS/R uses the best available scientific data for the subject analysis. As noted in the FEIS/R, 25 transects were established and monitored by recognized experts and knowledgeable marine ecologists. These field data clearly capture the extent of rocky reef, single boulders, and surfgrass. The larger rocky reef was delineated by divers floating buoys to the surface demarcating the approximate edge of the reef and a biologist in a kayak at the surface recording GPS points of the surfaced buoys. Twelve GPS points delineated this reef, known as the T-Street Rocky Reef.

No data exists that depicts or illustrates the extent of rocky reef or surfgrass for the entire locale. On 31 January 2011, two years after regular coordination meetings commenced, NMFS recommended use of San Diego Nearshore Program data from the UC San Diego website. The Corps compared the Nearshore Program data from the UC San Diego website http://nearshore.ucsd.edu/, and found the data justify and compliment the Corps mapped distribution of rocky reef and single boulders. Figure 4-10 and Figure 5-7 through Figure 5-9

illustrate the comparison of the US Army, Corps of Engineers San Clemente Shoreline rocky reef and surfgrass vegetation to the University of California, San Diego, Nearshore Mapping Program.

These figures show the Corps surfgrass survey results along with the outer T- Street reef in comparison to the Nearshore Program data from the UC San Diego web site. Comparison reveals that the large kelp bed mapping by the Corps (see Figure 4.4-2 in the FEIS/R) is more detailed and in the same geographic distribution alignment as the UCSD Nearshore program raster data. Furthermore, the Corps data is much more detailed in its distribution from the shoreline to a line 500 feet off-shore. The UCSD Nearshore data has little, if any, data with the same area distance.

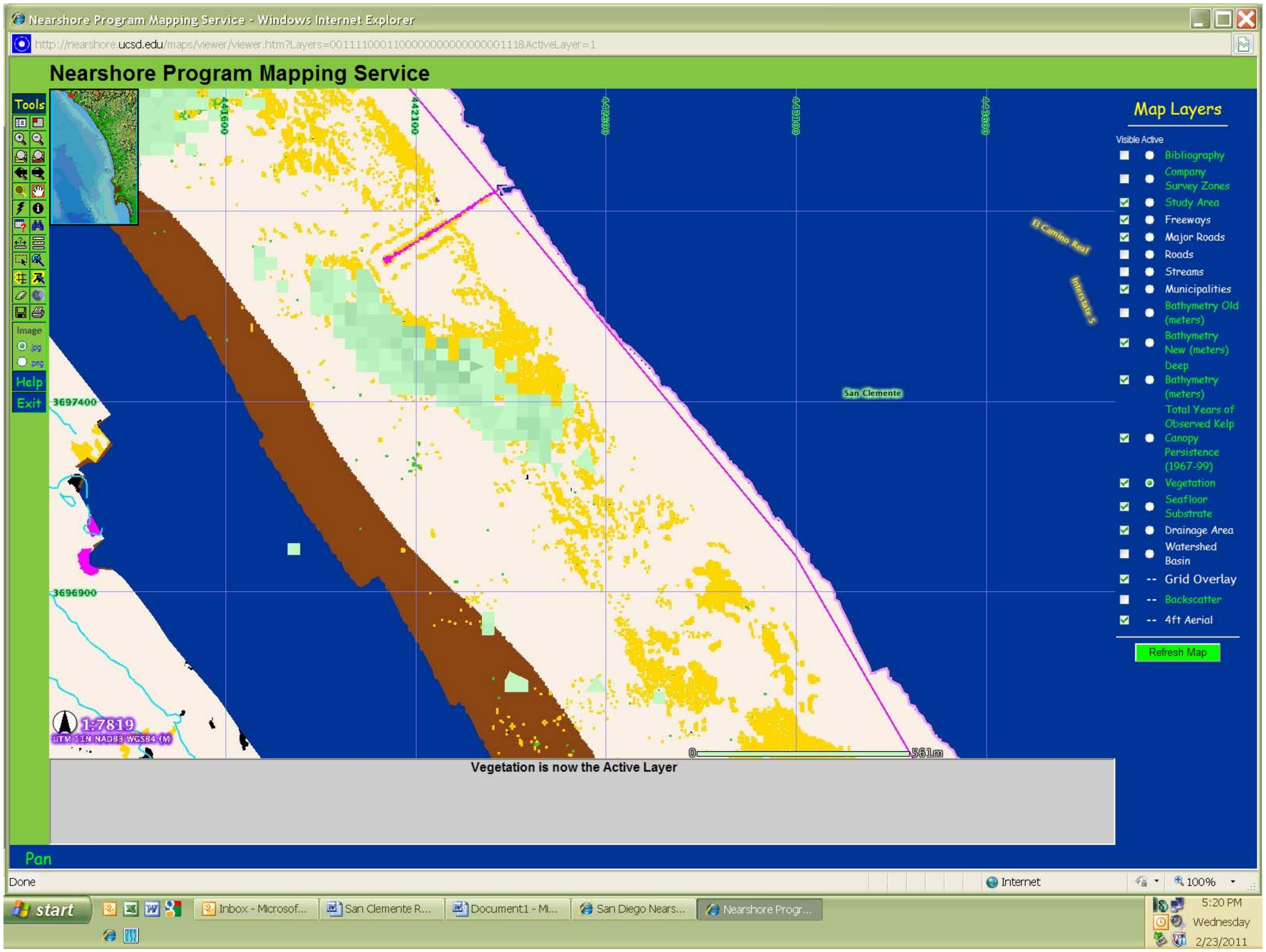
While the Corps acknowledges that there are scattered rocks within and outside the equilibrium footprint, the total acreages of these scattered rocks is not enough to change the analysis. Furthermore, field sampling indicates that the surfgrass in this vicinity inhabits and is growing on 1 to 2 ft (0.3 to 0.6 m) boulders, and has average blade lengths of 2 to 3 ft (0.6 to 0.9 m).
Nevertheless, during the PED phase, the Corps may utilize the U.S. Army Engineer Research and Development Center's (ERDC) Submerged Aquatic Vegetation Early Warning System (SAVEWS), discussed below, to refine this analysis.

The Submersed Aquatic Vegetation Early Warning System (SAVEWS) is a semi-automated acoustic-based measurement system that can detect and characterize submersed aquatic vegetation (SAV) while operating from a small survey boat. It uses an off-the-shelf digital echo sounder, with a narrow single-beam high-frequency transducer, and global positioning system (GPS) equipment to digitally record echo intensity and position data on a laptop. Software developed at the U.S. Army Engineer Research and Development Center (ERDC-EL) processes the distinct signature of SAV within the recorded signal to determine depth, plant height, and plant coverage every few meters along transect lines.

The resource agencies commented that the baseline surveys for surfgrass and rocky reef were conducted at a cursory reconnaissance level and, therefore, were inadequate to depict their respective distributions.

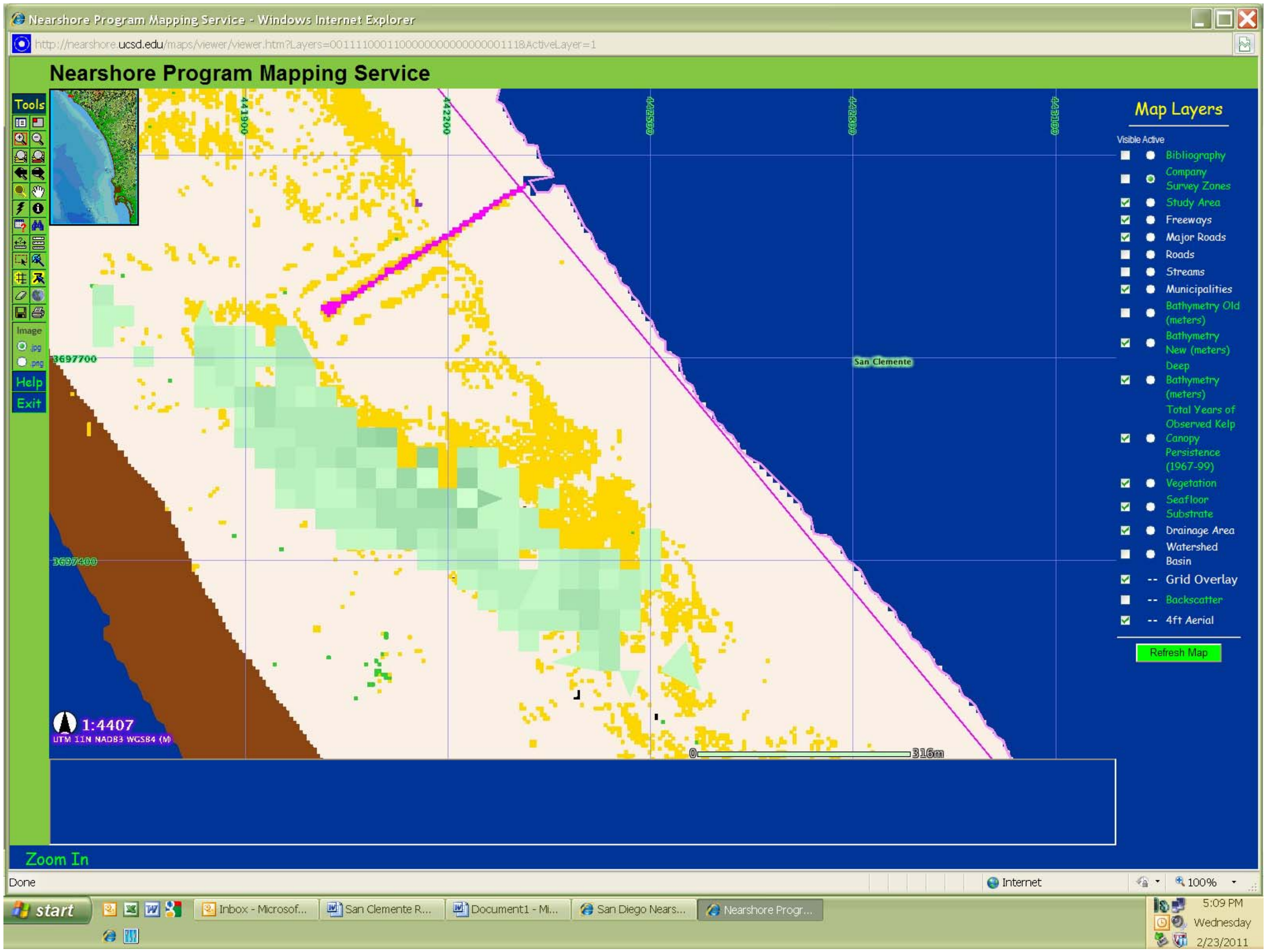
It should be clear that the Corps rocky reef and surfgrass surveys were conducted at more than just reconnaissance or cursory levels. The absence of surfgrass and reef in some transects should not be construed as an absence of scrutiny, e.g., the seagrass did not disappear. Above all, the surveys provided the information needed to assess potential impacts, and the basis needed for discussion and evaluation of project alternatives, along with potential monitoring and mitigation.

Figure 5-7 UC San Diego Nearshore Mapping Program



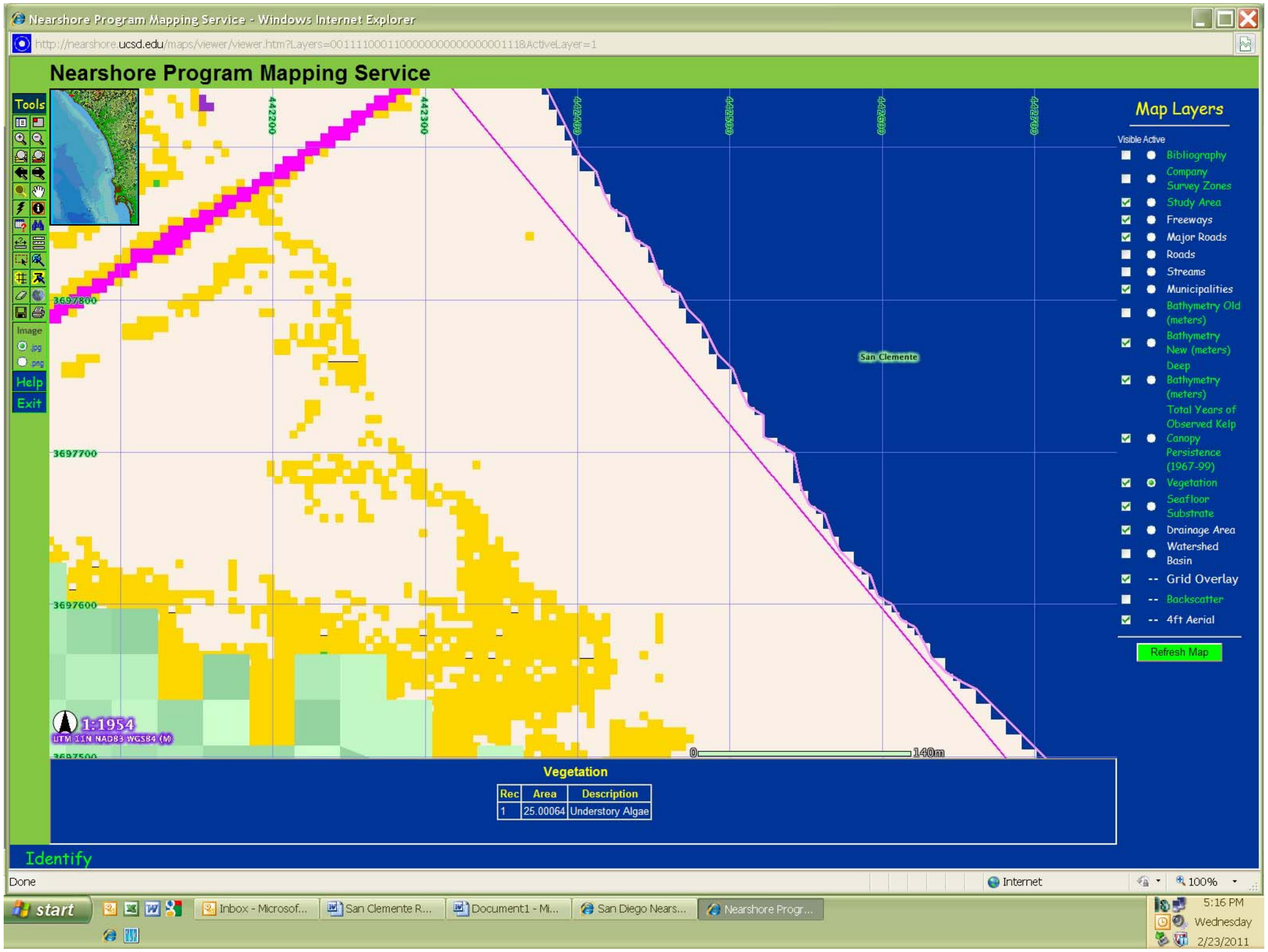
University of California, San Diego Nearshore Mapping Program (http://nearshore.ucsd.edu.). Notice the raster data of the kelp canopy in the blue green color.

Figure 5-8 UCSD Nearshore Program Data 500 Feet From Shoreline



UCSD Nearshore Mapping Program does not map the nearshore environs approximately 500 feet from the shoreline, off-shore whereas the Corps GPS mapping, which included 25 transects, did map rocks and surfgrass inside the 500 feet zone.

Figure 5-9 UCSD Nearshore Program Data



UCSD Nearshore Mapping Program does not map the nearshore environs approximately 500 feet from the shoreline, off-shore whereas the Corps GPS mapping which included 25 transects did map rocks and surfgrass inside the 500 feet zone.

5.4.5.2 Mitigation Ratios

The resource agencies want mitigation to be provided for prior to or concurrent with project impacts, and supplemented as needed to offset any additional, significant long-term adverse impacts documented under the monitoring program. If mitigation is not provided in advance of project impacts, the mitigation plan should address temporal losses of resources and include adequate compensation to address such losses at a greater than 1:1 mitigation ratio. The value and amount of "out of kind" mitigation proposed also needs further evaluation and discussion with the resource agencies. Out of kind mitigation is generally considered adequate only if conservation to impact ratios is proposed at a greater than 1:1 ratio.

The Corps does not see any effects or impacts to the T-Street reef and the surfgrass vegetation, and thus concludes that no mitigation is required. Nonetheless, if effects are observed a monitoring, mitigation and reporting plan (MMRP) has been developed in concert with the resources agencies. This plan will undergo further scrutiny during the PED by a team including ERDC Submerged Aquatic Vegetation Restoration Research Program (SAVRRP) experts and the resources agencies. If impacts are not observed, the Corps will continue to monitor for effects and will continue to collaborate with ERDC and the resources agencies to identify an appropriate mitigation design in the future if determined to be needed.

No ATR or IEPR comments raised this as a concern, and uncertainty persists as to whether there will be any impacts at all to rocky reef and surfgrass vegetation from the recommended alternative. Because of this, monitoring and adaptive management are included as an integral component of the project's implementation plan. If and when impacts are detected, they will be compensated for.

Corps planning policy is clear on the use of functional habitat evaluation assessment or functional assessments (FA):

> *Mitigation Planning Objectives. Mitigation planning objectives are clearly written statements that prescribe specific actions to be taken to avoid and minimize adverse impacts, and identifies specific amounts (units of measurement, e.g. , habitat units) of compensation required to replace or substitute for remaining, significant unavoidable losses" [ER 1105-2-100, App C, Paragraph C-3.b (13)]* and *"habitat-based evaluation methodologies…shall be used to describe and evaluate ecological resources and impacts" [ER 1105-2-100, App C, Paragraph C-3 d)]*

The Corps does not use ratios, but instead a scientific based approach through the use of functional habitat evaluation assessment (FA). A basic FA was used in the best professional judgment (BPJ) approach, and a more robust FA will be accomplished in PED during monitoring of the project and reference sites. The Corps impact analysis was thorough in its thought process, and based in collaboration with the resources agencies during a series of conference meetings.

A BPJ analysis was used to determine if impacts would occur in part and to what extent to the rocky reef and corresponding surfgrass vegetation. A BPJ approach was taken because: 1) there are no functional habitat evaluation assessment models or accounting systems for rocky reef habitat certified, or otherwise accepted, by the Corps Environmental Professional Center of Expertise (PCX), and 2) potential impacts to the rocky reef and surfgrass vegetation, as analyzed using a certified coastal engineering model, would be negligible on ecological resources.

The Corps doesn't have any type of "functional assessment" or "habitat assessment" designed, in turn, specifically for seagrasses (D Shafer. PhD, ERDC, personal communication, March 2011). The problem with developing a Habitat Suitability Index (HSI) type analysis for surfgrass is that there is insufficient information to construct standard HSI curves. Surfgrass has been so little studied that it is not clear if investigators could even come up with a species list of organisms unique to that habitat, much less create a curve that shows the relationship between surfgrass percent cover and "habitat value" (D. Shafer, PhD, ERDC, personal communication, March 2011).

This lack of data dictated a simpler interim approach based on presence/absence of surfgrass. Absence could be subdivided into areas that have the potential to function as surfgrass habitat (e.g. suitable depth, hard substrate) and those that have habitat unsuitable to support surfgrass (e.g. soft bottom, below depth limits) (D. Shafer, PhD, ERDC, personal communication, March 2011).

Scientific literature (Wyllie-Echeverria et. al 2007) indicates that surfgrass *Phyllospadix torreyi* is distributed widely along the entire Pacific Coast; and occurs from the northern tip of Vancouver Island, Canada to Isla Santa Margarita (Phillips 1979, Ramirez- Garcia et al. 2002), Baja, California, with its primary abundance south of Monterey, California (Phillips 1979). It is, however, unknown if P. *torreyi* is unique for a certain array of marine organisms or if it provides foraging, cover, and spawning habitat for obligate fish.

Based again on the coastal engineering beach profiles, it is uncertain if the rocky reef and surfgrass vegetation will be affected at all by project implementation. The marine ecologists who sampled the T-street reef (Rick Ware, M.S., Coastal Resources Management [15 years], and Noel Davis, PhD, Chambers Group [35 years]) are extremely experienced and knowledgeable in their sampling design, implementation of data collection, and data analysis.

The best available scientific data suggest that the 50 foot (15 meters) proposed action will have negligible effects on the habitat value of surfgrass beds. The coastal engineering model shows the predicted equilibrium cross-section footprint of the 50 ft (15 m) Beach Width Alternative at T-street reef. This profile indicates that most of the sediment accumulation will occur in the inshore area. Surfgrass in this area grows on 1 to 2 ft (0.3 to 0.6 m) boulders and has average blade lengths of 2 to 3 ft (0.6 to 0.9 m). The equilibrium footprint of the 50 ft (15 m) Beach Width Alternative likely would result in a range of negligible effects of no burial of surfgrass on the larger rocks to partial burial on the smaller boulders. Burial of surfgrass on the outer portions of T-street reef would not occur. Surfgrass is adapted to partial sand burial, routinely survives seasonal sand burial of part of its blades, and can recover quickly via regrowth if the root system is intact. The degree of sand burial surfgrass can withstand, however, is not well documented (SANDAG 2000). However, Coastal Resources Management (CRM 2000) observed surfgrass in the deepest portion of T-Street reef with 2/3 of its blades covered with sand, which suggested surfgrass could withstand temporary burial of up to 2/3 of its blade length.

To predict the potential burial of surfgrass at San Clemente, CRM and Moffatt and Nichol analyzed impacts to surfgrass from a similar proposed beach fill project at Linda Lane and T-Street (CRM 2000). Their analysis predicted that placement of 175,000 cy (133,000 m^3) of sand at Linda Lane and T-Street would result in a maximum 1 ft (0.3 m) burial of surfgrass for less than six months. Approximately 1 ft (0.3 m) of burial would bury less than 50 percent of the surfgrass blade length at these sites. Based on observation of burial of existing offshore surfgrass in the area, CRM (2000) proposed a criterion of sand burial of no more than 2/3 of the blade length for six months or less as a level that surfgrass can withstand, and concluded that burial of less than half the blade lengths for less than six months would not be expected to result in long-term damage (CRM 2000).

The estimate that approximately 20 percent of the reef or 1 acre would experience significant burial was determined by superimposing the sand distribution cross section predicted by Corps coastal engineers on the offshore bathymetry and by delineating the reef as well as the surfgrass locations measured in the field by Chambers Group. The sand distribution analysis predicted that the equilibrium footprint of the beach fill would extend to about 60 percent of the reef and to the entire identified surfgrass habitat, but that only the inner portion of the reef would receive substantial sand burial. Beyond the inner portions of the reef, the sand layer was predicted to be just a thin layer that would not bury surfgrass blades. The inner portion of the reef where the cross section showed burial was about 20 percent of the reef. Because the reef is about 5 acres in extent, the area of impact was estimated to be 1 acre.

A recent laboratory study of *Phyllospadix scouoleri* suggested that short term sand burial may result in shoot mortality, decreased shoot counts, and reduced growth of surfgrass (Craig et al. 2008). The study found that shoot density decreased compared to controls for a burial depth of 0.8 feet (25 cm), but not shallower burial depths. Mean shoot growth rate decreased in all burial treatments. Therefore, the 50 ft (15 m) Beach Width Alternative may result in some negligible degradation of the shallower portion (inner T-Street reef) of the surfgrass habitat, but would not result in loss of surfgrass. For the 50 ft (15 m) Beach Width Alternative, the sand from the beach fill is predicted to move out of the equilibrium footprint within 6 years.

Considerable reef habitat that supports giant kelp, feather boa kelp, gorgonians, palm kelp, and sparse surfgrass is located approximately 1,000 to 1,300 ft (300 to 400 m) from shore. None of the fill from the 50 ft (15 m) Beach Width Alternative is expected to reach this area. The CRM and Moffatt & Nichol analysis predicted that less than 0.2 ft (0.06 m) of sand from the San Clemente beach fill would accrete in the kelp beds (CRM 2000). Similarly, beach profile monitoring of a somewhat larger volume of sand placed on the beach at Oceanside detected very little movement of the sand at 1,000 ft (300 m) or more from shore. Based on this information, negligible effects of the proposed action would result in the transport of enough sand into kelp bed areas to result in a long-term net loss of the habitat.

A BPJ was accomplished by the marine ecologists who have sampled the T-street reef, as well as the rocky reefs adjacent to the project site, and who are extremely experienced and knowledgeable in their sampling design, implementation of data collection, and data analysis. During the PED phase a more robust functional habitat evaluation assessment will be accomplished using ERDC's Submerged Aquatic Vegetation Restoration Research Program and/or the Northwest Habitat Institute's Combined Habitat Assessment Protocol (CHAP). CHAP has undergone independent scientific review in the Pacific Northwest and is under review with the Corps PCX.

Mitigation funds are included as part of the contingency funds for the project. The expectation is that while there may be negligible effects to the inner rocky reef and surfgrass vegetation; actual monitoring data will be needed to support this determination, or to identify that there will be no significant impacts. Monitoring for 2 years immediately post construction is proposed to determine actual impacts.

The Project has a mitigation budget that accommodates 1 acre of impacts to surfgrass plus 1 acre of impacts to reef, for a total potential impact to 2 acres of resources as a worst-case scenario. Initial modeling by the Corps shows that there is potential to impact 20 percent of the inshore edge of T-Street reef; and 5 acres of the T-Street reef. Twenty percent of the inshore edge is a reasonably foreseeable estimate of impacts based on a best professional judgment functional habitat evaluation assessment and the coastal engineering model. Both the BPJ FA and the coastal engineering model considered the potential depth in addition to area; however that detail is not in inches, but in feet. A greater impact area would be unlikely, but an additional acre of potential impacts was included in the contingency mitigation budget to account for an unlikely worst-case scenario.

The Corps does not use ratios, but instead a scientific-based approach through the use of functional habitat evaluation assessment. A basic FA was used in the BPJ approach and a more robust FA will be accomplished in PED during the monitoring of the project site and the reference site. As previously stated, *Phyllospadix torreyi* is distributed widely along the entire Pacific Coast; and occurs from the northern tip of Vancouver Island to Baja, California, with its primary abundance south of Monterey, California. It is not known if P. *torreyi* is unique for a certain array of marine organisms or if it provides foraging, cover, and spawning habitat for obligate fish. It has been stated by CDFG that it provides forage for juvenile lobster, a CDFG harvest taxa.

Because resource agency recommendations for mitigation were only clarified in their response to the DEIS, development and certification of a habitat model to assess surfgrass impacts was not previously contemplated. NMFS recommended using their mitigation ratio calculator and started the high end ratio at 5:1. Other agencies (EPA and CDFG) wanted to use the Corps Regulatory Division 1.5:1 as the minimum ratio. To accomplish this, $3.7 million dollars are included in the cost of the recommended alternative for monitoring, mitigation, and reporting as a contingency. Nonetheless, contingency costs are included in total project costs, but monitoring may ultimately determine that less mitigation acres is required and thus costs may be lower.

Absent readily available models to assess potential impacts to surfgrass (such as habitat evaluation procedures habitat suitability indices) technical experts at ERDC concur that patch/size of impacts is the appropriate metric to use as the feasibility planning phase approaches closure. Model development will be pursued during PED, in turn, as a basis for monitoring, assessing and documenting any impacts immediately before and at regular intervals after initial sand placement.

Habitat Equivalency Analysis appears to be a good approach in this situation (D. Shafer, PhD, ERDC, personal communication, March 2011). According to ERDC, it has been successfully used for seagrass habitat in other settings.

Although percent cover is commonly used as a metric, there is a lack of science to justify inferring a linear relationship between SAV percent cover and habitat function. Data is lacking, for example, with which to say 80% SAV cover is twice as good as 40% cover for juvenile lobster habitat utilization (D. Shafer, PhD, ERDC, personal; communication, March 2011). ERDC recommended consideration, for now, of patch size/area as the only metric which we can speak to now with any degree of scientific confidence. There are at least a couple of modeling (HEAT) and habitat accounting system (CHAP) approaches to for use later on, as proposed, to assess effects of San Clemente sand placement.

The Corps developed cost effectiveness/ incremental cost analysis (CE/ICA) table in the mitigation plan/report showing costs and acres (where acres are our substitute for outputs) for various mitigation alternatives (L. Skaggs, Corps South Pacific Division [SPD], personal communication, March 2011). Surfgrass restoration is estimated to cost $2 million per acre, a linear relationship; while kelp forest restoration costs $500k per acre. A simple graphic display of the costs and acres for the various alternatives reveal why the recommended alternative represents the "best" mitigation plan (L. Skaggs, Corps SPD, personal communication, March 2011). Since costs and outputs/acres are linear, in the sense that there are no efficiencies or inefficiencies as surfgrass production rates change, the selection of the alternative becomes a question of "how much surfgrass output is needed to compensate for estimated impacts" (L. Skaggs, Corps SPD, personal communication, March 2011).

An Institute for Water Resources (IWR) Planning Suite analysis on the costs and outputs was accomplished and provided for mitigation alternatives (Figure 5-10 and Figure 5-11). Figure 5-10 shows the cost effectiveness of the contingent mitigation based upon the IWR Planning Suite analysis illustrates that kelp is the Best Buy followed by surfgrass for all alternatives. Figure 5-11 shows the cost effectiveness of the contingent mitigation based upon the IWR Planning Suite analysis illustrates that kelp is the Best Buy. The distributions show, that Group C kelp restoration is the most cost effective and the only Best Buy solution. If the kelp restoration is excluded from the mix, then Group C surfgrass would be the most efficient (and the only Best Buy solution). Acres were the only metric used to characterize outputs, since no other habitat values are available. It is critical to note that if kelp is acceptable as a restoration outcome, the natural resources would obtain as much kelp as surfgrass for 1/14 the cost (for 5 acres). If the Corps were to only plan to recommend 1 acre of surfgrass for mitigation, then the natural resources could gain 5 times as much kelp (5 acres) for less than 1/3 the cost.

Figure 5-10 San Clemente Shoreline Protection Mitigation Alternatives

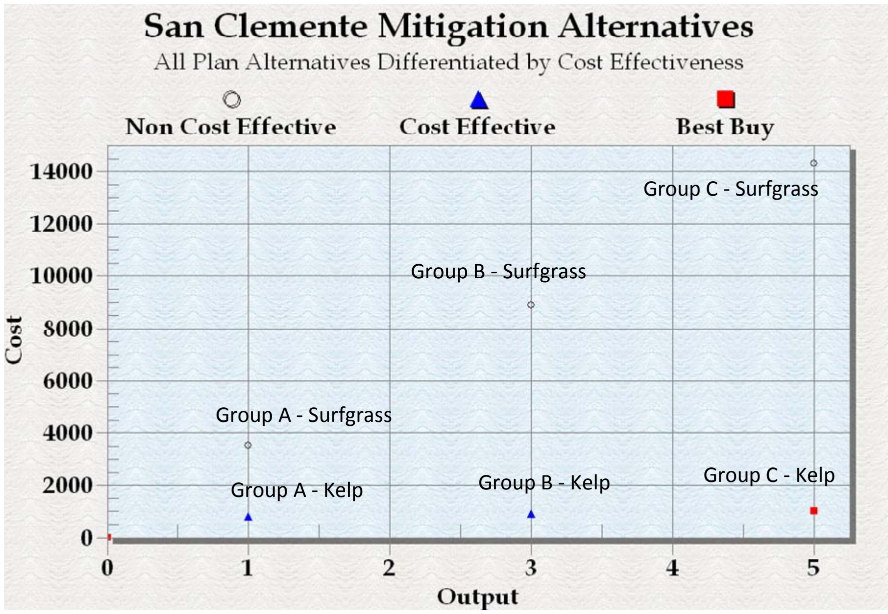
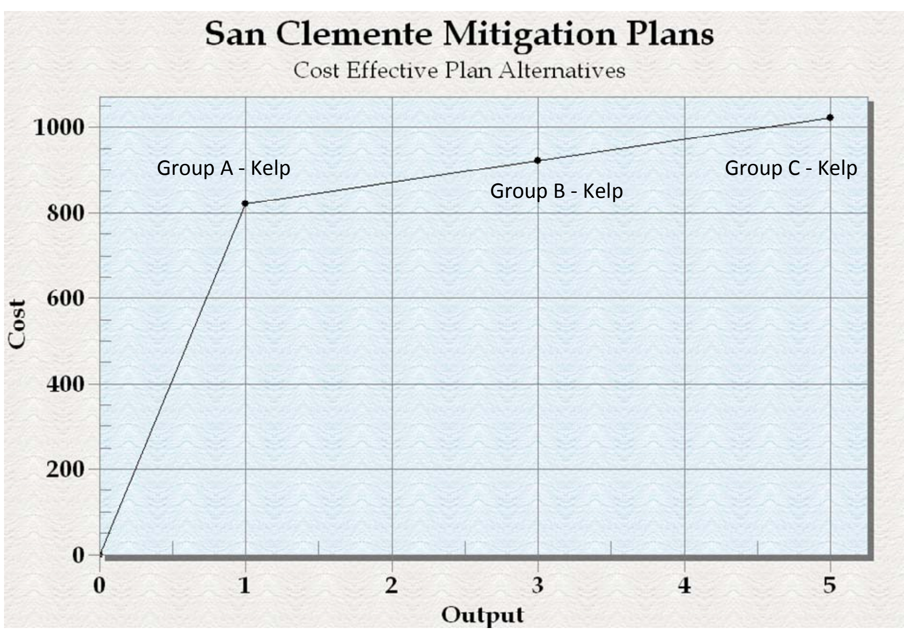


Figure 5-11 San Clemente Shoreline Protection Mitigation Plans



5.4.5.3 Opportunistic Beach Nourishment

The City of San Clemente has adopted a program to actively pursue opportunities for obtaining suitable sand for placement on San Clemente's beaches for erosion control and recreational benefits. The program is designed to obtain surplus sand from upland construction, development, or dredging projects in the region and place it on the City's beaches as nourishment. The purpose of the program is to capitalize on opportunities to obtain beach quality sand from construction projects and other sources when it becomes available. If the sand is determined to be beach-compatible, the material will be placed on the beach or nearshore area at a selected location, rather than disposing of it at an inland disposal site.

The four placement sites and one stockpile site include:

1. The beach at North Beach, just south of the San Clemente Metrolink train station and at the terminus of Avenida Pico, extending a distance of 1,500 feet, referred to as the North Beach Fill Site;
2. The beach near Linda Lane, south of Mariposa Point and north of the pier, extending a distance of 1,500 feet, referred to as the Linda Lane Beach Fi11Site;
3. The beach north of the beach commonly known as T-Street Beach, extending from the pier 1,000 feet south, referred to as the T-Street North Beach Fill Site;
4. The beach south of the beach commonly known T-Street Beach, extending south a distance of 1,200 feet referred to as the T-Street South Beach Fill Site; and
5. The Animal Shelter stockpile site located east of Avenido Pico and north of 'El Camino Real.

During the last five renewals of the Corps Regulatory opportunistic beach nourishment permit, the applicant did not use the permit even once. The key point the opportunistic program takes into consideration is the condition of the beach before sand placement. If beach locations at San Clemente do not need sand, it is not placed. Multiple placement sites are considered in an opportunistic program, and there are no guarantees that San Clemente will receive any sand at all. Sand is not placed at every site every time sand is available. Opportunistic programs, moreover, typically have volumes of sand magnitudes smaller than would be required at this beach (e.g., 10,000 to 40,000 cy instead of 200,000 cy). In addition, any future renourishment for this project will be based on the need for said sand. It does not automatically get renourished every 5 years. That is simply the estimated time frame when the beach is expected to retreat to a width of zero ft (0 m). If there is no need for renourishment at 5 years, the beach will not be renourished. There is no additive effect of both projects, in sum, that would result in over-nourishing the project site. Over-nourishment is unlikely since the beach has already retreated dramatically from the historic width.

The City of San Clemente's Corps Regulatory permit will be conditioned (J. Lambert, personal communication, March 2011) to not allow any opportunistic beach nourishment once the PED phase has commenced, most likely sometime in FY2012. The opportunistic beach nourishment cannot affect the Shoreline Protection project's reference site at Mariposa Point or and down coast littoral zone sand movement.

5.4.6 Upfront mitigation, endowments, third party agreements and implementation

It is the Corps policy in ER 1105-2-100, App C, Paragraph C-3 d. (1) (a) and following:

e. Mitigation Planning and Recommendations.
(1) General. District commanders shall ensure that project-caused adverse impacts to ecological resources have been avoided or minimized to the extent practicable, and that remaining, unavoidable impacts have been compensated to the extent justified. The recommended plan and the NED plan, if not one in the same, shall contain sufficient mitigation ecological resources (Section 906(d), WRDA`86). Any such mitigation measures will be fully justified.

The Corps typically plans to implement mitigation features, along with other project features, in the construction phase. While this scenario is typically based on known impacts to be mitigated, in this case there may be a planned lag to truly define the impacts that the models suggest may occur. Mitigation funds are included as part of the contingency funds for the project because effects to the inner rocky reef and surfgrass vegetation, if any, are uncertain. The expectation is that at most negligible effects and impacts to the inner rocky reef and surfgrass vegetation will occur; however, actual monitoring data are needed to support said predicted negligible effects. Mitigation is typically conducted before construction, but typically the likely impacts are known, which is not the case for this project. Monitoring for 2 years immediately post construction is proposed to determine what actual impacts are.

No direct placement of sand on the reef is proposed. The equilibrium footprint is that demonstrated as potentially extending to inner portions of the reef. Based on the best available scientific and coastal engineering data, it is predicted that there will be negligible effects to the rocky reef and surfgrass vegetation. Monitoring for 2 years immediately post construction is proposed to determine what actual impacts, if any, do occur. After the first four years (2 years pre-action, 2 years post-action) of monitoring, if the rocky reef and surfgrass vegetation illustrate effects based on triggers specifically determined by the marine ecologists deemed most knowledgeable and experience, the current plan is to attempt “in-kind” mitigation as the primary mode. If “in-kind” mitigation is not successful, based on success criteria developed in PED in consultation with said experts, the mitigation would be adjusted to “out-of-kind” mitigation. Because of numerous uncertainties surrounding surfgrass restoration, that is, the Corps will develop a compensatory secondary mitigation plan (out-of-kind). In sum, mitigation funds are included as part of the contingency funds for the project because impacts cannot reasonably be determined at this time.

Federal funds cannot be provided to establish an endowment fund for long-term mitigation because of the prohibition against "advance payments" set forth in 31 U.S. Code Section 3324. Federal law prohibits payment under a contract to provide goods and services may not be for more than the value of the goods or services already delivered or provided. The Corps cannot provide funds unless and until it receives goods or services.

The Corps can obtain mitigation services only under a competitively solicited FAR contract. It cannot fund a designated "third party" for mitigation services. Finally, funds obligated under an FY 11 contract must be spent in FY 11.

5.5 Cultural Resources

5.5.1 Significance Criteria

Adverse effects to sites and properties listed on, or eligible for, the NRHP are evaluated based on the Criteria of Adverse Effect as outlined in 36 (CFR) 800.5 of the regulations implementing Section 106 of the NHPA. The criteria of adverse effect is as follows:

An adverse effect is found when an undertaking may alter, directly or indirectly, the characteristics of a historic property that qualify the property for inclusion in the National Register in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association. Consideration shall be given to all qualifying characteristics of an historic property, including those that may have been identified subsequent to the original evaluation of the property's eligibility for the National Register.

- An adverse effect is found when an undertaking may alter, directly or indirectly, the characteristics of an historic property that qualify the property for inclusion in the National Register in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association. Consideration shall be given to all qualifying characteristics of an historic property, including those that may have been identified subsequent to the original evaluation of the property's eligibility for the National Register.
- Adverse effects may include reasonably foreseeable effects caused by the undertaking that may occur later in time, be farther removed in distance or be cumulative.
- Adverse effects on historic properties include, but are not limited to: (i) Physical destruction of or damage to all or part of the property; (ii) Alteration of a property, including restoration, rehabilitation, repair, maintenance, stabilization, hazardous material remediation and provision of handicapped access, that is not consistent with the Secretary's Standards for the Treatment of Historic Properties (36 CFR part 68) and applicable guidelines; (iii) Removal of the property from its historic location; (iv) Change of the character of the property's use or of physical features within the property's setting that contribute to its historic significance; (v) Introduction of visual, atmospheric, or audible elements that diminish the integrity of the property's significant historic features; (vi) Neglect of a property which causes its deterioration, except where such neglect and deterioration are recognized qualities of a property of religious and cultural significance to an Indian tribe or Native Hawaiian organization; and, (vii) Transfer, lease, or sale of property out of Federal ownership or control without adequate and legally enforceable restrictions or conditions to ensure long-term preservation of the property's historic significance.

5.5.2 Impacts Related to the 50 ft (15 m) Beach Width Alternative

Based on investigations conducted by Los Angeles District archeologists, the USACE has determined that there are no historic properties within the onshore portion of the Area of Potential Effect (APE). However, the San Clemente Municipal Pier is located within the APE, and it is considered locally significant and is listed on the City's Historic Structures List. Project activities along the onshore portion of the Project area involve the placement of dredged sands onto the beach. This alternative will most likely not impact the San Clemente Municipal Pier in any way. The proposed construction staging areas will be in nearby paved parking lots adjacent to the beach and Pier; these areas are already disturbed by development.

As for the offshore portions of the APE, the USACE has yet to determine whether or not these areas contain historic properties. Remote sensing surveys will be used to locate submerged cultural resources.

Mitigation Measures:

MM-CR-50-1: Any earthmoving associated with this Project that will involve previously undisturbed soil will be monitored by a qualified archeologist who meets the Secretary of Interior's Standards for an Archeologist (see 36 CFR Part 61). Earthmoving includes grubbing and ground clearing, grading, and excavation activities. If a previously unidentified cultural resource (i.e., property) that may be eligible for the NRHP is discovered, all earthmoving activities in the vicinity of the discovery shall be diverted until the USACE complies with 36 CFR § 800.13(a)(2).

MM-CR-50-2: Prior to construction, offshore borrow areas 1 and 2 will be subjected to an underwater remote sensing survey in order to determine if submerged cultural resources are present within these areas. The USACE will comply with Section 106 of the NRHP and its implementing regulations at 36 CFR 800, as amended. This compliance involves the identification and evaluation of cultural resources and consultation with the California State Historic Preservation Officer (SHPO), Native American tribes, and interested parties.

Significant and Unavoidable Impacts: None.

5.5.3 Impacts Related to the 115 ft (35 m) Beach Width Alternative

As with the 50 ft Beach Width Alternative, there are no historic properties within the onshore portion of the Area of Potential Effect (APE). However, the San Clemente Municipal Pier is located within the APE, and it is considered locally significant and is listed on the City's Historic Structures List. Project activities along the onshore portion of the Project area involve the placement of dredged sands onto the beach. This alternative will most likely not impact the San Clemente Municipal Pier in any way. The proposed construction staging areas will be in nearby paved parking lots adjacent to the beach and Pier; these areas are already disturbed by development.

As for the offshore portions of the APE, the USACE has yet to determine whether or not these areas contain historic properties. Remote sensing surveys will be used to locate submerged cultural resources.

Mitigation Measures: Implement MM-CR-50-1 and MM-CR-50-2.

Significant and Unavoidable Impacts: None.

5.5.4 Impacts Related to the No Action Alternative

Under the No Action Alternative, it is likely that emergency seawalls would be constructed to protect structures. This alternative would not result in any impacts to historic properties and thus would not disturb the site of the Proposed Action.

Mitigation Measures: None.

Significant and Unavoidable Impacts: None.

5.6 Ground and Vessel Transportation

5.6.1 Significance Criteria

An impact to transportation will be considered significant if a project alternative:

- Causes an increase in traffic which is substantial in relation to the existing traffic load and capacity of the street system (i.e., result in a substantial increase in either the number of vehicle trips, the volume to capacity ratio on roads, or congestion at intersections);
- Exceeds, either individually or cumulatively, a level of service standard established by the county congestion management agency for designated roads or highways;
- Results in a change in air traffic patterns, including either an increase in traffic levels or a change in location, that result in substantial safety risks;
- Substantially increases hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment);
- Results in inadequate emergency access;
- Results in inadequate parking capacity;
- Conflicts with adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks).

5.6.2 Impacts Related to the 50 ft (15 m) Beach Width Alternative

Impact T-50-1: *Causes an increase in traffic which is substantial in relation to the existing traffic load and capacity of the street system (i.e., result in a substantial increase in either the number of vehicle trips, the volume to capacity ratio on roads, or congestion at intersections).*

The initial beach nourishment proposes no trucking of materials for disposal. The only ground traffic that will be associated with the Project will be associated with the construction workers traveling to and from the construction site. The increase in ground traffic would not be substantial in relation to the existing traffic load or capacity of the street system. The initial beach nourishment would involve a barge and associated tow boats traveling from Oceanside Harbor to the Project site. Offshore dredge equipment has the potential to result in a hazard to boat traffic. However, during dredging and nourishment operations, proper advanced notice to mariners would be provided, and navigational traffic would not be allowed within the offshore borrow site area or mooring/discharge area directly offshore of Oceanside Harbor or San Clemente Pier. In addition, the proposed Project is not in an area of active navigation. Long-term maintenance would create the same impacts as the proposed action approximately every 6 years. The dredging operator shall pre-coordinate all planned dredging and transport operations with Camp Pendleton. Construction and maintenance impacts would be considered less than significant.

Mitigation Measures: None.

Significant and Unavoidable Impacts: None.

Impact T-50-2: *Exceeds, either individually or cumulatively, a level of service standard established by the county congestion management agency for designated roads or highways.*

The initial beach nourishment proposes no trucking of materials for disposal. The only traffic that will be associated with the Project will be that associated with the construction workers traveling to and from the construction site. The Project would not exceed, either individually or cumulatively, a level of service standard established by the county congestion management agency for designated roads or highways. Therefore, impacts would be considered not significant.

Mitigation Measures: None.

Significant and Unavoidable Impacts: None.

Impact T-50-3: *Results in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks.*

The only traffic that will be associated with the Project will be that associated with the construction workers traveling to and from the construction site. The proposed Project involves dredging and beach nourishment only and would not result in a change in air traffic patterns. Therefore, impacts would be considered not significant.

Mitigation Measures: None.

Significant and Unavoidable Impacts: None.

Impact T-50-4: *Substantially increases hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment).*

The proposed Project involves dredging and beach nourishment only and would not increase hazards due to design features or incompatible uses. Therefore, impacts would be considered not significant.

Mitigation Measures: None.

Significant and Unavoidable Impacts: None.

Impact T-50-5: *Results in inadequate emergency access.*

The initial beach nourishment involves the building of sand berms to create fill areas; however, only one of these areas will be constructed at any given time and shall be small segments of the beach so that minimal impacts to the beach would occur. In addition, there will always be alongshore beach access during this process. The Project would have a less than significant impact on emergency access.

Mitigation Measures: None.

Significant and Unavoidable Impacts: None.

Impact T-50-6: *Results in inadequate parking capacity.*

The initial beach nourishment proposes no trucking of materials for disposal. The only traffic that will be associated with the Project will be that associated with the construction workers traveling to and from the construction site. Parking lots are located at Linda Lane Park, across the street from the Pier, and at T-Street. In addition, there is street parking on the local streets. Parking capacity will not be impacted. Therefore, impacts would be considered not significant.

Mitigation Measures: None.

Significant and Unavoidable Impacts: None.

Impact T-50-7: *Conflicts with adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks).*

The proposed Project involves dredging and beach nourishment only and would not conflict with adopted policies, plans, or programs supporting alternative transportation. Therefore, impacts would be considered not significant.

Mitigation Measures: None.

Significant and Unavoidable Impacts: None.

5.6.3 Impacts Related to the 115 ft (35 m) Beach Width Alternative

Impact T-115-1: *Causes an increase in traffic which is substantial in relation to the existing traffic load and capacity of the street system (i.e., result in a substantial increase in either the number of vehicle trips, the volume to capacity ratio on roads, or congestion at intersections).*

The 115 ft Beach Width Alternative proposes no trucking of materials for disposal. The only ground traffic that will be associated with this alternative will be associated with the construction workers traveling to and from the construction site. The number of construction workers would be the same as for the proposed action and therefore the associated daily traffic would be the same. The length of the construction period associated with this alternative would be greater than the proposed action but the repetition of the long-term maintenance would be less frequent. The increase in ground traffic would not be substantial in relation to the existing traffic load or capacity of the street system.

As with the 50 ft Beach Width Alternative, the 115 ft Beach Width Alternative would involve a barge and associated tow boats traveling from Oceanside Harbor to the Project site. The number of daily trips would be the same as the proposed action. The length of the construction period associated with this alternative would be greater than the proposed action but the repetition of the long-term maintenance would be less frequent. Offshore dredge equipment has the potential to result in a hazard to boat traffic. However, during dredging and nourishment operations, proper advanced notice to mariners would be provided, and navigational traffic would not be allowed within the offshore borrow site area or mooring/discharge area directly offshore of Oceanside Harbor or San Clemente Pier. In addition, the 115 ft Beach Width Alternative is not in an area of active navigation. Long-term maintenance would create the same impacts as the proposed action though at a less frequent rate of approximately every 10 years. Construction and maintenance impacts would be considered less than significant and the similar to the proposed action.

Mitigation Measures: None.

Significant and Unavoidable Impacts: None.

Impact T-115-2: *Exceeds, either individually or cumulatively, a level of service standard established by the county congestion management agency for designated roads or highways.*

As with the 50 ft Beach Width Alternative, the 115 ft Beach Width Alternative proposes no trucking of materials for disposal. The only traffic that will be associated with this alternative will be that of the construction workers traveling to and from the construction site. The number of construction workers would be the same as for the proposed action and therefore the associated daily traffic would be the same. The length of the construction period associated with this alternative would be greater than the proposed action but the repetition of the long-term maintenance would be less frequent. This alternative would not exceed, either individually or cumulatively, a level of service standard established by the county congestion management agency for designated roads or highways. Therefore, impacts would be considered not significant and the similar to the proposed action.

Mitigation Measures: None.

Significant and Unavoidable Impacts: None.

Impact T-115-3: *Results in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks.*

The only traffic that will be associated with this alternative will be that associated with the construction workers traveling to and from the construction site. As with the proposed action, the 115 ft Beach Width Alternative involves dredging and beach nourishment only and would not result in a change in air traffic patterns. Therefore, impacts would be considered not significant and the same as the proposed action.

Mitigation Measures: None.

Significant and Unavoidable Impacts: None.

Impact T-115-4: *Substantially increases hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment).*

As with the 50 ft Beach Width Alternative, the 115 ft Beach Width Alternative Project involves dredging and beach nourishment only and would not increase hazards due to design features or incompatible uses. Therefore, impacts would be considered not significant and the same as the proposed action.

Mitigation Measures: None.

Significant and Unavoidable Impacts: None.

Impact T-115-5: *Results in inadequate emergency access.*

As with the 50 ft Beach Width Alternative, the 115 ft Beach Width Alternative involves the building of sand berms to create fill areas; however, only one of these areas will be constructed at any given time and shall be small segments of the beach so that minimal impacts to the beach would occur. In addition, there will always be alongshore beach access during this process. This Alternative would have a less than significant impact on emergency access and the similar to the proposed action.

Mitigation Measures: None.

Significant and Unavoidable Impacts: None.

Impact T-115-6: *Results in inadequate parking capacity.*

The 115 ft Beach Width Alternative proposes no trucking of materials for disposal. The only traffic that will be associated with this alternative will be that associated with the construction workers traveling to and from the construction site. The number of construction workers would be the same as for the 50 ft Beach Width Alternative and, therefore, the associated daily traffic would be the same. The length of the construction period associated with this alternative would be greater than the proposed action but the repetition of the long-term maintenance would be less frequent. Parking lots are located at Linda Lane Park, across the street from the Pier, and at T-Street. In addition, there is street parking on the local streets. Parking capacity will not be significantly impacted. Therefore, impacts would be considered not significant and the similar to the proposed action.

Mitigation Measures: None.

Significant and Unavoidable Impacts: None.

Impact T-115-7: *Conflicts with adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks).*

The 115 ft Beach Width Alternative involves dredging and beach nourishment only and would not conflict with adopted policies, plans, or programs supporting alternative transportation. Therefore, impacts would be considered not significant and the same as the proposed action.

Mitigation Measures: None.

Significant and Unavoidable Impacts: None.

5.6.4 Impacts Related to the No Action Alternative

Under the No Action Alternative, it is likely that emergency seawalls would be constructed to protect structures. This alternative would not result in any impacts to ground or vessel transportation and thus would not disturb the proposed Project area.

5.7 Land Use and Policy

5.7.1 Significance Criteria

An impact to land use will be considered significant if a project alternative:

- Physically divides an established community;
- Conflicts with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect; and/or
- Conflicts with any applicable habitat conservation plan or natural community conservation plan.

5.7.2 Impacts Related to the 50 ft (15 m) Beach Width Alternative

Impact LU-50-1: *Physically divides an established community.*

The construction and long-term maintenance of the proposed Project will neither disrupt nor divide any established community and, therefore, will have no impact on an established community.

Mitigation Measures: None.

Significant and Unavoidable Impacts: None.

Impact LU-50-2: *Conflicts with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect.*

The construction and long-term maintenance (i.e., renourishment) of the proposed Project does not conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the Project adopted for the purpose of avoiding or mitigating an environmental effect and there would be no impact.

Mitigation Measures: None.

Significant and Unavoidable Impacts: None.

Impact LU-50-3: *Conflicts with any applicable habitat conservation plan or natural community conservation plan.*

The City of San Clemente became a signatory agency in the Orange County Southern Natural Community Conservation Plan (NCCP)/Habitat Conservation Plan (HCP) subregional plan in May 1993. The construction and long-term maintenance of the proposed Project will not conflict with the OC southern NCCP/HCP and, therefore, impacts would be considered not significant.

Mitigation Measures: None.

Significant and Unavoidable Impacts: None.

5.7.3 Impacts Related to the 115 ft (35 m) Beach Width Alternative

Impact LU-115-1: *Physically divides an established community.*

The construction and long-term maintenance of the 115 ft Beach Width Alternative will neither disrupt nor divide any established community and, therefore, will have no impact on an established community, same as the proposed action.

Mitigation Measures: None.

Significant and Unavoidable Impacts: None.

Impact LU-115-2: *Conflicts with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect.*

The construction and long-term maintenance of the 115 ft Beach Width Alternative does not conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the Project adopted for the purpose of avoiding or mitigating an environmental effect and there would be no impact, same as the proposed action.

Mitigation Measures: None.

Significant and Unavoidable Impacts: None.

Impact LU-115-3: *Conflicts with any applicable habitat conservation plan or natural community conservation plan.*

The City of San Clemente became a signatory agency in the Orange County Southern NCCP/ HCP subregional plan in May 1993. The construction and long-term maintenance of the 115 ft Beach Width Alternative will not conflict with the OC Southern NCCP/HCP and, therefore, impacts would be considered not significant, same as the proposed action.

Mitigation Measures: None.

Significant and Unavoidable Impacts: None.

5.7.4 Impacts Related to the No Action Alternative

The No Action Alternative would not involve any dredging or beach nourishment activity. No impacts to land use would occur from the lack of these construction activities. Under the No Action Alternative, it is likely that emergency seawalls would be constructed to protect structures. Potential maintenance activities by SCRRA would have no impact on land use.

5.8 Noise

5.8.1 Significance Criteria

For stationary sources, the applicable noise standards include criteria established by local as well as any State regulations applicable to the proposed Project. Mobile-source noise (i.e., vehicle and vessel noise) is preempted from local regulation. Here an impact is considered significant if the existing noise levels exceed the objectives of the General Plan (i.e., 60 dBA CNEL for residential and noise sensitive areas) and the Project were to increase this noise level by 3 dBA (barely noticeable in an exterior environment); or if the Project adds 5 dBA (noticeable to most people) and the resultant noise level remains under the objectives of the General Plan.

All projects constructed in the City of San Clemente are subject to standard conditions set forth in the Municipal Code. The City of San Clemente noise standards are identified in Municipal Code Ch 8.48 (Noise Control) (Table 5-9).

Table 5-9 San Clemente Noise Standards

	7:00 AM to 10:00 PM	10:00 PM to 7:00 AM
Residential		
Exterior	55 dBA	50 dBA
Interior	50 dBA	40 dBA
Commercial	65 dBA	60 dBA
Industrial	70 dBA	70 dBA

Compliance with these provisions is mandatory and as such, does not constitute mitigation under CEQA. Those conditions specific to noise are included below:

- City Municipal Code Section 8.48.090, *Exemptions from Chapter*, that exempts noise sources associated with construction activities, provided said activities do not take place outside the hours of 7:00 a.m. and 6:00 p.m. Monday through Friday and 8:00 a.m. to 6:00 p.m. on Saturday, with no construction allowed on Sundays and City-observed holidays unless a permit is granted by the Community Development Director or his or her authorized representative.

- Any activity or equipment to the extent that design regulation thereby has been preempted by State or Federal law. This would include noise generated from the use of on-road and ocean-going vehicles.

5.8.2 Impacts Related to the 50 ft (15 m) Beach Width Alternative

Impact N-50-1: *Exposure of Persons to or Generation of Noise Levels in Excess of Standards Established in the Local General Plan or Noise Ordinance, or Applicable Standards of Other Agencies.*

In accordance with the City of San Clemente Municipal Code, sensitive residential land uses carry a daytime noise standard of 55 dBA between the hours of 7:00 a.m. and 10:00 p.m. and a nighttime standard of 50 dBA between the hours of 10:00 p.m. and 7:00 a.m.

However, in accordance with the City Municipal Code, construction is exempt from these standards so long as it is restricted to between the hours of 7:00 a.m. and 6:00 p.m., Monday through Friday and 8:00 a.m. to 6:00 p.m. on Saturday, with no construction allowed on Sundays and City-observed holidays unless a permit is granted by the Community Development Director or his or her authorized representative. These hours are requisite within the City and therefore, adherence to these hours is mandatory and does not constitute mitigation.

Because on-shore construction would not be performed outside of these hours, it is exempt from the stationary-source noise standards and therefore would not expose local residents to noise levels in excess of any regulatory standards and the impact is less than significant.

Mitigation Measures: None.

<u>Significant and Unavoidable Impacts</u>: None.

Impact N-50-2: *Exposure of Persons to or Generation of Excessive Groundborne Vibration or Groundborne Noise Levels.*

The 50 ft Beach Width Alternative would result in the addition of sand to the City of San Clemente beach. Excessive groundborne vibration is typically associated with such activities as large-scale demolition, pile driving, or blasting, none of which would be required during site construction. Only minimal groundborne vibrations would be created during Project construction activities associated site development and no significant vibration impacts would result from Project development.

<u>Mitigation Measures</u>: None.

<u>Significant and Unavoidable Impacts</u>: None.

Impact N-50-3: *A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project.*

The 50 ft Beach Width Alternative represents a construction effort with a duration of 46 days. The Project would not result in any new structures nor is it expected to increase beach attendance and its associated traffic. As such, there would not be a permanent increase in the ambient noise levels and the impact is less than significant.

<u>Mitigation Measures</u>: None.

<u>Significant and Unavoidable Impacts</u>: None.

Impact N-50-4: *A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project.*

Noise levels associated with construction activities would be higher than the ambient noise levels in the Project area, but would subside once construction of the Project is completed. Two types of noise impacts could occur during the construction phase. First, the transport of workers and equipment to the construction site would incrementally increase noise levels along site access roadways. Four pieces of heavy construction equipment would initially be delivered to the staging area and would be removed at the end of the construction period. Additionally, 10 workers (and vehicles) would make the daily commute to the construction site. Even though there could be a relatively high single event noise exposure potential with passing trucks during the mobilization and demobilization of the heavy equipment (a maximum noise level of 86 dBA at 50 feet), the increase in daily construction traffic is minimal and any addition to on-road noise would be less than 1 dBA when averaged over a 24-hour period, and would therefore have a less than significant impact on noise receptors along the vehicle routes.

The second type of impact is related to noise generated by onsite construction equipment and local residents would be subject to elevated noise levels due its operation. The FHWA provides noise data for construction equipment in its publication FHWA Highway Construction Noise Handbook (August 2006). The 50 ft Beach Width Alternative would use two front-end loaders and two dozers to conduct the on-shore activities. The FHWA document notes that of 55 measurements taken of bulldozers, the maximum measured levels (Lmax) averaged 82 dBA as measured at a distance of 50 feet. The logrithmetic average (Leq) noise is projected at 78 dBA also as measured at a distance of 50 feet. Similarly, front-end loaders are averaged at 79 dBA Lmax (75 dBA Leq) at 50 feet based on 96 measurements. If a loader and dozer were to work together in unison, the Leq is calculated at approximately 80 dBA as measured at a distance of 50 feet. This value is then used to determine the potential impact of the project.

The nearest existing residents are located to the northeast at a distance of about 55 - 60 meters from the closest point of the Project area. Assuming that these pieces generated a noise level of 80 dBA Leq at 50 feet, the resultant exterior noise at the receptor is calculated at 68 dBA Leq. Interior noise levels with windows closed would be reduced by over 20 dBA from this value. Most of the time, these levels (both exterior and interior) would be considerably lower due to increased distance as this represents the point where the equipment is operating most proximate to any given resident.

As noted above, the beach is located within the 65 dBA CNEL contour while the proximate receptors are estimated at about 60 dBA CNEL. Assuming that the daytime noise levels approximate the CNEL (i.e., 60 dBA at the receptors), the Project could raise noise at the most proximate receptors to approximately 69 dBA for an increase of 9 dBA. This level exceeds the 3-dBA threshold where the resultant noise is anticipated to exceed the goals of the Noise Element (i.e., 60 dBA CNEL for sensitive land uses) and the impact is considered as potentially significant.

Assuming that two pieces of heavy equipment work in unison, the equipment would produce a noise level of 60 dBA Leq as measured at a distance of approximately 500 ft (152 m). This also is the assumed ambient noise level at the residents and the addition of this construction noise would result in a composite noise level of 63 dBA Leq. This 500 ft (152 m) then represents the distance to the point of a 3-dBA increase for a significant impact. As such, any construction within 500 ft (152 m) of the proximate residents could create a significant impact.

On occasion, beach-based heavy equipment may be required to operate at night to keep up with the dredge. Any use of land-side equipment outside of the hours of 7:00 a.m. and 6:00 p.m. on weekdays, 8:00 a.m. and 6:00 on Saturdays, or at any time on Sundays or City-observed holidays represents a potentially significant impact.

Use of the dredge would also create noise. The dredge would use diesel engines for propulsion, dredging activities, and to provide on-board electric power. Dredge operations are projected to occur 24-hours per day, 7-days per week. A tug boat would be used to position the unit.

The noise produced by the dredge is based on data obtained by Mestre Greve and documented by Helix Environmental (Upper Newport Bay Unit III Sediment Control and Enhancement Project, Volume II Initial Study Technical Appendices, October 15, 1996). That report addressed the use of a 500 hp hydraulic dredge and measured a noise level of 67 dBA at a distance of 100 feet. The Project could use a dredge that is as much as 10 times more powerful than the unit measured by Helix. Assuming that the noise level is directly related to the power level, dredge noise would be approximately 10 dBA louder than that measured by Helix and here a value of 77 dBA as measured at 100 feet is assumed for dredging operations. The dredge would be assisted by a tug boat of approximately 4,268 horsepower. This would essentially double the use of offshore horsepower increasing this noise by 3 dBA. As such, offshore activities are estimated at 80 dBA as measured at a distance of 100 feet, or roughly 6 dBA louder than the two pieces of shore equipment working in unison if the noise was projected at a similar distance.

At its nearest point, the dredge would be positioned at about 2,500 ft (763 m) from receptors at San Clemente during pump-out, and about 4,200 ft (1,280 m) from the Oceanside receptors at the borrow site. Assuming that the dredge and tug work in unison off San Clemente, the noise at the proximate receptors is calculated at 52 dBA Leq. When added to the 60-dBA ambient level, at the receptor locations, the composite noise is calculated at 60.6 dBA for an increase of 0.6 dBA.

When added to the on-shore construction noise when heavy equipment operates proximate to the residents (i.e., 69 dBA Leq at the receptors), the composite noise is calculated at 69.1 dBA for an increase of 0.1 dBA. In summary, while the noise from the dredge may be audible when working late at night, its increase to the ambient noise is too small to be significant. Furthermore, the noise of the dredge is too low to add substantially to the noise of the on-shore equipment.

At a distance of approximately 4,200 ft (1,280 m) from receptors at the Oceanside borrow site, the dredge would produce a noise level of 44.5 dBA Leq. Assuming that the receptors in the Oceanside area also are subject to an existing level of 60 dBA, the addition of 44.5 dBA results in a composite level of 60.1 dBA for an increase of just 0.1 dBA. This level of increase is too small to be notable and is well under the 3-dBA threshold and would not be significant.

Mitigation Measures:

MM-N-50-3.1: The City of San Clemente Noise Element discusses the potential impacts of construction noise on the residents and requires construction to employ feasible and practical techniques and practices that minimize the generation of excessive noise on adjacent land uses. The Applicant shall implement the following:

- Regardless of dredge activity timing, on-shore equipment shall be restricted to the hours included in the City of San Clemente Noise Ordinance discussed above.
- To reduce the nuisance value of on-shore construction noise, on-shore construction activities located within 500 ft (152 m) of any residential unit shall not begin before 8:00 a.m. (as opposed to 7:00 a.m. as allowed in the Noise Ordinance). Work beyond may be performed in accordance with the hours included in the City Noise Ordinance. This

provision shall not apply to any equipment mobilizing from the staging area that may pass within 500 ft (152 m) so long as it is not actively engaged in the movement of sand.

- During all construction, the Project contractors shall equip all on-shore construction equipment with properly operating and maintained mufflers and engine shrouds consistent with manufacturers' standards.
- All heavy equipment shall be maintained in a proper state of tune as per the manufacturers' specifications.
- The Project contractor shall place any stationary construction equipment as far as feasible from proximate receptor locations and oriented such that emitted noise is directed away from sensitive receptors.

Implementation of these, or equally effective, measures would reduce the impact to less a less than significant level.

Significant and Unavoidable Impacts: None.

Impact N-50-5: *For a Project Located Within an Airport Land Use Plan or, Where Such a Plan Has Not Been Adopted, Within Two Miles of a Public Airport or Public Use Airport, Would the Project Expose People Residing or Working in the Project Area to Excessive Noise Levels.*

The Project site is not located within two miles of any airports and would not result in significant exposure to aircraft noise.

Mitigation Measures: None.

Significant and Unavoidable Impacts: None.

Impact N-50-6: *For a Project Within the Vicinity of a Private Airstrip, Would the Project Expose People Residing or Working in the Project Area to Excessive Noise Levels.*

The proposed Project is not located in the vicinity of a private airstrip and would not be impacted by private airport operations.

Mitigation Measures: None.

Significant and Unavoidable Impacts: None.

5.8.3 Impacts Related to the 115 ft (35 m) Beach Width Alternative

Impact N-115-1: *Exposure of Persons to or Generation of Noise Levels in Excess of Standards Established in the Local General Plan or Noise Ordinance, or Applicable Standards of Other Agencies.*

As with the 50 ft Beach Width Alternative, because on-shore construction would not be performed outside of these hours, it is exempt from the stationary-source noise standards and, therefore, would not expose local residents to noise levels in excess of any regulatory standards and the impact is less than significant.

Mitigation Measures: None.

Significant and Unavoidable Impacts: None.

Impact N-115-2: *Exposure of Persons to or Generation of Excessive Groundborne Vibration or Groundborne Noise Levels.*

The 115 ft Beach Width Alternative would result in the addition of sand to the City of San Clemente beach. Excessive groundborne vibration is typically associated with such activities as large-scale demolition, pile driving, or blasting, none of which would be required during site construction. Only minimal groundborne vibrations would be created during Project construction activities associated site development and no significant vibration impacts would result from Project development.

Mitigation Measures: None.

Significant and Unavoidable Impacts: None.

Impact N-115-3: *A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project.*

The 115 ft Beach Width Alternative represents a construction effort with a duration of 108 days. The Project would not result in any new structures nor is it expected to increase beach attendance and its associated traffic. As such, there would not be a permanent increase in the ambient noise levels and the impact is less than significant.

Mitigation Measures: None.

Significant and Unavoidable Impacts: None.

Impact N-115-4: *A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project.*

As with the 50 ft Beach Width Alternative, noise levels associated with construction activities would be higher than the ambient noise levels in the Project area, but would subside once construction of the Project is completed. Two types of noise impacts could occur during the construction phase. First, the transport of workers and equipment to the construction site would incrementally increase noise levels along site access roadways. Additionally, 10 workers (and vehicles) would make the daily commute to the construction site. Even though there could be a relatively high single event noise exposure potential with passing trucks during the mobilization and demobilization of the heavy equipment (a maximum noise level of 86 dBA at 50 feet), the increase in daily construction traffic is minimal and any addition to on-road noise would be less than 1 dBA when averaged over a 24-hour period, and would therefore have a less than significant impact on noise receptors along the vehicle routes.

The second type of impact is related to noise generated by onsite construction equipment and local residents would be subject to elevated noise levels due its operation. The 115 ft Beach Width Alternative would use two front-end loaders and two dozers to conduct the on-shore activities. The nearest existing residents are located to the northeast at a distance of about 55 - 60 meters from the closest point of the Project area. Assuming that these pieces generated a noise level of 80 dBA Leq at 50 feet, the resultant exterior noise at the receptor is calculated at 68 dBA Leq. Interior noise levels with windows closed would be reduced by over 20 dBA from this value. Most of the time, these levels (both exterior and interior) would be considerably lower due to increased distance as this represents the point where the equipment is operating most proximate to any given resident. As with the 50 ft Beach Width Alternative, any construction within 500 ft (152 m) of the proximate residents could create a significant impact.

As noted above, the beach is located within the 65 dBA CNEL contour while the proximate receptors are estimated at about 60 dBA CNEL. Assuming that the daytime noise levels approximate the CNEL (i.e., 60 dBA at the receptors), the Project could raise noise at the most proximate receptors to approximately 69 dBA for an increase of 9 dBA. This level exceeds the 3-dBA threshold where the resultant noise is anticipated to exceed the goals of the Noise Element (i.e., 60 dBA CNEL for sensitive land uses) and the impact is considered as potentially significant.

On occasion, beach-based heavy equipment may be required to operate at night to keep up with the dredge. Any use of land-side equipment outside of the hours of 7:00 a.m. and 6:00 p.m. on weekdays, 8:00 a.m. and 6:00 on Saturdays, or at any time on Sundays or City-observed holidays represents a potentially significant impact.

Use of the dredge would also create noise. The dredge would use diesel engines for propulsion, dredging activities, and to provide on-board electric power. Dredge operations are projected to occur 24-hours per day, 7-days per week. A tug boat would be used to position the unit.

Similar to the 50 ft Beach Width Alternative, offshore activities are estimated at 80 dBA as measured at a distance of 100 feet, or roughly 6 dBA louder than the two pieces of shore equipment working in unison if the noise was projected at a similar distance. At its nearest point, the dredge would be positioned at about 2,500 ft (763 m) from receptors at San Clemente during pump-out, and about 4,200 ft (1,280 m) from the Oceanside receptors at the borrow site. Assuming that the dredge and tug work in unison off San Clemente, the noise at the proximate receptors is calculated at 52 dBA Leq. When added to the 60-dBA ambient level, at the receptor locations, the composite noise is calculated at 60.6 dBA for an increase of 0.6 dBA.

When added to the on-shore construction noise when heavy equipment operates proximate to the residents (i.e., 69 dBA Leq at the receptors), the composite noise is calculated at 69.1 dBA for an increase of 0.1 dBA. In summary, while the noise from the dredge may be audible when working late at night, its increase to the ambient noise is too small to be significant. Furthermore, the noise of the dredge is too low to add substantially to the noise of the on-shore equipment.

At a distance of approximately 4,200 ft (1,280 m) from receptors at the Oceanside borrow site, the dredge would produce a noise level of 44.5 dBA Leq. Assuming that the receptors in the Oceanside area are also subject to an existing level of 60 dBA, the addition of 44.5 dBA results in a composite level of 60.1 dBA for an increase of just 0.1 dBA. This level of increase is too small to be notable and is well under the 3-dBA threshold and would not be significant.

Mitigation Measures: Implement MM-N-50-4.1.

Significant and Unavoidable Impacts: None.

Impact N-50-5: *For a Project Located Within an Airport Land Use Plan or, Where Such a Plan Has Not Been Adopted, Within Two Miles of a Public Airport or Public Use Airport, Would the Project Expose People Residing or Working in the Project Area to Excessive Noise Levels.*

The Project site is not located within 2 miles of any airports and would not result in significant exposure to aircraft noise.

Mitigation Measures: None.

Significant and Unavoidable Impacts: None.

Impact N-50-6: *For a Project Within the Vicinity of a Private Airstrip, Would the Project Expose People Residing or Working in the Project Area to Excessive Noise Levels.*

The proposed Project is not located in the vicinity of a private airstrip and would not be impacted by private airport operations.

Mitigation Measures: None.

Significant and Unavoidable Impacts: None.

5.8.4 Impacts Related to the No Action Alternative

The No Action Alternative would not involve any dredging or beach nourishment activity and no impacts to noise would occur from the lack of these construction activities. Under the No Action Alternative, it is likely that emergency seawalls would be constructed to protect structures. Potential maintenance activities by SCRRA may create noise associated with equipment used to maintain the railroad ballast and tracks. The amount of equipment and time needed to conduct potential maintenance activities is anticipated to be adverse, but less than significant.

5.9 Recreation

5.9.1 Significance Criteria

An impact to recreation will be considered significant if a project alternative:

- Increases the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated; and/or
- Includes recreational facilities or require the construction or expansion of recreational facilities, which might have an adverse physical effect on the environment.

5.9.2 Impacts Related to the 50 ft (15 m) Beach Width Alternative

Impact REC-50-1: *Increases the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated.*

During the beach nourishment, portions of the beach, nearshore zone, and potentially the Pier would be closed to public use. Recreational beach users would be limited to the amount of beach available to them during construction, based on the various closure periods, and may choose to visit a nearby beach instead. Given the short-term period of construction (up to four months), impacts would be considered significant, but temporary. The displacement of recreational users to the various nearby beaches would be temporary and short-term.

Long-term maintenance activities would create similar impacts as the initial construction. Therefore, physical deterioration of other recreational facilities associated with these other beaches would be less than significant.

Mitigation Measures: None

Significant and Unavoidable Impacts: None.

Impact REC-50-2: *Includes recreational facilities or requires the construction or expansion of recreational facilities, which might have an adverse physical effect on the environment.*

The beach nourishment provides for a wider beach area and greater opportunities for beach activities, enhancing the beach available for recreation users. The 50 ft Beach Width Alternative would not result in the construction or expansion of any recreational facilities that would have an adverse physical effect on the environment. Long-term maintenance activities would create similar impacts as the initial construction. The wider beach would be a benefit to beach recreation users.

Mitigation Measures: None.

Significant and Unavoidable Impacts: None.

Impact REC-50-3: *Results in a substantial degradation of the recreational experience at San Clemente Beach.*

As discussed in Section 5.3 under Impact WR-50-3, some of the sediment placed on San Clemente Beach to widen the beach to 50 ft would be carried offshore. Some of this sediment would settle on T-Street reef, a popular surfing area south of San Clemente Pier. The T-Street surfing location is within the alongshore extent of the proposed beach nourishment. The reef at T-Street is a seabed perturbation such that its elevation, shape, and orientation to incoming waves are a unique combination that tends to shoal waves to a peak with a resulting plunging “left” (from the surfer’s perspective, wave that breaks from right to left) and “right” (from the surfer’s perspective, wave that breaks from left to right), which results in a variety of waves and favorable surfing characteristics. The configuration and orientation of the reef to incoming waves create consistent surfing waves, making T-Street a popular break in the Orange County coastal area. High steepness waves result in plunging breakers, which are associated with beaches with steeper gradients. Plunging breakers descend very quickly and with substantial force; noted for a “lip,” or shoreward facing edge, at the top of the wave. With the proper set of conditions, the plunging lip can create a “tube” or barrel.” The consistent steepness of the wave coupled with the structure of the lip enables surfers to consistently reach higher speeds and perform more maneuvers.The surfing extends from the beach to about 600 ft (200 m) offshore and typically is in water depths less than 15 ft (5 m). The surfing area is closer to the beach than the actual reef location, as incoming waves require time and space to be transformed by the reef bathymetry.

- As discussed in Section 5.3.2, most of this sediment would settle in the inshore portion of the reef and would not affect the refractive abilities of the reef or the characteristics of the “take-off.” However, as the wave encounters the straightened bathymetry inshore, it may “close-out,” resulting in a shorter ride. This condition would be temporary and would lessen as the sediment moved off the reef steadily over the course of 6 years at a long-term erosion rate of 13 ft (4 m) per year. Although impacts due to the wider beach may occur, historic aerial photographs of San Clemente Beach at the Pier (Figure 5-6) indicate that the beach width in 1990 was approximately 55 ft (17 m) wide and no records have been found that indicate surfing ceased within the Project area during that time. Because the shorter rides are a temporary condition, impacts to surfing would not be significant.

The wider beach would improve the recreational experience for sunbathers, walkers/joggers, and picnickers. More beach area would be available for these activities.

Mitigation Measures: None

Significant and Unavoidable Impacts: None

Impact REC-50-4: *Results in a safety hazard to recreational beach users*

Heavy equipment working in an active public use area poses safety issues for adults and children. Children may be prone to come close to the equipment both during equipment operation on the beach and storage within staging areas.

Offshore dredge equipment has the potential to result in a hazard to boat traffic. During dredging and nourishment activities, proper advanced notice to mariners would be obtained and navigational traffic would not be allowed within the offshore borrow site area or mooring/discharge area offshore of Oceanside. It is unlikely that recreational vessels, such as kayaks, sailboats, jet-skiers, and paddleboards would use this area close to shore and close to the Pier.

A beach fill project has the potential to create public safety impacts to swimmers and waders. The two major impacts are derived from deeper water and reflected waves (Appendix D). When sand is introduced artificially into the littoral system, a beach fill can create deeper water conditions than the naturally occurring conditions (Appendix D). During construction of the beach fill, it is typical that the construction foreshore (beach) slope is steeper than the naturally occurring foreshore (beach) slope. It also is typical that the foreshore slope remains steeper than the natural condition for a period of time during the profile adjustment (equilibration) process. The newly created foreshore area, created by advancing the foreshore seaward, is now in deeper water than the previously existing natural condition. Also, during the profile equilibration process, an alongshore trough may form or the existing condition may become deeper. The swimming/wading public often perceives this trough as a “drop-off”. Recreational beach goers may have become accustomed to the shallow waters normally associated with the existing swash zone. Swimmers and waders, thus, may be unexpectedly confronted with deeper water resulting in hazardous conditions. Furthermore, deeper water in the surf zone allows larger waves to propagate than the naturally occurring shallow water condition. This increased water depth in the surf zone enables larger waves to break very close to the shore. This is commonly referred to as “shore break” or “shore pound”. The recreating public, which may have become accustomed to a mild wave condition, is suddenly confronted with a higher energy wave climate.

Reflected waves also can potentially degrade the surfing experience. Reflected waves propagating seaward can pass through normal incoming waves with no effect, or can meet incoming waves and create a condition known as destructive interference. The outbound and inbound waves meet and the resulting transfer of energy can cause the waves to pitch up in a chaotic sea state. The surfing experience could be degraded by the presence of these outbound waves as well as the resultant chaotic sea state.

In some locations nationwide, an increase in lifeguard rescue missions follow immediately after a beach fill construction project. In addition, signage would be provided to inform swimmers of potential hazards. The beach closure would prevent surfers from accessing the beach near the Pier, and the resulting wider beach would create a longer path for surfers to cross before reaching the water. In addition, the contract specifications shall require the contractor to fence/secure off areas of construction from public access, including construction staging areas and active construction areas, including the beach and nearshore zone. The effects on public safety while the beach fill Project is reaching equilibrium would be a significant, but temporary, impact.

Mitigation Measures:

MM-REC-50-4.1: Provide signs to warn swimmers, waders and surfers of potentially hazardous surf conditions. Provide extra lifeguards.

Significant and Unavoidable Impacts: None

5.9.3 Impacts Related to the 115 ft (35 m) Beach Width Alternative

Impact REC-115-1: *Increases the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated.*

Like the 50 ft Beach Width Alternative, the 115 ft Beach Width Alternative would result in recreational beachgoers being precluded from portions of the beach and ocean during beach construction. The construction period for the 115 ft Beach Width Alternative is 108 days compared to 46 days for the 50 ft Beach Width Alternative. Therefore, portions of the area around San Clemente Pier would be closed to the public for a longer period. Because portions of San Clemente Beach would still be open to the public at all times, the use of other beaches during construction of the 115 ft Alternative would not be expected to result in a significant impacts to other beaches, parks, or recreational facilities.

Mitigation Measures: None

Significant and Unavoidable Impacts: None.

Impact REC-115-2: *Includes recreational facilities or requires the construction or expansion of recreational facilities, which might have an adverse physical effect on the environment.*

The beach nourishment provides for a wider beach area and greater opportunities for beach activities, enhancing the beach available for recreation users. The 115 ft Beach Width Alternative would not result in the construction or expansion of any recreational facilities that would have an adverse physical effect on the environment. Long-term maintenance activities would create similar impacts as the initial construction. The wider beach would be a benefit to beach recreation users.

Mitigation Measures: None.

Significant and Unavoidable Impacts: None.

Impact REC-115-3: *Results in a substantial degradation of the recreational experience at San Clemente Beach.*

The impacts of the 115 ft Beach Width Alternative on the waves at T-Street reef is discussed in Section 5.3.3. Some of the sediment placed on the beach for the 115 ft Beach Width Alternative would move offshore and settle on T-Street reef. The 115 ft Beach Width Alternative could result in a sand layer of up to 6 ft (2 m) thickness on T-Street reef. This burial would have unquantifiable, but significant adverse effects to the wave breaking characteristics of the reef. The refractive abilities of the reef may be modified or lost, lessening the focusing effect of the reef and removing the point break characteristics of T-Street reef. Flattening of the slope in the reef area due to sedimentation has the potential to change the characteristic plunging point break to a quasi-spilling beach break and less desirable surfing conditions. Sedimentation in the shallow portion of the reef may result in "close-out" conditions and shorter rides. The sediment from the 115 ft Beach Width Alternative may be present on T-Street reef for up to 10 years. Because the 115 ft Beach Width Alternative has the potential to substantially modify the waves at T-Street reef and because these differences could persist for as much as 10 years, the impact on recreation is considered significant.

The much wider beach that would be created by the 115 ft Beach Width Alternative than the 50 ft Alternative would be a beneficial impact for sunbathers, walkers/joggers, and picnickers.

Mitigation Measure: Implement MM-WR-115-3.1.

Summary of Significant Unavoidable Impacts: The 115 ft Beach Width Alternative would result in substantial burial of T-street Reef and adverse modification of the wave characteristics there. The surfing experience would be degraded. The impacts may occur for about 10 years. Monitoring and documentation of impacts and the avoidance of future beach fills, would allow the wave characteristics to recover. Creation of an artificial surfing reef would replicate some of the surfing values, but an artificial surfing reef may not generate wave profiles equivalent to those at T-Street

Impact REC-115-4: *Results in a safety hazard to recreational beach users*

As described for the 50 ft Beach Width Alternative, immediately following beach construction, there may be changes in the surf zone that would result in conditions that could be hazardous to swimmers, waders, and surfers until the beach reaches equilibrium. Hazardous conditions to beachgoers would be a significant adverse impact.

Mitigation Measures: Implement MM-WR-50-4.1.

Summary of Significant Unavoidable Impacts: None

5.9.4 Impacts Related to the No Action Alternative

The No Action Alternative would not involve any dredging or beach nourishment activity. No impacts to recreation would occur from the lack of these construction activities. However, the narrowing beach profile, or potential lack of any sandy beach, would prevent recreational beach use. Under the No Action Alternative, it is likely that emergency seawalls would be constructed to protect structures. Potential maintenance activities by SCRRA may prevent use of the narrow beach because of equipment used to maintain the railroad ballast and tracks. The amount of equipment and time needed to conduct potential maintenance activities is anticipated to be less than significant.

5.10 Aesthetics

5.10.1 Significance Criteria

An impact to aesthetics will be considered significant if a project alternative:

- Has a substantial adverse effect on a scenic vista;
- Substantially damages scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a State scenic highway;
- Substantially degrades the existing visual character or quality of the site and its surroundings; and/or
- Creates a new source of substantial light or glare which would adversely affect day or nighttime views in the area.

5.10.2 Impacts Related to the 50 ft (15 m) Beach Width Alternative

Impact AES-50-1: *Has a substantial adverse effect on a scenic vista.*

The beach and Pier at the Project site at San Clemente is visible from the surrounding area, and views from the beach include the Pacific Ocean. Potential closure of the Pier and the viewing area it provides would interfere with the public enjoyment of the surrounding visual environment. Construction equipment on the beach may obstruct visual views of recreational users at ground level. The dredge equipment may also disrupt visual resources of the ocean vista. The visual enjoyment of the public would be temporarily interrupted or obstructed by the presence of the construction equipment on either a concentrated, small section of the beach or spread out along the length of the beach. The impacts to the scenic vista would be short-term and temporary, which would be less than significant. Long-term maintenance activities would create similar impacts as the initial construction. The resulting wider beach would enhance the view of the beach and result in a visual benefit.

Mitigation Measures: None.

Significant and Unavoidable Impacts: None.

Impact AES-50-2: *Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway.*

The California Department of Transportation (Caltrans) designates roadways that provide scenic views as official Scenic Highways or Corridors. A highway can be officially designated a State Scenic Highway when the local jurisdiction adopts a scenic corridor protection program, applies to Caltrans for scenic highway approval, and receives notification that the highway has been designated as an official State Scenic Highway. The Project site is not located near a designated State scenic highway. Therefore, the proposed Project would have no impact on scenic resources within a State highway.

Mitigation Measures: None.

Significant and Unavoidable Impacts: None.

Impact AES-50-3: *Substantially degrade the existing visual character or quality of the site and its surroundings*

The proposed Project would result in a wider beach, which would be a minor alteration of the visual character of the existing environment. During the construction phase, the visual character of the site would be affected by construction activities and the presence of construction equipment and materials; however, the construction phase is temporary, and as such, would not result in permanent adverse effects to the visual character of the site. The resulting wider beach would enhance the view of the beach and result in a visual benefit. Long-term maintenance activities would create similar impacts as the initial construction. Therefore, the Project would not substantially degrade the existing visual quality of the surrounding area, and impacts would be less than significant.

Mitigation Measures: None.

Significant and Unavoidable Impacts: None.

Impact AES-50-4: *Create a new source of substantial light or glare, which would adversely affect day or nighttime views in the area.*

No light and glare impacts would occur as a result of the beach nourishment because no lighting or new source of glare is proposed. The dredge would potentially use lights during nighttime dredging activities; however, the dredging activities are short-term and temporary, if used, and would not create a new source of substantial light or glare that would impact visual resources. Long-term maintenance activities would create similar impacts as the initial construction. Therefore, the proposed Project would have less than significant impacts on day or nighttime views in the area.

Mitigation Measures: None.

Significant and Unavoidable Impacts: None.

5.10.3 Impacts Related to the 115 ft (35 m) Beach Width Alternative

Impact AES-115-1: *Has a substantial adverse effect on a scenic vista.*

As with the 50 ft Beach Width Alternative, potential closure of the Pier and the viewing area it provides would interfere with the public enjoyment of the surrounding visual environment. Construction equipment on the beach may obstruct visual views of recreational users at ground level. The dredge equipment may also disrupt visual resources of the ocean vista. The visual enjoyment of the public would be temporarily interrupted or obstructed by the presence of the construction equipment on either a concentrated, small section of the beach or spread out along the length of the beach. This temporary impact would be of a longer duration than with the 50 ft Beach Width Alternative. However, the impacts to the scenic vista would be short-term and temporary, which would be less than significant. Long-term maintenance activities would create similar impacts as the initial construction. These long-term maintenance activities would occur less frequently than with the 50 ft Beach Width Alternative. The resulting wider beach would enhance the view of the beach and result in a visual benefit. This benefit would be potentially greater with this alternative, due to greater width of the beach.

Mitigation Measures: None.

Significant and Unavoidable Impacts: None.

Impact AES-115-2: *Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway.*

As with the 50 ft Beach Width Alternative, the 115 ft Beach Width Alternative is not located near a designated State scenic highway. Therefore, this Alternative would have no impact on scenic resources within a State highway, same as the proposed action.

Mitigation Measures: None.

Significant and Unavoidable Impacts: None.

Impact AES-115-3: *Substantially degrade the existing visual character or quality of the site and its surroundings*

The 115 ft Beach Width Alternative would result in a wider beach, which would be a minor alteration of the visual character of the existing environment. During the construction phase, the visual character of the site would be affected by construction activities and the presence of construction equipment and materials. This temporary impact would be of a longer duration than with the 50 ft Beach Width Alternative. However, the construction phase is temporary, and as such, would not result in permanent adverse effects to the visual character of the site. As with the 50 ft Beach Width Alternative, the resulting wider beach would enhance the view of the beach and result in a visual benefit. This benefit would be potentially greater with this Alternative, due to greater width of the beach. Long-term maintenance activities would create similar impacts as the initial construction. These long-term maintenance activities would occur less frequently than with the 50 ft Beach Width Alternative. Similar to the the 50 ft Beach Width Alternative, this Alternative would not substantially degrade the existing visual quality of the surrounding area, and impacts would be less than significant.

Mitigation Measures: None.

Significant and Unavoidable Impacts: None.

Impact AES-115-4: *Create a new source of substantial light or glare, which would adversely affect day or nighttime views in the area.*

As with the 50 ft Beach Width Alternative, no light and glare impacts would occur as a result of the 115 ft Beach Width Alternative because no lighting or new source of glare is proposed. The dredge would potentially use lights during nighttime dredging activities; however, the dredging activities are short-term and temporary, if used, and would not create a new source of substantial light or glare that would impact visual resources. Long-term maintenance activities would create similar impacts as the initial construction. Similar to the 50 ft Beach Width Alternative, the 115 ft Beach Width Alternative would have less than significant impacts on day or nighttime views in the area.

Mitigation Measures: None.

Significant and Unavoidable Impacts: None.

5.10.4 Impacts Related to the No Action Alternative

The No Action Alternative would not involve any dredging or beach nourishment activity. No impacts to aesthetics would occur from the lack of these construction activities. However, the narrowing beach profile, or potential lack of any sandy beach, would prevent visual enjoyment of the sandy beach vista. Under the No Action Alternative, it is likely that emergency seawalls would be constructed to protect structures. Potential maintenance activities by SCRRA may include views of additional rocks/rip-rap used to maintain the railroad ballast and tracks. The change in the visual environment due to potential maintenance activities is anticipated to be less than significant.

5.11 Public Health and Safety

5.11.1 Significance Criteria

An impact to public health and safety will be considered significant if a project alternative would result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:

- Fire protection;
- Police protection;
- Schools;
- Parks; and/or
- Other public facilities.

5.11.2 Impacts Related to the 50 ft (15 m) Beach Width Alternative

Impact PHS-50-1: *Substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for fire protection, police protection, schools, parks, and/or other public facilities.*

The proposed Project would not provide new or physically altered government facilities that would impact fire protection, police protection, schools, parks, and/or public facilities. However, as stated in the recreation analysis, the 50 ft Beach Width Alternative may potentially expose the public to potential safety hazards. Heavy equipment working in an active public use area poses safety issues for adults and children. Children may be prone to come close to the equipment both during equipment operation on the beach and storage within staging areas. In addition, offshore dredge equipment has the potential to result in a hazard to boat traffic. The dredge would be equipped with markings and lightings in accordance with the U.S. Coast Guard regulations. The location and schedule of the dredge would be published in the U.S. Coast Guard Local Notice to Mariners. The dredge would travel at very low speeds (approximately 1.5 knots) during dredging operations. The travel speed during transport would be approximately 5 knots. During dredging and nourishment activities, proper advanced notice to mariners would be obtained, and navigational traffic would not be allowed within the offshore borrow site area or mooring/discharge area offshore of Oceanside. It is unlikely that recreational vessels, such as kayaks, sailboats, jet-skiers, and paddleboards would use this area close to shore and close to the Pier; however, signage would be provided to inform these recreational users of potential hazards. In addition, signage would be provided to inform swimmers of potential hazards. Long-term maintenance activities would create similar impacts as the initial construction. The proposed Project would be temporary and short-term, and impacts would be less than significant.

Mitigation Measures: Implement MM-WR 5.9.2-4.1.

Significant and Unavoidable Impacts: None.

5.11.3 Impacts Related to the 115 ft (35 m) Beach Width Alternative

Impact PHS-115-1: *Substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for fire protection, police protection, schools, parks, and/or other public facilities.*

The same potential, temporary, safety hazards to the public would occur during the construction of the 115 ft Beach Width Alternative as with the 50 ft Beach Width Alternative. These temporary impacts would be of a longer duration than with the proposed action. Long-term maintenance activities would create similar impacts as the initial construction. The long-term maintenance activities associated with this alternative would occur less frequently than with the 50 ft Beach width alternative. Similar to the proposed action, the 115 ft Beach Width Alternative would be temporary and short-term, and impacts would be less than significant.

Mitigation Measures: Implement MM-WR-50-4.1.

Significant and Unavoidable Impacts: None.

5.11.4 Impacts Related to the No Action Alternative

Under the No Action Alternative, it is likely that emergency seawalls would be constructed to protect structures. As a result of the continued beach erosion throughout San Clemente Beach, a number of public safety concerns have surfaced. Public restrooms are located on the beach, seaward (west) of the railroad tracks. Continued damages to these facilities may require their relocation to the landward side (east) of the railroad tracks. This would require pedestrians to continually cross the tracks to use the restrooms. A public safety issue is created because many will cross the railroad tracks in an unsafe manner. Furthermore, the loss of sand within the active nearshore profile has exposed underlying hard substrate and man-made structures. A public safety issue is created because the exposed material, in many cases, remains underwater and hidden from sight, posing a number of potential dangers to unwary recreational swimmers. The City of San Clemente is liable for accidents resulting from exposed man-made structures. The economic impact associated with the City's liability has the potential to be substantial.

5.12 Socioeconomics/Environmental Justice

5.12.1 Significance Criteria

An impact to socioeconomics/environmental justice will be considered significant if a project alternative:

- Impacts a sector of the economy, productivity, competition, prices, or jobs;
- Impacts the welfare of minority or low-income populations; and/or
- Impacts the fiscal and physical ability of the local governmental agencies to meet the needs of the public following the project-related changes in the local population.

5.12.2 Impacts Related to the 50 ft (15 m) Beach Width Alternative

Impact SEJ-50-1: *Impacts a sector of the economy, productivity, competition, prices, or jobs.*

Maintaining the beach will maintain or increase tourism according to King and Symes (2003). The socioeconomic effects of beach replenishment at San Clemente would be considered a beneficial impact. The wider sandy beach would provide greater recreation opportunity, opportunity for public access, enhance tourism in the region, and increase local recreation revenue due to increased numbers of visitors to the beaches. In addition, the creation of construction jobs associated with the shoreline improvements would be a beneficial impact to the study area.

No significant direct population, employment, income, or housing impacts are expected to result from the offshore construction activities, either on a local basis or regional basis. Long-term maintenance activities would create similar impacts as the initial construction. Offshore construction operations (i.e., vessel traffic and dredging) may potentially conflict with local commercial fishing operations during winter months, including gear/equipment damage and the disruption of fishing locations. Thirty days prior to the start of construction, the local commercial fishermen’s association shall be provided with written notification of the intended start date of on shore construction, offshore construction, maps of Project-related vessel transportation routes, and its duration. Noticing shall include a point of contact throughout the entire construction phase to respond to concerns regarding interference and/or other issues associated with local commercial fishing operations. Impacts would be considered less than significant.

Mitigation Measures: None

Significant and Unavoidable Impacts: None.

Impact SEJ-50-2: *Impacts the welfare of minority or low-income populations.*

The construction and long-term maintenance of the proposed Project would not be expected to have any negative effect on minority or low-income populations. In addition, the expansion of the beach width would be a public improvement that would benefit residences and businesses alike.

Mitigation Measures: None.

Significant and Unavoidable Impacts: None.

Impact SEJ-50-3: *Impacts the fiscal and physical ability of the local governmental agencies to meet the needs of the public following the project-related changes in the local population.*

No significant direct population, employment, income, or housing impacts are expected to result from the proposed action, either on a local basis or regional basis. Although the shoreline protection improvements may increase opportunities for recreation, the Project alone would not increase the need for housing in the area, nor would it contribute to an environmental justice concern. The personnel required for the operation activities related to the proposed action are not expected to create population immigration, either directly or indirectly, into the area. Long-term maintenance activities would create similar impacts as the initial construction. Therefore, the proposed Project would not alter regional or local population projections and would have no significant impacts related to population immigration, such as a decrease in housing availability or an increase in the number of jobs in the area.

Mitigation Measures: None.

Significant and Unavoidable Impacts: None.

5.12.3 Impacts Related to the 115 ft (35 m) Beach Width Alternative

Impact SEJ-115-1: *Impacts a sector of the economy, productivity, competition, prices, or jobs.*

Maintaining the beach will maintain or increase tourism according to King and Symes (2003). As with the proposed action, the socioeconomic effects of beach replenishment at San Clemente would be considered a beneficial impact. The wider sandy beach would provide greater recreation opportunity, opportunity for public access, enhance tourism in the region, and increase local recreation revenue due to increased numbers of visitors to the beaches. This benefit would be potentially greater with this alternative, due to greater width of the beach. In addition, the creation of construction jobs associated with the shoreline improvements would be a beneficial impact to the study area. The length of the construction effort would be longer with this Alternative than with the proposed action. No significant direct population, employment, income, or housing impacts are expected to result from the offshore construction activities, either on a local basis or regional basis. Long-term maintenance activities would create similar impacts as the initial construction but would occur less frequently than with the proposed action. Offshore construction operations (i.e., vessel traffic and dredging) may potentially conflict with local commercial fishing operations during winter months, including gear/equipment damage and the disruption of fishing locations. Thirty days prior to the start of construction, the local commercial fishermen's association shall be provided with written notification of the intended start date of on shore construction, offshore construction, maps of Project-related vessel transportation routes, and its duration. Noticing shall include a point of contact throughout the entire construction phase to respond to concerns regarding interference and/or other issues associated with local commercial fishing operations. Impacts would be considered less than significant, similar to the proposed action.

Mitigation Measures: None

Significant and Unavoidable Impacts: None.

Impact SEJ-115-2: *Impacts the welfare of minority or low-income populations.*

Similar to the proposed action, the construction and long-term maintenance of the 115 ft Beach Width Alternative would not be expected to have any negative effect on minority or low-income populations. In addition, the expansion of the beach width would be a public improvement that would benefit residences and businesses alike.

Mitigation Measures: None.

Significant and Unavoidable Impacts: None.

Impact SEJ-115-3: *Impacts the fiscal and physical ability of the local governmental agencies to meet the needs of the public following the project-related changes in the local population.*

As with the proposed action, no significant direct population, employment, income, or housing impacts are expected to result from the 115 ft Beach Width Alternative, either on a local basis or regional basis. Although the shoreline protection improvements may increase opportunities for recreation, this alternative alone would not increase the need for housing in the area, nor would it contribute to an environmental justice concern. The personnel required for the operation activities related to this alternative are not expected to create population immigration, either directly or indirectly, into the area. Long-term maintenance activities would create similar impacts as the initial construction. Therefore, similar to the proposed action, the 115 ft Beach Width Alternative would not alter regional or local population projections and would have no significant impacts related to population immigration, such as a decrease in housing availability or an increase in the number of jobs in the area.

Mitigation Measures: None.

Significant and Unavoidable Impacts: None.

5.12.4 Impacts Related to the No Action Alternative

No population immigration-related socioeconomic impacts (e.g., impacts on housing or employment) are expected under the No Action Alternative. However, beaches would continue to erode in the future, which may increase the potential for some loss of recreational uses and access to beaches. Also, it is likely that emergency seawalls would be constructed to protect structures. There may be a net loss in economy due to the lack of beach visitors, which would be a potentially significant impact.

6.0 CUMULATIVE IMPACT ANALYSIS

6.1 Description of Cumulative Projects

6.1.1 Dana Point Harbor Maintenance Dredging

Dana Point Harbor is located in Capistrano Bay on the southern Orange County coastline, approximately half way between Los Angeles and San Diego. The main elements of the project include (1) maintenance dredging of the navigational channels, anchorages, turning basins, and areas under docks affected by sediment build up, (2) disposal of dredged material, and (3) reuse of suitable clean material to enhance the sediment quality of the interior harbor beach and nourishment for the County Park portion of Capistrano Beach. The design project depths in the dredging area vary from -8 ft (-2 m) MLLW at the Boat Launch Ramp and Youth and Group Docks to -15 ft (5 m) MLLW in the East Anchorage and Main Channel, and 1 foot (0.3 m) of removal of the top layer of fine sand at "Baby Beach." The project is anticipated to take up to four months to complete.

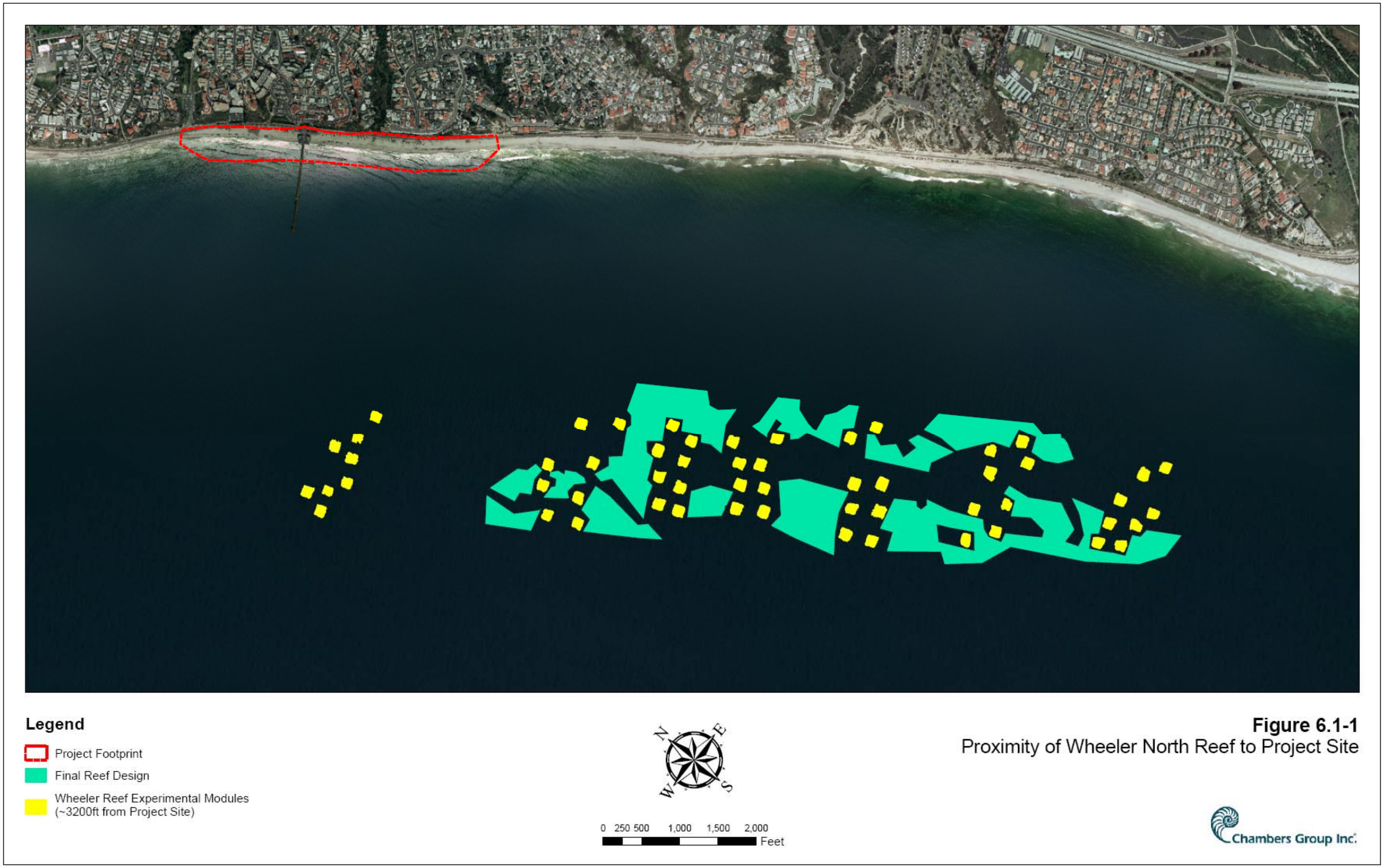
The total quantity of dredge material is estimated to be up to 155,700 cy (119,041 m^3). Up to 63,200 cy (48,319 m^3) will be disposed at an EPA approved site (LA-3), located approximately 14 mi (23 km) from the entrance of Dana Point Harbor. Up to 9,500 cy (7,263 m^3) of clean coarse sand material will be used to replace the top layer of fine sand material removed from "Baby Beach," and up to 83,000 cy (63,458 m^3) of clean coarse sand material is anticipated to be used to nourish San Juan Capistrano County Beach, placed either directly on the dry beach or placed in the nearshore littoral zone.

Material will be removed using clamshell dredge equipment, loaded onto bottom-dump scows, and transported to the LA-3 ocean disposal site offshore of Capistrano Beach, or to Baby Beach. For Capistrano or Baby Beach, tugboats would then position the scow for bottom dumping into the nearshore/surfzone area. The alternative method would be to remove material using a cutter/suction head dredge and hydraulically pump via pipeline to Capistrano or Baby Beach, potentially with the assistance of a booster pump. The material would be placed into fill dikes on the beach and final grading would be performed using bulldozers.

6.1.2 San Onofre Nuclear Generating Station Kelp Reef Project

The Wheeler J. North Reef, or the San Onofre Nuclear Generating Station (SONGS) kelp mitigation reef, is located offshore of San Clemente, California, in water depths of approximately 38 to 49 ft (11.5 to 15 m). The entire kelp reef project area is an 862-acre (349 hectares) leased parcel located 0.6 mi (1 km) offshore of the San Clemente beach between the San Clemente Pier and San Mateo Point. The southern end of the reef is about two miles north of SONGS and just north of San Mateo Point and extends north three miles to the City of San Clemente Pier. The kelp reef project is approximately 3,200 ft offshore from the seaward boundary of the Project footprint (Figure 6-1).

Figure 6-1 Proximity of Wheeler North Reef to Project Site



The kelp reef was proposed to be constructed in two phases. Phase 1, constructed in September 1999, covers 22.4 ac (9.1 ha) of sea floor. This was the experimental stage and 56 modules were designed to test the viability of using different types and densities of material (e.g., quarry rock versus concrete rubble). Each module has a two-dimensional footprint of 132 ft x 132 ft (40 m x 40 m). The modules are grouped into seven clusters or blocks in the leased area.

The Phase 2 reef was begun in June 2008 and is a 127.6-ac, (51.6 ha) low profile (< 3 ft [1 m]), single-layer reef constructed of quarry rock, which will be distributed on the benthos in quantities similar to those of the lowest substrate density (i.e., 42% bottom coverage) used for the Phase 1 experimental reef. The design of the Phase 2 mitigation reef consists of 11 polygons, varying in area from 2.4 to 37.5 ac (1 to 15.2 ha). The reef construction duration was estimated at 100 working days.

The final reef design locates the Phase 2 mitigation reef in close proximity to the San Mateo Kelp Bed, avoids hard substrate areas, maintains the integrity of the Phase 1 reef modules, provides for navigation channels, and avoids areas of historical kelp growth as well as areas of special interest to local fisheries.

6.1.3 Railroad Operations

Commuter rail stops at San Clemente Pier include two daily Amtrak trains between late April and October and weekend and holiday service year round, as well as two Metrolink weekend train stops. Presently, rail service safety requires occasional preventative maintenance in the form of monitoring the rail bed for erosion and utilizing riprap to prevent erosion. Due to chronic beach erosion, the railroad corridor between the bluff and the beach is threatened by undermining. In response, OCTA has been randomly placing riprap stones along the most critical segment between North Beach and the Marine Safety Building to reduce wave impacts on the railroad tracks. The cumulative impact of stone placement over the years has resulted in a reduction of lateral beach access.

6.2 Analysis of Cumulative Impacts

6.2.1 Air Quality and Meteorology

Construction of the related projects would be short-term and depending on the extent of construction, could have effects similar to or greater than that of the proposed Project. Even with the prescribed mitigation, the proposed action is anticipated to exceed the significance threshold limitations for NO_x and $PM_{2.5}$. In accordance with SCAQMD methodology, projects that exceed the daily threshold values and cannot be mitigated to less than the SCAQMD thresholds add significantly to the cumulative impact. As such, the beach fill Project also is considered as significant at the cumulative level.

With respect to cumulative emissions concentrations and their potential impact on sensitive receptors, the localized impact analysis demonstrates that all emissions levels would remain within their respective threshold values and the beach fill Project would not result in emissions in excess of the Ambient Air Quality Standards. As such, the Project does not add to a cumulative violation of the standards.

6.2.2 Geology and Topography

The placement of approximately 117,800 cy (90,117 m^3) of sediment from the dredging of Dana Point Harbor on the beach or into the nearshore zone at Capistrano Beach would add sediment to the Oceanside littoral cell. Capistrano Beach is approximately 4 mi (6.4 km) upcoast from San Clemente Pier. Some of the Dana Point Harbor sediment would be expected to be moved gradually downcoast by littoral processes and would act cumulatively with either action alternative to widen the beach at San Clemente. The Dana Point Harbor Dredging project would act cumulatively with the Project to offset the impacts of coastal erosion.

Some of the sediment from the Dana Point Dredging may be deposited offshore in the vicinity of shallow reefs off San Clemente where it would act cumulatively with either action alternative to increase the sand accumulation in and around the reefs. However, the monitoring of the large SANDAG beach fill at Oceanside Beach indicates that little sediment from the project would be expected to accumulate in the nearshore area beyond naturally occurring variations. The incremental addition of a percentage of a smaller volume of sand discharged upcoast would not be expected to significantly add to sand build-up on reefs. The cumulative impacts of the Dana Point Dredging project and the proposed action would not result in a substantial adverse modification of nearshore topography.

Sediment from the proposed Project and the Dana Point Dredging project would not be expected to affect Wheeler J. North Reef, which is approximately 3,200 ft offshore, beyond the area of the final proposed Project beach profile.

6.2.3 Water Resources

The discharge of sediment from the Dana Point Harbor Dredging project to Capistrano Beach will act cumulatively with the proposed action to add sediment to the Oceanside littoral cell. The proposed action will act in a cumulative fashion with the Dana Point Harbor Dredging project to offset erosion on beaches in south Orange County and northern San Diego County. Most of the sediment from these projects is expected to accumulate on downcoast beaches or in the very shallow nearshore area between the foreshore and the bar. Beach fill would be deposited onshore and would be expected to move offshore in a manner that would not alter the wave characteristics of popular surf breaks, such as T-Street, and would not be expected to affect Wheeler J. North Reef approximately 3,200 ft seaward of the proposed Project footprint.

Like the proposed action, the Dana Point Harbor Dredging project would discharge sediments to the beach or nearshore zone and thus may cause a temporary localized increase in turbidity in nearshore waters. The discharge of sediments from Dana Point Harbor dredging would occur at Capistrano Beach approximately 4 mi (6.4 km) from the proposed action. Even if the projects occurred at the same time, the turbidity plumes would be sufficiently distant that they would not interact with each other. Monitoring of turbidity and adjustment of operations to avoid extensive turbidity plumes would mitigate any cumulative impacts of turbidity from these projects.

6.2.4 Biological Resources

Like the proposed action, the Dana Point Harbor Dredging project would generate temporary turbidity that could interfere with the foraging activities of visual predators including the State and Federal endangered California least tern and State and Federal endangered California brown pelican. Theoretically, the turbidity from both projects could have a cumulative impact on these sensitive bird species if both projects generated extensive turbidity at the same time, thus reducing foraging potential for least terns and brown pelicans over a greater area than would occur from either project alone. Neither the Dana Point Harbor project nor San Clemente Pier is near a least tern or a brown pelican nesting site. The Dana Point Harbor project would not contribute to cumulative effects of turbidity on nesting least terns. The Dana Point Harbor project could contribute to cumulative effects of turbidity on foraging least terns and brown pelicans away from their breeding areas, but turbidity plumes from these projects would be limited in time and area.

Neither the Project action nor the Dana Point Harbor project is near a nesting colony of the federal threatened western snowy plover. Therefore, the projects will have no cumulative effects on nesting plovers.

Both the proposed Project action and the Dana Point Dredging project would avoid placing sediment directly on sensitive biological habitats. The placement of pipelines to pump sand to the beach has the potential to damage sensitive marine resources if the pipeline or anchors are placed on rocky habitat. Because the projects are in different locations, any impacts of pipeline placement would affect different areas and would not act cumulatively to impact the same area. The impacts of pipeline and anchor placement could be mitigated to not significant by locating pipelines in areas that would minimize impacts on sensitive habitats based on a biological survey of the area.

There is potential that movement of discharged sediments could result in accumulation around sensitive biological habitats, including rocky intertidal, surfgrass, offshore reefs, and kelp beds. Because sand from the Dana Point Dredging project eventually will be transported downcoast towards San Clemente, there is some potential that sediment from both projects could accumulate at the same reefs. If sensitive habitat were buried for an extended period, impacts could be significant. However, the monitoring of the large SANDAG beach fill at Oceanside Beach indicates that little sediment from the proposed action would be expected to accumulate in the nearshore area beyond naturally occurring variations. The incremental addition of a percentage of a smaller volume of sand discharged upcoast from the dredging of Dana Point Harbor would not be expected to significantly add to sand build-up on reefs. Of sensitive resources in the Project area, surfgrass is most likely to be affected by sand accumulation because it grows in shallow nearshore areas where sand is most likely to be deposited. Surfgrass is adapted to periodic sand movement, and the analysis in Section 5.4.2 indicates that sediment from the proposed action would not be deposited in sufficient volume and for a long enough period to harm surfgrass. The incremental addition of a portion of a smaller amount of sediment discharged over 4 mi (6 km) upcoast is unlikely to add sufficient sediment to adversely affect surfgrass. Sediment from the proposed action and the Dana Point Dredging Project would not be expected to affect Wheeler J. North Reef, which is approximately 3,200 ft offshore, beyond the area where beach fill sand would be transported.

6.2.5 Cultural Resources

The proposed Project would not be expected to contribute to the loss of cultural resources. The Dana Point Harbor and Wheeler North Reef projects also would not impact cultural resources. There would be no cumulative effect on cultural resources.

6.2.6 Ground and Vessel Transportation

The Dana Point Harbor project proposes limited, if any, trucking of materials for disposal. The proposed Project does not propose any trucking of materials. If both projects were to occur simultaneously and dredging equipment for both projects were active at the same time, there would be an increase in the number of vessels in the Project areas. However, the dredge equipment for the Dana Point Harbor project would be separate from the dredging efforts for the proposed Project at San Clemente, which would originate out of Oceanside Harbor. The dredges for both projects would not be expected to present a navigation hazard for fishing or recreational boaters either in the harbors or offshore, as these vessels near the harbors often operate in the presence of other vessels and obstacles with little incident. The proposed Project would create cumulative impacts to vessel traffic that would be less than significant.

The proposed Project would occur at least two years after the construction of the Wheeler North Reef project and, therefore, would not have any cumulative impacts to transportation in conjunction with that project.

6.2.7 Land Use and Policy

Construction and future periodic beach nourishment for the proposed Project would occur as necessary and would have no adverse impact to land use or any policies or plans. As such, the proposed Project would not contribute to any cumulative land use impacts in conjunction with either the Dana Point Harbor or Wheeler North Reef projects.

6.2.8 Noise

Because the cumulative projects are spaced apart both in time and location, the stationary noise from both construction and operations is not measurably additive and any cumulative impact would stem from the incremental addition of traffic associated with the various projects. The beach fill Project includes no operational traffic and contributes only 10 vehicles to the roads through the Project area during construction. Any cumulative impact would be less than significant.

6.2.9 Recreation

There is the possibility that the initial beach fill or future maintenance nourishment activity may occur simultaneously along with the Dana Point Harbor project. There is a potential for dredge equipment for the proposed Project to be present at the same time as the Dana Point Harbor project. The cumulative presence of dredging equipment may interrupt recreational activity in the Project vicinity for the duration of construction. Assuming beach use is low during the construction period, cumulative impacts may be potentially significant, but temporary and short-term.

The proposed Project would occur at least two years after the construction of the Wheeler North Reef project and, therefore, would not have any cumulative impacts to recreation in conjunction with that project.

6.2.10 Aesthetics

The impacts to aesthetics from the proposed Project and Dana Point Harbor project both are temporary and construction related and will not result in the permanent obstruction of any scenic vistas or open views, nor will the Project create an aesthetically offensive viewshed. If both projects were to occur at the same time, there would be multiple dredges within 5 miles of each other, in addition to the associated tug boats, barge, and crew boats during construction. The temporary impacts of the construction equipment are temporary and less than significant.

The proposed Project would occur at least two years after the construction of the Wheeler North Reef project; because impacts to aesthetics for the proposed Project are construction related only, the proposed Project would not have any cumulative impacts to aesthetics in conjunction with the Wheeler North Reef project.

6.2.11 Public Health and Safety

The proposed Project and Dana Point Harbor Dredging projects are both temporary and construction related only; they will not impact the capacities of public services or utilities. If both projects were to occur at the same time, there may be a potentially significant impact on the safety of recreation users on the beach and in the water. For both projects, the dredge would be equipped with markings and lightings in accordance with the U.S. Coast Guard regulations. The location and schedule of the dredge would be published in the U.S. Coast Guard Local Notice to Mariners. The dredge would travel at very low speeds (approximately 1.5 knots) during dredging operations. The travel speed during transport is approximately 5 knots. The dredge would not be expected to present a navigation hazard for fishing or recreational boaters either in the harbor or offshore of the project sites, as these vessels often operate in the presence of other vessels and obstacles with little incident. Even if both the proposed Project and Dana Point Harbor Dredging project were to occur at the same time, implementation of mitigation measures for each project would create cumulative impacts that would be temporary and short-term and would be less than significant.

The Wheeler North Reef project has been constructed; because impacts to public health and safety for the proposed Project are construction related only, the proposed Project would not have any cumulative impacts to public health and safety in conjunction with the Wheeler North Reef project.

6.2.12 Socioeconomics/Environmental Justice

The Dana Point Harbor Dredging project would not have any impacts on socioeconomics/environmental justice; therefore, no cumulative impacts would result in conjunction with the proposed Project. The proposed Project would occur at least two years after the construction of the Wheeler North Reef project; because impacts to socioeconomics/environmental justice for the proposed Project are construction related only, the proposed Project would not have any cumulative impacts to socioeconomics/environmental justice in conjunction with the Wheeler North Reef project.

7.0 ENVIRONMENTAL COMMITMENTS

The following table lists the actions committed to be undertaken by the USACE for the proposed action to ensure environmental impacts are reduced to the extent possible. These actions may be part of design of the Project as may be best management practices or specific features to reduce environmental impacts; there may be monitoring activities to alert the USACE and the contractor to potential environmental impacts; and there may be mitigation measures to compensate for actual impacts to the environment.

Table 7-1 Summary of design features and monitoring commitments

Design Features	Purpose	Timing	Implementation Responsibility
Air quality			
Use of BACTs and Contingency Measures for construction activities	To reduce air emissions	During all construction activities	Construction contractor
Construction equipment will be properly maintained and tuned	To reduce air emissions	During all construction activities	Construction contractor
Maintain at least a 12 percent saturation level of the sand	To reduce air emissions	During beach fill activities	Construction contractor
Prohibit truck idling in excess of five minutes	To reduce air emissions	During all construction activities	Construction contractor
Where feasible, use aqueous or emulsified diesel fuel for construction equipment.	To reduce air emissions	During all construction activities	Construction contractor
Where feasible, use diesel oxidation catalytic converter	To reduce air emissions	During all construction activities	Construction contractor
Where feasible, require the use of newer, lower-emitting trucks to transport construction workers as well as equipment and material to and from construction sites	To reduce air emissions	During all construction activities	Construction contractor
Water Quality, Sediments, Oceanography			
Construct “L”-shaped berms	Anchor sand placement operations and reduce nearshore turbidity	During beach fill	Construction contractor

Table 7-1 Summary of design features and monitoring commitments (continued)

Design Features	Purpose	Timing	Implementation Responsibility
Monitor turbidity	To reduce impacts related to turbidity	During dredging and beach fill activities	Construction contractor
Prepare SWPPP and OSPRP	Ensure minimal contamination from fuel leaks, if any	During all construction activities	Construction contractor
Biological Resources			
An underwater survey for kelp and surfgrass shall be conducted by marine biologists prior to the initiation of beach fill activities. Based on the survey, a mooring location and a pipeline route shall be selected that minimizes contact with surfgrass and kelp habitat. If kelp and surfgrass cannot be avoided completely, immediately following beach fill activities, another survey of the mooring and pipeline areas shall be conducted to determine whether kelp and surfgrass were damaged. If substantial damage to surfgrass or kelp occurs, an additional survey shall be conducted six months after the beach fill to determine if kelp and surfgrass have recovered. If substantial damage to kelp and eelgrass is still observed, restoration of habitat shall be implemented in consultation with the resource agencies.	Mooring Location and pipe placement to ensure avoidance and minimization to marine resources	During dredging and beach fill activities	USACE qualified marine ecologist or his/her designated marine ecologist.

Table 7-1 Summary of design features and monitoring commitments (continued)

Cultural Resources			
Prior to construction, offshore borrow areas 1 and 2 will be subjected to an underwater remote sensing survey in order to determine if submerged cultural resources are present within these areas.	Avoid potentially undisturbed, submerged cultural resources.	Prior to dredging activities	USACE qualified archaeologist or his/her designated archaeologist
Noise			
On-shore construction activities must be limited to less than 9 hours per day.	Minimize noise emissions	During beach nourishment/notch fill	Construction contractor
Recreation			
The contract specifications shall require the contractor to fence/secure off areas of construction from public access, including construction staging areas and active construction areas, including the beach and nearshore zone.	Avoid safety hazards to recreation-goers	During beach nourishment	Construction contractor

Table 7-1 Summary of design features and monitoring commitments (continued)

Design Features	Purpose	Timing	Implementation Responsibility
Public safety			
The dredge would be equipped with markings and lightings in accordance with the U.S. Coast Guard regulations. The location and schedule of the dredge would be published in the U.S. Coast Guard Local Notice to Mariners. The dredge would travel at very low speeds (approximately 1.5 knots) during dredging operations. The travel speed during transport would be approximately 5 knots. During dredging and nourishment activities, proper advanced notice to mariners would be obtained, and navigational traffic would not be allowed within the offshore borrow site area or mooring/discharge area offshore of Oceanside.	Warn boaters/ fishermen of dredging activities to ensure avoidance	Before and during dredging activities and beach nourishment	USACE resident engineer
Socioeconomics			
The local commercial fishermen's association shall be provided with written notification of the intended start date of on shore construction, offshore construction, maps of project-related vessel transportation routes, and its duration. Noticing shall include a point of contact throughout the entire construction phase to respond to concerns regarding interference and/or other issues associated with local commercial fishing operations.	Avoid gear conflicts and provide for compensation if loss occurs	Thirty days prior to the start of construction	Coast Guard (via construction contractor) and USACE
Monitoring Commitments			
Monitor turbidity levels	To avoid turbidity impacts to fish and aquatic species	During dredging operations and beach fill activities	Construction Contractor

Table 7-1 Summary of design features and monitoring commitments (continued)

Design Features	Purpose	Timing	Implementation Responsibility
Any earthmoving associated with this Project that will involve previously undisturbed soil will be monitored by a qualified archeologist who meets the Secretary of Interior's Standards for an Archeologist (see 36 CFR Part 61). If a previously unidentified cultural resource (i.e., property) that may be eligible for the NRHP is discovered, all earthmoving activities in the vicinity of the discovery shall be diverted until the USACE complies with 36 CFR § 800.13(a)(2).	Avoid any potentially undisturbed cultural resources.	During beach fill activities	USACE qualified archaeologist or his/her designated archaeologist

8.0 OTHER NEPA/CEQA REQUIRED ANALYSES

8.1 Effects Found Not to be Significant

Issues that were found not to be significant for the proposed Project included land use and policy. Issues that were found to be less than significant without the need for mitigation measures were geology and topography, noise, transportation, recreation, aesthetics, and public health and safety. The construction and long-term maintenance of the proposed Project would not have a significant effect on these elements and the analyses of these issues are detailed in the environmental consequences section.

8.2 Unavoidable Significant Impacts

The environmental impacts of the proposed Project are described in the environmental consequences section of this Final EIS/EIR. The proposed Project presents one impact that may be significant and cannot be reduced to less than significant levels through the application of feasible mitigation measures are summarized below. A complete description of this impact is presented in the environmental consequences section.

8.3 Irreversible and Irretrievable Commitment of Resources

Section 15126(c) of the CEQA Guidelines requires an EIR to address any significant irreversible environmental changes and irretrievable commitment of resources that may occur as a result of alternative implementation. Resources which are irreversibly or irretrievably committed to a project are those that are typically used on a long-term or permanent basis; however, some are considered short-term resources that cannot be recovered and are thus considered irretrievable. These resources may include the use of non-renewable resources, such as fuel, wood, or other natural or cultural resources. Human labor also is considered a nonretrievable resource because labor used for the proposed action would not be used for other purposes. The unavoidable destruction of natural resources which limit the range of potential uses of that particular environment would also be considered an irreversible or irretrievable commitment of resources.

The proposed Project would result in the placement of approximately 251,000 cy (192,000 m^3) of dredged beach-compatible fill material along a 3,412 ft long and 50 ft wide beach adjacent to the San Clemente Pier. The Project would nourish the eroded existing beach, which would provide recreational opportunities not only for residents, but also contribute to the regional tourist industry. The proposed action would result in the consumptive use of nonrenewable energy sources and labor required to operate dredges, trucks, pumping equipment, and grading equipment. These commitments of resources could have otherwise been applied to projects other than the proposed action. However, the proposed Project would not result in the use of a substantial amount of resources. Additionally, no natural resources would be permanently destroyed and beach replenishment would be considered beneficial to the region.

8.4 Growth Inducing Impacts

Under CEQA Guidelines Section 15126.2(d), an EIR must discuss the ways in which the proposed action and alternatives could foster economic or population growth or the construction of additional housing, either directly or indirectly, in the area of population growth or the construction of additional housing, either directly or indirectly, in the area surrounding the proposed action. Analysis of growth-inducing effects includes those characteristics of the action that may encourage and facilitate activities that, either individually or cumulatively, would affect the environment. Population increases, for example, may impose new burdens on existing community service facilities. Similarly, improvement of access routes may encourage growth in previously undeveloped areas. Growth may be considered beneficial, adverse, or of no significance environmentally, depending on its actual impacts to the environmental resources present.

A benefit of the proposed Project would be the enhancement or continuation of the recreational usage of the beach at San Clemente Pier. Protection of the beach shoreline provides an amenity for local residents and tourists. The resulting temporary recreational benefits derived from the additional beach area would not be expected to increase the demand for public services and utilities, nor create a need for additional recreational facilities above current projections. Fewer than 100 workers would be involved in construction of the proposed Project, and they would be expected to primarily be drawn by the local work force. The San Clemente Shoreline Protection Project would not involve any new development or add any people to the local population. The proposed Project would have no growth-inducing impacts.

8.5 Energy Requirements and Conservation Potential of Alternatives and Mitigation Measures

Under Appendix F of the CEQA Guidelines, EIRs are required to include a discussion of the potential energy impacts of proposed projects, with particular emphasis on avoiding or reducing inefficient, wasteful, and unnecessary consumption of energy. Potential energy considerations include energy consuming equipment and processes for construction, operation, and/or removal of the Project, energy requirements by fuel type for each Project stage, energy conservation and design features, energy costs and supplies, and transportation use requirements (e.g., estimated daily trips by mode).

The proposed Project would implement several mitigation measures that would reduce inefficient, wasteful, and unnecessary consumption of energy. The energy requirements for the proposed construction activity would be confined to fuel for the dredge, labor transportation, and other construction equipment. Examples of mitigation measures include use of a diesel oxidation catalytic converter for the dredge and the use of newer, lower-emitting trucks to transport construction workers as well as equipment and material to and from construction sites, such as the use of "low-sulfur diesel for construction equipment and diesel particulate filters for diesel equipment and trucks." The use of alternative clean fuel, such as electric or compressed natural gas-powered construction equipment with oxidation catalysts instead of gasoline- or diesel-powered engines, is also recommended. However, where diesel equipment has to be used because there are no practical alternatives, it is recommended the construction contractors use low-sulfur diesel. In addition, the proposed Project does not involve the trucking of materials, which would decrease the use of trucking equipment typically associated with a beach nourishment project. The minimal use of pieces of construction equipment and implementation of the mitigation measures recommended would allow impacts to energy to be less than significant.

8.6 Relationship between Short-term Uses of the Environment and Maintenance and Enhancement of Long-Term Productivity

The CEQ under NEPA Regulations (40 CFR Part 1500 et seq.) require that an EIS discuss issues related to environmental sustainability. The discussion relates to environmental consequences, including consideration of "the relationship between local short-term uses of man's environment and the maintenance and enhancement of long-term productivity" (42 USC Section 4332[C] [iv]).

Implementation of the proposed Project would not result in any environmental impacts that would significantly narrow the range of beneficial uses of the environment or pose long-term risks to health, safety, or the general welfare of the public communities surrounding the beach at San Clemente Pier. Rather, the Project would provide for future beneficial beach resources (e.g., recreational activities, sandy shoreline habitat).

9.0 PUBLIC INVOLVEMENT AND INTERAGENCY COORDINATION

9.1 Required Coordination

This EIS/EIR was circulated for a public review period of 45 days, from August 6 through September 20, 2010, to appropriate resource agencies, local interest groups, and individuals (see Section 13 for distribution list). A public meeting was held at the Community Development Office at 910 Calle Negocio, San Clemente, CA 92673, on August 19, 2010, at 7 p.m. All comments and concerns that were received during the review period have been incorporated into the Final EIS/EIR.

9.2 Public Involvement

Public involvement is a process by which interested and affected individuals, organizations, agencies, and government entities are consulted and included in the decision-making process of a planning effort. In providing public service, the Federal role in water resources planning is to respond to what the public perceives as problems and opportunities and to formulate and select alternative plans that reflect public preferences. In addition, the National Environmental Policy Act (PL 91-190), among other Federal laws and regulations, mandate public involvement. Federal planning policies, USACE practice, and regulations have consistently required and encouraged this practice. All this must occur, however, with the awareness that the USACE cannot relinquish its legislated decision-making responsibility.

9.2.1 Public Participation

Two of the milestones in the Corps of Engineers South Pacific Division (CESPD) milestone system have been established specifically for the purpose of providing a public forum to receive public input. Public participation through the NEPA/CEQA review process is through both a formal public scoping period and a public and agency review period.

To announce the start of the report scoping, a public notice was issued to local residents, Federal, State, and Local agencies, and interested groups. The recipients were invited to provide input to the study, including the scoping of the environmental issues that should be addressed throughout the study. The Notice of Intent (NOI) was published in the Federal Register. The Notice of Preparation (NOP) was distributed with the NOI and has been approved by the lead CEQA agency, the City of San Clemente. The notice announced a public workshop, where the public were given the opportunity to comment.

A 45-day public review of the Draft EIS/EIR was conducte in August and September of 2010. A final public meeting was held on August 19, 2010 to present the findings of the study and to provide the public an opportunity to express their views on the results and recommendations of the pre-authorization study. Comments included concerns with some of the engineering and environmental assumptions and analyses and the need to develop an acceptable “monitoring and mitigation plan”. All comments have been addressed and our responses are included in the Section 14.0. Additional conference calls and meetings with the Resource Agencies were held to address some of their concerns over the "monitoring and mitigation plan" and revisions have been made to Appendix B based on these discussions.

9.3 Interagency Coordination

The USACE is the lead agency for NEPA, and the City of San Clemente is the lead/responsible agency for CEQA. This Final EIS/EIR is prepared as a joint document. The implementation or construction phase of the proposed action will be cost-shared with the local sponsor, the City of San Clemente. Therefore, this document is prepared in compliance with NEPA and CEQA regulations.

The proposed action was coordinated with the concerned resource agencies during preparation of the Final EIS/EIR to ensure that the proposed action complies with the requirements of the applicable laws and regulations. A summary of coordination is provided in the following sections.

Pursuant to specific legislative mandates and to assist in the preparation of this document, formal and informal coordination has been initiated with various agencies. The following summarizes the coordination and consultation efforts.

9.3.1 U.S. Fish and Wildlife Service

Coordination with USFWS regarding biological impacts and mitigation has been on-going. The Final EIS/EIR has been prepared to determine the effect of the proposed action on Federal listed species (Section 5.4). In compliance with the FWCA, the USACE has conducted on-going coordination efforts during initial and current stages of planning for this Project. The USACE met with resource agencies, including the USFWS, NOAA Fisheries, and CDFG on October 16, 2007, May 15 and December 16, 2008, July 16, 2009, and January 31, 2011, to discuss the proposed Project and alternatives. The main topics of discussions included the current status of the proposed Project, Project alternatives, and potential environmental issues.

9.3.2 U.S. Army Corps of Engineers, Regulatory Branch

The proposed Project has been coordinated with the USACE Regulatory Branch, which is responsible for issuing the Section 404 permit for dredging. Coordination with USACE Regulatory Branch is on-going. The USACE does not issue itself a 404 permit, but must comply with the CWA. The USACE will complete a 404(b)(1) analysis to ensure Project compliance with the CWA.

9.3.3 U.S. Environmental Protection Agency

The USACE has coordinated with the USEPA throughout the NEPA process and construction activities.

9.3.4 National Marine Fisheries Service

The USACE met with resource agencies, including NOAA Fisheries, on October 16, 2007 and December 16, 2008, to discuss the proposed Project and alternatives. The USACE has been coordinating with the NOAA Fisheries regarding EFH. Dredging and fill placement construction activities are not anticipated to have significant impacts to EFH. USACE shall continue to coordinate with the NOAA Fisheries throughout the NEPA process and construction activities.

9.3.5 California Coastal Commission

USACE shall continue to coordinate with the CCC throughout the NEPA process and construction activities. The Corps is preparing a Coastal Consistent Determination (CCD) in accordance with Federal Coastal Zone Management Act (CZMA), 16 U.S.C. §1455(d), and regulations at 15 C.F.R. §930 et seq. It is the responsibility of the Corps to determine if a proposed federal activity affects the coastal use of resources in a manner that is not consistent with the California Coastal Management Plan (CCMP) that California has adopted and implemented.

9.3.6 California State Lands Commission

USACE has coordinated with the CSLC throughout the NEPA process and construction activities.

9.3.7 California Department of Fish and Game

The USACE met with resource agencies, including CDFG, on May 15 and December 16, 2008 and July 16, 2009 to discuss the proposed Project and alternatives. USACE has been coordinating with the CDFG regarding State listed species. Dredging and fill placement construction activities are not anticipated to have significant impacts to State listed species. USACE shall continue to coordinate with the CDFG throughout the CEQA process and construction activities.

9.3.8 California State Historic Preservation Officer/Advisory Council on Historic Preservation

An initial letter was sent to the California SHPO in accordance with Section 106 implementing regulations 36 CFR 800, as amended. This initial consultation described the APE and outlined the steps the USACE has taken to identify historic properties within the APE.

Based on identification efforts to date, there are no historic properties within the APE. A report on these efforts was prepared and sent to the SHPO, with a determination as to whether the Project will affect historic properties. The Project is in compliance with the Act.

9.3.9 Regional Water Quality Control Board

To satisfy requirements of the Federal CWA, USACE would submit this Final EIS/EIR and appropriate technical documentation to the San Diego RWQCB, tasked with implementing the CWA within the region, for their review for CWA Section 401 certification, pursuant to 33 CFR 336.1(a)(1). Upon review of the submittal, the RWQCB would evaluate if issuance of a 401-water quality certification is appropriate. The USACE shall continue to coordinate with the RWQCB throughout the CWA process and construction activities.

9.3.10 Other Agencies/Public Interest Groups

In addition to the above, USACE shall continue coordination efforts with various agencies to minimize impacts to fishing activities and marine resources that may result from placement of beach fill.

9.4 Required Permits and Approvals

Table 9-1 List of Federal, State, and Local Project Approvals

Agency	Permit/Approval
Federal	
USACE	• Permit under Section 404 of the Clean Water Act, 33 U.S.C. Section 1344 • Section 10 of the River and Harbors Act of 1899, 33 U.S.C Section 403
USFWS	• Fish and Wildlife Coordination Act, 16 U.S.C. Section 661-666
NMFS	• Magnuson-Stevens Fishery Management and Conservation Act, 1996 amendments
State	
CSLC	• Long-term management lease to CDFG or USFWS
RWQCB	• Section 401 Water Quality Certification • Compliance with waste discharge requirements for dredge and fill
SHPO	• Compliance and Coordination with SHPO under NHPA 1966, Section 106 (as defined in 36 CFR 60 and 36 CFR 800)
CCC	• Federal Consistency Determination
Local/Regional	
County of Orange	• Grading permit
County of Orange Vector Control	• Review for public health concerns
South Coast Air Quality Management District (SCAQMD)	• Construction-related air permits
SCAQMD/EPA	• Federal Air Conformity Determination

- The RWQCB may use the Joint EIS/EIR to consider Water Quality Certification under Section 401 of the Clean Water Act, as well as to consider granting permits for waste discharge requirements for dredge and fill.
- The SCAQMD may use the Joint EIS/EIR to consider construction-related air permits and for the Federal Air Conformity Determination.

10.0 LIST OF PREPARERS AND REVIEWERS

Agencies and contractors responsible for the preparation and review of this EIS/EIR include the following:

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11.0 GLOSSARY, ACRONYMS, AND ABBREVIATIONS

11.3 Acronyms

AAQS	Ambient Air Quality Standards
ACHP	Advisory Council on Historic Preservation
A.D.	After Christ, of the Christian era
a.m.	Ante meridiem, before noon
APE	Area of Potential Effects
AQMP	Air Quality Management Plan
BA	Biological Assessment
BACT	Best Available Control Technology
B/C	Benefit/Cost ratio
B.C.	Before Christ, before the Christian era
BO	Biological Opinion
BP	Before present
CAA	Clean Air Act
CAAQS	California Ambient Air Quality Standards
CARB	California Air Resources Board
CCC	California Coastal Commission
CCD	Coastal Consistency Determination
CCR	California Code of Regulations
CCSTWS	Coast of California Storm and Tidal Waves Study
CDIP	Coastal Data Information Program
CDFG	California Department of Fish and Game
CEQ	Council on Environmental Quality
CEQA	California Environmental Quality Act of 1970
CESA	California Endangered Species Act
CFR	Code of Federal Regulations
CHRIS-SCCIC	California Historical Resources Information System at the South Central Coastal Information Center
CNEL	Community Noise Equivalent Level
CSC	California Species of Special Concern
CSDM	Coastal Storm Drain Outfall Monitoring
CSLC	California State Lands Commission
CWA	Clean Water Act of 1977
CZMA	Coastal Zone Management Act
DOD	Department of Defense
EFH	Essential Fish Habitat
EIR	Environmental Impact Report
EIS	Environmental Impact Statement
ENSO	El Niño-Southern Oscillation
ER	Engineer Regulation
ER-L	Effects Range-Low
ER-M	Effects Range-Median
ESA	Federal Endangered Species Act of 1973

ESU	Evolutionarily Significant Unit
FE	Federal-listed, endangered species
FT	Federal-listed, threatened species
FWCA	Fish and Wildlife Coordination Act of 1958
GIS	Geographic Information System
HCP	Habitat Conservation Plan
HHW	Higher High Water
HLW	Higher Low Water
HUD	Department of Housing and Urban Development
I-5	Interstate 5 Freeway
LCP	Local Coastal Program
LHW	Lower High Water
LLW	Lower Low Water
LOSSAN	Los Angeles to San Diego
LST	Localized Significance Threshold
LUP	Land Use Plan
MBTA	Migratory Bird Treaty Act
MCBCP	U.S. Marine Corps Base, Camp Pendleton
MHHW	mean higher high water
MHTL	mean high tide line
ML	maximum level
MLW	mean low water
MLLW	mean lower low water
MMPA	Marine Mammal Protection Act of 1972
MSL	Mean Sea Level
MSAA	Master Streambed Alteration Agreement
NAAQS	National Ambient Air Quality Standards
NAHC	National Historic Preservation Act
NCCP	Natural Communities Conservation Plan
NEPA	National Environmental Policy Act of 1969
NGVD	National Geodetic Vertical Datum
NHPA	National Historic Preservation Act
NOAA	National Oceanographic and Atmospheric Administration
NOAA Fisheries	National Marine Fisheries Service
NOI	Notice of Intent
NOP	Notice of Preparation
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historic Places
NTU	Nephelometric Turbidity Units
OCTA	Orange County Transportation Authority
OSPRP	Oil Spill Prevention and Response Plan
p.m.	Post meridiem, after noon
PRC	Public Resources Code
PSSDA	Puget Sound Dredged Disposal Analysis
ROD	Record of Decision
RWQCB	Regional Water Quality Control Board

SANDAG	San Diego Association of Governments
SCAG	Southern California Association of Governments
SCAQMD	South Coast Air Quality Management District
SCB	Southern California Bight
SCRRA	Southern California Regional Rail Authority
SE	State-listed, endangered species
SHPO	State Historic Preservation Officer
SIP	State Implementation Plan
SL	screening level
SQG	Sediment Quality Guidelines
SRA	Source Receptor Area
ST	State-listed, threatened species
SWPPP	Storm Water Pollution Prevention Plan
SWRCB	California State Water Resources Control Board
T-BACT	Toxics Best Available Control Technology
USACE	United States Army Corps of Engineers, Los Angeles District
USC	United States Code
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
WRDA	Water Resources Development Act

11.4 Chemical Abbreviations

CO	carbon monoxide
DDT	dichlorodiphenyltrichloroethane
NO_2	nitrogen dioxide
NOx	oxides of nitrogen
O_3	ozone
PAHs	polycyclic aromatic hydrocarbons
Pb	lead
PCBs	polychlorinated biphenyls
PM_{10}	particulate matter equal to or less than 10 microns in size
$PM_{2.5}$	fine particulate matter equal to or less than 2.5 microns in size
ROG	reactive organic gases
SO_2	sulfur dioxide
SOx	oxides of sulfur
TAC	toxic air contaminants

11.5 Units of Measurement

ac	acre(s)
ºC	degrees Celsius
dB	decibels
dBA	decibels using A weighted measurements

ºF	degrees Fahrenheit
ft	foot/feet
ft/sec	feet per second
ft^2	square feet
ha	hectare
hp	horsepower
H:V	horizontal:vertical
kg	kilograms
km	kilometer(s)
lbs	pounds
L_{dn}	Day-night average noise level
L_{eq}	equivalent noise level
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
m	meter(s)
m^2	square meter(s)
m^3	cubic meter(s)
mi	mile(s)
mi^2	square mile(s)
mL	milliliter(s)
mm	millimeter(s)
mph	miles per hour
NTU	Nephelometric Turbidity Unit(s)
ppm	parts per million
ppt	parts per thousand
yd	yard(s)
yd^2	square yard(s)
yd^3	cubic yard(s)
yd^3/ft	cubic yard(s) per foot
yr	year
µg/kg	micrograms per kilogram
µg/L	micrograms per liter
%	percent

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14.0 RESPONSE TO COMMENTS

No.	Commenter	Comment	Response
Federal Agencies			
D.F. Levi, Commanding Officer, Marine Corps Base, Camp Pendleton, September 15, 2010			
1	Marine Corps	General. The location of the proposed borrow site depicted in Figures 1.1-1, 1.3-1 and throughout the DEIR/DEIS would be more accurately identified as located off Camp Pendleton since it is directly west of Camp Del Mar and the Del Mar Boat basin not the Oceanside Harbor area as currently stated.	The borrow site (Area 2) is offshore of both the Camp Del Mar Boat Basin and Oceanside Harbor as shown in Geotechnical Appendix Plate 1, ranging from 0.75 to 1.0 miles. This will be clarified throughout the report(s).
2	Marine Corps	General. The proposed borrow site and transit routes appear to be in close proximity or through nautical restricted areas that exist in the vicinity of the Camp Del Mar area and further up the coast off Red Beach of Marine Corps Base Camp Pendleton. The Coast Guard has listed and, described these restricted areas off Camp Pendleton in detail in their publication: Coast Pilot 7 in §334.900, §334.905 and §334.91O. Regulations for these areas prohibit several activities including dredging and anchoring. As sites are in close proximity to the proposed borrow site the Draft EISIEIR should incorporate some information regarding their existence and restrictions.	Inquiry was made with the Marine Corps Base Camp Pendleton (MCBCP), Land Management Branch as well as the US Coast Guard publication Coast Pilot 7 in §334.900, §334.905 and §334.910. Both sources have indicated that the borrow site and the transit location are not within a restricted area. The FEIS/R will replace a figure that depicts the borrow site location as Figure 3.4-1, page 3-9 in reference to "restricted areas 334.900 and restricted area 334.910" (U.S. Coast Pilot 7).
3	Marine Corps	Page 1-1 Study Area -the proposed borrow area is outside the described study area. Does it have its own study area? If so where is it addressed?	Detail is focused on the San Clemente beach placement site because 1) there are no onshore impacts associated with dredging at the Oceanside borrow site and because 2) information on the Oceanside borrow side was included in the EIR/EA for the San Diego Regional Beach Sand Project (SANDAG 2000) and is incorporated by reference. Where pertinent, information on the Oceanside borrow site is included in Section 4.0. Section 4.2.1 describes the location and substrate of the borrow site. Section 4.3.1 is a general description of water column physical and chemical characteristics and is applicable to the Oceanside borrow site. Section 4.3.3 specifically contains information on sediments at the Oceanside borrow site. Section 4.3.4 on

No.	Commenter	Comment	Response
			oceanographic characteristics and coastal processes is applicable to the Oceanside borrow site as well as San Clemente because both sites are in the same littoral cell. Section 4.4.2 includes information on the biology of the Oceanside borrow site.
4	Marine Corps	Page 3-1 Evaluation Criteria. Were any planning constraints considered for the impact caused by the dredging at the borrow site? Such as -"Preserve water quality characteristics along the coast and near shore areas in the vicinity of the borrow site"	Impacts of dredging at the borrow site were evaluated against the significance criteria for the relevant issue areas (Section 5). To the extent feasible, it was a project objective to avoid or mitigate for significant impacts. The relevant significance criteria for water quality that were applied to dredging at the borrow site were: “Impacts to marine water quality are considered significant if any of the following apply: • The water quality objectives in the California Ocean Plan (SWRCB 2005) are violated; and/or • Project operations or discharges that change background levels of chemical and physical constituents or elevate turbidity would produce long-term changes in the receiving environment of the site, area, or region that would impair the beneficial uses of the receiving water. Impacts are considered less than significant if the project would result in elevation of contaminants, but the levels remain below water quality criteria or if elevation of contaminant concentrations above criteria occurs only within a couple of hundred feet or less of the point of discharge for a few hours or less.”
5	Marine Corps	Page 3-3 Beach Fill. Lines 27 and 28 states "Beach nourishment may use offshore or onshore borrow sites. In the study area, offshore sources have historically been used for several reasons." Please include the reasons for excluding onshore borrow sites.	Offshore sites were chosen using the SANDAG (2000) study discussed, which identified offshore sources in the project vicinity. Onshore sources were not carried forward as they were not as technically or economically feasible.

No.	Commenter	Comment	Response
6	Marine Corps	Page 3-9. Figure 3.4-1-Oceanside Borrow Site Map. Recommend that this graphic be changed to a Navigational Chart for more clarity of the borrow site's location.	The FEIS/R will replace a figure that depicts the borrow site location as Figure 3.4-1, page 3-9 in reference to "restricted areas 334.900 and restricted area 334.910 (U.S. Coast Pilot 7). A navigational chart is not necessary and would be more confusing to the general public. The dredge operator will know and will be well versed on navigation charts for the dredge.
7	Marine Corps	Page 4-1 Affected Environment Since part of the project includes dredging material at the borrow site, information on that location should be included in the Affected Environment Chapter.	Please see the Response to Comment 3. The affected environment at the borrow site is discussed for the relevant issue areas in Section 4.
8	Marine Corps	Page 4-1 Meteorology and Air Quality needs to include discussions about San Diego Air Pollution Control District (SDAPCD) since there will be emissions in that Air District.	Information for the San Diego Air Basin has been added to the FEIS/R.
9	Marine Corps	Page 4-13 Water Quality, Sediments, and Oceanography should discuss discharges in the vicinity of the borrow site.	Section 4.3.1 has been amended to include information on discharges near the Oceanside borrow site.
10	Marine Corps	Page 4-38 Biological Resources Lines 7 and 8 states - "These sections describe biological resources found in the vicinity of the proposed beach fill and borrow site areas along the San Clemente coastline." The proposed borrow site is along the Camp Pendleton/Oceanside coastline. Does this section cover that site or only the potential borrow site near San Clemente? Some sections like Page 4-45 lines 26-36 provide information on the proposed borrow site along the Camp Pendleton/Oceanside coastline and others like Table 4-14 focus only on the San Clemente site ignoring biological resources in the immediate vicinity of the proposed borrow site.	The biological resources section addresses both the San Clemente beach placement site and the Oceanside borrow area. Some additional text has been added to clarify the relationship between sensitive resources and the borrow site.
11	Marine Corps	Table 4-14 Special Status Listed Species that May Occur in the San Clemente Pier or Oceanside Borrow Site Areas: -Southern steelhead has also been found in the Santa Margarita River near the proposed borrow site.	Table 4-14 will be revised to indicate taxa that will not be present and those that could be present, but their occurrence is negligible or very low. 1. Southern steelhead will not be affected because the project action implementation will occur at a time when they are not present.

No.	Commenter	Comment	Response
		-Western snowy plover nesting sites are located within about one mile of the proposed Oceanside borrow site as such the "Potential For Occurrence in the Project Area" should be high. -California least tern nesting sites are located within about one mile of the proposed Oceanside borrow site as such the "Potential For Occurrence in the Project Area" should be high.	2. Snowy plover will not be affected by the action implementation because these charadrids will not be breeding during the project implementation. Sea and Sage Audubon performed a 2010 winter survey. San Clemente Beaches were not included. Beach habitat within the project placement footprint, as well as in Oceanside, are narrow and heavily used by people. Philip Unitt, San Diego Natural History Museum, Birds of San Diego County, Memoir 13, 1984, does not show snowy plovers in north portion of the county. California State Parks has tracked snowy plovers during winter window surveys and has driven San Clemente State Beach many times with zero plovers observed over the years (David Pryor, personal communication, February 2011). Snowy plovers will not use the borrow site and any wintering activity will not be affected by actions at the borrow site off-shore. Potential for occurrence remains negligible to low, at best. In comparison, the Landing Craft, Air Cushion (LCAC) Transport would be expected to have orders of magnitude greater effect on snowy plovers than the borrow site operations. 3. Least terns will not be affected by the action implementation because these larids will not be breeding during the project implementation. Least terns will be on their southern latitude wintering grounds during project implementation. Potential for occurrence remains negligible.
12	Marine Corps	Page 4-51 Section 4.4.3.3 Steelhead Trout (Federal Endangered) -Southern steelhead has also been found in the Santa Margarita River near the proposed borrow site.	It is recognized that southern steelhead migrate up the Santa Margarita River and this information will be added to the FEIS/R. However, there will be no effect to southern steelhead because this taxon will not be

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			present during sand placement activities due to the season and the fish would be expected to avoid the barge activities at the borrow site in the same manner they would avoid any other vessel in the area.
13	Marine Corps	Page 4-51 Section 4.4.3.5 California Least Tern (Federal and State Endangered)-Lines 3 & 4 Large numbers of California least tern nesting sites are located within about one mile of the proposed Oceanside borrow portion of the project area and are likely to forage at the proposed borrow site.	Least terns will not be affected by the action implementation because these larids will not be breeding during the project implementation. Least terns will be on their southern latitude wintering grounds during project implementation. Potential for occurrence remains negligible.
14	Marine Corps	Page 4-51 Section 4.4.3.6 Western Snowy Plover (Federal Threatened) Lines 37 & 38-The Santa Margarita River nesting site is located within about one mile of the proposed Oceanside borrow portion of the project area.	Snowy plover will not be affected by the action implementation because these charadrids will not be breeding during the project implementation. Wintering snowy plovers will be few, if any on the beaches opposite the borrow site and the site is 0.75 to 1.0 miles off-shore and thus will not be affected by borrow site activities.
15	Marine Corps	Page 4-57 Section 4.5.2 Area of Potential Effects (APE) states "The offshore portion of the APE includes two offshore borrow sites, Areas 1 and 2. Area 1 is located southwest of the San Clemente Municipal Pier, and Area 2 is located off the coast of Oceanside." Section 4.5.3 summarizes the archaeology within and adjacent to the southern California coastline from Doheny State Beach to San Mateo Point. Where is the summary for Area 2 which is located off the coast of Camp Pendleton/Oceanside?	During the Design Phase, an underwater remote sensing survey of the borrow site (Area 2) will be conducted for the purpose of identifying any resources that may be present. If resources are identified, they will be evaluated for inclusion in the National Register of Historic Places (NRHP). If any are determined to be eligible for the NRHP, avoidance or mitigation efforts would be implemented. These compliance procedures will be coordinated with the SHPPO officer and consistent with Section 106 of the National Historic Preservation Act (36CFR800).
16	Marine Corps	Page 4-64 Section 4.6.2 Vessel Transportation - Oceanside Harbor may be 20 miles from the San Clemente portion of the project area but it is within one mile of the Proposed Borrow Site. The section should also address Marine Corps and Navy use of the area near and between the two portions of the project site and dredge barge impacts on those uses. This may also be the place to address the nautical restricted areas listed and described in the Coast Guard publication known as Coast	Inquiry was made with the Marine Corps Base Camp Pendleton (MCBCP), Land Management Branch and as well as the US Coast Guard publication Coast Pilot 7 in §334.900, §334.905 and §334.910. Both sources have indicate that the borrow site and the transit location are not with a restricted area. The FEIS/R will replace a figure that depicts the borrow site location as Figure 3.4-1, page 3-9 in reference to “restricted areas 334.900 and restricted area 334.910

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		Pilot 7 that are in the vicinity of the Camp Del Mar area (in addition to a 3rd restricted area located further up the coast off Red Beach). The planned borrow site for this project is located within the Camp Pendleton Amphibious Vehicle Training Area (CPAVTA), as noted on most nautical charts (extends approximately 5.5 miles out from the southern end of the Camp Pendleton/Oceanside Harbor north breakwater and north to just south of San Mateo point). While that should not be a problem and dredging operations would not be prevented off the southern coast of Camp Pendleton, nevertheless, advance coordination of any planned dredging operations in or near the CPAVTA is required. The Final EIR/EIS for this project should include a provision that the dredging operator pre-coordinate all planned dredging and transport operations with Camp Pendleton. If the Base is made aware of such offshore dredging operations and transport in advance, this activity can be incorporated into the Daily Training Schedule and efforts can be made to deconflict any potential Naval or Marine Corps amphibious training operations that may also be planned in close proximity to the dredging site and throughout the CPAVTA.	(U.S. Coast Pilot 7). Dredging will occur in the winter months outside environmental (e.g., nesting least tern) windows. Dredging will occur between early September and the end of March. Oceanside Harbor Days are held at the end of September/beginning of October and will be avoided. All other annual sailing events that occur near the Harbor will be coordinated and avoided. The Corps will contact the CPAVTA and obtain schedules of training activity occurring in the ocean and coordinate dredging activities to avoid and conflict/interference. The FEIS/R now includes a provision that the dredging operator shall pre-coordinate all planned dredging and transport operations with Camp Pendleton.
17	Marine Corps	Page 4-80 Section 4.9.1 Beaches -fails to address Camp Pendleton and Oceanside beaches which are located within one mile of the proposed borrow site.	MCBCP beaches will be added to the FEIS/R.
18	Marine Corps	Page 4-81 Section 4.9.2 Annual Events -fails to address Camp Pendleton Del Mar Recreation Beach and Oceanside Harbor Events which are located within one mile of the proposed borrow site.	Dredging will occur between early September and the end of March. Dredging activities will occur approximately 0.75 to 1.0 miles from the shoreline and would not be expected to have any effects on the Oceanside Harbor Events occurring onshore except for the aesthetic view of a dredge in the distance. The addition of one relatively small dredge in the area near the harbor where naval vessels are common would not be expected to affect the general public during this event. All other annual sailing events that occur near the Harbor will be coordinated and

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			avoided.
19	Marine Corps	Page 5-1 Section 5-1 Air Quality and Meteorology -Where is the discussion for emissions within the SDAPCD?	Information for the San Diego Air Basin has been added to the FEIS/R.
20	Marine Corps	Page 5-25 Impact WR-50-2: Would there be any potential impact from turbidity during dredging to southern steelhead attempting to enter the Santa Margarita River during the rainy season?	As described in Section 5.3.2, turbidity generated during dredging at the Oceanside borrow site is expected to affect a relatively small area. Observations during dredging at the Oceanside borrow site for the San Diego Regional Beach Sand Project identified only small plumes that did not exceed 2,700 square yards in extent. Southern steelhead enter southern California streams during the winter season when streams are flowing and nearshore waters are naturally turbid from stream discharges. Turbidity from dredging at the Oceanside borrow site would not be expected to have a significant effect on southern steelhead.
21	Marine Corps	Page 5-35 Section 5.4 Biological Resources -Lines 25 & 26 -with the discovery of southern steelhead in the Santa Margarita River its potential to occur in the project area (borrow site) is higher than identified in the draft EISIEIR.	The assessment of potential to occur is accurate as currently stated in the document. The potential for southern steelhead to occur at the Santa Margarita River during project implementation remains negligible to low. Because steelhead may change the stream they inhabit from one year to the next, the discovery of southern steelhead in the Santa Margarita River in one year does not increase the potential for the species to occur in the project area; further discoveries within the river would need to validate that the recent occurrence was not a chance occurrence.
22	Marine Corps	Page 5-45 -Impact BR-115-1: A direct adverse effect on the population of a special status listed species or the loss or disturbance of important habitat for a listed species. Lines 34-36Western snowy plovers also breed on the beaches of Camp Pendleton near the Oceanside borrow area.	Snowy plover will not be affected by the action implementation because these charadrids will not be breeding during the project implementation. Wintering snowy plovers will be few, if any, on the beaches opposite the borrow site and the site is 0.75 to 1.0 miles off-shore and thus will not be affected by borrow site activities. California State Parks has tracked snowy plovers during winter window surveys and has driven San Clemente State Beach many times with

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			zero plovers observed over the years (David Pryor, personal communication, February 2011). Thus, snowy plovers will not be disturbed during the winter season and their breeding habitat at MCBCP will not be affected during project implementation. Snowy plovers are added to the discussion on page 5-45, Section 5.4.3.
23	Marine Corps	Page 5-52 Section 5.6 Ground and Vessel Transportation only talks about ground transportation impacts. There is nothing about impacts to ocean vessel transportation. As noted earlier in Section 4.6.2 Vessel Transportation, the planned borrow site for this project is located within the Camp Pendleton Amphibious Vehicle Training Area (CPAVTA and advance coordination of any planned dredging operations in or near the CPAVTA is required. If Camp Pendleton is made aware of such offshore dredging operations and transport in advance, this activity can be incorporated into the Daily Training Schedule and efforts can be made to deconflict any potential Naval or Marine Corps amphibious training operations that may also be planned in close proximity to the dredging site and throughout the CPAVTA.	The Corps will contact the CPAVTA and obtain schedules of training activity occurring in the ocean and coordinate dredging activities to avoid and conflict/interference.
24	Marine Corps	Page 5-60, Section 5.8 -Noise -What are the noise standards/criteria on shore in the vicinity of the borrow site? This would seem important to support the statement in lines 1 and 2 on page 564, and 26 through 30 on page 5-67.	As described in Section 5.8.2, the noise of the dredging activities at the Oceanside borrow site to onshore receptors would be 44.5 dBA leq. The increase in noise to sensitive receptors would be imperceptible. The noise of the dredge onshore would be less than the noise of breaking waves. Therefore, noise criteria for the City of Oceanside would not be applicable because noise from the dredge would not be discernible to sensitive receptors onshore.
25	Marine Corps	Page 5-77, Section 5.11 -Public Health and Safety -It appears the planned borrow site for this project is located within the Camp Pendleton Amphibious Vehicle Training Area (CPAVTA), as noted on most nautical charts. While that should not be a problem and dredging operations	Inquiry was made with the Marine Corps Base Camp Pendleton (MCBCP), Land Management Branch and as well as the US Coast Guard publication Coast Pilot 7 in §334.900, §334.905 and §334.910. Both sources have indicate that the borrow site and the transit

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		would not be prevented off the southern coast of Camp Pendleton, nevertheless, advance coordination of any planned dredging operations in or near the CPAVTA is strongly recommended. The Final EIRIEIS for this project should include a provision that the dredging operator pre-coordinate all planned dredging and transport operations with the Camp Pendleton Range Scheduling department in the Range Operations Division. If the Base is made aware of such offshore dredging operations and transport in advance, this activity can be incorporated into the Daily Training Schedule and efforts can be made to deconflict any potential Naval or Marine Corps amphibious training operations that may also be planned in close proximity to the dredging site and throughout the CPAVTA.	location are not with a restricted area. The FEIS/R will replace a figure that depicts the borrow site location as Figure 3.4-1, page 3-9 in reference to "restricted areas 334.900 and restricted area 334.910" (U.S. Coast Pilot 7). As with all US Army Corps projects that are within DoD Ranges, coordination will ensue during project implementation.
26	Marine Corps	Page 6.1 Description of Cumulative Projects -Why isn't the Oceanside Harbor Dredging project include in the Cumulative Impact Analysis since it is located within one mile of the borrow site?	Oceanside Harbor dredging is not included as a cumulative project for the dredging at the Oceanside borrow site because the impacts of the two dredging projects would not be expected to interact cumulatively. The dredging at the Oceanside borrow site would not affect the shoreline environment, including Oceanside Harbor. Dredging at Oceanside Harbor would not be expected to affect the environment in the vicinity of the borrow site about 1 mile offshore.
27	Marine Corps	Page 7-1 Section 7.0 Environmental Commitments -Since the planned borrow site for this project is located within the Camp Pendleton Amphibious Vehicle Training Area (CPAVTA), as noted on most nautical charts the commitment that the dredging operator pre~coordinate all planned dredging and transport operations with Camp Pendleton should be added. If the Base is made aware of such offshore dredging operations and transport in advance, this activity can be incorporated into the Daily Training Schedule and efforts can be made to deconflict any potential Naval or Marine Corps amphibious training operations that may also be planned in close proximity to the dredging site and throughout the CPAVTA.	Inquiry was made with the Marine Corps Base Camp Pendleton (MCBCP), Land Management Branch and as well as the US Coast Guard publication Coast Pilot 7 in §334.900, §334.905 and §334.910. Both sources have indicate that the borrow site and the transit location are not with a restricted area. The FEIS/R will replace a figure that depicts the borrow site location as Figure 3.4-1, page 3-9 in reference to "restricted areas 334.900 and restricted area 334.910" (U.S. Coast Pilot 7). As with all US Army Corps projects that are within DoD Ranges, coordination will ensue during project

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			implementation.
28	Marine Corps	Page 9-3 Section 9.3.10 Other Agencies/Public Interest Groups -Coordination with MCB Camp Pendleton is required for all activity that takes place in the Camp Pendleton Amphibious Vehicle Training Area (CPAVTA), as noted on most nautical charts.	Inquiry was made with the Marine Corps Base Camp Pendleton (MCBCP), Land Management Branch and as well as the US Coast Guard publication Coast Pilot 7 in §334.900, §334.905 and §334.910. Both sources have indicate that the borrow site and the transit location are not with a restricted area. The FEIS/R will replace a figure that depicts the borrow site location as Figure 3.4-1, page 3-9 in reference to “restricted areas 334.900 and restricted area 334.910” (U.S. Coast Pilot 7). As with all US Army Corps projects that are within DoD Ranges, coordination will ensue during project implementation.
Kathleen M. Goforth, Manager, Environmental Review Office, EPA, September 20, 2010			
29	EPA	Project Purpose and Need: Page 2-6 of the DEIS states that the purpose and need are "to prevent the severe beach erosion that results from winter storms and to prevent damage to adjacent beachfront structures, including the heavily used rail line". However, the DEIS does not clearly demonstrate whether placement would be a "beneficial use" at the proposed location through the rebuilding of an eroding beach. The DEIS section on the relationship between the sediment budget and long-term shoreline change does not appear to support that the beach is eroding. For example, the DEIS states that the "resultant sediment budget indicates the shoreline is essentially in balance between erosion and accretion" (see Section 4.3.4.3). The table on shoreline change also demonstrates that the shoreline has varied between eroding, accreting, and balanced (see Table 4-10) with the maximum erosion rate of minus 2 feet/year at T-street. The sediment budget and the long-term shoreline change studies referenced on DEIS p. 4-36 conflict with the more	It is recognized that the shoreline change data set used in the present analysis is limited at best. However, this was the most recent data available for this area at the time this analysis was conducted; there was no other data available. While data intensive information resulting in conclusive findings is preferred, the best available data provided the results in this analysis. It is further recognized that the shoreline change data set results in a less than desired numerical presentation. However, the results are consistent with the overall shoreline change scenario in this region. The sediment budget indicates the shoreline is in balance, neither accretional nor erosional (+0.03 m/yr). Inclusion of recent monitoring data results in a marginally erosive shoreline (-0.10 m/yr). The very small annual change signal is masked within the much larger envelope of seasonal changes. The seasonal variations are on order of 15 m and thus are two orders of magnitude larger than the mean annual

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		recent studies cited on DEIS p. 4-35 that appear to support the downward trend of beach width in the project location. However, according to the DEIS, it has been eight years since the last study, the most recent beach width being measured in 2002 (Table 4.3-6). Due to the time elapsed, the high variability of beach width in the past, and the appearance of conflicting information with the historical and long-term analyses, we recommend that the DEIS include the results of more recent beach width monitoring in the project location. Other project purposes include protection of railroad infrastructure from wave erosion. Section 4.6.1.2 of the DEIS states that the Orange County Transportation Authority has placed "riprap along the most critical segment between North Beach and the Marine Safety Building to decrease wave erosion impacts"; however much of this segment is not within the project footprint, and the project area south of the Marine Safety Building has no protecting riprap. The DEIS should address why the project area south of the Marine Safety Building has no protecting riprap. If this area is not considered part of the "critical segment", the DEIS should explain the purpose and need of including the area in the project. *Recommendations:* The FEIS should include an analysis of all existing data to clearly demonstrate a net loss of sediment deposition over the project area, and that local beach profiles show the effects of such erosion and thus are in need of replenishment. The FEIS should also provide clarification of the U.S. Army Corps of Engineers' (USACE) anticipated erosion rate of 12.8 feet per year (see Section 3.4.2.5) and why this rate is higher than historical erosion rates (-2 ft/year at T-street). For additional clarity, we also recommend that the sediment budget (Table 4-9) and long-term shoreline change (Table 4.3-6) sections include	long term signal. The three survey lines SC 1680 (Linda Lane), SC 1660 (T Street), and SC 1623 (State Beach) are south of Mariposa Point (Reach 7) whereas SC 1720 (Shorecliffs) is north of Mariposa Point. Mariposa Point, although physically small, is morphologically significant as it represents a salient feature in an otherwise uniform section of shoreline. This salient is a micro morphological separation between Shorecliffs and the other three survey lines. These three lines south of Mariposa Point are consistent in erosional trend whereas the Shorecliffs trend is accretional. Uncertainties in the results of this analysis are assumed captured within the design long term shoreline change distribution. The design distribution is a triangular form with a minimum (max erosion) of -0.46 m/yr, a maximum (max accretion) of +0.38 m/yr, a peak of -0.21 m/yr, resulting in a mean value of -0.10 m/yr. The Coastal Engineering Appendix has been amended to include a narrative that summarizes the sediment budget and erosion rates. This narrative discusses the larger littoral cell, the smaller project reach within, and their relationship to the measured sediment budget and erosion rates. This narrative further emphasizes the marginally negative long-term erosion rate and the implications on observed and future damages.

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		a map and description of the sampling stations, as well as a depiction of shoreline change during each of the represented periods.	
30	EPA	The FEIS should include more information on the National Security issues surrounding the single track LOSSAN railroad adjacent to the project area. Page 4-65 of the DEIS states that the Department of Defense has designated this right-of-way as a Strategic Rail Corridor with great significance to National Defense. However, little information. is given regarding how or when this determination was made. We note that the Federal Railroad Administration filed a Environmental Impact Statement in 2007 (Final Program Environmental Impact Statement for LOSSAN, Los Angeles to San Diego Proposed Rail Corridor Improvements in the State of California (CEQ# 20070465)) calling for the relocation of the LOSSAN railroad away from the Shoreline with plans to run a new line adjacent to Interstate 5. Recommendation: The FEIS should include the results of consultation with the Department of Defense to ensure that all project alternatives are consistent with current National Security policy.	The FEIS is consistent with NEPA and Corps plan formulation policy. It is not the responsibility of the US Army Corps of Engineers to describe the Department of Defense designation of this right-of-way as a Strategic Rail Corridor with great significance to National Defense. It is not crucial to this project if the Federal Railroad Administration filed a Environmental Impact Statement in 2007 calling for the relocation of the LOSSAN railroad away from the Shoreline with plans to run a new line adjacent to Interstate 5. The purpose of this Project is not predicated on the protection of the LOSSAN Railroad. EPA should discuss the railroad relocation project directly with Department of Defense. Recommendation is noted.
31	EPA	Alternatives Analysis: The DEIS includes a no-action alternative and two action alternatives. The two action alternatives include nourishment of the same linear project area but with different beach widths, (50 feet and 115 feet). While the proposed project (50 feet width option) would have fewer impacts from fill activity than the 115 feet alternative, both alternatives would have similar adverse environmental and recreational impacts in the	The alternatives presented in the report were developed through the Corps' plan formulation and coastal engineering processes for a storm damage reduction study. Consideration was given to all potential impacts and benefits. The 15-m plan produces the highest net benefits to the nation while causing the least potential impacts (represents the LEDPA). Thru this plan formulation process, a 10-m plan was analyzed and it resulted in fewer net benefits, but similar potential impacts as the 15-m

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		same linear project areas. *Recommendation:* The FEIS should include, at a minimum, an additional alternative that reduces the amount of linear project footprint. EPA suggests that an alternative excluding fill south of the Marine Safety Building may meet the needs of the project while greatly reducing adverse impacts to surfing, coral reefs, and surfgrass. The FEIS alternatives analysis should include a reasonable range of practicable alternatives that meet the project purpose and demonstrate the project's compliance with the CWA Section 404(b)(1) Guidelines and selection of the Least Environmentally Damaging Practicable Alternative LEDPA.	plan. The current recommended plan contains an adaptive management element in that monitoring of the equilibrated/dispersed sediment will be done to possibly modify future renourishment activities for the purpose of reducing impacts to an acceptable level. This could entail placing sediment in different locations, within the project area, or reducing the overall volume of sediment place.
32	EPA	Air Quality (General Conformity): EPA is concerned that applicability of the general conformity program has not been appropriately addressed in the DEIS. The project area is in Orange County, California. This county is part of a larger area that is not meeting federal air quality standards for ozone. The DEIS states that "The area may request a higher classification" (DEIS Vol. 2 p. 12). In fact, the area was reclassified to extreme nonattainment for the 1997 ozone national ambient air quality standards (NAAQS) on June 4, 2010. For this reason, the area now has a lower applicability threshold for general conformity. The DEIS is not clear that the applicability threshold used for analysis was 25 tons per year (tpy); however, we believe this to be the case, and want to clarify that the required threshold for analysis is 10 tpy. For more information go to: http://www.epa.gov/oaqpsOOl/greenbk/gfr2rpt2.htmi.	Information related to General Conformity, including the re-designation to extreme, was added to the document.

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		Recommendation: The FEIS should state clearly that the general conformity threshold is 10 tpy. Provide the results of the General Conformity applicability analysis to indicate whether the preferred alternative is above or below this de minimis level. If it is over de minimis, indicate the method that will be used to demonstrate that the project conforms to the applicable state implementation plan (SIP) for the area.	
33	EPA	Air Quality Analysis: The DEIS reports that the project will have no long-term impacts and a temporary short term adverse impact to air quality, but does not comprehensively assess the Project's operational and construction direct, indirect, or cumulative impacts to air quality. The FEIS should include a complete description of potential impacts and ways to reduce those impacts. In particular, EPA has concerns regarding the apparent lack of both an air quality impact assessment of fill placement, and a staging area plan that minimizes exposures to sensitive receptors and residents.	The FEIS/R addresses the temporary short-term impacts related to construction and does not identify any operational long-term emissions associated with the project. Impacts from fill placement were addressed and mitigations were added to ensure the staging areas will minimize exposures to sensitive receptors.
34	EPA	Construction Mitigation Measures: EPA commends USACE for incorporating mitigation strategies to reduce or minimize air pollutant, paving, and fugitive dust emissions. However, in addition to idling restrictions, proper maintenance of equipment, and the selection of construction equipment based on low emission factors, this Project should incorporate more stringent emission controls for PM and ozone precursors for construction-related activity. *Recommendations:* Due to the serious. nature of the particulate matter of 10 microns or less (PM_{10}) and $PM_{2.5}$ conditions in the South Coast Air Basin, EPA recommends that the best available control measures (BACM) for these pollutants be implemented at all times and that the FEIS and ROD incorporate the Construction Emissions Mitigation Plan. We recommend that all applicable requirements under the	Additional mitigation measures were added to the FEIS/R. Costs have been included in the project contingency.

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		South Coast Air Quality Management District (SCAQMD) Rules and the following additional measures be incorporated into the Construction Emissions Mitigation Plan. Fugitive Dust Source Controls: • Stabilize open storage piles and disturbed areas by covering and/or applying water or chemical/organic dust palliative where appropriate. This applies to both inactive and active sites, during workdays, weekends, holidays, and windy conditions. • Install wind fencing, and phase grading operations, where appropriate, and operate water trucks for stabilization of surfaces under windy conditions. • When hauling material and operating non-earthmoving equipment, prevent spillage, and limit speeds to 15 miles per hour (mph). Limit speed of earthmoving equipment to 10 mph. Mobile and Stationary Source Controls: • Reduce use, trips, and unnecessary idling from heavy equipment. • Maintain and tune engines per manufacturer's specifications to perform at California Air Resources Board (CARB) and/or EPA certification, where applicable, levels and to perform at verified standards applicable to retrofit technologies. Employ periodic, unscheduled inspections to limit unnecessary idling and to ensure that construction equipment is properly maintained, tuned, and modified consistent with established specifications. CARB has a number of mobile source anti-idling requirements. See their website at: http://www.arb.ca.gov/msprog/truck-idling/truck-idling.htm • Prohibit any tampering with engines and require continuing adherence to manufacturer's recommendations • If practicable, lease new, clean equipment meeting the most stringent of applicable Federal or State Standards. In general, only Tier 2 or newer engines	

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		should be employed in the construction phase. • Utilize EPA-registered particulate traps and other appropriate controls where suitable, to reduce emissions of diesel particulate matter and other pollutants at the construction site. Administrative controls: • Identify all commitments to reduce construction emissions and incorporate these reductions into the air quality analysis to reflect additional air quality improvements that would result from adopting specific air quality measures. • Identify where implementation of mitigation measures is rejected based on economic infeasibility. • Prepare an inventory of all equipment prior to construction, and identify the suitability of add-on emission controls for each piece of equipment before groundbreaking. (Suitability of control devices is based on: whether there is reduced normal availability of the construction equipment due to increased downtime and/or power output, whether there may be significant damage. caused to the construction equipment engine, or whether there may be a significant risk to nearby workers or the public.) Meet CARB diesel fuel requirement for off-road and on-highway (i.e., 15 ppm), and where appropriate use alternative fuels such as natural gas and electric. • Develop construction traffic and parking management plan that minimizes traffic interference and maintains traffic flow. • Identify sensitive receptors in the project area, such as children, elderly, and infirm, and specify the means by which you will minimize impacts to these populations. For example, locate construction equipment and staging zones away from sensitive receptors and fresh air intakes to buildings and air conditioners.	
35	EPA	EPA is concerned that the air quality analysis in the DEIS does not include emissions associated with the multiple collection barge trips needed to remove and transport fill	The DEIS/R did include the analysis of multiple trips moving fill from the borrow site to the project site. The FEIS/R did not require revision to the air quality

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		from the project site nor does the DEIS appear to include estimates of the number of necessary collection barge trips, distance traveled, and corresponding air emissions. *Recommendations:* The FEIS should include a revised air quality analysis and updated emissions comparison to SCAQMD significance thresholds to account for the emissions from the equipment required to transport fill. The FEIS should also commit to additional minimization measures for these emissions.	analysis.
36	EPA	Water Resources: Although a CWA Section 404 permit is not needed for the proposed action, the project must be in compliance with the CWA Section 404(b)(l) Guidelines. Also, the FEIS and ROD will serve as the basis for future permits that will be needed for maintenance of beach nourishment. Under the proposed action, sand replenishment will have to be done every five or six years to restore the design beach width and those actions may need a permit. While the project will have impacts to high value marine habitats, including special aquatic sites (defined at 40 CFR 230.3(q-1)), the Section 404(b)(1) Alternatives Analysis (Appendix A) concludes that all impacts are localized and temporary, and therefore, insignificant. There is no discussion of the basis for this conclusion. As a result of the large volumes of sand being placed on receiver beaches, the proposed project could lead to significant and unavoidable adverse impacts on surface water quality and fisheries from increased turbidity and fill in special aquatic sites. Other short-and long-term threats to water quality include construction-related containments such as oil and hydraulic fluid and increased turbidity that	The basis for the conclusion that impacts to water quality and high value marine habitats will be localized and transitory is discussed in Sections 5.3.2 and 5.4.2. The conclusions were based on modeling of predicted sediment transport from the placement site and observations made during previous beach nourishment projects in southern California on turbidity and impacts to high value marine habitats. A monitoring and mitigation program is proposed for high value marine habitats to confirm that high value marine habitats are not affected and that mitigation measures are implemented if they are. The potential impacts of turbidity and construction related contaminants are addressed in Section 5.3.2. Mitigation measures MM-WR-50-1.1 and MM-WR-50-1.2 are proposed to reduce those impacts to insignificant. As discussed in Section 4.4, subtidal surveys of the project area were conducted by Coastal Resources Management in March and June 2000 and by Chambers Group in March 2008 and July 2009. A survey of the shoreline in the project area was conducted by Chambers Group on May 18, 2008.

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		would occur during the future, associated maintenance activities for the proposed project. *Recommendations:* The FEIS should include a comprehensive biological survey of the San Clemente shoreline. The FEIS should address the potential of the project to contribute to elevated turbidity levels. The USACE should consider marine design modifications regarding factors such as location and size, to minimize these environmental impacts. Additional minimization measures for impacts to the aquatic environment should be discussed in the FEIS. Minimization measures include timing and rate of fill placement. The USACE should commit to placement in fall or winter to better mimic natural shoreline turbidity processes and reduce impacts during high recreational use times, and to develop debris management plans to ensure that the borrow site materials do not deposit trash, or other debris that may be harmful to the ocean environment.	As discussed in Section 3.4.2.3 and Section 5.3.2, project construction has been designed to minimize turbidity. The sand would be placed on the beach behind an L-shaped sand berm. Retention by the berm allows sediments to settle and greatly reduces turbidity. Construction would be during the fall or winter to reduce and avoid impacts to the marine environment.
37	EPA	Source & Quality of Beach Nourishment Materials: The DEIS briefly considers sources of sand such as onshore and offshore borrow sites (DEIS p. 3-3); however, it then goes on to state, "for this project offshore dredging would be required". Any opportunities for further minimizing impacts to the aquatic environment by using sand from other USACE permitted projects, or using sources from which the dredging might provide enhancement of environmental, navigational, or recreational conditions should be discussed in the FEIS. We note that the chemical testing of the sediments in the proposed Oceanside borrow pit occurred several years	As stated in the Geotechnical Engineering Appendix, an adequate level of analysis for borrow site selection and testing has been conducted (per USACE guidelines). Sections 3.5.1 and 3.5.2 describe methodology for borrow site selection and suitability based on both grain size characteristics and presence of contaminants. Borrow site Area 2 was found to be compatible and contains no contaminants. Section 4.2.2 describes the Bulk Chemistry borrow testing form the same USACE'03 Investigation

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		ago. Due to this lapse of time, additional testing may be necessary. The DEIS did not describe the initial sampling scheme (depth of cores, how many cores) nor whether the cores went down to anticipated dredging depth. Additionally, the table did not provide a chemical reference sample along a beach transect at the proposed receiving site. The DEIS provides insufficient discussion of the regulatory approval process of material for testing. A Sampling and Analysis Plan (SAP) for tiered testing, pursuant to the Inland Testing Manual should be required for each placement within the beach nourishment program. The SAP should examine the source material and the receiver site sediments and address tiered testing requirements (including grain size and the need for other testing) and be reviewed by the USACE, USEPA, Coastal Commission, and the RWQCB for concurrence prior to any sampling of the materials. All SAP's and approvals should be reviewed by the interagency dredging group run by the Los Angeles USACE s District (SC-DMMT). *Recommendation:* The USACE should evaluate and discuss in the FEIS the opportunity to coordinate with other projects that may produce suitable material for beach nourishment purposes. The ROD should include a commitment to consideration of opportunistic sources of beach nourishment material prior to each nourishment cycle. The discussion of the chemical testing of the proposed Oceanside borrow site should be expanded in the FEIS to include pertinent information such as core depth and number of samples. The FEIS should also describe, and the ROD should commit, to project review through an interagency	(Attachment 1 provides detailed analysis). Stephen John (EPA, personal communication) stated that since the August USACE sampling did not identify contaminants, no additional analysis is required.

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		regulatory approval process (i.e., SC-DMMT) to ensure that the sediments are suitable for ocean placement.	
38	EPA	Biological Quality Surveys and Monitoring: We acknowledge the USACE commitment to a 50 year monitoring period (over the life of the project). As discussed in the DEIS, surveys and monitoring have typically been incorporated into beach nourishment projects. The document cites the San Diego Association of Governments' (SANDAG) "monitoring data that suggest the San Clemente fill will erode on average at a rate of 12.8 feet per year (3.9 m/yr)", (p. 3-18). To counter this erosion, the DEIS states that proposed project monitoring would be required to assess replenishment schedules. However, the document does not sufficiently discuss a biological monitoring plan. This information should be included in order to evaluate the effectiveness of the proposed action in protecting biological diversity/quality. The monitoring plan should include pre-and post-project dive surveys and benthic community sampling of the borrow site and the receiver site to ensure that each benthic community returns to its pre-project density and structure. We stress that any monitoring should have appropriate adaptive management to ensure minimal impacts to aquatic resources. The Coastal Sediment Management Workgroup is currently preparing a document outlining practices to minimize impacts to aquatic resources. The adaptive management process should allow for incorporation of these practices and associated principles and any other developments in regional sediment management over the life of the project. *Recommendation:* The FEIS should include a detailed description of a	A biological monitoring plan is included as Mitigation Measure MM-BR-50-2.2. The biological monitoring plan is described in detail in Appendix B.

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		survey/monitoring program for the biological impacts of the Proposed Project, and commit to its incorporation as a required project element. The monitoring program should have a clear adaptive management strategy to ensure that the aquatic environment is protected.	
39	EPA	Endangered Species: The DEIS insufficiently evaluates the potential impacts to endangered species. For example, the document states, "No proposed or endangered species are expected to be present on the site" (DEIS p.A-lO). The basis for this statement is unclear due to the lack of a complete shoreline biological survey. *Recommendation:* The FEIS should include a comprehensive biological survey of the entire project area as well as the borrow site, including a complete review of species that may be affected by the project. The results of consultation with the United States Fish and Wildlife Service and National Oceanic and Atmospheric Administration (NOAA), if appropriate, regarding threatened or endangered species or critical habitat should be included in the FEIS. Beach nourishment activities should avoid the nesting seasons for listed species, such as the least tern.	As clearly stated and outlined in the FWS and NMFS *Endangered Species Consultation Handbook: Procedures for Conducting Consultations and Conferences Activities under Section 7 of the Endangered Species Act (*USFWS/NMFS 1998), the action agency (i.e., the Corps) makes the effects determination of the action on federal listed taxa. The ESA guidelines state that the "best scientific data available" be used in an analysis. Based on the concept of "available data," new data is not required to be collected and comprehensive biological surveys do not need to be performed, where these activities would be cost prohibitive and unreasonable. For this project, these activities would yield no new substantial information that is not already known. The project action is avoiding all listed taxa, as stated.
40	EPA	Cumulative Impacts: Given that the Project will take place over the next 50 years, the FEIS should include a comprehensive list of other projects in the area that are under construction or planned within that time frame, such as ecosystem restoration opportunities at San Elijo Lagoon, and related cumulative impacts. The DEIS states, "most of the sediment from the project is expected to accumulate on down coast beaches" (p.6-4). The feasibility of periodically replenishing beaches should be analyzed and incorporated in plans for future growth. An analysis of how future projects, in conjunction with the proposed Project,	In the project area, net littoral transport is southward. It is expected that the fill material will have the most influence immediately adjacent the fill area in the San Clemente State Beach area. The fill material will tend to slowly redistribute across the profile as it drifts southward. San Elijo Lagoon is approximately 36 miles south of the fill area. The fill quantity being relatively small is expected to have no down drift impacts to San Elijo Lagoon. Project monitoring will include transect lines outside of the fill area both north and south to monitor fill movement.

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		may cumulatively impact the health of the affected resources should be addressed in this section. *Recommendation:* The FEIS should include a comprehensive discussion of all types of reasonably foreseeable projects that may take place in the area during the construction period, such as the LOSSAN Proposed Rail Corridor Improvements, the San Elijo Lagoon restoration, and others, and predict the cumulative impacts on affected resources.	
41	EPA	Climate Change: Current research estimates that climate change could cause sea level rise and change the amount, timing, and intensity of rain and storm events. The Pacific Institute has created maps estimating flood risk due to sea level rise in the San Clemente Shoreline area; to see the map go to: http://www.pacinst.org/reports/sealevelrise/hazmaps/SanClemente.pdf *Recommendation:* The FEIS should describe and evaluate projected climate change consequences such as sea level rise, frequency of high intensity storms, and amplified rain events; their effects on the beaches; and how these effects could change re-nourishment plans for the San Clemente Shoreline Protection Project.	Sea level change is quantitatively addressed in accordance with current USACE guidance and is included in the Coastal Engineering Appendix. Sea level change analysis includes scenarios for three rates of sea level change: existing, medium, and high. The risk and uncertainty model incorporates sea level change and the model sensitivity is discussed in the main report. The recommended plan is expected is perform functionally under all 3 predicted sea level rise scenarios as explained in the report. This study assumes stationarity relative to high intensity storms and amplified rain events. In other words, this study assumes that future high intensity storms and amplified rain events will be similar in magnitude to past high intensity storms and amplified rain events. There is no USACE guidance for escalating the magnitude of future storm and/or rain events due to climate change. The risk and uncertainty model used in this analysis incorporates extreme storm events. The risk and uncertainty model randomly selects storm events based on their probability. Extreme storm events will be selected (albeit infrequently) and their impacts incorporated into the results.
42	EPA	Executive Order 11988: Floodplain Mgmnt: Per Flood Insurance Rate Maps (FIRM), portions of the	The recommended plan is located within FIRM#: 06059C0536Jand is within a VE zone with BFE 13.

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		project footprint may be in a Zone VE Coastal Flood Zone with velocity hazard with a established base flood elevation (BFE). See FIRM#: 06059C0536J Orange Co Uninc & Inc Areas 12/03/2009. Executive Order 11988 Floodplain Management requires federal agencies to avoid, to the extent possible, the long and short-term adverse impacts associated with the occupancy and modification of floodplains. For more information go to: http://www.fema.gov/plan/prevent/floodplain/nfipkeywords/zone_ve.shtm. *Recommendation:* The FEIS should discuss any impacts that the Proposed Project may have on the potential for flooding.	High velocity impacts including direct structure damages and flooding were quantitatively addressed within the risk and uncertainty model. The damage categories are fully described in the Coastal Engineering Appendix and the economic summary is fully described in the Economics Appendix. The recommended plan is designed to alleviate high velocity damages and will not induce additional flood damages. The recommended plan is not expected to encourage additional occupancy and/or development within the project footprint.
Robert S. Hoffman, Assistant Regional Administrator for Habitat Conservation, NOAA Fisheries, September 20,2010			
43	NMFS	NEPA (Affected Area): The DEIS should elaborate on the quantity of habitat affected by the proposed action. For example, the acreage of benthic habitat affected by dredging operations should be provided, Similarly, the estimated area affected by sediment placement should be provided, This estimate should account for both direct impacts associated with sediment placement and indirect impacts associated with the equilibrium footprint. In addition, the estimated rates and depth of burial within the equilibrium footprint should be provided.	The borrow area footprint is approximately 535,396 sq m (132.2 acre). The immediate fill construction footprint is approximately 102,271 sq m (25.3 acre). At equilibrium, the fill footprint for the 15 m alternative is approximately 534,401 sq m (132.0 acre).
44	NMFS	NEPA (Submerged Reef Alternative): The objectives of the proposed project are to 1) reduce storm-related damages to public and private properties and 2) enhance and maintain beach recreation and associated economic tourism benefits. The DEIS also identified a number of planning constraints that inform the evaluation criteria for the various alternatives. These constraints are 1) preserve the nearshore ecosystem that supports commercial lobster and fishing industries and snorkeling activities; 2) preserve the opportunities for surfing; 3) preserve critical habitat that supports listed species; 4) preserve water quality characteristics; 5) preserve cultural and historical	In order to be effective, a submerged reef alternative typically needs to be in relatively shallow water. Submerged reefs constructed worldwide are typically in water depths less than 6 m (20 ft). The Oil Piers project placed the submerged reef at 200 m (600 ft) offshore. At San Clemente, this depth (and distance offshore) would place an artificial reef directly on top of the natural reefs existing in the project area, including T-Street reef, thereby increasing ecosystem impacts. A properly designed submerged reef would reduce

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		features; and 6) preserve air quality conditions. The DEIS then incorporated the objectives and constraints of the project into the following evaluation criteria: addresses purpose and need, technical feasibility, economic feasibility, environmental impacts, and public acceptability. Of the alternatives identified, NMFS believes additional analysis of the submerged reef alternative is warranted. Moreover, additional justification should be provided for the comparisons and conclusions made for the varying alternatives, as summarized in Table 3-1. NMFS is aware of initial planning efforts in Ventura County (i.e. Oil Piers) and northern San Diego County (i.e. Fletcher Cove) to evaluate the application of submerged reefs for beach protection and other benefits. The initial documents prepared for these projects support the potential feasibility of this approach. Moreover, submerged reefs provide additional habitat benefits and, if designed properly, may improve surfing conditions. According to a report developed for the Corps planning process for the Oil Piers Ventura County project, studies of benefits associated with the construction of multi-purpose reefs at various locations around the world have all shown significant benefit/cost ratios. The lowest was approximately 20: 1 for a small reef in Bournemouth, UK, to over 60: I for the Narrowneck reef on the Gold Coast, Australia. A recent report for a multipurpose reef in Wellington, New Zealand, estimated a conservative benefit to cost ratio of 24:1. Although NMFS does not believe submerged reefs are a panacea for erosion control, they may impede erosion at local scales. They minimize many negative aspects of other erosion control methods and have the potential to benefit ecosystems, tourists and local communities. Thus, NMFS believes this alternative warrants further discussion and evaluation in the DEIS.	wave energy in the lee of the structure with possibly ancillary benefits to recreation. Wave energy reduction in the structure lee would aid retainage of sand on the beach; however, this reduction would not eliminate the need for sand placement and/or nourishment. A beach fill would still be required. A beach fill of approximately 11,000 cu m along approximately 340 m of beach was proposed for the Oil Piers Submerged Reef Project. Based on a comparison of the beach fill to beach length, as well as the requirement to place an artificial reef on top of existing natural reefs, a submerged reef alternative would have greater impacts to the project environment than the proposed action.

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45	NMFS	NEPA (Analysis): Balancing Ecosystem Services The proposed project involves some inherent trade-offs. Protection of existing infrastructure and maintaining recreational opportunities associated with beach usage are obvious ecosystem services that may be provided by this project. However, repeated beach till projects may have an environmental cost to various natural resources (e.g. surfgrass, rocky reefs, intertidal and shallow subtidal invertebrate assemblages, fishery resources). These costs need to be incorporated into the analysis to ensure the benefit to cost ratio is not skewed. Prior to the commitment of federal resources, a clear evaluation should be provided that examines the expected costs over the long-term. Without such an analysis, it would be difficult to accurately predict whether the proposed project would be in the public's best interest.	According to USACE guidelines, the economic evaluation of all proposed alternatives need to account for all the positive and negative impacts related the implementation of the project. Therefore, the economic analysis included the benefits of reducing damages to the infrastructure and increasing recreational opportunities in the project area due to the implementation of the recommended project. In addition, the economic analysis should include any mitigation costs that would account for any negative impact due to implementation of the recommended project. The mitigation costs will include all the activities that will be needed to resolve any expected negative impacts due to the implementation of the Project. Currently, the environmental evaluation of the recommended project has identified not any specific environmental impacts due to project but has recommended that costs for monitoring should be accounted for in the overall costs for the project. Therefore, the benefit/cost ratio for the recommended plan includes the extra costs for monitoring of possible negative impacts due to the implementation of the project.
46	NMFS	NEPA (Analysis): Adequacy of Monitoring Studies Peterson and Bishop (2005) reviewed 46 beach monitoring studies and showed that 1) only 11 percent of the studies controlled for both natural spatial and temporal variation in their analyses; 2) 56 percent reached conclusions that were not adequately supported; and 3) 49 percent failed to meet publication standards for citation and synthesis of related work. They opined that regulatory and resource agency practices are in urgent need of reform as the risk of cumulative impacts grows in the face of sea level rise, climate change, and increased coastal development. NMFS notes that, with the exception of one project from the 1970s, all the studies that were reviewed	The southern California studies cited in the document used fixed transects. Therefore, if a change on a transect is observed, the biologists can be confident that a change actually occurred and is not the result of spatial variation. What is much more difficult is to determine the cause of a change because numerous natural events affect marine communities. No southern California studies have detected major degradation of marine resources following a beach nourishment project. Therefore, the weight of the evidence does not suggest that such degradation will occur from the San Clemente project. In addition, the Corps considered sea level rise as provided in the guidance in Engineer Circular “Water

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		were on the Atlantic or Gulf coastlines. Thus, their results may not be directly applicable to projects implemented in Southern California. However, NMFS shares the concerns expressed by the authors that the presumption that nourishment projects are ecologically benign may be based upon an incomplete and flawed body of science. If previous monitoring results in Southern California are to be used as support for conclusions that impacts to biological resources are minor and/or insignificant, NMFS believes a more rigorous examination of their sampling design, statistical analyses, and conclusions are necessary.	Resource Policies and Authorities Incorporating Sea-level Change Considerations in Civil Works Programs" (2009). The circular identifies that sensitivity of alternative plans and designs to the rates of future local mean sea level change should be determined. Design or operations and maintenance measures should be identified to minimize adverse consequences while maximizing beneficial effects. For each alternative sensitive to sea level change, potential timing and cost consequences should be evaluated during the plan formulation process.
47	NMFS	NEPA (Analysis): Cumulative Impact Analysis: The cumulative impact analysis does not include the opportunistic program that has recently been permitted by Corps Regulatory Division (SPL-2004-00838-JPL). This is a 5-year opportunistic beach nourishment program to place a maximum of 300,000 cubic yards of sediment per year on four different sites within the coastal zone of the City of San Clemente. This project would use opportunistic fill sources and cover a maximum of 29 acres of tidal habitat. The disposal sites include one at North Beach, one at Linda Lane, and two at T-Street. In addition, a stockpile site is proposed near the intersection of Avenido Pico and El Camino Road. Given the spatial overlap and proximity, NMFS believes this program should be evaluated within the cumulative impact analysis. In addition, the DEIS should evaluate how climate change may affect the frequency of nourishment events. Sea level rise, increased frequency and severity of storms, and increased wave height are expected climate change impacts that may exacerbate existing beach erosion rates and may increase the frequency of nourishment events. These may all affect the fate of sediment placed for beach	The opportunistic program is not included in the cumulative impacts analysis because if the project proposed in this EIS/EIR occurs, the opportunistic program would not place sand on project area beaches. There will not be two beach nourishment projects occurring concurrently within this project area. The Corps considered sea level rise as provided in the guidance in Engineer Circular "Water Resource Policies and Authorities Incorporating Sea-level Change Considerations in Civil Works Programs" (2009). Historic trends at San Diego, California indicate a positive sea level rise of +2.45 mm/yr based on water level measurements during the period 1950-1999. If past trends are projected into the future at San Diego, a sea level rise of 0.12 m (0.4 ft) would be expected during the 50 year period of economic analysis. The NRC Curve III estimates sea level rise, during the 50 year economic period of analysis, to be 0.70 m (2.3 ft). Relative sea level rise has project impacts from two primary considerations: 1) long-term beach erosion, and 2) increased wave run-up and overtopping. The effects of sea level rise are addressed in Appendix D of the EIS/EIR.

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		nourishment purposes and subsequent movements into the nearshore environment and should, thus, be considered in the cumulative impact analysis.	The Recommended (NED) Plan is formulated on the basis of continuous monitoring of beach fill erosion and renourishment. This monitoring would be expected to identify any rapid change in sea level through an unanticipated change in renourishment requirements. Although sea level change should be identified through the frequency of renourishment, the Recommended (NED) Plan still requires an assessment of how sensitive its performance is to sea level change. To examine the NED Plan under sea level change a sensitivity analysis was performed , based on the NRC Curve III, assuming a maximum sea-level rise of 0.70 meters over 50-years, as a point of reference the base case assumes a sea-level rise of 0.12 meters. This sea level change was incorporated into the model along with an adjustment to the construction cost of the seawall and simulated over the array of alternatives. Based on the model optimization and analysis of the costs and benefits the 50 ft beach width alternative has the greatest economic benefits and is the NED Plan for both the base sea level case and the max sea level case. If max sea level rise did occur during the 50 year life of the project then the NED plan could be adjusted to meet the max sea level rise case. For a project such as a beach nourishment project for which the beach is typically re-nourished every 5-10 years, the local mean sea level will be reevaluated every 5-10 years (in this case every 6 years), prior to renourishment, and accommodation for sea-level rise can be made during each renourishment period. The effects of the maximum sea-level rise case on the NED Plan are relatively minor. The number of fills over the project life increase from 9.11 to 9.66 with maximum sea-level rise.
48	NMFS	NEPA (Analysis): Environmental Commitments:	Section 7 of the DEIS/DEIR has been amended to include environmental commitments for biological

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		Section 7 of the DEIS identifies a variety of environmental commitments for the proposed action. However, no commitments are provided to address biological resources. NMFS recommends that this section be amended to include mitigation measures for biological resources.	resources.
49	NMFS	Endangered Species Act: Section 7 of the Endangered Species Act (ESA; see 16 U.S.C. § 1536(a)(2» requires federal agencies to consult with the Secretary of Commerce and/or the Secretary of the Interior to insure that "any action authorized, funded, or carried out by such agency ... is not likely to jeopardize the continued existence of any endangered species or threatened species .... " *See also* 50 C.F.R. part 400. In Section 4 of the Joint DEIS/DEIR, the following ESA-listed species were described as having the potential to occur in the nearshore waters off San Clemente and Oceanside, CA: Guadalupe fur seal *(Arctocephalus townsendi),* blue whale *(Balaenoptera musculus),* fin whale *(B. physalus),* humpback whale *(Megaptera novaeangliae),* Steller sea lion *(Eumetopias jubatus),* northern right whale *(Eubalaena glacialis),* sei whale *(B. borealis),* sperm whale *(Physeter macrocephalus),* loggerhead sea turtle *(Caretta caretta),* green sea turtle *(Chelonia mydas),* Pacific olive ridley sea turtle *(Lepidochelys olivacea),* leatherback sea turtle *(Dermochelys coriacea),* and white abalone *(Haliotis sorenseni).* Black abalone *(Haliotis cracherodii)* was listed as endangered under the ESA on January 14,2009 (74 FR 1937) and should also be included as having the potential to occur in the project area. If the Corps determines that their proposed project may affect any ESA-listed species under NMFS' jurisdiction, including whales, seals, sea lions, abalone and sea	As part of the responsibilities under the ESA Section 7 consultation process, the Corps has made a no effect determination of the project implementation on the listed marine mammals discussed in Section 4. The discussion of no effect on these marine mammals is detailed in Section 5. Currently, black abalone does not occur within the project area. The proposed rule for listing critical habitat for the black abalone indicates that nearest locale is the Palos Verdes Peninsula to Los Angeles Harbor region. They currently do not occur on the rocky reef within the project area and the potential to occur remains negligible.

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		turtles, the Corps should request concurrence from NMFS.	
50	NMFS	Marine Mammal Protection Act: Whales, dolphins, porpoises, seals, and sea lions are protected under the MMP A. *See 16* U .S.C. § 1361 *et seq.* Under the MMP A, it is generally illegal to "take" a marine mammal without prior authorization from NMFS. "Take" is defined as harassing, hunting, capturing, or killing, or attempting to harass, hunt, capture, or kill any marine mammal. Except with respect to military readiness activities and certain scientific research conducted by, or on behalf of, the Federal Government, "harassment" is defined as any act of pursuit, torment, or annoyance which has the potential to injure a marine mammal in the wild, or has the potential to disturb a marine mammal in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering. Harassment of marine mammals may occur if hauled animals flush the haul out site and/or move out of the immediate aquatic area to increase their distance from dredging related activities, such as noise associated with the dredging, presence of workers, or unfamiliar activity in proximity to a haul out site. The measured sound exposure levels of a clamshell dredge may range between 75-88 dBA (re 20 iJPa) at 50 feet. Animals have been observed flushing from haul out sites at a sound exposure level of less than 100 dBA, and it is possible that marine mammals may modify their behavior as a result of the noise produced by the dredging operations. NMFS recommends including detailed information on the expected impacts that dredging will or will not have on marine mammals. The DEIS/EIR indicated that it is expected that marine mammals in the vicinity of the project area, specifically	The dredge area is not in the vicinity of any marine mammal haul out sites. Although marine mammals possibly could be present in the dredging area, the site has not been identified as one of importance to any marine mammal species. The area is offshore Camp Pendleton and Oceanside Harbor where large vessels capable of disturbing marine mammals come and go on a regular basis. Disturbance to marine mammals from the dredging would be minimal. The surf zone where turbidity from sand placement would temporarily occur is often naturally turbid and beach placement activities would occur during late fall and winter when turbidity is most likely to occur. Turbidity, natural or man-made, is assumed to impact marine mammals; however, because of the time of year when the project would occur, and the temporary nature of the impact, effects on marine mammals would be minimal. An Incidental Harassment Authorization under the Marine Mammal Protection Act has not been required for similar beach nourishment projects.

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		gray whales *(Eschrichtius robustus),* would be expected to avoid the immediate vicinity of the dredging area, and that the turbidity plumes from the project would have an adverse impact on bottlenose dolphins *(Tursiops truncatus).* Please note the definition of a "take" under the MMP A and that the rapid exit from the project area could be considered harassment under the MMP A. In addition, avoidance is not considered a mitigation measure to reduce impacts to marine mammals should the action cause harassment and animals avoid the project area. Please provide more detail as to why the turbidity plumes would have an adverse impact on bottlenose dolphins. Based on the information provided in the DEIS/EIR regarding the potential take of marine mammals, it may be necessary to receive authorization from NMFS under the MMP A for this proposed project.	
51	NMFS	Magnuson-Stevens Fishery Conservation and Management Act (Action Area): The proposed project occurs within EFH for various federally managed fish species within Coastal Pelagic Species, Pacific Groundfish Species, and Highly Migratory Species Fishery Management Plans (FMPs). In addition, the project occurs within areas designated as habitat areas of particular concern (HAPC) for various federally managed fish species within the Pacific Groundfish FMP. HAPC are described in the regulations as subsets of EFH which are rare, particularly susceptible to human-induced degradation, especially ecologically important, or located in an environmentally stressed area. Designated HAPC are not afforded any additional regulatory protection under MSA; however, federal projects with potential adverse impacts to HAPC will be more carefully scrutinized during the consultation process. As defined in the Pacific Groundfish FMP, San Clemente contains the following types of HAPC: surf grass, rocky reef and canopy kelp.	The FEIS/R uses the best scientific data available for inclusion into the analysis. The Corps' marine ecology contractor conducted several dives along 25 transects, as noted in the FEIS/R. These field data were more than reconnaissance level field investigations. The data clearly and unequivocally captures the distribution extent of rocky reef, single boulders, and the extent of surfgrass distribution. The larger rocky reef was delineated by divers floating buoys to the surface demarcating the approximate edge of the reef and a biologist in a kayak at the surface recording GPS points of the surfaced buoys. There are 12 GPS points that delineated the approximate area of the T-Street Rocky Reef. Rocky intertidal habitat is addressed in Section 5.4.2. Because sand transport is expected to be primarily to the south, significant rocky intertidal upcoast of the project area is not expected to be impacted by sand placement. The extensive reef and kelp offshore San Clemente pier was mapped and is shown in Figure

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		Figure 4.4-2 depicts the observed surf grass in relationship to the dive transects, expected impact area (i.e. equilibrium footprint), and kelp habitat. Scattered surfgrass amongst boulders have been observed in the northern portion of the Linda Lane impact area. More extensive rocky reef and surf grass habitat occur in the southern portion of the impact area at T - street. The survey information provided does not delineate areal extent of rocky reef and surfgrass within the impact area. Appendix B estimated the T –street reef to be 5 acres. No quantification of area and/or coverage was provided for the scattered boulders and surfgrass habitat. Rocky intertidal and more expansive subtidal rocky reef and associated kelp habitat exists in areas immediately adjacent to the expected impact area.	4.4-2. The scattered boulder and surfgrass habitat occurs throughout the shallow water area offshore the sand placement site. This area was characterized by several subtidal transects. The area is mostly sand with scattered boulders throughout the area at relatively low density. The entire area appears to be bedrock covered by a shallow sand layer that shifts. The lack of encrusting biota on many of the boulder suggests that rocks are covered and uncovered periodically. There currently is no available data that depicts or illustrates the rocky reef or surf grass of the entire locale. NMFS recommended using the San Diego Nearshore Program data from the UC San Diego website. The use of the website with these data was not recommended until 31 Janaury 2011, after two years of coordinating with NMFS. In a comparison of the data from the Nearshore Program (http://nearshore.ucsd.edu) to data collected from project surveys, the Nearshore Program data justifies and compliments the Corps mapping distribution of the rocky reef and single boulders. The attached noted illustrations (RTC Exhibit A) show the Corps surfgrass survey results along with the outer T- Street reef in comparison to the Nearshore Program data from the UC San Diego website. The large kelp bed mapped by the Corps Figure 4.4-2 in the FEIS/R is, in fact, more detailed and in the same geographic distribution alignment as the UCSD Nearshore program raster data. Furthermore, the Corps data is much more detailed in is distribution from the shoreline 500 feet off-shore, whereas the UCSD Nearshore data has little, if any, data within the area that is 500 feet from shore. The Corps acknowledges that there are scattered

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			rocks within and outside the equilibrium footprint and the total acreages of those scattered rocks are not expected to change the data analysis. Nevertheless, the Corps may, during the PED phase, utilize the Corps ERDC Submerged Aquatic Vegetation Early Warning System, which is a semi-automated acoustic-based measurement system that can detect and characterize submersed aquatic vegetation (SAV) while operating from a small survey boat. It uses an off-the-shelf digital echo sounder, with a narrow single-beam high-frequency transducer, and global positioning system (GPS) equipment to digitally record echo intensity and position data on a laptop. Software developed at the U.S. Army Engineer Research and Development Center (ERDC-EL) processes the distinct signature of SAV within the recorded signal to determine depth, plant height, and plant coverage every few meters along transect lines.
52	NMFS	Magnuson-Stevens Fishery Conservation and Management Act (Effects of the Action): Based on information provided in the EFH assessment and developed during consultation, NMFS concludes that proposed action would adversely affect EFH for various federally managed species within Coastal Pelagics Species, Highly Migratory Species, and Pacific Groundfish FMPs. Dredging will disturb benthic organisms within the project footprint via direct removal or indirect mortality from an associated turbidity plume. Sediment from the beach fill project will be redistributed by wave and tidal energy onto nearshore areas, which may bury rocky reef habitat, surfgrass habitat, and benthic organisms that serve as prey for a variety of fishery species. In addition, turbidity generated from the beach fill will adversely affect the light regime in the immediate nearshore area, which may reduce the quality and/or quantity of surfgrass and kelp habitat.	During the two year coordination meeting efforts, the Corps consulted with the NMFS on the EFH as required. The NMFS was part of the EFH process and did not express the concerns identified in this comment and subsequent comments regarding “Effects of the Action” during the EFH coordination two year timeframe. The Corps analyzed all alternatives (35 meter to 5 meter in 5 meter increments). The 15 meter alternative was the environmentally least impacting while maintaining the benefit/cost ratio required by the Corps policy. The borrow site is immediately off-shore from the Oceanside Harbor, an area of maximum disturbance by vessel traffic, including MCBCP Landing Craft, Air Cushion (LCAC) Transport. The Del Mar - Boat Basin, as well as Oceanside Harbor, has undergone harbor dredging for many decades and the fish populations in the nearshore environment persist. The dredging operations proposed in this project action

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			are similar to, and not greater than, on-going dredging activities at the Oceanside Harbor Dredging borrow site. A revised monitoring, mitigation, and reporting plan has undergone several iterations reviews, several by the resources agencies and by the Crops SPD, HQ, and ERDC.
53	NMFS	Surf grass habitat is likely to be impacted by beach nourishment and shoreline protection projects that place sand either directly or indirectly onto surf grass beds (Craig et al 2008). As described in the 404(b)(1) Guidelines, the discharge of dredged or fill material may reduce the value of vegetated shallows as nesting, spawning, nursery, cover, and forage areas, as well as their value in protecting shorelines from erosion and wave actions. In addition, the primary productivity of the system would be reduced if impacts were to occur. Surfgrasses exhibit late successional traits, recover very slowly from disturbance, require facilitation from algae before settling, and are strong competitors (Turner 1985). Removal of surfgrass from a rocky reef community has profound impacts to community structure (Turner 1985). Thus, surfgrass habitat is largely determined by patterns of disturbance. Repeated beach nourishment efforts likely will increase this rate of disturbance to these systems. Slow recovery times suggest that disturbances to these communities may be ecologically significant. The DEIS acknowledges that some burial will occur and that the inshore areas of the impact area will be most affected by burial. However, the DEIS asserts that the proposed action will not result in a long-term net loss in habitat value of surfgrass. In addition, it states that the proposed project will have no significant adverse effects on special aquatic sites. NMFS does not believe these conclusions are adequately supported by the analysis.	There is little surfgrass in the scattered rock and sand area. The surfgrass is confined to occurrence on some of the boulders within this area. The exposed rocks are themselves not dense and difficult to quantify. The only actual surfgrass bed within the project area is that which was mapped on T-street Reef. The potential for impacts to this reef was discussed in Section 5.4. The DEIS/R acknowledged that there may be some impacts to surfgrass habitat, particularly in the shallower portions of the reef. The mitigation, monitoring and reporting plan in the FEIS/R provides for the monitoring of surfgrass habitat and mitigation if persistent impacts are documented.

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		Previous predictions of burial associated with placement of 175,000 cubic yards were described in the DEIS that indicated an estimated maximum 1 foot burial of surfgrass for less than six months. Short term burial at depths of 0.8 feet exhibited a statistically significant decline in shoot count within a laboratory setting (Craig et aI, 2008). Furthermore, the DEIS indicates that some portions of surf grass habitat within the equilibrium footprint already exhibit some burial. Thus, the additive impact associated with this beach fill project may exacerbate existing conditions for surf grass habitat. Based upon the above and that the proposed project involves approximately 40% more sediment than previous predictions, NMFS believes the proposed project would reduce the quality of surfgrass habitat in the project vicinity. Given the uncertainties associated with modeling, there is also a real potential for reductions in the quantity of surf grass habitat. Galst and Anderson (2008) have suggested that surf grass is important for nearshore fish communities and reductions in surf grass could negatively affect recruitment patterns. Specifically, experimental reductions in coverage of seagrass (ranging from 7 to 180 square meters) resulted in significant decreases in the density of newly recruited fish species. Similarly, NMFS expects reductions in coverage and/or density may reduce other ecological services provided by surfgrass, such as primary productivity, substrate for epibiota, and wave energy dissipation.	
54	NMFS	To date, NMFS is unaware of any comprehensive survey to delineate surfgrass and rocky reef in the project area. According to Appendix B of the DEIS, which describes a biological resources monitoring program, the general area of the T -street reef is approximately 5 acres. Appendix B further states that potential burial of the inshore edge of T - Street is uncertain, but, if it were to occur, it would be expected to occur in the approximately 20 percent inshore edge of the T -street reef area. Scattered patches of rocky	There is little surfgrass in the scattered rock and sand area. The surfgrass is confined to occurrence on some of the boulders within this area. The exposed rocks are themselves not dense and difficult to quantify. The only actual surfgrass bed within the project area is that which was mapped on T-street Reef. The potential for impacts to this reef was discussed in Section 5.4. The mitigation, monitoring and reporting plan in the FEIS/R will document the

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		reef and surfgrass may also exist in other areas of the footprint, but no estimates are given to quantify the extent of the impact. Given the lack of detailed habitat characterization and uncertainty associated with burial predictions, it is difficult to estimate the quantity of surfgrass habitat that may be affected. Hard-bottom habitats, such as rocky reefs, are present within and adjacent to the project area. These hard-bottom habitats provide substrate for a diversity of algae and invertebrate species, which are utilized by a number of different fish species. Many organisms adapted to rocky reef habitats are highly susceptible to burial and/or sediment scour. Thus, burial and/or increased scour may diminish the ecological functions provided by rocky reefs. Some increased level of burial and/or scour is expected to occur to rocky reef areas within the equilibrium footprint. However, the DEIS suggests that the proposed action will have only minor transitory effects, but acknowledges that unforeseen impacts may occur and that resource monitoring is appropriate. Significant burial is not expected in the rocky intertidal areas near Mariposa Point or the more extensive subtidal rocky reefs and kelp habitat found near Mariposa Point and immediately offshore (approximately 1,000 to 1,300 feet from the beach) of the estimated impact area.	amount of surfgrass habitat impacted by the project and would provide for mitigation if impacts persist.
55	NMFS	The proposed project will increase turbidity within the project area due to dredging and beach fill operations. Based upon monitoring conducted at another dredging operation in Oceanside, the estimated average down coast distance of the turbidity plume was between 272 and 329 feet. Turbidity monitoring of a hopper dredge operation for a regional beach sand project indicated that plumes did not exceed 2,700 square yards (0.56 acres). Construction monitoring during a regional beach sand project indicated that turbidity plumes ranged between 2,640 and 10,000 feet and were largely confined to the surf zone. Beach nourishments create turbidity plumes, an	Impacts from dredging were addressed in Impact BR-50-4. The DEIS/R stated that "[r]ecovery of the benthic invertebrate community would be expected to begin almost immediately with settlement of larvae and immigration of mobile species from nearby unaffected areas. Recovery of the infaunal community to values comparable to pre-dredging levels may occur in as little time as six months or as long as two years, with an average of about one year (CSLC, USFWS, and USACE 2001). The impact of dredging on invertebrates is not significant because the affected area would be small and the biota would

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		area of water with a high concentration of suspended sediments that can last for days and cover habitats adjacent to the project site. Turbidity decreases light penetration and therefore has adverse effects on seagrass and canopy kelp habitats. These plants form the basis of highly productive systems and any losses would adversely affect nearshore EFH. In addition, turbidity plumes may alter fish behavior. Many fishes wi1llikely disperse away from the turbidity plume as fine particulates can clog gill rakers and decreased visibility can make foraging more difficult. Sessile, filter feeding invertebrates may experience mortality, as suspended sediments can clog feeding apparatus.	recover quickly. There would not be a discernible impact on the population of any species."
56	NMFS	Impacts to rocky reef, surfgrass, and/or kelp habitat may also occur if anchor moorings and/or the slurry pipeline were placed on these sensitive habitats. The DEIS indicates that placement of moorings and pipelines shall avoid these sensitive habitats. However, a more detailed and comprehensive habitat survey should be conducted to properly delineate the areas to avoid.	As discussed in Section 5.4, prior to the placement of the pipeline that will pump the sand to shore from the hopper dredge, a detailed survey will be done of the area proposed for the pipeline and a route will be identified that minimizes impacts to rocks and surfgrass.
57	NMFS	California grunion *(Leuresthes tenuis)* spawn on sandy beach habitats throughout the Southern California Bight every year from March to August. On full and new moons, eggs are deposited in the sand above the high tide line shortly after spring high tides. Two weeks later, corresponding with spring high tides, larval grunion hatch from eggs and return to the water. Beach nourishment can cause mortality by burying developing eggs. Heavy machinery and other disturbances during construction could also kill developing or juvenile grunion. However, the proposed project would not impact grunion spawning because it has committed to occur outside the grunion spawning season of March to August.	Comment noted.
58	NMFS	EFH Conservation Recommendations: As described in the above effects analysis, NMFS has determined that the proposed action would adversely	The monitoring and mitigation plan in Appendix B has been revised to include mitigation for loss of surfgrass and reef habitat. If surfgrass mitigation fails, a contingency plan has been developed to plant kelp on

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		affect EFH for various federally managed fish species within the Coastal Pelagics, Highly Migratory Species, and Pacific Groundfish FMPs. Therefore, pursuant to section 305(b)(4)(A) of the MSA, NMFS offers the following EFH conservation recommendations to avoid, minimize, mitigate, or otherwise offset the adverse effects to EFH. 1) Given the high ecological values associated with surfgrass and rocky reef habitat, NMFS believes unavoidable reductions in quantity and/or quality of these habitats should be addressed via compensatory mitigation. The Corps and project sponsor should develop a contingency mitigation plan in consultation with NMFS and other interested agencies prior to the record of decision for the proposed project. The contingency mitigation plan should be based upon a reasonable estimate of potential impacts to rocky reef and surfgrass habitat. This estimate should be developed and agreed upon by Corps, NMFS, and other interested agencies prior to the record of decision for the proposed project. This estimate may then be used as the basis for determining the approximate cost of implementing a mitigation project and should be incorporated into the benefit to cost ratio of the proposed project. In addition, the estimated cost can serve as the basis for providing financial assurances that will ensure a high level of confidence that the compensatory mitigation project will be completed if impacts are observed. c. The Corps and/or the project partner should include in-kind surfgrass restoration, establishment, and/or enhancement as part of the mitigation plan. According to the 2008 mitigation rule, compensatory mitigation is defined as the restoration (re-establishment	an offshore reef.

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		or rehabilitation), establishment (creation), enhancement, and/or in certain circumstances preservation of aquatic resources for the purposes of offsetting unavoidable adverse impacts which remain after all appropriate and practicable avoidance and minimization has been achieved. The rule suggests that compensation for unavoidable impacts to difficult to replace (DTR) resources (e.g. bogs, fens, springs, streams, etc.) should be provided through in-kind rehabilitation, enhancement or preservation. Given the slow recovery time and the difficulties associated with restoring this habitat, NMFS believes that surfgrass should be considered a DTR resource. Therefore, NMFS believes the Corps and/or the project partner should include in-kind surfgrass restoration or establishment as part of the mitigation plan. b. Given the uncertainty associated with surfgrass mitigation success, the Corps and/or the project partner should develop a contingency plan should surfgrass mitigation efforts fail. Based upon discussions with the Corps, kelp mitigation may be the most appropriate out-of-kind approach if in-kind mitigation does not yield positive results. Therefore, the Corps and/or the project partner should design an artificial reef capable of supporting kelp habitat that would offset similar ecological functions that were lost due to surfgrass impacts. c. The Corps and/or the project partner should coordinate with NMFS and other interested agencies to determine an appropriate mitigation ratio for impacts to surfgrass and rocky reef habitat. 2) A scientifically defensible monitoring plan should be developed prior to a record of decision on the proposed project.	

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		The purpose of the monitoring plan is to detect environmental impacts associated with the proposed project and serve as the basis for determining whether compensatory mitigation is appropriate. Results from the monitoring plan will inform the development of a final mitigation plan, which will be based upon the approach described in the contingency mitigation plan. The monitoring plan should be described in greater detail than the program currently described in Appendix B. The sampling design and statistical analyses should be clearly described and should be based upon fundamental principles of statistical inference. This monitoring plan should be reviewed and approved by the Corps, NMFS, and other interested resource agencies prior to a record of decision. In addition, to ensure adequate scientific rigor, consideration should be given to involving an independent review by recognized, biostatistical experts.	
59	NMFS	EFH Conservation Recommendations (Statutory Response Requirements): Please be advised that regulations at section 305(b)(4)(B) of the MSA and 50 CFR 600.920(k) of the MSA require your office to provide a written response to this letter within 30 days of its receipt and at least 10 days prior to final approval of the action. A preliminary response is acceptable if final action cannot be completed within 30 days. Your final response must include a description of measures to be required to avoid, mitigate, or offset the adverse impacts of the activity. If your response is inconsistent with our EFH conservation recommendations, you must provide an explanation of the reasons for not implementing those recommendations. The reasons must include the scientific justification for any disagreements over the anticipated effects of the proposed action and the measures needed to avoid, minimize, mitigate, or offset such effects.	Comment noted.
60	NMFS	EFH Conservation Recommendations (Supplemental	If the project changes substantially, EFH consultation

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		Consultation): Pursuant to 50 CFR 600.920(1), the U.S. Army Corps of Engineers must reinitiate EFH consultation with NMFS if the proposed action is substantially revised in a way that may adversely affect EFH, or if new information becomes available that affects the basis for NMFS' EFH conservation recommendations.	will be reinitiated.
61	NMFS	Fish and Wildlife Coordination Act Comments: The purpose of the FWCA is to ensure that wildlife conservation receives equal consideration, and is coordinated with other aspects of water resources development [16 U.S.C. 661]. The FWCA establishes a consultation requirement for federal departments and agencies that undertake any action that proposes to modify any stream or other body of water for any purpose, including navigation and drainage [16 U.S.C 662(a)]. Consistent with this consultation requirement, NMFS provides recommendations and comments to federal action agencies for the purpose of conserving fish and wildlife resources. The FWCA allows the opportunity to offer recommendations for the conservation of species and habitats beyond those currently managed under MSA and ESA. According to Subpart E Section 230.43 of the Section 404(b)(1) Guidelines for Specification of Disposal Sites for Dredged or Fill Material (404(b)(1) Guidelines), vegetated shallows are considered special aquatic sites (SAS). SAS are geographic areas, large or small, possessing special ecological characteristics of productivity, habitat, wildlife protection, or other important and easily disrupted ecological values. These areas are generally recognized as significantly influencing or positively contributing to the general overall environmental health or vitality of the entire ecosystem of a region. This status provides special consideration when evaluating actions involving dredged	As stated, the purpose of the FWCA is to ensure that the fish and wildlife resources receive consideration in project alternative development and selection. The FWCA is an action that is taken between the FWS and the Corps, not the NMFS; these comments are noted, but inappropriate for the purposes of FWCA. Furthermore, the Corps San Clemente Shoreline Protection has, in fact, considered the fish and wildlife resources in the alternative development and selection. FWS, as well as other resources agencies, were invited and/or attended several coordination meetings in which the coastal engineering profiles were presented, given, and discussed with the resources agencies, of which NMFS was included. Effects of the project implementation of each alternatives (35m, 30m, 25m, 20m, 15m, 10m, and 5m) were discussed and the effects to fish and wildlife, including EFH as well as federal and state listed taxa, including grunion spawning season. As the action agency, the Corps has made a “no effect” determination on federal listed taxa, including green sea turtles, which are thoroughly discussed in Section 5 of the FEIS/R. Fish and wildlife resources were considered in the alternative selection by reducing the effects of the project on fish and wildlife from the 35 meter to the 15

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		or fill material pursuant to Section 404 of the Clean Water Act. Vegetated shallows are defined as permanently inundated areas that under normal circumstances support communities of rooted aquatic vegetation. NMFS believes surfgrass should be considered a SAS and receive special consideration when evaluating actions involving discharge of dredged or fill material. Surfgrasses are considered to be among the most productive seagrass systems on the planet (Ramirez-Garcia et al. 1998). Galst and Anderson (2008) indicate that surfgrass beds serve as an important habitat for nearshore fishes, and the loss of surfgrass from disturbance has negative consequences for recruitment success. Surf grass also serves as an important nursery habitat for a variety of invertebrates, such as California spiny lobster (Engle 1979, as cited in MPLA Initiative 2009), and as habitat for algae (Stewart and Myers 1980, as cited in MLPA Initiative 2009). Shaw (1986) suggests that the importance of surfgrass as a nursery for juvenile lobsters in southern California is clearly apparent and the disturbance or destruction of this habitat could seriously decrease lobster abundance. Surfgrass is also important foraging habitat for the endangered green turtle on the Pacific side of the Baja Peninsula (Lopez-Mendilaharsu et al2005). Although utilization of nearshore habitats in southern California is less understood, sub-populations of the endangered green turtle are known to utilize San Diego Bay and the Long Beach area for foraging. If surfgrass serves a similar function in southern California, then adverse effects to surfgrass habitat may have a negative impact on habitat used by this listed species. NMFS has determined that rocky reef and surfgrass habitat may be negatively impacted by proposed project activities. As such, EFH Conservation Recommendations provided above also serve as FWCA recommendations to	meter alternative. Effects of the project implementation for each of the alternatives were discussed with special emphasis on rocky reef and surfgrass with emphasis with the FWS, who is responsible under FWCA to prepare the Coordination Act Report (CAR) and in which the Corps has a MIPR to prepare the CAR. A functional assessment habitat evaluation using best professional judgment was accomplished and is presented in the summary of the FEIS/R. The conclusions of implementing the 15 meter alternative are based on this functional assessment habitat assessment in which the conclusion is that there will be no impacts to rocky reef or surfgrass due to project implementation of the 15 meter alternative. It is the FWS responsibility to coordinate their actions with the CDFG and the NMFS. The NMFS comments were given to the Corps before the Corps received the FWS's draft CAR. Lastly, the FWCA is very clear that the FWS presents the action agency with recommendations that are discretionary for implementation and are recommendations, not requirements. At the 31 Janaury 2011 project conference between the Corps and the resources agencies, there were agreements and non-agreements to the FWCA draft CAR recommendations. As previously stated, a MMRP has undergone several reviews and revisions from the resources agencies as well as Corps's internal review with SPD, HQ, and external review with the Los Angeles District ATR review team. The document has undergone external (outside the Corps) review and currently is being

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		compensate for these negative impacts.	reviewed by the Corps ERDC Submerged Aquatic Vegetation Restoration Research Program. The revised MMRP is found as Appendix B and implementation will commence implementation in the PED phase. The Corps LAD will employ the services of the Corps ERDC Submerged Aquatic Vegetation Restoration Research Program for implementation of the MMRP, including development of mitigation triggers and success criteria alongside the resources agencies. Most importantly, it must be determined if impacts to rocky reef and surfgrass with project implementation will occur. Monitoring of rocky reef and surfgrass will commence two years prior to project implementation at the project site as well as the reference site. It must be noted and understood that the best scientific information was used in the coastal engineering model that has been certified by knowledgeable and experienced experts. A more robust functional assessment habitat evaluation will be performed during the PED phase.
State Agencies			
Cy R. Oggins, Chief, Division of Environmental Planning and Management, CSLC, September 15, 2010			
62	State Lands Commission	*COMMENT:* Please be advised that both the borrow site and the receiver site involve sovereign lands under the jurisdiction of the CSLC. Use of the borrow site will require authorization from the Commission for the issuance of a dredging lease. The receiver site appears to overlap the lease area under Lease No. PRC 8567.9 issued by the CSLC to the city of San Clemente for the 'City of San Clemente Opportunistic Beach Replenishment Program.' Use of the receiver site will require the city of San Clemente to amend Lease No. PRC 8567.9 to accommodate the project. Lease applications can be	Section 18 of the Real Estate Appendix explains that the City of San Clemente will obtain a lease for the borrow area from the CA State Lands Commission. The limits of placement under the opportunistic lease PRC 8567.9 do fall within the proposed limits of the current project and the City will request Lease 8567.9 be amended if necessary.

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		accessed via our website at http://www.slc.ca.gov	
63	State Lands Commission	In order to provide the basis for an effective mitigation monitoring program as required by CEQA, CSLC staff recommends that the table be revised to include a comprehensive summary of all the mitigation measures and monitoring commitments relied upon in the EIS/EIR, and at a minimum reflect the following revisions: • Table 7-1 should include several omitted mitigation measures identified in Section 5 including Geology/Topography (MM-ER-115-2.1), Biological Resources (MM-BR-50-2.1 and 2.2), Cultural Resources (MM-CR-50.1), Noise (MM-N-50-3.1), and Recreation (MM-R-50-4.1). • The table should reference or incorporate all components of the Biological Resources Monitoring Plan in Appx B. • The mitigation measures in the table should be numbered to indicate the corresponding section or appendix where they originated.	The mitigation measures indicated have been added to Table 7-1. The biological resources mitigation and monitoring plan in Appendix B will be referenced in the table.
Marija Vojkovich, Regional Manager, Marine Region, DFG, September 30, 2010			
64	CA DFG	General: The Department wants to stress the importance that the project be designed carefully in order to primarily avoid adverse biological impacts to sensitive marine species to the maximum extent possible. Our concerns relate to potential impacts to rocky reefs, surfgrass, marine algae, and the fish and invertebrate communities that utilize these for critical habitat. Many marine species, such as rockfish, *Sebastes* spp, and other fish species managed under the Department's Nearshore Fishery Management Plan (NFMP), use these important habitats for breeding, shelter, spawning, foraging and resting. The NFMP species are found primarily in rocky reef or kelp habitat in nearshore waters. A list and description of NFMP fish species can be found on the Department's website at http://www.dfg.ca.gov/marine/nfmp/pdfs/section1_chap2.pdf. Additionally, the federally endangered black	Currently, black abalone does not occur within the project area. The proposed rule for listing critical habitat for the black abalone indicates that nearest locale is the Palos Verdes Peninsula in the Los Angeles Harbor region. They currently do not occur on the rocky reef within the project area and the potential to occur is negligible. The term "critical habitat" should not be used as to confuse the federal legal term of listed taxa critical habitat. There is not officially listed critical habitat for any listed taxa within the borrow site or the beach receiver site. Impacts to rocky reefs, surfgrass, marine algae, and the fish and invertebrate communities that use these habitats are discussed in Section 5.4.2. The 15 ft. (50

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		abalone, *Haliotis cracherodii,* and several other abalone species could occur in the project area inhabiting kelp and rocky reef habitats. The California spiny lobster, *Panulirus interruptus*, a recreationally and commercially important species, also inhabits the project area. Lobsters rely upon the reefs and surfgrass in the area for spawning, foraging and shelter.	m) beach width alternative minimizes impacts associated with a larger beach fill while still providing substantial project benefits.
65	CA DFG	Project Alternatives: In order to reduce risk and protect important offshore sensitive species and habitats, the Department recommends that the alternatives analysis be modified to include analysis of a more conservative alternative, such as a reduced quantity of sand for the project or a different deposition location on the beach. Kelp and rocky reefs in the project area are critical habitat for the black abalone, and surfgrass habitat is essential for spawning and as a nursery for juvenile fish, lobsters and other invertebrates. Additionally, surfgrass and kelp provide root system structure that helps to stabilize sand.	During the two year coordination meeting efforts, the Corps consulted with the CDFG. The CDFG was part of the process and did not express the concerns identified in this comment during the coordination two year timeframe. The Corps analyzed all alternatives (35 meter to 5 meter). The 15 meter alternative was the environmentally least impacting while maintaining the benefit/cost ratio required by the Corps policy. Furthermore, the Corps did, in fact, perform the required Essential Fish Habitat "consultation" as required by the MSA with CDFG's presence in the discussion. As previously stated, the Corps is aware of the marine aquatic vegetation (surfgrass and kelp). CDFG was presented the coastal engineering beach profile analysis in which discussion of the effects of the project would or would not occur. It was explained to CDFG that the beach receiver site is on the high portion of the dry sandy beach, not the surf zone or nearshore waters. It was further explained that the natural high tides and storm surge would distribute the receiver site sand onto the beach width, thus emulating a natural process; hence, the equilibrium will take four to six months to occur. No sand will be placed directly by project activities into the equilibrium footprint outside of the dry beach. As discussed in Section 3.4.2, a range of beach width alternatives were considered. The 15 meter

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			alternative was the alternative that provided the highest benefits to cost ratio while minimizing impacts to valuable marine habitats. Based on models of post-placement sand deposition, the 10 meter beach width alternative would have similar potential impacts on sensitive marine habitats as the 15 meter alternative but would have less project benefits. A 5 meter beach fill alternative would not have a positive benefit to cost ratio. Placement of fill on a shorter length of beach would not reduce the potential impacts to rocky reef and surfgrass habitats. Based upon the coastal engineering model that has been certified by national known experts internal and external to the Corps, the 15 meter profile indicates that there would be no impact to the T-Street rocky reef or surfgrass. The Corps does discuss the potential for impacts to a small inner portion of the T-Street rocky reef and potentially to surfgrass. Nonetheless, that remains unknown. Furthermore, as previously stated, a MMRP has undergone several reviews and revisions from the resources agencies including CDFG as well as Corps's internal review with SPD, HQ, and the external to the Los Angeles District ATR review team. The document has undergone external (outside the Corps) review and currently is being reviewed by the Corps ERDC Submerged Aquatic Vegetation Restoration Research Program. The revised MMRP is found as Appendix B and implementation will commence implementation in the PED phase with monitoring activities discussed in the MMRP.
66	CA DFG	The DEIS/DEIR proposes a surfgrass compensatory mitigation plan for an experimental surfgrass transplantation contingent upon unexpected adverse	Appendix B has been revised to include a back up mitigation plan. Kelp would be transplanted to an offshore reef if the experimental surfgrass transplant

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		impacts, such as a significant loss of surfgrass area or reduction in density of surfgrass mats. There is no indication in the DEIS/DEIR of a secondary plan if the experimental surfgrass transplant is not successful. The Department suggests that a back up mitigation plan should be available in the event that the experimental surfgrass transplant does not succeed. Additionally, habitat compensation and the criteria for triggering compensatory mitigation should be further discussed and agreed upon with the Department and other resource agencies. The Department will continue to work with the Corps to develop adequate mitigation and monitoring plans that will sufficiently avoid and minimize the risk of burial and other adverse impacts to sensitive species and habitats.	fails.
67	CA DFG	Monitoring Plans: There are two mitigation and monitoring plans presented in the DEIS/DEIR for surfgrass habitat; one for the offshore reefs, referred to as MM-BR-50-2.2, and one for the habitats along the mooring and slurry pipeline route on the sea floor, referred to as MM-BR-50-2.1. The Department concurs that these two areas will need baseline surveys conducted prior to the project and post construction surveys that monitor for significant damages or degradation of surfgrass, kelp and reef habitat. The Department always advises that avoidance measures be used first and to the maximum extent practicable. The DEIS/DEIR minimization plan for surfgrass and kelp suggests that the Corps has already determined that avoidance measures are not feasible. However, the Department believes that the mooring and sea floor pipeline plan could be revised so that the routes avoid impacts completely. The Department is willing to work with the Corps to discuss and develop an alternative pipeline route. The MM-BR-50-2.2 surfgrass and reef habitat mitigation and monitoring plan of the DEIS/DEIR is limited to pre- and post- construction, with no monitoring during construction. The Department believes that it is appropriate to monitor surfgrass and reefs during the	As discussed in Section 5.4.2, mitigation measure MM-BR-50-2.1 specifies that based on the pre-construction surveys, a pipeline route be selected that minimizes contact with surfgrass and kelp habitat. A route that completely avoids contact with these resources would be the route that minimizes impacts if such a route exists. A route that has some contact with kelp and/or eelgrass would only be selected if a route that avoids these resources completely cannot be found. Mitigation measure MM-BR-50-2.2 proposes pre- and post-construction monitoring of reefs and surfgrass, because impacts, if any, would not be expected to be observed during construction when sand is placed directly on the beach, but following construction as the waves re-distribute this sand and move some of it offshore and downcoast where it may deposit in reef and surfgrass habitats.

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		construction activities because of the uncertainty of adverse impacts predicted in the DEIS/DEIR. The Department's recommendation for additional monitoring to avoid potential impacts is based mainly on the fact that there has not been consistent success from surfgrass transplantation projects in the past. Additionally, the best available transplantation techniques for surfgrass are still considered experimental at this time. The Department also recommends that if monitoring during the sand deposition indicates signs of adverse effects (i.e. significant burial) to surfgrass and/or reef habitat, then construction activity should be stopped and re-evaluated before permanent damages are done. The project could continue with possible modifications, such as re-locating the deposition area on the beach, to avoid or minimize adverse impacts. Monitoring should continue to evaluate the effectiveness of any modifications to project activities. A revised monitoring plan should incorporate these recommendations.	
68	CA DFG	Reporting: Reporting procedures are lacking from all plans. The Department expects to receive all survey and monitoring reports, within three to five days for preliminary results and 30 days for final reports, in order to have time to review and respond to potential impacts to marine habitats.	CDFG will receive all survey and monitoring reports, as requested.
Local Agencies and Organizations			
Mark Rauscher, Beach Campaigns Manager, Surfrider, E-mail, September 20, 2011			
69	Surfrider	Section 1.2 Project Background ***Thoroughly describe the private property threatened by shoreline changes.*** The document states: "Changes to the beach shoreline caused by erosion have reduced recreational opportunities and are threatening the stability of City facilities, private property, and a major Southern CA commuter rail corridor."	There are no private structures on the ocean side of the SCRRA rail line within the project area. All references to private structures have been removed from the document.

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		It is unclear what "private property" is under threat by shoreline changes, and what protection it would be afforded by the proposed project. It is our understanding that all structures all structures constructed west of the railroad within the project area are public facilities. It is important to describe the structures accurately as their storm-damage protection provides the economic benefits of such a project. This lack of private property should also be reflected in Sections 2.1: Purpose and Need and 2.2: Project Objective.	
70	Surfrider	Section 2.1.2: Threat to the Railroad Corridor ***Provide clear and supported justification for the future necessity of seawall construction in a no-project alternative.*** As noted, the railroad corridor has varying levels of hard protection along the project stretch. Yet the railroad has successfully managed erosion and wave attack issues for relatively low cost. The document does not explicitly describe which sections are more at risk, nor why the presumption is made that continued rock placement will not be allowed in the future, necessitating the need for a highly engineered and costly seawall as described in Coastal Engineering Appendix, Section 4.4. Given that the bulk of the economic justification for this project relies on this particular prediction of future conditions, it requires a more robust explanation. Section 4.4 states: "It will become mandatory for the SCRRA to construct seawalls in the future. Project formulation indicates that due to evolving law and coastal structure construction regulations, the ability for the SCRRA to use revetment methods will expire." Yet the previous language within the section does not	Future necessity of seawall is documented in a July 19, 2005 letter from OCTA (owner of the Orange County region LOSSAN) stating they would expect to support future construction of a seawall.

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		support this statement. In addition, this project does not even encompass the most threatened portion of the railroad, as areas to the north (Mariposa) and to the south (Calafia) are at much higher risk of wave impact damages, yet OCTA has not attempted to gain permits for a permanent vertical seawall at these sections.	
71	Surfrider	Section 2.1.3: Public Safety and Liability. ***Correct the discussion of the public safety issues due to moved infrastructure in a "managed retreat" alternative.*** The document claims that erosion threatens public restrooms, which could require relocation if erosion trends continue. It goes on to state that such a relocation would cause a public safety issue due to the resultant increase in pedestrian railroad crossings. This premise is incorrect. The public restrooms which are located west of the railroads within the project area occur at T---Street and the Pier. T---Street already has a railroad overpass preventing any direct pedestrian crossings. The Pier already has a railroad underpass allowing safe passage below the railroad. Hence, no increase in pedestrian crossings need occur if restroom facilities are relocated east of the railroad.	Report will be revised to reflect the following: "Depending on the location of construction of restrooms, if necessary under managed retreat, crossing the tracks may be dangerous if beachgoers decide to do so rather than use the designated pedestrian crossings. There are currently safe pedestrian crossings for beachgoers to cross the tracks and access the beach."
72	Surfrider	4.3.4.3: Littoral Processes and Sediment Transport. ***Documented processes do not support the need for the project.*** The *Sediment Budget* section shows that the long---term sediment budget for this section is essentially in equilibrium, with net erosion equaling net accretion. The *Long Term Shoreline Change* section also finds variable net positive and net negative changes both along shore and through time. This would indicate that in the long term San Clemente's shoreline is nearly unchanged, and that sediment likely moves alongshore in pulses with portions	It is recognized that the shoreline change data set used in the present analysis is limited at best. However, this was all the data available for this area at the time this analysis was conducted. While data intensive information resulting in conclusive findings is preferred, the best available data resulted in this analysis. It is further recognized that the shoreline change data set results in a less than desired numerical presentation. However, the results are consistent with the overall shoreline change scenario in this region.

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		of the city's beaches growing while others are shrinking. Particularly striking is the quote: "During the period 1980-1989, the shoreline was predominantly positive with accretion rates ranging from + 1.4ft/yr (+0.43 m/yr) to +7.2 ft/yr (+2.16 m/yr)." This is the period that experienced the strong 1983 El Nino winter storms, but which apparently survived with little net erosion. The *Recent Shoreline Change Rate* attempts to show moderate shoreline width reductions, but is not consistent throughout the study area, with beach widening shown at Shorecliffs. There are also an extremely low number of data points (at least 12 years missing in the recent past) to be able to conclusively define the nature or extent of observed shoreline change. Because of this it is unclear if the single data point at the end of the time series represents a long term negative trend, or simply a perturbation in a highly active shoreline as seen in the first ten years of the time series. In other words, does the beach come and go with the weather and storm conditions, and we're only observing a single point in time?	The sediment budget indicates the shoreline is essentially in balance, neither accretional nor erosional (+0.03 m/yr). Inclusion of recent monitoring data results in a marginally erosive shoreline (-0.10 m/yr). The very small annual change signal is masked within the much larger envelope of seasonal changes. The seasonal variations are on order of 15 m and thus are two orders of magnitude larger than the mean annual long term signal. The three survey lines SC 1680 (Linda Lane), SC 1660 (T Street), and SC 1623 (State Beach) are south of Mariposa Point whereas SC 1720 (Shorecliffs) is north of Mariposa Point. Mariposa Point, although physically small, is morphologically significant as it represents a salient feature in an otherwise uniform section of shoreline. This salient is a micro morphological separation between Shorecliffs and the other three survey lines. These three lines south of Mariposa Point are consistent in erosional trend whereas the Shorecliffs trend is accretional. Uncertainties in the results of this analysis are assumed captured within the design long term shoreline change distribution. The design distribution is a triangular form with a minimum (max erosion) of -0.46 m/yr, a maximum (max accretion) of +0.38 m/yr, a peak of -0.21 m/yr, resulting in a mean value of -0.10 m/yr. This means that some years will be erosional, some years will be accretional, and the average value will be slightly negative (-0.3 ft/yr).
73	Surfrider	Impact WR--50--3: Nearshore wave characteristics (50 ft alternative). ***Monitoring of surfing quality should be designated as mitigation under all project alternatives.*** There is potential for adverse impacts on surfing as described in this section as well as in the Engineering	The following text was revised in the Coastal Appendix; revised text is underlined. Survey methods will consist of topographic measurements, bathymetric measurements, <u>surf quality observations</u>, and video stereo photogrammetric methods. The monitoring period <u>will</u>

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		Appendix (6.3.4), yet no mitigation measures are provided. The 115 ft alternative predicts definitively adverse impacts to wave characteristics and does suggest monitoring of surf conditions followed by adjustment of subsequent renourishments if surfing is degraded and does not recover. Based on the description of potential impacts within the Engineering Appendix, in particular, there is a possibility of severe degradation of surfing quality. As such, we request that monitoring of surfing quality before and after construction be provided as mitigation of any chosen project, including the 50 ft alternative. Potential impacts as described could pose a significant degradation of wave quality: "The surfing experience might consist of a normal "take---off," but then "close---out" as the wave encounters the straightened bathymetric contours inshore" and would justify the need for monitoring and mitigation if these impacts are experienced. In addition, meeting notes in the appendices specifically state that monitoring of surfing quality is to be undertaken. This needs to be reflected within the body of the impacts analysis. This monitoring and mitigation should reflect the discussion of impacts from the 115 ft alternative below. ***Impacts to wave characteristics in the designated surfing zone north of the pier must be evaluated and described.*** Within section Impact WR-50-3 and WR-115-3, there is no mention of surfing anywhere aside from T-Street. While T-Street is a consistently high-quality surfing area, surfing is often restricted there under "black ball" conditions when the lifeguards ban hard-board surfing for the bulk of the day during the summer. At these times surfing within the project stretch is restricted to the area directly north of the pier, causing the pier zone to become incrementally more	begin one year before construction (for the surf quality observations) and continue for the 50-year period of Federal involvement. The table of monitoring costs has been modified to reflect the surf quality monitoring.

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		valuable for use.	
74	Surfrider	Impact MM--WR--115--3.1: Nearshore waves characteristics (115 ft alternative). ***Timing for mitigation measure should be shortened.*** Under the 115 ft alternative, it is estimated that surfing waves could be significantly degraded for a period of 10 years. This is beyond the estimated period of return for future nourishments. An allowance of 10 years degradation and monitoring before future plans are adjusted is unacceptable. Similar to surfgrass, direct mitigation or reconstruction of the resource is not currently possible, and no time allotment is provided for the surfgrass mitigation (MM---ER---115---2.1). In addition, artificial surfing reefs are not viable as mitigation for lost surfing resources, and a greater emphasis on adverse impact prevention should be made.	Due to the likelihood of significant impacts to both habitat and surfing resources (nearshore waves), the 115 ft alternative was not chosen as the Recommended Plan. Following the process of first trying to avoid, if necessary, then minimize, and as a last resort to mitigate impacts, the recommended plan of a 50-ft wide beach was identified as the Recommended Plan.
Tom Bonigut, P.E., Assistant City Engineer, City of San Clemente - Public Works Dept., September 10, 2010			
75	City Staff	Sand compatibility and acceptability. Is there a QA/QC process to ensure that the borrow site sand will be suitable for placement on San Clemente beaches, and if for some reason it is not, what is the backup plan for borrow sites? This is a really important one, as we are receiving feedback that the Oceanside borrow site does not provide quality beach sand, and that a borrow site further site (name escapes me) is actually better.	The usual Corps or Los Angeles District specific procedure QA check for borrow site consistency is to perform random grain size analysis tests of the dredged material collected in the dredge process during the final construction phase of project: For example: Assuming on-the-beach placement: Most of the time, the majority of the QA samples will be collected at the end of pipe discharge for on beach placement. If hopper dredge is used, then additional sampling should occur from the hopper to confirm or collaborate sediment sizes discharged from hopper discharge pipe prior to discharge onto beach or onto nearshore. The number of such samples is dependent on the amount of material placed per event. For nearshore placement, the samples would be collected from the dredge containment device prior to placement (e.g., from hopper bin if hopper dredge used). The answer is that QA samples are collected

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			from both at the end of dredge pipe and in the container of dredge if hopper dredge is used. The Los Angeles Geotechnical Branch policy on the frequency, and number of samples is as follows: For total dredge material placement volumes of less than about 500,000 cubic yards, the frequency of sampling is = 1 QA sample per 35,000 cubic yards of material placed or per 35,000 cubic yard event. For greater than 500,000 cubic yards and up to 1,000,000 cubic yards, the frequency of sampling is = 1 QA sample per 50,000 cubic yard event. For greater than 1,000,000 cubic yards, the frequency of sampling is = 1 QA sample per 75,000 cubic yards. The QA is performed during the construction phase and included in construction specs for the Contractor to actually perform the collection and laboratory testing of QA samples as such. The purpose of the QA is to provide actual test data to show the consistency of dredge material over time and to provide information for Corps mgmt to make decisions on quality of dredge material and/or to make recommendations or direct the Contractor to move into a better area of the designated borrow area, during the actual dredging event. At this time, there is not a backup plan is for poor quality material that will eventually be dredged, other than that we have already made a selection of the most suitable borrow site, based on expected grain size compatibility that best matches the San Clemente beach renourishment study needs. The borrow site(s) selected and identified within the feasibility study can have sediment quality that is variable depending on

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			areas dredged within this selected borrow site(s). The dredged sediment can be expected to changes over time with depth of sediment stratigraphy encountered during actual dredging (i.e., it can better or worse depending on, for example, if a specific poor quality layer of sediment or borrow material is encountered and dredged in a specific time event, and then another better layer or increasing quality of sediment or material is encountered in another specific time event). However, the geotech explorations and sieve analysis thus so far provided, indicate that the borrow area(s) selected are overall acceptable for compatibility with the San Clemente study area.
76	City Staff	Beach monitoring. Is there any discussion about what we think would happen to beaches south of the project area? I.e. since there is a net southward sand movement, what might happen to those beaches and surf breaks? Would or should the monitoring plan address some of those areas too? We certainly need to ensure, to the extent possible, that we don't impact surf breaks south of the project area.	Net littoral transport is southward. It is expected that the fill material will have the most influence immediately adjacent the fill area up to the state beach area. The fill material will tend to slowly redistribute across the profile as it drifts southward. The fill quantity being relatively small is expected to have little or no impacts down drift of Cottons Point (Trestles). Project monitoring will include transect lines outside of the fill area both north and south to monitor fill movement.
77	City Staff	Can the discussion about the reference line for the project be improved? It's unclear to some what the starting point is for determining where the 15-meter beach width starts? Is it fixed throughout the project area (e.g. some offset from the rail line), or does it vary according to some other criterion? Also, is it fixed in time according to current conditions? I.e. what if our beach erodes significantly between now and the time an actual project is constructed? Will the beach berm width reference line be shifted also, or would the project be as described currently? Is it possible to define a seaward project limit instead of using a reference line that could change over time?	The fill line is the location of the +5.2 m contour (+17 ft) at the time of the fill. The fill will be a uniform 15 m parallel to this contour, thus the fill will mimic the existing shoreline in shape. The report will be amended to strengthen this description. The model does show renourishments will be conducted when the beach erodes back to the berm position at the time of fill. Project Authorization will specify actual renourishment interval (every 6 years) and quantity; however, implementation is sometimes dependent on funding available.

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Public			
George Gregory, E-mail, September 17, 2010			
78	George Gregory	it seems ludicrous to replenish the beach sands without promoting erosion and passive replenishment	The fill is expected to undergo an initial equilibration process then form a stable beach, which hopefully will not produce a more rapid rate of erosion than currently experienced.
79	George Gregory	if sands will migrates south may we please replenish north beach first thus supplying the pier area 2nd	Pumping onshore will be conducted to maximize the efficiency of operation and minimize negative environmental impacts.
80	George Gregory	if the near costal quarry's where relocated away would this not help with passive and aggressive replenishment of san clement ,capo beach, beaches & soils	In general, the presence of sand mining operations within the San Juan Creek portion of the watershed could have an overall impact of sediment supply to the beaches in the San Clemente area.
81	George Gregory	are their plans to use the spoils from any excavation or tunneling up in the ortages ,For costal replenishment or building material .Thus using the spoils to replace native soils and or releasing and allowing to pass thru the quarry native soils to the shore	All sediment will be hopper dredged from Borrow Area 2 offshore of Camp Del Mar Boat Basin and Oceanside Harbor and pumped onshore via pipeline.
82	George Gregory	it seam important to keep up the allusion of success that a supply of sand can bring. with constant permits equipment and plans in place ,available and maintained for train transportation of sand and soils for the grooming and maintenance of the coastal resources. possibly hedging are bet and augmenting strategic and civil and possible emergency capabilities (the volley ball court is like playing on dull broken glass)train car loads are fairly efficient and affordable compared to truck loads. Possible improving the quality of soils from distant and local sources	Comment noted.
83	George Gregory	lastly it seems to be a shame the energy used to harvest the soils do not seem to be of any benefit in the first place as in deepening a harbor or entrance improving wet lands or impoundments or importing away proofed soils from a site like Santa Ana river basin and flood control projects	The Corps study process identified dredging material from Borrow Area 2 as the alternative in the Federal Interest.

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Lynn Hughes, Letter, September 14, 2010			
84	Lynn Hughes	Page 9: Problem Identification. Does not include the economic impacts from erosion that would reduce the income to local visitor/tourist serving businesses, and loss of taxes and other revenues to the city, including bedroom taxes, sales taxes, and property taxes; and beach parking and beach concession revenues. It does not include the added cost to provide lifeguard and other protective services to safely keep the public away from hazardous conditions and to protect, relocate, or replace public improvements. Additionally, it does not speak to the potential liability or defense costs from lawsuits due to the injury or death to beach goers as the result of exposed natural and man-made dangers.	Concur with your comment that the economic evaluation did not account for regional economic impacts related to the erosion of the shoreline. It would be expected that the local economy will be impacted by the erosion of the shoreline. However, the USACE guidelines for determining federal interest in coastal shoreline project is mainly based on reducing infrastructure damages(recreational buildings, future protection measures, and impacts on transportation) instead on regional impacts like tourism, local taxes and decreases in concession sales. Based on the availability of funding for the study and schedule for the study, the economist for the study determined that any evaluation of the regional impacts will be limited for the study.
85	Lynn Hughes	Page 9: Problem Identification, mentions potential danger of exposed underlying hard substrate and man-made. Page 10, Problem Statement, mentions reduces recreational space on an already space-limited beach. I would suggest that more emphasis be placed in both areas regarding the fact that the erosion not only causes a reduction of recreational space, but can present public dangers from exposed man-made and natural hard structures. This condition can make shoreline and offshore ocean areas unsafe, hence unusable by the public. San Clemente City Lifeguards have had to post and, at times, restrict the use of some near shore and off shore ocean areas due to these dangers. This is no easy task, since these hazardous conditions can become exposed overnight and are difficult to detect during changing tidal and surf conditions. This task is further complicated by strong wave and currents. A swimmer can enter the water in a location that is relatively safe and be swept down the beach hundreds of feet in a matter of a few minutes where	Comment is understood and has already been emphasized throughout the report(s), including the Coastal Engineering Appendix and Draft Main Report (page 17 and page 60 paragraph 1).

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		there might be exposed dangers that are under water and, therefore, undetectable.	
86	Lynn Hughes	ES-1, under Overview, the same point regarding the dangers of exposed hard structures and its economic impacts should be made here as well. Also, it should be further emphasized, possibly under the Executive Summary, Project Background, page 1-4, that the LOSSAN railroad Riprap is not engineered and therefore subject to continual undermining and failure during periods of erosion. It is possible that the tracks could be undermined to the extent that the railroad tracks could not safely carry the load of railway cars brought in to drop addition rock.	Discussion will be inserted in this section regarding dangers of hard structures. Discussion will be placed in Executive Summary, pg 1-4 explaining that most of the placed rip-rap is un-engineered and, thus, not guaranteed to provide any level of protection.
Keith Aiken, E-mail, September 23, 2010			
87	Keith Aiken	The train track running on top of San Clemente beaches is at the root of the problem.	Correct, much of the project justification lies in the without project assumption that the railroad would need to be protected by a seawall.
88	Keith Aiken	It's hard to believe an alternate rail route cannot be found – especially with the desire of Amtrak to increase rail traffic.	Potential for an alternative route is discussed in the main report. No plans currently exist to relocate/reroute the railroad at this time and any efforts would be astronomically costly.
89	Keith Aiken	Experience has shown that sea walls accelerate beach erosion. The sea walls already built by Amtrak, to protect rail lines, are accelerating beach sand erosion. Why isn't Amtrak being held responsible for its part in adding to the problem and mandated to help with sand replenishment costs?	This is an issue separate of the study area (specifically Reach 6) being considered for this project as no seawalls exist in Reach 6. Basis for this Federal cost-shared project lies in protection of shoreline infrastructure in Reach 6 and the associated benefits versus costs of doing this.
90	Keith Aiken	We were told by the geologists that most all sand migrates southward; so why not add sand at North Beach? North Beach has been severely impacted and is in need of sand replenishment. Plus the sand eroded from North Beach would help to replenish sand on all San Clemente beaches as it migrates south. At the very least, sand could be deposited at North Beach and not in the T-street area – as sand will naturally move into that area from sand replenishment on beaches north of T-street.	Placement of sand will occur along the beach within only Reach 6, as described in the report. Adaptive management will be used as explained in the report to minimize environmental impacts and create a uniform 15-m wide beach through equilibration of the sand.
Don Kunze, Public Meeting, August 19, 2010			

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91	Don Kunze	Where did San Clemente sand go?? Why?? Why not bring it back.	Littoral (sediment) transport in the San Clemente region is predominantly towards the south (San Onofre). This movement of sand along the coast is a natural occurrence; therefore, the sand transported to the south is needed to supply sediment to those beaches.
92	Don Kunze	Did Dana Point Harbor affect us? How about nuclear plant affect?	Dana Point Harbor as well as the nuclear power plant have no known effect on the beaches in San Clemente.
93	Don Kunze	What about new rock reef and kelp?	The reference to new rock reef and kelp is unclear. If in reference to Southern California Edison Reefs constructed as mitigation for the impacts of the San Onofre Nuclear Power Plant, a separate environmental document was prepared specifically for that project and is not included as part of this proposed Project.
94	Don Kunze	Seems to be less sand and more rock (pebbles) than ever. Why?? Since 1983.	There is less sand and more rock because of natural erosive processes, this caused the need for this project.
95	Don Kunze	Being a taxpayer cost to me?	The initial nourishment event will be cost-shared 65% Federal and 35% non-Federal. Each of the subsequent renourishment events will be cost-shared 50% Federal and 50% non-Federal.

APPENDIX A – 404(b)(1)

SECTION 404(b)(1) EVALUATION OF THE EFFECTS OF THE DISCHARGE OF DREDGED OR FILL MATERIAL INTO WATERS OF THE UNITED STATES: SAN CLEMENTE SHORELINE PROTECTION PROJECT

I. Introduction:

The following evaluation is provided in accordance with Section 404(b)(1) of the Federal Water Pollution Control Act Amendments of 1972 (Public Law 92-500) as amended by the Clean Water Act of 1977 (Public Law 95-217). The intent of this document is to state and evaluate information regarding the effects of the discharge of dredged or fill material into waters of the United States.

II. Project Description:

a. **Location:** San Clemente Beach in the City of San Clemente, Orange County, California

b. **General Description:** The City of San Clemente is located along the coast of southern California about 60 miles (100 kilometers) south of Los Angeles at the southern end of Orange County near the border of San Diego County. The study area is on the beach near San Clemente Pier within the City of San Clemente and extends approximately 3,412 feet (1,040 meters) from Linda Lane to T-Street and is located within the San Clemente 7.5-minute U.S. Geological Survey (USGS) topographic quadrangle in Section 4 of Township 9 South and Range 7 West. The Proposed Project consists of dredging material from offshore Oceanside, then hauling and placing it at San Clemente Beach. The proposed Project is a 50 foot (15 m) resultant beach width. Beach fill would be 3,412 ft (1,040 m) long with a +17 ft (+5.2 m) crest elevation. The dredge volume is estimated to be approximately 251,130 cubic yards (192,000 m^3). Construction is anticipated to begin in 2012.

c. **Authority and Purpose:** The purpose of the San Clemente Shoreline Project (Project) is to provide shore protection through nourishment of the beach at the San Clemente Municipal Pier. Developing and maintaining the beach is needed to prevent the severe beach erosion that results from winter storms and to prevent damage to adjacent beachfront structures, including the heavily used rail line that runs along the beach through the city. In addition to the above, the loss of sand at the beach would have a negative impact on recreation, which supports the local economy, and would reduce the ecological functioning of the sand beach/littoral zone.

d. General Description of Dredged or Fill Material:

1. **General Characteristics of Material:** Dredge material gradation is 6-12 percent of fines, 5-8 percent of gravel/cobbles, and the rest is sand. Material classification assumed is 10 percent fines, 83 percent sand and 7 percent gravel.

2. **Quantity of Material:** The recommended plan will require approximately 251,000 cy (192,000 m3) of beach compatible sand.

3. **Source of Material:** The recommended plan consists of dredging material from offshore Oceanside, then hauling and placing it at San Clemente Beach.

e. Description of the Proposed Discharge Sites:

1. **Location:** The discharge site is approximately 3,412 ft (1,040 m) of shoreline within the City of San Clemente. The area is approximately centered about San Clemente Pier; the south limit of the proposed beach fill is located immediately south of the T-Street overpass, while the north limit is located immediately north of the Marine Safety Headquarters. A major passenger rail line linking the coastal cities of Southern California runs between the beach and the coastal bluffs.

2. **Size:** The pier area beach profile indicates a typical berm elevation of +17 ft (+5.2 m), a typical foreshore slope of 8H:1V – 10H:1V, an offshore slope of 110H:1V, and a railroad elevation of approximately +21 ft (+6.4 m).

3. **Type of Site:** The shoreline in the Project area consists mainly of narrow, gently to moderately sloping sandy beaches backed by high, coastal bluffs. This sandy beach grades into a foreshore consisting of cobble and gravel pockets at the water's edge.

4. **Type(s) of Habitat:** The Project area consists of sandy beach, upland vegetation, intertidal habitat, and low-to-high relief patch reef.

5. **Timing and Duration of Discharge:** Dredging would be performed 24 hours a day, 7 days a week. Shore equipment would work 9 hours a day, 6 days a week. The Project duration is estimated at four months. Construction is anticipated to begin in 2012.

f. **Description of Disposal Methods:** The proposed project will be constructed with hopper dredging equipment with pump ashore capability and conventional earthmoving equipment. At the receiver beach, the dredge will be attached to a moored floating section of pipeline extending 1,500 ft (457 m) to the shoreline. The material would be re-suspended and discharged through the on-board pumping system to the receiver site. Existing sand at the receiver site would be used to build a small, “L”-shaped berm to anchor the sand placement operations. The short side of the “L” would be transverse (crosswise) to the shoreline and would be the proposed width. The long side would be parallel to the shore at the seaward edge and would be approximately 200 ft (61 m) long. The slurry would be pumped onto the beach between this berm and toe. The berm reduces ocean water turbidity by allowing all the sand to settle out inside the bermed area while the seawater is channeled along the berm until it reaches the open end where it drains into the ocean. Temporary dikes within the berm will allow sand to settle in designated areas. Once a 200 ft (61 m) section of berm is filled in with sand, another 200 ft (61 m) of berm will be created, the pipeline will be moved or extended into the new berm area, and the process would begin again. As the material is deposited behind the berm, the sand would be spread using two bulldozers and one front-end loader to direct the flow of the sand slurry and form a gradual slope to the existing beach elevation.

III. Factual Determinations

A. Physical Substrate Determinations:

1. **Substrate elevation and slope:** Because of various seasonal cycles of sand deposition and erosion and the lack of adequate natural beach re-nourishment, the beach varies in width from 0 to 200 ft (0 to 60 m). The Proposed Project would construct a 50 ft (15 m) wide beach with a + 17 ft (+5.2 m) crest elevation along 3,412 ft (1,040 m) of beach in the Project area.

2. **Sediment type:** The beach in San Clemente is composed of fine to medium grained sands and silty sands. Material classification assumed is 10 percent fines, 83 percent sand and 7 percent gravel.

3. **Dredged/fill material movement:** Within the Project area, the beach width meanders from 0 ft wide to 76 ft (23 m) to 0 ft to 129 ft (39 m) and back to 0 ft along the reach.

4. **Physical effects on benthos:** The Project will alter topography by excavating soft bottom offshore of Oceanside and placing the sediment on the beach at San Clemente to widen the beach. Neither the relatively featureless ocean bottom offshore Oceanside nor the sand beach at San Clemente is a unique geologic feature. Excavation of sand offshore Oceanside would not result in a substantial modification of nearshore bathymetry. There may be temporary burial impacts in the nearshore area, including partial burial of T-Street reef in the inshore portions; however, this burial would be short term if it were to occur.

5. **Actions taken to minimize impacts:** There are no significant impacts to the physical substrate. No minimization measures are required.

B. Water Circulation, Fluctuation, and Salinity Determinations

1. Water

a. Salinity

Salinity would not be altered by the proposed project.

b. Water chemistry

Water chemistry would not be altered by the proposed project.

c. Clarity

Clarity would not be altered by the proposed project.

d. Color

Water color would not be altered by the proposed project.

e. Odor

Water odor would not be altered by the proposed project.

f. Taste

Water taste would not be altered by the proposed project.

g. Dissolved gas levels

Dissolved gas levels would not be altered by the proposed project.

h. Nutrients

Nutrients would not be altered by the proposed project.

i. Eutrophication

Eutrophication would not be altered by the proposed project.

j. Others as appropriate

No other water characteristics would be altered by the proposed project.

2. **Current patterns and circulation**

   a. Current patterns and flow:

      The Project area is within the littoral zone where waves are the primary force in generating the alongshore currents that are responsible for moving sand, suspended by wave action, along the coast. Approximately 91 percent of the waves off San Clemente approach from the relatively narrow 20-degree band between 230º-240º, and all other approach directions are minor or negligible. This predominately westerly wave approach means that alongshore currents in the project area are mainly downcoast.

   b. Velocity:

      The proposed project would not impact the velocity of the waves within the project area.

   c. Stratification:

      Because the proposed project occurs within a dynamic environment, there would be no impacts to stratification.

   d. Hydrologic regime:

      Because the proposed project occurs within ocean waters, the hydrologic regime would not be impacted.

3. **Normal water level fluctuations:** The proposed project would not alter normal water level fluctuations.

4. **Salinity gradients:** The proposed project would not alter salinity gradients.

5. **Actions that will be taken to minimize impacts:** The proposed project does not impact water circulation, fluctuation, or salinity; no actions are required to minimize impacts.

C. Suspended Particulate/Turbidity Determinations

1. **Expected changes in suspended particulates and turbidity levels in vicinity of disposal site:** Turbidity plumes generated during the discharge of offshore sediments to the receiver site have the potential to degrade nearshore waters. However, turbidity plumes would be expected to be confined primarily to the naturally turbid surf zone and associated rip currents. Construction monitoring during the SANDAG project in San Diego County documented that beach fill operations generated turbidity plumes that ranged between 2,640 and 10,000 ft (800 and 3,000 m) and were greatly influenced by rip currents. The turbidity

plumes remained in the surf zone unless rip currents carried them offshore (SANDAG 2002). The proposed project method of discharging the sediments behind an L-shaped berm allows fine particles to settle prior to introduction to the ocean and reduces the potential for nearshore turbidity. Because turbidity plumes generated during initial placement of sediments on receiver beaches would primarily be confined to the surf zone and rip currents, areas that are naturally turbid, degradation of coastal waters by turbidity from the proposed project would not be expected to occur.

2. Effects on chemical and physical properties of the water column:

a. Light penetration:

With the exception of temporary elevations of turbidity within the surf zone during discharge to the receiver site, the proposed project would not alter light penetration of the water column.

b. Dissolved oxygen:

Because of the dynamic environment of the project area, the proposed project would not alter dissolved oxygen levels in the water column.

c. Toxic metals and organics:

The proposed project may introduce non-detectable to very low levels of toxic metals and organics; however the levels would be below all the thresholds in the Sediment Quality Guidelines.

d. Pathogens:

The proposed project would not introduce pathogens into the water column.

e. Aesthetics:

With the exception of temporary elevations of turbidity within the surf zone during discharge to the receiver site, the proposed project would not alter the aesthetics of the water column.

f. Others as appropriate

There are no other chemical or physical properties of the water column that would be affected by the proposed project.

3. **Effects on biota**

a. Primary production, photosynthesis:

Although temporary elevations of turbidity within the surf zone during discharge to the receiver site may occur, the proposed project would not alter light penetration of the water column and, therefore, would not impact primary production or photosynthesis.

b. Suspension/filter feeders:

The effect of project related turbidity on local suspension and filter-feeding invertebrate and fish populations is unknown, but even complete loss would result in immediate recolonization, and impacts would be expected to be short-term and insignificant. Any appreciable turbidity increase may cause clogging of respiratory and feeding apparatus of sedentary bottom fish and filter feeders. Motile organisms, however, would evacuate and avoid the area and temporarily relocate to adjacent undisturbed areas. Most of the impacts would be confined to the immediate vicinity of disposal activities. Algae and non-motile marine invertebrates may experience higher localized mortality rates during rock placement. Those species currently inhibitory exposed surfaces would be destroyed, but new surfaces would be quickly recolonized. Most studies have found that the diversity, biomass, and abundance of sandy intertidal invertebrates declines following beach nourishment, but that the community recovers within a few months.

c. Sight feeders:

The proposed placement of sediments behind a dike would reduce the suspended sediment concentrations in the discharge. Turbidity plumes generated during beach fill operations at the receiver sites could interfere with foraging by visually-feeding birds such as gulls, terns, pelicans and cormorants. However, turbidity plumes would be expected to be confined primarily to the naturally turbid surf zone and associated rip currents. Therefore, the impacts of turbidity from the discharge of sediments to receiver beaches would not be expected to be significant.

4. **Actions taken to minimize impacts:** The proposed project has been designed to minimize impacts by placing sandy material behind a berm before introduction to ocean waters. Impacts to biota are not expected to be significant; therefore, no further minimization efforts are required.

D. **Contaminant Determinations:** The sediments proposed for the beach fill have been tested and found to contain very low levels of contaminants. Contaminant concentrations of metals, pesticides, polychlorinated biphenyls (PCBs), polycyclic aromatic hydrocarbons (PAHs), phthalates, and phenols were non-detectible to low and well below all the thresholds in the Sediment Quality Guidelines. No dichlorodiphenyltrichloroethane (DDT) or chlorinated pesticides were detected in the samples.

E. Aquatic Ecosystem and Organism Determinations

1. **Effects on plankton:** Project related turbidity plumes would be expected to be confined primarily to the naturally turbid surf zone and associated rip currents No significant reduction in plankton is expected due to project generated turbidity.

2. **Effects on benthos:** Most of the benthic invertebrates within the area dredged from offshore Oceanside would be killed by the dredging. Some mobile organisms such as crabs may escape the dredge. Recovery of the benthic invertebrate community would be expected to begin almost immediately with settlement of larvae and immigration of mobile species from nearby unaffected areas. Recovery of the infaunal community to values comparable to pre-dredging levels may occur in as little time as six months or as long as two years, with an average of about one year. Discharge of offshore sand onto receiver beaches would bury intertidal invertebrates living in the sand of receiver beaches. Most studies have found that the diversity, biomass, and abundance of sandy intertidal invertebrates declines following beach nourishment but that the community recovers within a few months. Therefore, the effects of beach nourishment on sandy intertidal invertebrates would be temporary and would not be expected to be significant.

3. **Effects on nekton:** Nearshore fishes are highly unlikely to be exposed to suspended sediment concentrations that would have lethal or sublethal effects. Because the turbidity would be limited in extent and would be confined to the naturally turbid surf zone and rip current areas, significant impacts of turbidity to nearshore fishes are unlikely. Some fishes may avoid the turbid areas. Temporary turbidity within a limited area in the vicinity of the surf zone would not have a discernible impact on the population of any fish species.

4. **Effects on aquatic food web:** As discussed above, impacts to the aquatic food web are expected to be temporary and insignificant.

5. **Effects on special aquatic sites:**

   a. Sanctuaries and refuges:

      There are no sanctuaries or refuges on the project site.

b. Wetlands:

There are no wetlands on the project site.

c. Mud flats:

There are no mudflats on the project site.

d. Vegetated shallows:

Special aquatic sites in the project area include surfgrass beds and kelp beds. The sand placement footprint does not include any kelp beds, surfgrass, or rocky intertidal areas. Therefore, no direct impacts to sensitive habitats would occur from the placement of sand on the beach. In addition, the Proposed Project would not place anchors for the monobuoy, where the hopper dredge will moor while it discharges sand to the beach, or place the sinker pipeline that will pump the sediment to shore from the hopper dredge on any sensitive habitat. The Project also will avoid side to side movement of the anchors or pipeline as they are placed, which could abrade surfgrass, algae, or attached invertebrates. Sediment placed on the beach may gradually move offshore and downcoast. The nearest kelp bed is located 1,200 ft (360 m) offshore of the San Clemente Beach fill area. Because most of the surfgrass in the Project area grows on T-Street reef, it is possible to avoid surfgrass by avoiding the reef when laying the pipeline. In addition, to avoid impacts to reefs that support kelp and other sensitive species such as gorgonians and surfgrass, the hopper dredge should moor inshore of these reefs, which are located approximately 1,000 to 1,300 ft (300 to 400 m) from the beach. Based on beach profile monitoring of a similar volume of fill at Oceanside and a previous analysis for a lower volume of fill near San Clemente Pier, very little of the sand placed on the beach at San Clemente would be expected to migrate offshore into the kelp beds. The only significant surfgrass in the project area is at T-Street Reef in the surfzone. Because of the high wave energy in this area, any sand from the beach fill that was moved into the T-Street surfgrass bed would be expected to be rapidly resuspended and moved downcoast by wave action. However, if impacts to surfgrass in this area are observed, mitigation will be implemented as described in the Biological Resources Monitoring Plan (Appendix B of the EIS/EIR).

e. Coral reefs:

There are no coral reefs on the project site.

f. Riffle and pool complexes:

There are no riffle and pool complexes on the project site.

6. **Threatened and endangered species:**

   There are no federal or state listed taxa that would use or inhabit the project site during project implementation and no habitat is present. There is no designated critical habitat on the site. No proposed or endangered species are expected to be present on the site and there is no proposed critical habitat on the site.

7. **Other wildlife:**

   The greater amount of sand on San Clemente Beach following beach nourishment would be expected to have a beneficial effect on shorebird birds in a marine environment by increasing resting habitat. Several beach nourishment projects have documented greater use of the beach for resting by a variety of birds such as gulls, shorebirds, and other larids following the placement of sand on the beach. The increased sand beach also may increase foraging opportunities for shorebirds that feed on sandy intertidal invertebrates.

   The Corps continues on-going coordination with USFWS regarding biological impacts and mitigation in compliance with the Fish and Wildlife Coordination Act. The USACE met with resource agencies, including the USFWS, on several occasions, to discuss the proposed project and alternatives. Other invitees and attendees included NOAA Fisheries and CDFG. The main topics of discussion included the proposed project, project alternatives, and potential environmental issues.

8. **Actions to minimize impacts:** The proposed project has been designed to minimize impacts by placing sandy material behind a berm before introduction to ocean waters. Impacts to the aquatic ecosystem and organisms are not expected to be significant; therefore, no further minimization efforts are required.

F. Proposed Disposal Site Determinations

1. **Mixing zone determination:**

   Discharge will be onto the beach behind a berm not into the water column. The berm will tend to trap particles but some of the water will run back into the surf zone temporarily generating turbidity. Construction monitoring during a similar beach nourishment project in San Diego County documented that beach fill operations generated turbidity plumes that ranged between 2,640 and 10,000 ft (800 and 3,000 m) and were greatly influenced by rip currents. The turbidity plumes remained in the surf zone unless rip currents carried them offshore.

2. Determination of compliance with applicable water quality standards

3. Potential effects on human use characteristic:

a. Municipal and private water supply:

The proposed project would have no effect on municipal or private water supplies or water conservation.

b. Recreational and commercial fisheries:

On shore construction may temporarily interfere with shore fishing activities in the immediate project area. Offshore construction operations (i.e., vessel traffic and dredging) may potentially conflict with local commercial fishing operations during winter months, including gear/equipment damage and the disruption of fishing locations. Thirty days prior to the start of construction, the local commercial fishermen's association shall be provided with written notification of the intended start date of on shore construction, offshore construction, maps of project-related vessel transportation routes, and its duration. Noticing shall include a point of contact throughout the entire construction phase to respond to concerns regarding interference and/or other issues associated with local commercial fishing operations. Impacts would be considered less than significant.

c. Water related recreation:

During the beach construction, portions of the beach, nearshore zone, and potentially the Pier would be closed to public use. Impacts would be temporary (up to four months) During dredging and nourishment activities, proper advanced notice to mariners would be obtained and navigational traffic would not be allowed within the offshore borrow site area or mooring/discharge area. In addition, signage would be provided to inform swimmers of potential hazards. The beach closure would prevent surfers from accessing the beach near the Pier. Recreational users would be required to visit a different beach or different portions of the beach during the closure periods. The displacement of recreational users to the various nearby beaches would be temporary and short-term. However, the proposed project would not impact surfing conditions or other water sports once completed.

In the long-term, the beach nourishment would create a wider beach area and greater opportunities for beach activities, enhancing the beach available for recreation users. The wider beach would be a benefit to beach recreation users. Long-term maintenance activities would create similar impacts as the initial construction.

d. Aesthetics:

The proposed project would result in a wider beach, which would be a minor alteration of the visual character of the existing environment. During the construction phase, the visual character of the site would be affected by construction activities and the presence of construction equipment and materials; however, the construction phase is temporary, and as such, would not result in permanent effects to the visual character of the site. In the long term, the resulting wider beach would enhance the view of the beach and result in a visual benefit. Long-term maintenance activities would create similar impacts as the initial construction.

e. Parks, National and historical monuments, National seashores, wilderness areas, research sites, and similar preserves:

The proposed project would have temporary construction impacts to San Clemente City Beach, but in the long-term would enhance the beach by providing a wider sandy beach. The proposed project would not have any effect on national and historic monuments, national seashores, wild and scenic rivers, wilderness areas or research sites.

G. **Determination of cumulative effects on the aquatic ecosystem:** All the potential effects of the project would occur at the site. No indirect offsite effects are anticipated. The Proposed Project would not cause downcoast erosion. The only cumulative project that has the potential to interact with the proposed project is the Dana Point Dredging Project, which would place about 83,000 cubic yards of sediment dredged from the harbor either on Capistrano Beach or in the nearshore zone off of Capistrano Beach. The discharge of sediment from the Dana Point Harbor Dredging project to Capistrano Beach will act cumulatively with the proposed action to add sediment to the Oceanside littoral cell. The proposed action will act in a cumulative fashion with the Dana Point Harbor Dredging project to offset erosion on beaches in south Orange County and northern San Diego County. Most of the sediment from these projects is expected to accumulate on downcoast beaches or in the very shallow nearshore area between the foreshore and the bar. Beach fill would be deposited onshore and would be expected to move offshore in a manner that would not alter the wave characteristics of popular surf breaks, such as T-Street, and would not be expected to affect Wheeler J. North Reef approximately 3,200 ft seaward of the proposed project footprint.

Like the proposed action, the Dana Point Harbor Dredging project would discharge sediments to the beach or nearshore zone and thus may cause a temporary localized increase in turbidity in nearshore waters. The discharge of sediments from Dana Point Harbor dredging would occur at Capistrano Beach approximately 4 miles (6.4

km) from the proposed action. Even if the projects occurred at the same time, the turbidity plumes would be sufficiently distant that they would not interact with each other. Monitoring of turbidity and adjustment of operations to avoid extensive turbidity plumes would mitigate any cumulative impacts of turbidity from these projects. The incremental addition of a portion of a smaller amount of sediment discharged over 4 mi (6.4 km) upcoast is unlikely to add sufficient sediment to affect surfgrass or shallow reefs in the San Clemente area.

The Proposed Project will not have any indirect effects on the human environment. Impacts of the Proposed Project on the human environment include temporary impacts to air quality, transportation, noise, recreation, aesthetics, navigation, and public safety during construction. The only project that would act cumulatively with the Proposed Project on the human environment would be the Dana Point Dredging Project if it occurred simultaneously with the Proposed Project. Because the Dana Point Dredging Project would be 4 miles upcoast from the Proposed Project and because construction of both projects would be temporary, the cumulative effects of these two projects on the human environment would be negligible.

There have been no previously permitted cumulative actions on the site. The proposed sediment source area offshore of Oceanside was used to supply sand to San Diego beaches for the SANDAG project. The San Onofre Nuclear Generating Station Kelp Reef Project involved construction of a reef of quarry rock offshore San Clemente in the summer of 2008. The San Onofre Nuclear Generating Station Kelp Reef Project occurred offshore the Proposed Project. Because construction of these two projects would occur at different times, there would be no cumulative construction impacts. The San Onofre Nuclear Generating Station Kelp Reef would be too far offshore from the Proposed Project to be affected by sediment placed on San Clemente Beach.

H. Determination of secondary effects on the aquatic ecosystem: Impacts of the Proposed Project are all temporary construction impacts. Significant impacts to sensitive species are avoided. Other temporary construction impacts are minimized by the design features and environmental commitments of the Proposed Project.

Findings of Compliance

A. **Adaption of the Section 404(b)(1) Guidelines to this Evaluation:** No significant adaptations of the guidelines were made relative to this evaluation.

B. **Evaluation of Availability of Practicable Alternatives to the Proposed Discharge Site Which Would Have Less Adverse Impact on the Aquatic Ecosystem:** Section 3.2 of the EIS/EIR identifies the measures that were considered, but not carried forward for the project, including the various (5 m to 35 m) scales of beach nourishment not discussed further in the EIS/EIR. Sections 3.3 and 3.4 of the EIS/EIR discuss the beach nourishment alternative and the 15 m and 35 m scales of beach nourishment. There are no alternative disposal methods available for this project which would be 1) more consistent with the project authorization that mandates disposal into the littoral drift system, or 2) have a less environmentally damaging resultant.

C. **Compliance with Applicable State Water Quality Standards:** To satisfy requirements of the Federal CWA, the Corps will submit this Final EIS/EIR and appropriate technical documentation to the San Diego RWQCB, tasked with implementing the CWA within the region, for their review for CWA Section 401 certification, pursuant to 33 CFR 336.1(a)(1). Upon review of the submittal, the RWQCB would issue a 401 certification. The Corps will continue to coordinate with the RWQCB throughout the CWA process and construction activities.

D. **Compliance with Applicable Toxic Effluent Standard or Prohibition Under Section 307 of the Clean Water Act:** No toxic materials are known or likely to occur in the project area.

E. **Compliance with Endangered Species Act of 1973:** Formal consultation was not required with the USFWS under the ESA because the Corps, as the action agency, made a no effect determination and is avoiding all federal listed taxa. However, under Section 7(a)(2) of the ESA, Federal agencies must consult with Federal resource agencies (i.e., USFWS, NOAA Fisheries) and prepare a Biological Assessment (BA) if listed species and/or critical habitat are present in an area to be impacted by Project activity. The USFWS and/or NOAA Fisheries then would prepare a Biological Opinion (BO) on how the action would affect the species and/or its critical habitat, and would suggest reasonable and prudent measures to avoid jeopardizing the continued existence of the species or adversely modifying its critical habitat. If prior to and/or during construction it is determined that Federal endangered and threatened species would be adversely impacted, the USACE would initiate Section 7 consultation.

F. **Compliance with Specified Protection Measure for Marine Sanctuaries Designated by the Marine Protection, Research, and Sanctuaries Act of 1972:** No sanctuaries as designated by the Marine Protection, Research and Sanctuaries Act of 1972 will be affected by the proposed project.

G. **Evaluation of Extent of Degradation of the Waters of the United States**

1. **Significant adverse effects on human health and welfare:**

a. Municipal and private water supplies

The proposed project will have no significant adverse effects on municipal and private water supplies.

b. Recreation and commercial fisheries

The proposed project will have no significant adverse effects on recreation and commercial fisheries.

c. Plankton

The proposed project will have no significant adverse effects on plankton.

d. Fish

The proposed project will have no significant adverse effects on fish.

e. Shellfish

The proposed project will have no significant adverse effects on shellfish.

f. Wildlife

The proposed project will have no significant adverse effects on wildlife.

g. Special aquatic sites

The proposed project will have no significant adverse effects on special aquatic sites.

2. **Significant adverse effects on life stages of aquatic life and other wildlife dependent on aquatic ecosystems:** The proposed project will have no significant adverse effects on life stages of aquatic life and other wildlife dependent on aquatic ecosystems.

3. **Significant adverse effects on aquatic ecosystem diversity, productivity, and stability:** The proposed project will have no significant adverse effects on aquatic ecosystem diversity, productivity, and stability.

4. **Significant adverse effects on recreational, aesthetic, and economic values:** The proposed project will have no significant adverse effects on recreational, aesthetic, and economic values.

H. Appropriate and Practicable Steps Taken to Minimize Potential Adverse Impacts of the Discharge on the Aquatic Ecosystem

Avoidance

- Beach fill will avoid the grunion spawning season since there will be no construction during this time period. However, if beach fill would to occur during the grunion spawning season of March to August, a qualified biologist shall observe the receiver beach during all predicted grunion runs and mark areas where grunion spawning occurs. All beach construction activities shall avoid these designated spawning areas until the next predicted high tide series to allow grunion eggs to hatch.

- Beach nourishment will avoid the least tern nesting season by implementing the project outside the season. The least tern nesting season is April 15 to September 15; nearest colony is 15 miles south (down coast) of the Project site.
- Prior to construction, offshore borrow areas 1 and 2 will be subjected to an underwater remote sensing survey in order to determine if submerged cultural resources are present within these areas. If cultural resources are indicated, dredging will avoid those areas.
- To avoid public safety impacts to beach goers, the contract specifications shall require the contractor to fence/secure areas of construction from public access, including construction staging areas and active construction areas, including the beach and nearshore zone.

Minimization

- To minimize air quality impacts, use Best Available Control Technology during construction.
- To minimize turbidity, discharge sediments to the beach behind L-shaped berms.
- To minimize turbidity, monitor turbidity during sediment discharge and if significant turbidity is observed, modify operations (such as by slowing rate of discharge) until turbidity abates
- To minimize potential for contaminant leaks and spills during construction, prepare and adhere to a Storm Water Pollution Prevention Plan and Oil Spill Response Plan.
- To minimize noise impacts, limit construction activities to less than 9 hours per day.
- To minimize navigation impacts and threats to vessel safety, the dredge would be equipped with markings and lightings in accordance with the U.S. Coast Guard regulations. The location and schedule of the dredge would be published in the U.S. Coast Guard Local Notice to Mariners. The dredge would travel at very low speeds (approximately 1.5 knots) during dredging operations. The travel speed during transport would be approximately 5 knots. During dredging and nourishment activities, proper advanced notice to mariners would be obtained, and navigational traffic would not be allowed within the offshore borrow site area or mooring/discharge area offshore of Oceanside.
- To minimize conflicts with fishermen, the local commercial fishermen's association shall be provided with written notification of the intended start date of on shore construction, offshore construction, maps of project-related vessel transportation routes, and its duration. Noticing shall include a point of contact throughout the entire construction phase to respond to concerns regarding interference and/or other issues associated with local commercial fishing operations.

Compensation

- Mitigation would be triggered only if conditions observed during the monitoring period reach thresholds identified in the monitoring plan and persist through the two year post-construction monitoring period, as there may be transitory effects and subsequent recovery.
- If significant impacts to surfgrass and reef habitat are observed, renourishment events would be modified to avoid impacts. Although several studies currently are being conducted to successfully transplant surfgrass and may show potential for success, to date success rates have not been consistent and studies are on-going. Mitigation will be based on the results of monitoring conducted before and after sand placement, as identified in the Mitigation Plan in Appendix B of the EIS/EIR. The Corps will coordinate these efforts with the resource agencies.

I. On the Basis of the Guidelines, the Proposed Disposal Sites(s) for the Discharge of Dredged or Fill Material is

☐ Specified as complying with the requirements of these guidelines; or,

☒ Specified as complying with the requirements of these guidelines, with the inclusion of appropriate and practical conditions to minimize pollution or adverse effects on the aquatic ecosystem; or,

☐ Specified as failing to comply with the requirements of these guidelines.

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APPENDIX B – BIOLOGICAL RESOURCES MONITORING PLAN

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Rocky Reef/Surfgrass Monitoring, Mitigation, and Reporting Plan

Rocky Reef/Surfgrass Habitat

This appendix outlines 1) a pre- and post-construction monitoring program for rocky reef/surfgrass habitat in the San Clemente Pier area (Reach 6) to determine if project mitigation would be necessary; 2) a preliminary mitigation implementation plan, if mitigation is determined to be necessary; and 3) a preliminary mitigation monitoring plan, if mitigation is determined to be necessary. The final monitoring plan will be prepared during the pre-construction engineering design (PED) phase of the project. The details of these plans will be finalized in conference with knowledgeable, experienced, and qualified marine ecologists. The monitoring shall be performed by knowledgeable, experienced, and qualified marine biologists. These knowledgeable, experienced, and qualified marine ecologists may come from a variety of various agencies, organizations, institutions, or community centers of practice and expertise, such as academia - University of California, Corps Engineer Research and Development Center (ERDC), NOAA National Marine Fisheries Southwest Fisheries Sciences Center, USGS Western Ecological Research Center, other federal and state agencies, as well as consulting marine ecologists. CDFG, FWS, and NMFS regulatory resources agency staff will also be involved with the review process.

Pre- and Post-Construction Monitoring Plan

The Proposed Project has been designed to avoid or minimize impacts to sensitive biological resources to the maximum extent practicable. Currently, potential project impacts have been identified using a conservative coastal engineering model. The nature of the coastal engineering model has uncertainties due to multiple variables within the natural environment. Impacts to rocky reef and surfgrass reef are expected to be none to very minor, but currently are unknown. A post-construction monitoring strategy has been developed to determine if the project results in permanent loss of either rocky reef and/or surf grass. Based on the model, it is estimated that in a worst case about 20 percent of the reef or 1 acre may be impacted by the beach fill. For the purpose of costing, it is assumed that 1 acre of surfgrass and an additional 1 acre of reef without surfgrass could be impacted and require compensatory mitigation.

Mitigation would be triggered only if certain conditions occur during, and persist through, the two year post-construction monitoring period, as there may be transitory effects and subsequent recovery that would not be apparent in a shorter period of time. Persist means that observed sand burial of reef and/or loss of surfgrass continues to be significantly different on T-street reef compared to controls in all monitoring periods after the initial observed effect. During the two year post-construction monitoring, the reference site will be monitored to assess the natural variation, if possible, in rocky reef and surfgrass reef. Other published and unpublished literature will also be used in this analysis.

The following criterion is suggested as a potential trigger for implementing the potential mitigation.

- A persistent decrease in surfgrass cover or surfgrass density and an increase in sand cover and/or depth that is statistically significantly different than the controls and the baseline at the 0.05 confidence level (i.e., p-value = 0.05).

Actual triggers would be determined in coordination with knowledgeable, experienced, and qualified marine biologists and specific resource agencies prior to initiation of post-construction monitoring activities. These knowledgeable, experienced, and qualified marine ecologists may come from a variety of various agencies, organizations, institutions, or community centers of practice and expertise, such as academia - University of California, Corps Engineer Research and Development Center (ERDC), NOAA National Marine Fisheries Southwest Fisheries Sciences Center, USGS Western Ecological Research Center, other federal and state agencies, as well as consulting marine ecologists. CDFG, FWS, and NMFS regulatory resources agency staff will also be involved with the review process.

Proposed Pre- and Post-Construction Monitoring Activities

Prior to the implementation of the monitoring program, the extent of reef habitat throughout the entire predicted equilibrium footprint for the project will be mapped using side scan sonar or another appropriate method. This information will be used in the Monitoring Plan to establish transect lines.

Transects shall be established in the rocky reef area containing the surfgrass bed on T-Street reef (Project area) and in a control area of similar depth upcoast of the beach fill near Mariposa Point. Mariposa Point is considered an appropriate control because 1) it is close to the Project area and thus subjected to a similar wave climate, 2) supports surfgrass at a range of depths similar to T-Street reef, and 3) is upcoast of the beach fill out of the path of littoral drift, which is strongly downcoast in the San Clemente area. The transects shall be permanent transects with repeated use during all monitoring stages. Transects should cover, at a minimum, the inshore portion, middle, and offshore portion of the reef. The same number of transects should be established in the control area as in the T-Street reef area and the transects should be at similar depths. On each transect, the following parameters should be monitored at a minimum: 1) surfgrass density (i.e., number of shoots per square meter), 2) percent cover of surfgrass, sand, and rock, and 3) sand depth. The line intercept method is recommended for measuring percent cover and sand depth.

Transects should be monitored at the following intervals:

Pre-project monitoring (two years previous to beach nourishment):

- Twice within winter/spring
- Twice within summer/fall

Pre-project baseline monitoring (one year previous to beach nourishment):

- within one month prior to start
- 3 months prior to start
- 6 months prior to start
- 1 year prior to start

Post-construction:

Year One
- within one month after completion
- 3 months after completion
- 6 months after completion
- 1 year after completion

Year Two
- Twice within winter/spring
- Twice within summer/fall

Biological resources within the project area identified as potentially being impacted include surfgrass patches and rocky reef habitat at T-Street. Because a survey was not conducted to delineate the T-street reef, the general area of the T-street reef was based on the outer extent of mapped surfgrass locations (approximately 5 acres). Actual delineation of the T-street reef will need to be identified prior to the pre-construction survey. This survey would use side scan sonar or another appropriate methodology to delineate T-street reef and other reef habitat within the potential equilibrium footprint of the sand placement. Potential project impacts to these resources were based on modeling that indicates sand movement may extend to the offshore/outer edge of the reef; however, sand at the offshore/outer edge of the reef would be thin and not significant. Potential burial of the inshore edge of T-Street reef is uncertain; however, in a reasonable worst case scenario, approximately 20 percent of the inshore edge of the T-Street reef area (about 1 acre) may be buried. These knowledgeable, experienced, and qualified marine ecologists may come from a variety of various agencies, organizations, institutions, or community centers of practice and expertise, such as academia - University of California, Corps Engineer Research and Development Center (ERDC), NOAA National Marine Fisheries Southwest Fisheries Sciences Center, USGS Western Ecological Research Center, other federal and state agencies, as well as consulting marine ecologists. CDFG, FWS, and NMFS regulatory resources agency staff will also be involved with the review process. If significant impacts to these biological resources are observed, renourishment events would be modified to avoid or minimize impacts to the extent practicable and project mitigation would be implemented.

Pre- and Post-Construction Monitoring Costs

Pre-construction Monitoring
This cost assumes that permanent transects will be established. One day is allotted to install the markers and up to four days to conduct the survey at both the reference site and T-street reef, taking into consideration the wave environment in the project area and assuming three transects. This survey is assumed to occur within one year prior to construction activities.

a. Side-scan sonar survey $200,000
b. Pre-construction Monitoring:
   (two years prior to beach nourishment):
   - Twice within winter/spring; Twice within summer/fall: $131,000

c. Pre-construction Baseline Monitoring:
(one year prior to beach nourishment):
- o 4 events (one month, 3 months, 6 months, 1 year) $120,000

d. Pre-construction Report (2 years prior and 1 year prior) $ 10,000
Subtotal ***$461,000***

Post-Construction Monitoring
This cost assumes that permanent transects will be established. One day is allotted to find or re-install the markers and up to four days to conduct the survey at both the reference site and T-street reef, assuming three transects.

a. Year One
- o 4 events (one month, 3 months, 6 months, 1 year): $120,000

b. Year Two
- o Twice within winter/spring; Twice within summer/fall: $ 131,000

c. Post-construction Report (Years One and Two) $ 10,000
Subtotal ***$261,000***

Renourishment Pre- and Post-Construction Surveys

A standardized and consistent survey protocol will be developed during the PED phase for future beach renourishment cycles. The information collected from monitoring during the initial nourishment event will provide baseline information to compare future beach conditions. Because baseline information will be readily available for the Project site, the survey protocol for renourishment activities will focus on a single pre- and post-construction survey rather than the monitoring period proposed for initial nourishment activities.

Project Mitigation

If mitigation were required based on results of the post-construction monitoring, rocky reef and surfgrass mitigation shall each be conducted at an equivalent functional value to the impacted area. Because it will take at least two years to identify impacts, some temporal loss of surfgrass, if impacts were to occur, is unavoidable. Recovery of impacted resources will also occur as sand is redistributed within the littoral cell. Additionally, if impacts were to occur, future beach fills would be modified to avoid future impacts; any observed burial of reef or surfgrass would be temporary because sand would be expected to move out of the project area.

Reef habitat mitigation shall be constructed at an equivalent functional value of shallow and deep water reef proportional to the area of surfgrass on reef impacted. The area of surfgrass loss will be mitigated with an equal area of shallow water reef; the area of reef without surfgrass will be mitigated as deep water reef. Shallow water reef would be constructed on the offshore/outer edge of the existing reef; deep water reef would be constructed at approximately 30 foot water depth. Shallow water reef shall be constructed with a final top elevation of -10 to -14 feet Mean Lower Low Water. Construction of a reef that is shallower than the outer edge of T-Street reef is not proposed because construction methods would not be practical (e.g., a barge with the reef construction materials would not be able to operate in very shallow water). Construction of a very shallow reef would need to be constructed by building a temporary road from shore; such a road would have significant impacts. Although the surfgrass mitigation reef would be deeper than the impact area, if surfgrass transplants are successful, the slightly deeper reef would replace the lost surfgrass resource. Deep water reef shall be constructed similar to the Southern California Edison Reefs constructed as mitigation for the impacts of the San Onofre Nuclear Power Plant. For example, if the monitoring shows 1 acre of reef impact and 1 acre of surfgrass impact, 1 acre of shallow water reef would be constructed and 1 acre of deep water reef. Mitigation would be implemented in the Project area at sites to be determined in coordination with knowledgeable, experienced, and qualified marine biologists. These knowledgeable, experienced, and qualified marine ecologists may come from a variety of various agencies, organizations, institutions, or community centers of practice and expertise, such as academia - University of California, Corps Engineer Research and Development Center (ERDC), NOAA National Marine Fisheries Southwest Fisheries Sciences Center, USGS Western Ecological Research Center, other federal and state agencies, as well as consulting marine ecologists. CDFG, FWS, and NMFS regulatory resources agency staff will also be involved with the review process.

Although several studies currently are being conducted to determine how to successfully transplant surfgrass and may show potential for success, success rates to date have not been consistent. Due to the absence of an established, successful method for mitigation of loss of surfgrass itself, proposed mitigation currently is focused upon restoration of the rocky reef that surfgrass currently uses as habitat. However, as previously described, if it is determined that surfgrass has been affected by the Project and a change is shown not to be due to natural variation, an experimental surfgrass transplant shall be implemented in addition to the construction of a shallow rocky reef. Currently, surfgrass transplant success is much higher for subtidal than for intertidal conditions and, therefore, surfgrass mitigation efforts for this project will focus on subtidal transplants only. The methodology for the surfgrass transplant shall be the transplant of sprigs from a donor bed to the new reef using the method developed by Bull et al. (2004). The contractor may propose an alternative transplant method, if evidence can be presented that the alternative method has as great or greater chance of success as the sprig transplant method. To avoid harvesting effects to the subject surfgrass bed, donor material will be taken from a larger area of surfgrass.

A fraction of the shallow water reef shall be test planted with surfgrass. The transplant will be conducted in the late summer/early fall, the time of year when most surfgrass seeds are released and germinate in southern California.

An area equal to approximately 25 percent of the surfgrass impact area (not to exceed 0.1 acre) will be test planted. Success of the transplant shall be determined after six months based on survivorship, percentage change in the number of leaves and the amount of areal coverage. The experimental transplant will be considered successful if the sprigs survive and there is a net increase in number of leaves and aerial coverage. Experimental surfgrass transects have shown that if the transplant is not successful, the transplants die and the reef is bare. If the transplants survive, surfgrass grows. If the test transplant is successful, the remainder of the surfgrass impact area will be planted on the shallow water reef with surfgrass. If the test transplant is unsuccessful, mitigation will be conducted out of kind using kelp transplant on the deep water reef at an equivalent functional value; one acre, in the case of the costed scenario.

Project Mitigation Monitoring Plan

Similar to the Post-Construction Monitoring Plan, transects shall be established in the rocky reef area containing the surfgrass bed on the mitigation reef (if the experimental surfgrass transplant is successful) and in a reference site (control area) of similar depth upcoast near Mariposa Point. The transects shall be permanent transects. The same number of transects should be established in the control area as in the mitigation areas and transects should be at similar depths. On each surfgrass transect, the following parameters should be monitored at a minimum: 1) surfgrass density (i.e., number of shoots per square meter), 2) percent cover of surfgrass, sand, and rock, 3) sand depth, and 4) identification and quantity of flora and fauna. The line intercept method is recommended for measuring percent cover and sand depth.

Transects should be monitored at the following intervals, if successful:

***Post-mitigation implementation*:**

Year One
- within one month after completion
- 3 months after completion
- 6 months after completion
- 1 year after completion

Years Two through Five
- Once within winter/spring
- Once within summer/fall

Success Criteria

Success criteria of surfgrass would include determining if measured parameters are significantly different than the reference transects. Success criteria for the mitigation reef itself would include no complete permanent burial of the reef. Because of the predominantly sandy bottom environment in the project area, placement of the deep water rocky reef would be considered successful if a characteristic invertebrate and fish community were to become established. On each surfgrass transect, the following parameters should be monitored and evaluated at a minimum: 1) surfgrass density (i.e., number of shoots per square meter), 2) percent cover of surfgrass, sand, and rock, 3) sand depth, and 4) identification and quantity of flora and fauna. The line intercept method is recommended for measuring percent cover and sand depth. Specific success criteria will be developed during the Preconstruction, Engineering and Design (PED) phase. General success criteria will consist of the following:

1. Approximately 50% - 60% of the fish, invertebrates, and algae found at the reference site occur at the mitigation site two years post-mitigation.
2. Approximately 50% - 60% of surfgrass survival at the mitigation site two years post-mitigation implementation.

Project Mitigation Monitoring Costs

Reef Construction and Transplant Costs

Costs for reef construction and transplant costs would be based on actual impacts. The estimated costs for one acre of shallow surfgrass reef and one acre of deep water reef are provided below for reference. This scenario assumes successful test transplant operations. If test transplant operations are not successful, then compensatory mitigation would be triggered.

Shallow water reef design and construction (1 acre)	$2 million
Deep water reef construction (1 acre)	$500,000
Surfgrass transplant (1 acre)	
Test (0.1 acre)	$25,000
Mitigation – if Test successful (0.9 acre)	*$225,000*
Subtotal (*test successful*)	***$2,750,000***
Deep water reef construction (1 acre)	$500,000
Surfgrass transplant (1 acre)	
Test (0.1 acre)	$25,000
Subtotal (*test not successful*)	***$525,000***

Project Mitigation Monitoring Activities

a. Year One	$120,000
o after implementation - 4 events (one month, 3 months, 6 months, 1 year)	
b. Year Two	$65,500
o 2 events (once within winter/spring; once within summer/fall)	
c. Annual Report Years One and Two	$5,000
Subtotal (*test successful*)	***$190,500***

<u>Compensatory Mitigation</u>

If the surfgrass test planting is not successful, then out-of-kind and potentially off-site compensatory mitigation that has an equivalent functional value to the area of surfgrass on reef impacted is to occur via kelp planting on the deep water reef constructed during the previous project mitigation. Using the example of 1 acre of reef impacts and 1 acre of surfgrass impacts, if the surfgrass transplant is not successful, 1 acre of kelp will be planted on the 1 acre of deep water reef built during the project mitigation. All mitigation for kelp shall be monitored for 5 years.

Compensatory Mitigation Monitoring Plan

Similar to the Post-Construction Monitoring Plan, transects shall be established in the rocky reef area containing the kelp bed on the deep water mitigation reef (if the surfgrass transplant is unsuccessful) and in a reference site (control area) of similar depth upcoast near Mariposa Point. The transects shall be permanent transects. The same number of transects should be established in the control area as in the mitigation areas and transects should be at similar depths. On each kelp transect, the following parameters should be monitored at a minimum: 1) kelp density (number of kelp plants per square meter) of each age class, 2) holdfast diameter of each adult kelp plant on the transect, 3) number of stipes of each adult kelp plant on the transect and 4) identification and quantity of associated flora and fauna.

Transects should be monitored at the following intervals:

***Post-compensatory mitigation implementation*:**

Year One

- within one month after completion
- 3 months after completion
- 6 months after completion
- 1 year after completion

Years Two through Five

- Once within winter/spring
- Once within summer/fall

Success Criteria

Success criteria of kelp would include determining if the measured parameters are significantly different than the reference transects. Success criteria for the mitigation reef itself (if it is not planted with kelp) would include no complete permanent burial of the reef. Because of the predominantly sandy bottom environment in the project area, placement of the deep water rocky reef would be considered successful if a characteristic invertebrate and fish community were to become established. On each kelp transect, the following parameters should be monitored and evaluated at a minimum: 1) kelp density (number of kelp plants per square meter) of each age class, 2) holdfast diameter of each adult kelp plant on the transect, 3) number of stipes of each adult kelp plant on the transect and 4) identification and quantity of associated flora and fauna. Specific success criteria will be developed during the Preconstruction, Engineering and Design (PED) phase. General success criteria will consist of the following:

1. Approximately 50% - 60% of the fish, invertebrates, and algae found at the reference site occur at the mitigation site two years post-mitigation.
2. Approximately 50% - 60% of kelp survival at the mitigation site two years post-mitigation implementation.

Compensatory Mitigation Installation/Implementation Costs

Kelp Transplant Costs

Costs for transplant costs would be based on actual impacts. The costs of reef construction are included above in Project Mitigation for the surfgrass mitigation. This assumes the shallow water reef and deep water reef that were constructed during the Project Mitigation will not be removed; the costs for the compensatory mitigation would be in addition to the Project Mitigation costs above. The estimated costs for a one acre kelp transplant are provided below for reference. This scenario assumes unsuccessful test surfgrass transplant operations.

Kelp Transplant (1 acre)	$50,000
Subtotal (*test unsuccessful*)	***$50,000***

Compensatory Mitigation Monitoring Activities (Only if test transplant is unsuccessful and deep water rocky reef is constructed)

a. Year One	$120,000
o after implementation - 4 events (one month, 3 months, 6 months, 1 year)	
b. Year Two	$65,500
o 2 events (once within winter/spring; once within summer/fall)	
c. Annual Report Years One and Two	$5,000
Subtotal (*test unsuccessful*)	***$190,500***

Summary of Pre and Post Construction Monitoring

Activity		Cost
Pre-construction monitoring		
Side-scan sonar[1]		[$200,000]
2 years prior to construction - 4 events		$131,000
1 year prior to construction – 4 events		$120,000
Pre-construction report		$10,000
	Subtotal	**$261,000**
Post-construction monitoring		
Year 1 – 4 events		$120,000
Year 2 – 4 events		$131,000
Post-construction report		$10,000
	Subtotal	**$261,000**
Total Pre and Post Construction Monitoring[2]		***$522,000***

1 = Side scan sonar is already within coastal engineering monitoring and it will be completed and shared data
2 = the pre and post monitoring costs are not part of the mitigation costs; they are scheduled for implementation whether mitigation is necessary and implemented or not necessary and therefore not implemented.

Summary of Mitigation and Monitoring Costs

Mitigation and Monitoring - Surfgrass		
1 acre shallow reef construction		$2,000,000
1 acre deep reef construction		$500,000
1 acre surfgrass transplant		
Test (0.1 acre)		$25,000
Mitigation – *if test successful* (0.9 acre)		$225,000
Year 1 monitoring - 4 events (*if test successful)*		$120,000
Year 2 monitoring - 2 events (*if test successful)*		$65,500
Report (*if test successful)*		$5,000
	Subtotal	**$2,940,500**
Mitigation and Monitoring - Kelp		
1 acre shallow reef construction		$2,000,000
1 acre deep reef construction		$500,000
1 acre surfgrass transplant		
Test (0.1 acre)		$25,000
1 acre kelp transplant *(if test not successful)*		$50,000
Year 1 monitoring - 4 events *(if test not successful)*		$120,000
Year 2 monitoring - 2 events *(if test not successful)*		$65,500
Report *(if test not successful)*		$5,000
	Subtotal	**$2,765,500**
Summary Mitigation and Monitoring Cost[3]		
Mitigation – Surfgrass successful (Transplant Surfgrass)		***$2,940,500***
Mitigation – Surfgrass not successful (Transplant Kelp)		***$2,765,500***

3 = The cost for the Mitigation – Surfgrass successful (Transplant Surfgrass) includes the cost of constructing both shallow and deep rocky reef as does Mitigation – Surfgrass not successful (Transplant Kelp).