Draft Version 3

Naval Base Point Loma
Fuel Pier Replacement and Dredging
(P-151/DESC1306) Environmental Assessment

San Diego, California
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Acronyms and Abbreviations

ac	acre
ACM	asbestos-containing material
ADT	Average Daily Traffic
AGOR	auxiliary general oceanographic research vessel
ANSI	American National Standard Institute
APE	Area of Potential Effect
BMP	Best Management Practice
CAA	Clean Air Act
CAAQS	California Ambient Air Quality Standards
CARB	California Air Resources Board
CASHPO	California State Historic Preservation Officer
CATEX	Categorical Exclusion
CCR	California Code of Regulations
C & D	construction and demolition (waste)
CDC	Child Development Center
CDFG	California Department of Fish & Game
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CH_4	methane
CNEL	Community noise equivalent level
CNPS	California Native Plant Society
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalent
CPP	contaminated petroleum product
CRFS	California Recreational Fishing Survey
CSLC	California State Lands Commission
CVN	Nuclear-powered aircraft carrier
CWA	Clean Water Act
cy	cubic yards
dB	decibel
dBA	A-weighted decibel measurement
DEH	Department of Environmental Health
DFM	diesel fuel marine
DFSP	Defense Fuel Support Point
DHS	Department of Homeland Security
DMM	discarded military munitions
DoD	Department of Defense
DRMO	Defense Reutilization and Marketing Office
EA	Environmental Assessment
EFH	Essential Fish Habitat
EIS	Environmental Impact Statement
EO	Executive Order
EOD	Explosive Ordnance Disposal
EPCRA	Emergency Planning and Community Right-to-Know Act
ESA	Endangered Species Act
ESQD	Explosives Safety Quantity Distances
FICUN	Federal Interagency Committee on Urban Noise
FISC	Fleet and Industrial Supply Center
FMP	Fishery Management Plan
FONSI	Finding of No Significant Impact
FOR	Fuel Oil Reclamation
FY	fiscal year
ft	feet/foot
GHG	greenhouse gas
HAP	hazardous air pollutants
HAPC	Habitat Area of Particular Concern
I	Interstate
ICP	Integrated Contingency Plan
IHA	Incidental Harassment Authorization
IMPLAN	Impact Analysis for Planning
in	inch
INRMP	Integrated Natural Resources Management Plan
IR	Installation Restoration
JP-5	jet fuel
kHz	kilohertz
km	kilometers
LBP	lead-based paint
LCS	Littoral Combat Ships
Ldn	Day-night average noise levels
Leq	Energy equivalent levels
lf	linear feet
Lmax	maximum noise level
LOS	Level of Service
LPD	landing platform dock
m	meter(s)
MBTA	Migratory Bird Treaty Act
mg/L	milligrams per liter
mi	mile(s)
µPa	micropascal
MLLW	Mean Lower Low Water
MOTEMS	Marine Oil Terminal Engineering and Maintenance Standards
MOU	Memorandum of Understanding
MMP	Marine Mammal Program
MMPA	Marine Mammal Protection Act
MNB	Moffatt & Nichol-Blaylock
MSDS	Material Safety Data Sheet
MWR	Morale, Welfare, and Recreation
NAAQS	National Ambient Air Quality Standard
NAB	Naval Amphibious Base
NAS	Naval Air Station
NAVFAC	Naval Facilities Engineering Command
NB	North Bay
NBPL	Naval Base Point Loma
NBSD	Naval Base San Diego
NEPA	National Environmental Policy Act
NMAWC	Naval Mine & Anti-submarine Warfare Command
NMFS	National Marine Fisheries Service
N_2O	nitrous oxide
NOAA	National Oceanic and Atmospheric Administration
NO_x	nitrogen oxides

NPDES	National Pollutant Discharge Elimination System
NRSW	Navy Region Southwest
NSR	New Source Review
NTU	nephelometric turbidity units
O_3	ozone
OSHA	Occupational Safety and Health Administration
PAH	polycyclic aromatic hydrocarbons
$PM_{2.5}$	particulates less than 2.5 microns in diameter
PM_{10}	particulates less than 10 microns in diameter
ppm	parts per million
PFMC	Pacific Fishery Management Council
PLECA	Point Loma Ecological Conservation Area
RCNM	Roadway Construction Noise Model
RCRA	Resource Conservation and Recovery Act
RMS	root-mean square
ROG	reactive organic gases
ROI	region of influence
RONA	Record of Non-Applicability
RWQCB	Regional Water Quality Control Board
SANDAG	San Diego Association of Governments
SCM	special conservation measure
SDAB	San Diego Air Basin
SDAPCD	San Diego Air Pollution Control District
SEL	sound exposure level
SIP	State Implementation Plan
sf	square feet
SPL	sound pressure level
SSC	Space and Naval Warfare Systems Center
SSN	Nuclear-powered submarine
SWPPP	Storm Water Pollution Prevention Plan
SWRCB	State Water Resources Control Board
T-AKE	Dry cargo and ammunition resupply vessel
T-AKR	Large, medium speed roll-on/roll-off ship
T-AO	Military sealift replenishment "oiler" vessel
T-AOE	Fast combat support ship
TDI	Tierra Data, Inc.
TL	transmission loss
UFC	Unified Facilities Criteria
U.S.	United States
USACE	United States Army Corps of Engineers
USC	United States Code
USCG	United States Coast Guard
USDOT	United States Department of Transportation
USMC	United States Marine Corps
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
UWR	Universal Waste Rule
VOC	volatile organic compound
WMP	Waste Management Plan
YON	U.S. Navy fuel barge
ZOI	Zone of Influence

DRAFT ENVIRONMENTAL ASSESSMENT
NAVAL BASE POINT LOMA (NBPL)
FUEL PIER REPLACEMENT AND DREDGING (P-151)
SAN DIEGO, CALIFORNIA

ABSTRACT

The United States Department of the Navy (Navy) has prepared this Environmental Assessment (EA) in accordance with the 1969 National Environmental Policy Act (NEPA), The Council on Environmental Quality Regulations for Implementing NEPA (40 Code of Federal Regulations Parts 1500-1508), and the Chief of Naval Operations Instructions for Implementing NEPA (OPNAVINST 5090.1C, CH-1) .

The EA addresses the issues related to the current deficiencies of the existing Naval Base Point Loma Fuel Pier (Pier 180). It evaluates the environmental effects of two action alternatives that would correct the deficiencies and provide for the fueling needs of existing and future Navy ships. A no-action alternative is also evaluated.

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EXECUTIVE SUMMARY

This EA has been prepared in compliance with the National Environmental Policy Act (NEPA) of 1969 (42 United States Code [USC] § 4321, as amended); the Council on Environmental Quality (CEQ) Regulations for Implementing the Procedural Provisions of NEPA (Title 40 Code of Federal Regulations [CFR] §§ 1500-1508, 1 July 1986); and Navy Procedures for Implementing NEPA (32 CFR § 775).

The United States (U.S.) Navy proposes to demolish the aging and seismically deficient Fuel Pier (Pier 180) at Naval Base Point Loma (NBPL), construct a new enhanced Fuel Pier with optimum capability to support current and projected fueling needs of the Navy and Department of Homeland Security (DHS), and perform associated dredging. Project demolition, construction, and dredging would occur simultaneously during an approximately four-year period starting in August 2013 and ending in January 2017.

This Environmental Assessment (EA) addresses the potential environmental impacts of Alternative 1, Alternative 2, and the No-Action Alternative.

PURPOSE AND NEED FOR THE PROPOSED PROJECT (ALSO REFERRED TO HEREIN AS THE PROPOSED ACTION)

The fuel pier at NBPL Defense Fuel Support Point (DFSP) is critical to the mission of the Navy and is the largest active Navy fueling facility in the vicinity. More than 42 million gallons of fuel are stored at NBPL DFSP and more than 11 million gallons of fuel are issued and received every month to an average of 43 ships including the Military Sealift Command, Expeditionary Warfare Training Groups, three carrier strike groups, National Oceanic & Atmospheric Administration (NOAA), DHS, foreign and small craft.

The proposed project is needed to provide improved safety features and improved fuel receipt and delivery capability at the NBPL Defense Fuel Support Point (DFSP) to service existing and future classes of naval vessels. As described in Section 1.1, *Introduction/Background*, there is a need for this project because: (1) the existing fuel pier is over 100 years old and is in poor condition; (2) the existing fuel pier is not consistent with the modern standards (including seismic safety standards) set out in the California State Lands Commission (CSCL) Marine Oil Terminal Engineering and Maintenance Standards (MOTEMS) regulations (3) the existing fuel pier lacks adequate deep water berthing capability, thus cannot safely accommodate all of the existing and future classes of vessels; (4) dredging and sediment disposal are needed to deepen an existing turning basin, so that the basin can safely accommodate current and future deep draft berthing capabilities; (5) improved fueling features and capabilities are needed to service the current and projected future demand of vessels, which is expected to increase by 30 to 35 percent by 2018, and (6) Navy and DHS need adequate and safe ship fueling facilities now and in the future to accomplish their missions of security and national defense.

The purpose of the proposed project is to replace the aging, seismically deficient, and increasingly dysfunctional and obsolete fuel pier (Pier 180) at NBPL with a new pier that would

meet CSLC MOTEMS, meet projected ship fueling requirements, and enable the Navy and DHS to meet their national security and defense missions.

ALTERNATIVE 1 PIER REPLACEMENT AND ASSOCIATED DREDGING

The scope of Alternative 1 would include the five key elements listed below.

- ***Temporary Relocation of the Navy Marine Mammal Program (MMP) –*** Before the pier replacement activities begin, the Navy MMP would be temporarily relocated to the Naval Mine and Anti-Submarine Warfare Command (NMAWC), part of NBLP that is over three kilometers away from the fuel pier. Limited construction at NMAWC would occur and Navy marine mammal enclosures would be towed from the existing facilities to the temporary NMAWC site. After completion of the new fuel pier, the Navy marine mammal enclosures would be moved back to their original location adjacent to the fuel pier and the temporary facilities at NMAWC would be removed.
- ***Phased Demolition and Removal of the Existing Fuel Pier –*** Demolition and removal of the existing fuel pier would take place in two phases to maintain the fueling capabilities of the existing fuel pier while the new pier is being constructed.
- ***Phased Construction of a Replacement Fuel Pier –*** A new, double-deck fuel pier would be constructed that would provide flexibility in fueling multiple vessel types, meet MOTEMS requirements for seismic performance, and have a total area that is 5,315 square feet/0.12 acre smaller than the area of the existing fuel pier. There would be no pile driving or other in-water construction or demolition during the least tern foraging season (from April 1 through September 15) of each year that the project is ongoing. Due to these restrictions on in-water construction, pile driving could take up to three years to complete.
- ***Regulated Navigation Zones –*** The existing U.S. Coast Guard (USCG) Security Zone would be amended to needed to provide adequate security standoff distance to the east for the proposed new fuel pier alignment. A temporary Security Zone would be established to a distance of 100 ft offshore from the proposed temporary Navy marine mammal relocation site at NMAWC for the period that the Navy marine mammals are present.
- ***Dredging and Sediment Disposal –*** Dredging and sediment disposal are needed to deepen an existing turning basin, so that the basin can safely accommodate current and future deep draft berthing capabilities. Ocean disposal of dredge sediments was considered and approved by the U.S. Environmental Protection Agency (USEPA) and USACE, but USEPA specified beneficial reuse for nearshore replenishment as the appropriate placement. The dredged sediments would be hauled by barge to a beneficial reuse site south of the Imperial Beach pier. Under Alternative 1, dredging could be done before, during, or after the pier replacement effort and could potentially occur while the Navy MMP is at its existing location, so long as pier replacement has not begun. It is anticipated that dredging will take approximately three months to complete.

However, there would be no dredging during the California least tern foraging season, April 1 to September 15.

Although not an element of the (P-151) NBPL Fuel Pier Replacement Project, the P-151 EA addresses the relocation of the Everingham Brothers San Diego Bay bait barges. The Navy is not relocating the bait barges. Relocating the bait barges outside of the zone of influence (ZOI) for pile driving noise would reduce the exposure of wild marine mammals to sound levels below thresholds for injury and behavioral disturbance (Levels A and B thresholds, respectively). In addition, moving the bait barges would help avoid potential damage to commercial bait fish that are important to the local fishing industry. The viable relocation options for the bait barges and potential environmental impacts of relocating the bait barges are discussed in this EA. These two potential relocation sites have been approved by Navy Region Southwest Port Operations and avoid bird-aircraft strike hazards for Navy, U. S. Coast Guard, and Lindbergh Field (San Diego International Airport) aircraft (NRSW 2012; U. S. Coast Guard 2012). Following adoption of a Finding of No Significant Impact (FONSI) for this project, the Everingham Brothers Bait Company and the California State Lands Commission would be expected to execute a lease for a relocation site.

ALTERNATIVE 2 DELAYED DREDGING ALTERNATIVE

Implementation of Alternative 2 would be the same as described under Alternative 1, except that dredging would occur years after completion of the fuel pier replacement effort. There would be no dredging or other in-water construction or demolition work during the California least tern foraging season (Apri1 1 to September 15) while the project is ongoing. As with Alternative 1, it is anticipated that dredging would take approximately three months to complete and the dredged material would be transported to the beneficial reuse site south of the Imperial Beach pier and deposited in the nearshore zone. As with Alternative 1, after completion of the replacement fuel pier, the Navy marine mammal enclosures would be moved back to their current site. The Navy marine mammal relocation period is required only for the duration of demolition and construction activities. The same relocation of the Everingham Brothers Bait Company bait barges as described for Alternative 1 would occur under Alternative 2.

NO-ACTION ALTERNATIVE

Under the No-Action Alternative, the Navy would not implement the demolition of the existing Fuel Pier, construction of the new fuel pier facility, or dredging activities. The seismic structural deficiencies of the existing fuel pier would remain out of conformance with the current MOTEMS. Notwithstanding the remaining seismic deficiencies, current and future demand for a fuel pier to safely accommodate deep draft vessels would not be met. Under the No-Action Alternative, the Navy MMP would not be temporarily relocated to NMAWC and the Everingham Brothers Bait Company two San Diego Bay bait barges would not be relocated. Although the fuel pier itself would not be demolished, Buildings 110 and 140 on the existing pier would be taken down, and a new onshore control tower would be constructed as part of military construction P-401, an on-going project that is modernizing the existing Defense Fuel Support Point (DFSP) Point Loma bulk fuel storage and distribution facility.

The No-Action Alternative is not considered a reasonable alternative because it does not meet the purpose of and need for the Project as required under the Council of Environmental Quality regulations (40 Code of Federal Regulations 1502.14[d]). However, it does provide a measure of the baseline conditions described in Chapter 3, against which the potential adverse impacts of the Project can be compared.

AGENCY CORRESPONDENCE AND PUBLIC INVOLVEMENT

Appendix A documents the correspondence between the Navy and the regulatory agencies involved in this project. The 45-day public scoping period began on 28 April 2012 and ended on 11 June 2012. A public meeting was held on 3 May 2012 at the Loma Portal Elementary School. The Public Scoping Summary Report is provided as Appendix B of this EA.

The Draft EA will also be made available for public review and comment. All applicable public comments received will be addressed in the Draft and Final EA and included in Appendix B of the respective documents.

SUMMARY OF ENVIRONMENTAL CONSEQUENCES

Potential environmental impacts have been analyzed for the following resources: biological resource habitats and communities; fisheries; birds; marine mammals; threatened and endangered species; water resources; hazardous materials and wastes; noise; air quality; transportation and circulation; and socioeconomics and environmental justice. Table ES-1 summarizes determinations of environmental consequences followed by the respective avoidance and minimization measures/special conservation measures (SCMs) for Alternative 1, Alternative 2, and the No-Action Alternative. Chapter 3 provides a detailed discussion of the environmental consequences. As described in Table ES-1, implementation of Alternative 1, Alternative 2, or the No-Action Alternative would not result in significant impacts to any resource area.

Table ES-1. Summary of Potential Impacts and Avoidance and Minimization Measures/Special Conservation Measures

Resource Area	*Alternative 1 Pier Replacement and Associated Dredging*	*Alternative 2 Delayed Dredging Alternative*	*No-Action Alternative*
Biological Resource Habitats and Communities	Other than the incremental deepening of deep subtidal habitat by dredging the high spot in the turning basin, no permanent change would result from dredging, temporary relocation of the Everingham Brothers Bait Company bait barges, or the temporary relocation of the Navy Marine Mammal Program. Minor and short-term impacts to vegetated and nonvegetated soft bottom benthic habitat would occur. Impacts to eelgrass from the proposed fuel pier would be minor (approximately 0.05 ac of eelgrass surveyed in 2011, and an additional 0.05 ac of habitat that historically supported eelgrass) and would be offset by using the eelgrass mitigation bank. Eelgrass impacts from the temporary relocation of the Navy MMP would be minor (approximately 0.67 ac of eelgrass in 2011, and an additional 0.32 ac of habitat that historically supported eelgrass), temporary, and would be temporarily offset by using the eelgrass mitigation bank. The structural habitat of the existing pier would be removed but largely replaced by that of the new pier; differences would be inconsequential. Organisms occurring in the immediate area may be lost or displaced directly by project activities (equipment or noise) or indirectly by short-term changes suspended sediments, turbidity, dissolved oxygen, and light diffusion. However, organisms are expected to return to the project area upon project completion, and epifauna are expected to recolonize the new fuel pier from nearby, undisturbed areas within a relatively short time period. Therefore, through the use of the preventative measures described below, the minor and short-term impacts to biological resource habitats and communities would not be significant. **Avoidance and Minimization Measures/Special Conservation Measures (SCMs):** Before proceeding with the project, the Navy would obtain the required Clean Water Act (CWA) Section 404/Rivers and Harbors Act Section 10 permits.. All required terms and condition of the permits would be implemented. The following avoidance and minimization measures are proposed for use during the proposed activities to reduce the potential to impacts to habitats and communities. Fisheries, Birds, Marine Mammals, and Threatened and Endangered Species contain additional Avoidance and Minimization Measures applicable to those specific resources. • Sheet piling would be left in place to minimize sediment and eelgrass disturbance that would otherwise result from	Impacts associated with Alternative 2 would be the same as those for the Alternative 1, with the exception that dredging activities would be delayed until years after completion of construction of the pier. Under Alternative 2, there would be no significant impacts to biological resource habitats and communities. **Avoidance and Minimization Measures/SCMs:** Under Alternative 2, avoidance and minimization measures/SCMs would be the same as those for Alternative 1.	Under the No-Action Alternative, existing conditions would remain unchanged. The Navy would continue to utilize the NBPL fuel pier without replacement of the pier and without implementation of safety improvements. **Avoidance and Minimization Measures/SCMs:** Under the No-Action Alternative, avoidance and minimization measures/SCMs would not be necessary.

Table ES-1. Summary of Potential Impacts and Avoidance and Minimization Measures/Special Conservation Measures

Resource Area	*Alternative 1 Pier Replacement and Associated Dredging*	*Alternative 2 Delayed Dredging Alternative*	*No-Action Alternative*
	vessel traffic. • In conjunction with a Caulerpa survey, a final pre-construction eelgrass survey would be made. Additionally, a post-construction eelgrass survey would be conducted and compared to both historical data and the pre-construction survey to determine the amount of eelgrass habitat permanently shaded, whichever is greater. This impact to eelgrass would be offset by using the eelgrass mitigation bank. Temporary impacts at NMAWC would also be offset by the mitigation bank, but upon successful reestablishment of eelgrass within impacted areas at the NMAWC location, the bank would be credited for the reestablished acreage. • The contractor would use only clean construction materials suitable for use in the oceanic environment. The contractor would ensure no debris, soil, silt, sand, sawdust, rubbish, cement or concrete washings thereof, chemicals, oil, or petroleum products from construction would be allowed to enter into or placed where it may be washed by rainfall or runoff into waters of the U.S. Upon completion of the project authorized, any and all excess material or debris would be completely removed from the work area and disposed of in an appropriate upland site. • Spill kits and cleanup materials would be present during construction should there be a leak into the surrounding water. • All debris would be transported to, and disposed of, at an appropriate upland disposal site, or recycled if appropriate. • During project implementation the Navy would regularly monitor construction activities to ensure that no deviation from the project as described herein are occurring. The Navy would report any violation of authorized impacts to the National Marine Fisheries Service (NMFS) within 24 hours of its occurrence. • The beach and adjacent strand/coastal scrub habitat inshore of the fuel pier and southward along the shore would not be used for any purpose.		
Fish	Fish communities and habitats would be temporarily affected by in-water construction and demolition. The potential for injury to fish would exist at close ranges to impact pile driving. Within the corresponding Zones of Influence (ZOIs), fish are likely to be move away from pile being driven. Disturbance to	Impacts associated with Alternative 2 would be the same as those for Alternative 1, with the exception	Under the No-Action Alternative, existing conditions would remain unchanged. The Navy would

Table ES-1. Summary of Potential Impacts and Avoidance and Minimization Measures/Special Conservation Measures

Resource Area	*Alternative 1 Pier Replacement and Associated Dredging*	*Alternative 2 Delayed Dredging Alternative*	*No-Action Alternative*
	fish is possible at greater ranges, but, if anything, only temporary behavioral reactions would be anticipated, without long-term consequences for fish populations. Impacts would not be significant. Approximately 0.05 ac of eelgrass habitat as of 2011, and an additional 0.05 ac of habitat that historically supported eelgrass, would be permanently shaded. This area represents a tiny fraction of that which is found within and adjacent to San Diego Bay (0.0027% and 0.0058%, respectively) and would be offset by using the eelgrass mitigation bank. The proposed temporary relocation site for the Navy MMP would temporarily impact 0.67 ac of eelgrass surveyed in 2011, and an additional 0.32 ac of habitat that historically supported eelgrass; this temporary impact at NMAWC would be offset by using the eelgrass mitigation bank. As such, implementation of Alternative 1 would not result in any significant impacts to fisheries or Essential Fish Habitat (EFH). **Avoidance and Minimization Measures/SCMs:** Avoidance and minimization measures integrated into the project design pertaining to Fisheries and EFH include the following: • Sheet piles beneath the existing pier would be left in place to minimize sediment and eelgrass disturbance. • In conjunction with a Caulerpa survey, a final pre-construction eelgrass survey would be made. Additionally, a post-construction eelgrass survey would be conducted and compared to both historical data and the pre-construction survey to determine the amount of eelgrass habitat permanently shaded, whichever is greater. This impact to eelgrass would be offset by using the eelgrass mitigation bank. Temporary impacts at NMAWC would also be offset by the mitigation bank but upon successful reestablishment of eelgrass within impacted areas at the NMAWC location, the bank would be credited for the reestablished acreage. • The contractor would use only clean construction materials suitable for use in the oceanic environment. The contractor would ensure no debris, soil, silt, sand, sawdust, rubbish, cement or concrete washings thereof, chemicals, oil, or petroleum products from construction would be allowed to enter into or placed where it may be washed by rainfall or runoff into waters of the U.S. Upon completion of the project authorized, all excess material or debris would be completely removed from the work area and disposed at an	that dredging activities would not take place until years after completion of the new fuel pier. Under Alternative 2, there would be no significant impacts to fisheries. **Avoidance and Minimization Measures/SCMs:** Under Alternative 2, avoidance and minimization measures/SCMs would be the same as those for Alternative 1.	continue to utilize the NBPL fuel pier without replacement of the pier and without implementation of safety improvements. **Avoidance and Minimization Measures/SCMs:** Under the No-Action Alternative, avoidance and minimization measures/SCMs would not be necessary.

Table ES-1. Summary of Potential Impacts and Avoidance and Minimization Measures/Special Conservation Measures

Resource Area	*Alternative 1 Pier Replacement and Associated Dredging*	*Alternative 2 Delayed Dredging Alternative*	*No-Action Alternative*
	appropriate upland site. • Spill kits and cleanup materials would be present during construction should there be a leak into the surrounding water. • During project implementation, the Navy would regularly monitor construction activities to ensure that no deviations from the project as described herein are occurring. The Navy would report any violation of authorized impacts to NMFS within 24 hours of its occurrence. The following avoidance and minimization measures would be followed during the proposed pile driving and dredging activities. • Soft Start - The use of a soft-start procedure is believed to provide additional protection to marine mammals by providing a warning and/or giving marine mammals a chance to leave the area prior to the hammer operating at full capacity. The Test Pile Program will utilize soft-start techniques (ramp-up/dry fire) recommended by NMFS for impact and vibratory pile driving. These measures are as follows: *"The soft-start requires contractors to initiate noise from vibratory hammers for 15 seconds at reduced energy followed by a 30-second waiting period. This procedure should be repeated two additional times. If an impact hammer is used, contractors are required to provide an initial set of three strikes from the impact hammer at 40 percent energy, followed by a 30-second waiting period, then two subsequent 3-strike sets."*		
Birds	Alternative 1 may disturb migratory bird foraging and resting in the immediate vicinity while construction and/or demolition activity is occurring. However, any impacts would be short-term, localized, and would not impact bird populations. Birds on the water regularly experience the noise and disturbance of passing vessels, while the project area is routinely subject to the elevated noise and activity of workers and equipment associated with common industrial practices. Hence, project-related noise is not expected to be a novel disturbance or to have strong effects on migratory birds. Indirect impacts to foraging because of reduced visibility or changes in prey distribution in response to noise or turbidity would similarly be localized, intermittent, and less than significant. No in-water demolition, construction, or dredging activities would occur during the least tern breeding season. (April 1 through September 15). Therefore, the Proposed	Impacts associated with Alternative 2 would be the same as those for Alternative 1, with the exception that dredging would not take place until years after completion of the new fuel pier. Under Alternative 2, there would be no significant impacts to birds. **Avoidance and Minimization**	Under the No-Action Alternative, existing conditions would remain unchanged. The Navy would continue to utilize the NBPL fuel pier without replacement of the pier and without implementation of safety improvements. **Avoidance and Minimization Measures/SCMs:**

Table ES-1. Summary of Potential Impacts and Avoidance and Minimization Measures/Special Conservation Measures

Resource Area	*Alternative 1 Pier Replacement and Associated Dredging*	*Alternative 2 Delayed Dredging Alternative*	*No-Action Alternative*
	Action would not have a significant impact under the MBTA and there would be no significant impacts on other non-migratory marine bird habitat or populations. **Avoidance and Minimization Measures/SCMs:** Avoidance and minimization measures for birds would be the same as those for biological resource habitats and communities. Avoidance and minimization measures to protect California least terns are provided in Threatened and Endangered Species.	**Measures/SCMs:** Under Alternative 2, avoidance and minimization measures/SCMs would be the same as those for Alternative 1.	Under the No-Action Alternative, avoidance and minimization measures/SCMs would not be necessary.
Marine Mammals	The Proposed Action would not result in any injuries or mortalities (Level A takes) of marine mammals. The Proposed Action has the potential, however, to result in minor behavioral changes (Level B takes) to four marine mammal species from underwater and airborne (only to harbor seals) noise associated with impulsive or vibratory pile driving, construction, and demolition. Considering the 6 ½-month work windows for all 3 years combined, total Level B behavioral harassments (takes) are expected as follows: California sea lions – 2,405; harbor seals – 270; gray whales – 45; and coastal bottlenose dolphins - 2,016. Marine mammals that are taken (harassed) may change their normal behavior patterns (e.g., swimming speed, foraging habits, etc.) or be temporarily displaced from the area of construction. Any takes would likely have only a minor effect on individuals and no effect on the population. As such, the Proposed Action would result in minor behavioral effects on individuals and localized, temporary effects on their habitat use but is not anticipated to have any detectable adverse impact on population recruitment, survival, or recovery (i.e., no more than a negligible adverse effect). Therefore, the implementation of Alternative 1 would not result in any significant impacts to marine mammals. **Avoidance and Minimization Measures/SCMs:** In conjunction with the NEPA process, the Navy is applying for an Incidental Harassment Authorization (IHA) from the National Marine Fisheries Service (NMFS), and will abide by all conditions of approval for IHA once it is issued. The IHA application contains proposed mitigation, monitoring, and reporting measures that are presently incorporated as SCMs, but are subject to modification through the consultation with NMFS on the IHA. Section 3.4.3.2 details the avoidance and minimization measures set in place to lessen the impacts to mammals, which include avoidance and minimization measures for pile driving,	Impacts associated with Alternative 2 would be the same as those for Alternative 1, except that dredging would not take place until years after the completion of the new fuel pier. Under Alternative 2, there would be no significant impacts to marine mammals. **Avoidance and Minimization Measures/SCMs:** Under Alternative 2, avoidance and minimization measures/SCMs would be the same as those for Alternative 1.	Under the No-Action Alternative, existing conditions would remain unchanged. The Navy would continue to utilize the NBPL fuel pier without replacement of the pier and without implementation of safety improvements. **Avoidance and Minimization Measures/SCMs:** Under the No-Action Alternative, avoidance and minimization measures/SCMs would not be necessary.

Table ES-1. Summary of Potential Impacts and Avoidance and Minimization Measures/Special Conservation Measures

Resource Area	*Alternative 1 Pier Replacement and Associated Dredging*	*Alternative 2 Delayed Dredging Alternative*	*No-Action Alternative*
	a discussion of the avoidance and minimization measure effectiveness, monitoring, and reporting.		
Threatened and Endangered Species	California Least Tern Conservation measures established in the Memorandum of Understanding Between U.S. Fish and Wildlife Service and the U.S. Navy Concerning Conservation of the Endangered California Least Tern in San Diego Bay, California (Appendix F.2) would be followed, resulting in the avoidance of noise- and turbidity-producing in-water activities in designated least tern foraging habitat, which includes the project area, from April 1 through September 15, when least terns are present nesting and foraging in San Diego Bay. No persistent effects on foraging conditions are expected once in-water construction/demolition activities are halted. At other times, the onshore noise and activity associated with the project would be similar to ongoing activities at NBPL and not expected to affect least tern foraging in the adjacent waters. There would be no effect on least tern nesting colonies, the nearest of which is across the bay at North Island. Based on this analysis, the Navy has concluded that Alternative 1 may affect, but is not likely to adversely affect, the California least tern, and is consulting informally with the U.S. Fish and Wildlife Service to request concurrence with this conclusion. There would be no significant impact on the California least tern. Green Sea Turtle No sea turtle habitat would be impacted by any project activities, and sea turtles are not expected to occur in northern San Diego Bay during the fall-winter timing of in-water construction/demolition and pile driving activities. Any sea turtles present in the general vicinity during any project activities would be able to detect and avoid the noise and associated in-water activities. Furthermore, increases in noise levels from dredging activities would not vary substantially from normal levels of North Bay activity. By following the avoidance and minimization measures, no injuries to sea turtles are expected. As such, the Navy has concluded that there would be no effect on sea turtles from the implementation of Alternative 1. Therefore, implementation of Alternative 1 would have no significant impact to sea turtles. Programmatically, the Navy will continue to consult informally with NMFS on other Navy construction activities	Impacts associated with Alternative 2 would be the same as those for Alternative 1, with the exception that dredging would not take place until years after completion of construction of the pier. Under Alternative 2, there would be no significant impacts to threatened and endangered species. **Avoidance and Minimization Measures/SCMs:** Under Alternative 2, avoidance and minimization measures/SCMs would be the same as those for Alternative 1.	Under the No-Action Alternative, existing conditions would remain unchanged. The Navy would continue to utilize the NBPL fuel pier without replacement of the pier and without implementation of safety improvements. **Avoidance and Minimization Measures/SCMs:** Under the No-Action Alternative, avoidance and minimization measures/SCMs would not be necessary.

Table ES-1. Summary of Potential Impacts and Avoidance and Minimization Measures/Special Conservation Measures

Resource Area	*Alternative 1 Pier Replacement and Associated Dredging*	*Alternative 2 Delayed Dredging Alternative*	*No-Action Alternative*
	and facilities projects throughout San Diego Bay to identify any risks that could negatively impact sea turtles and to agree upon related avoidance and minimization measures. These measures would support a programmatic "may affect, not likely to adversely affect" finding that would be subject to the regulator's written concurrence. <u>Western Snowy Plover</u> Since the western snowy plover is not known or expected to occur in the project area, and since the nearby sandy beach would not be used for any project-related purpose, there would be no effect on individuals or potential habitat for this species. Therefore, there would be no significant impact to western snowy plovers. <u>Other Special Status Species</u> The project sites are not in proximity to important foraging, resting, or breeding areas for bird species, and similar habitats are abundant throughout San Diego Bay. Potential disturbance of shoreline and adjacent open water areas that may be used on a transient basis by sensitive water and shore bird species would be short-term and less than significant. Noise generated during demolition, construction, and dredging activities would not substantially increase noise levels. Additionally, these increases in noise and activity would not vary substantially from normal levels of activity, vehicular traffic, and marine vessels operating in the immediate area and would cease upon completion of demolition, construction, and dredging activities. Therefore, with implementation of Alternative 1 there would be no adverse effect on these species' populations or habitats. **Avoidance and Minimization Measures/SCMs:** The following avoidance and minimization measures would be utilized during the proposed activities to reduce the potential to impact threatened and endangered species: • Dredging and other in-water demolition or construction would not occur during the endangered California least tern breeding season (April 1 - September 15). • The Navy would continue to follow the conservation measures established in the current Tern Memorandum of Understanding (MOU) (Appendix E.2). • In conjunction with marine mammal monitoring (Section 3.4.3.2) (currently part of the Navy's IHA application), qualified observers will also search for and document any		

Table ES-1. Summary of Potential Impacts and Avoidance and Minimization Measures/Special Conservation Measures

Resource Area	*Alternative 1 Pier Replacement and Associated Dredging*	*Alternative 2 Delayed Dredging Alternative*	*No-Action Alternative*
	occurrence of sea turtles within areas of potential effect or interaction with the project. During pile driving/extraction activities, monitoring will extend to the limit potential Level B behavioral harassment, specifically to the underwater 160 dB re 1 µPa (rms) isopleth for impact pile driving; and for vibratory pile driving or extraction, to either the underwater 120 dB re 1 µPa (rms) isopleth or to the point at which project sound becomes indistinguishable from background noise (maximum project sound SPL (rms) ≤ median ambient rms), whichever is less. A 10-meter buffer zone will also be monitored during other in-water operations of equipment and vessels. Monitoring will commence at least 15 minutes prior to the activities. • If any sea turtle is seen within these visual ranges prior or during the corresponding activity, the activity would not commence until the animal has moved out of the area or at least 15 minutes has passed since the last such sighting. • Programmatically, the Navy will continue to consult informally with NMFS on sea turtle occurrence and Navy construction activities and facilities projects throughout San Diego Bay to identify any risks that could negatively impact sea turtles.		
Water Resources	There would be no impact to bathymetry from temporary relocation of the Navy marine mammal program, the Everingham Brothers Bait Company bait barges, and pier demolition and construction. The impact to bathymetry from dredging the high spot in the existing turning basin would be less than significant because most of area, surrounding the proposed dredge footprint is already deeper than the proposed dredge depth (-40 feet mean lower low water level). Use of dredge sediments for nearshore replenishment at Imperial Beach would be a beneficial impact. There would be minor, localized temporary increases to circulation caused by vessel movement, in-water demolition, and construction, and dredging; these increases would cease when each particular activity ends. The piles for the proposed new fuel pier and guide piles for the temporary Navy MMP relocation site at NMAWC would be sufficiently spaced to allow water to circulate freely through the areas. Temporary relocation of the Everingham Brothers Bait Company bait barges would not involve in-water construction, dredging, or other activity that would affect circulation. Therefore, impacts to water circulation within San Diego Bay associated with	Under Alternative 2, dredging would be done years after the pier replacement effort is completed. Thus under this Alternative, there would be no potential intermittent overlap of increased turbidity associated with demolition and construction activities. Under Alternative 2, significant impacts to bathymetry and circulation would not occur. Under this alternative, significant impacts to marine and surface	Under the No-Action Alternative, no demolition or construction activities would occur and existing water resources would not be affected. However, under the No-Action Alternative the beneficial impact from the removal of creosote-treated pilings would not occur. **Avoidance and Minimization Measures/SCMs:** Under the No-Action Alternative,

Table ES-1. Summary of Potential Impacts and Avoidance and Minimization Measures/Special Conservation Measures

Resource Area	*Alternative 1 Pier Replacement and Associated Dredging*	*Alternative 2 Delayed Dredging Alternative*	*No-Action Alternative*
	demolition/construction activities and the presence of the proposed new pier would not be significant. Changes to bacteria and nutrient levels in the bay waters near NMAWC associated with proposed temporary relocation of the Navy MMP would be within normal levels. Changes to bacteria levels would be temporary and would not exceed standards established by the California Department of Health Services and the SWRCB to protect water contact recreation in coastal waters from bacterial contamination. Temporary relocation of the bait barges could bring a potential source of copper (in the form of antifouling paint) to the vicinity of the San Diego Bay shoreline at Harbor Island (west basin), listed as an impaired water body on the Clean Water Act Section 303(d) list due to copper from an unknown source. The barges would be present only for part of each year during the four-year construction period so any potential input of copper to the impaired waters would be restricted. The intervening distance and tidal flushing would be anticipated to reduce copper concentrations in the water actually reaching the impaired segment. Removal of the old fuel pier wood pilings would remove creosote, a source of polycyclic aromatic hydrocarbons, from the Bay waters. Thus, removing the wood pilings would represent a net beneficial water quality impact for the fuel pier area. The bait barge operation does not involve waste water discharges... With the minimization measure discussed below to reduce potential input of copper from antifouling paints, there would not be a significant impact to marine water quality due to temporary relocation of the bait barges. SSC Pacific is covered under NBPL's overall NPDES permit, which would be amended for the temporary relocation of the Navy marine mammal program to NMAWC. The new fuel pier would have stormwater management capabilities that would comply with current NBPL Permit requirements. All rainfall accumulating on the lower deck as well as rainfall from the 85th percentile storm event accumulating on the upper deck of the new pier would be captured and pumped to NBPL's fuel oil reclamation facility for treatment. Basewide and site-specific Best Management Practices (BMPs) to prevent impacts to surface water would be followed at the new fuel pier. Therefore, with implementation of Alternative 1 no significant impacts to water quality and would occur.	water resources, and beneficial uses within the bay would not occur. **Avoidance and Minimization Measures/SCMs:** Under Alternative 2, avoidance and minimization measures/SCMs would be the same as those for Alternative 1.	avoidance and minimization measures/SCMs would not be necessary.

Table ES-1. Summary of Potential Impacts and Avoidance and Minimization Measures/Special Conservation Measures

Resource Area	*Alternative 1 Pier Replacement and Associated Dredging*	*Alternative 2 Delayed Dredging Alternative*	*No-Action Alternative*
	During demolition, construction, and dredging, protective measures would be implemented to minimize impacts to marine water quality. Protective measures for demolition and construction would include implementation of a construction National Pollutant Discharge Elimination System (NPDES) permit; a construction Storm Water Pollution Prevention Plan;(SWPPP) the NBPL Integrated Contingency Plan (ICP) for Oil and Hazardous Substance Spill Prevention and Response Facility Response Plan NBPL ICP; and the use of catch devices and sheeting. Protective measures to minimize turbidity would include: retention of the existing sheet pile and cutting piles at the mudline. All in-water work would comply with the requirements of a Section 401 Water Quality Certification from the Regional Water Quality Control Board (RWQCB) and Section 404/Section 10 permits from the USACE. Through compliance with USACE, EPA, and Regional Water Quality Control Board (RWQCB) permit requirements, no significant impacts to marine water quality would occur. **Avoidance and Minimization Measures/SCM's:** The following avoidance and minimization measures/SCMs would be implemented as part of Alternative 1 to reduce impacts to below a level of significance: • Sheet piles beneath the existing fuel pier would be left in place to minimize sediment and eelgrass disturbance. • The demolition and construction contractors would be required to prepare and implement a Construction Demolition Plan that would cover all phases of the work to be done. The contractors' plan would be required to specify materials, equipment, and procedures to be used to contain all construction and demolition waste and debris. • Contractors would be required to use catch devices and sheeting to capture and contain debris. • Before demolition begins, the contents of each pipeline would be pumped out. The pipelines would be cleaned to minimize accidental release of pipeline residue during demolition activities. Pipeline contents and cleaning water would be captured and properly disposed. • Discuss with the Everingham Brothers Bait Company the formulation of the antifouling coatings used in the maintenance operations to determine the concentration of copper. If copper-containing paints are used, consider substituting coatings with lower copper concentrations or		

Table ES-1. Summary of Potential Impacts and Avoidance and Minimization Measures/Special Conservation Measures

Resource Area	*Alternative 1 Pier Replacement and Associated Dredging*	*Alternative 2 Delayed Dredging Alternative*	*No-Action Alternative*
	no copper if feasible. • In accordance with the Navy's Stormwater Construction Permitting Policy, the contractor would be required to obtain a construction NPDES permit that would remain in effect for the length of the project. The NPDES permit would require preparation and implementation of a SWPPP that would identify project-specific BMPs to minimize impacts at the fuel pier construction site and at the NMAWC temporary relocation site. • Per the NBPL Integrated Contingency Plan (ICP) for Oil and Hazardous Substance Spill Prevention and Response Facility Response Plan, any petroleum release or petroleum sheen observed on the water surface would be reported to the USCG National Response Center and other agencies as required. • Booms and other spill containment equipment kept on hand would be immediately deployed, the source of the release would be determined and secured, and cleanup measures appropriate to the nature and extent of the spill would be implemented. These procedures would minimize the potential for contaminants related to project activities to enter marine waters. • Upon completion of the new fuel pier, the NBPL Storm Water Discharge Management Plan and the fuel pier BMPs would be reviewed, and revised/updated as needed to incorporate changes resulting from the changes to the fuel pier structure and/or operations. The NBPL Storm Water Discharge Management Plan and Basewide BMPs for preventing and minimizing contact of potential pollutants with stormwater would continue to be followed, including: restricting access, regular cleaning and sweeping, controlling spills and reducing waste, avoiding hosing down the site, and regular inspection and maintenance of the storm drain system. All BMPs specific to the fuel pier would also be followed. • A Section 401 Water Quality Certification from the RWQCB would be obtained, as would a Section 404/Section 10 permit from the USACE; these permits would apply to all in-water components of the project.		
Hazardous Materials and Wastes	Through the use of the preventive measures described below and implementation of the procedures described in the Integrated Contingency Plan (ICP) for Oil and Hazardous Substance Spill Prevention and Response NBPL in the event of	Under Alternative 2, the same project components would occur as for	Under the No-Action Alternative, fueling operations currently being conducted at

Table ES-1. Summary of Potential Impacts and Avoidance and Minimization Measures/Special Conservation Measures

Resource Area	*Alternative 1 Pier Replacement and Associated Dredging*	*Alternative 2 Delayed Dredging Alternative*	*No-Action Alternative*
	an accidental release, no increase in human health risk or environmental exposure to hazardous materials or hazardous wastes would occur with implementation of Alternative 1. Therefore, implementation of Alternative 1 would not have a significant impact with respect to the use, storage, or disposal of hazardous materials or hazardous wastes. Through adherence to Navy Region Southwest recycling and waste minimization requirements, reuse of the construction materials required for the Navy marine mammal temporary relocation component, implementation of Alternative 1 would have not have a significant impact to solid waste and regional landfill capacity. **Avoidance and Minimization Measures/SCMs** • The Navy would characterize all hazardous wastes associated with demolition of the existing fuel pier (building materials falling under the Universal Waste Rule, coal tar coating on the steel superstructure, lead-based paint, asbestos-containing materials (if determined to be present), and treated wood waste for proper disposal at an appropriately-permitted facility. • If discarded military munitions were encountered during project activities, the Navy would establish an explosives safety quantity distance arc for the location and conduct site remediation as needed. • Contractors involved with construction and demolition for all components of Alternative 1 would be subject to all federal, state, and San Diego County requirements for hazardous materials and hazardous waste management, and would be required to follow the requirements of the Navy Region Southwest Waste Management Plan (NRSW 2007). In addition, demolition and construction contractors would implement BMPs designed to minimize the potential for hazardous material releases during demolition and construction activities. • A safety buffer zone would be established between the underwater fuel pipelines to NAS North Island and the demolition/construction work zone and dredge footprint. All contractors' equipment and vessels would remain outside the safety buffer zone. • Before the fuel pier is demolished, all fuel, lubricating oil, and contaminated petroleum product inside the pipelines on the fuel pier would be pumped out and the pipelines would be cleaned. • The US Coast Guard and California State Lands Commission would continue to inspect fuel pier operations while the existing fuel pier remains in use during the first	Alternative 1, involving the same types and volumes of hazardous and non-hazardous materials and wastes. Therefore, no significant impacts associated with hazardous materials, hazardous wastes, public health and safety, and solid waste would occur. **Avoidance and Minimization Measures/SCMs:** Under Alternative 2, avoidance and minimization measures/SCMs would be the same as those for Alternative 1.	the existing fuel pier would continue. Therefore, there would be no change from the existing conditions. **Avoidance and Minimization Measures/SCMs:** Under the No-Action Alternative, avoidance and minimization measures/SCMs would not be necessary.

Table ES-1. Summary of Potential Impacts and Avoidance and Minimization Measures/Special Conservation Measures

Resource Area	*Alternative 1 Pier Replacement and Associated Dredging*	*Alternative 2 Delayed Dredging Alternative*	*No-Action Alternative*
	phase of construction, and would inspect the new pipelines when and fuel pier operations when the new pier is completed. . The pipelines on the new fuel pier would be constructed according to applicable federal and state regulations for pipelines and marine bulk fuel transfer facilities. • The contaminated petroleum product and ballast water pipelines for the new fuel pier would be designed and tested in accordance with the requirements of CCR Title 22, Chapter 15- Interim Status Standards for Owners and Operators of Hazardous Waste Transfer, Treatment, Storage, and Disposal Facilities, Article 10 Tank Systems and the applicable guideline standards in the American Petroleum Institute Standard 650 Welded Tanks for Oil Storage. • Hazardous wastes that would be generated at the new fuel pier would continue to managed according to federal, state and county regulations, and be recycled/disposed of appropriately per the by licensed contractors. The San Diego County Department of Environmental Health would continue their regulatory oversight of hazardous waste activities at the new fuel pier.		
Airborne Noise	Pile driving would be the dominant noise-generating activity associated with the proposed project. All pile driving would take place during daylight hours. During pile driving, outdoor airborne noise levels in residential areas beyond the NMAWC boundary and in the La Playa neighborhood north of NBPL would not exceed City of San Diego construction noise ordinances (75 decibels A-weighted [dBA]). During pile driving at NMAWC, the indoor noise levels at schools and day care centers beyond the NMAWC boundary would be slightly greater than the classroom criteria levels for effective hearing with windows closed (35dBA). Since the pile driving would be intermittent during the school day, and would last only about two weeks (eight days total) these levels would be considered acceptable. During pile driving at NBPL, the indoor noise levels with windows closed at the Child Development Center (CDC) at Building 377 at NBPL would be slightly greater than the classroom criteria levels for effective hearing (35dBA). Since the pile driving would be intermittent during the school day, and there would be 6 ½ months without pile driving (during the least tern foraging season) these noise levels would be considered acceptable.	Under Alternative 2, the noise impacts associated with the demolition, construction, and dredging activities would be the same as those discussed under Alternative. 1. However, dredging would take place years after construction was completed, so noise from dredging would occur in the absence of other project-related noise.	Under the No-Action Alternative, industrial activities currently being conducted in the area would continue, and the area's acoustical environment would remain unchanged. Therefore, there would be no noise impacts associated with the No-Action Alternative.

Table ES-1. Summary of Potential Impacts and Avoidance and Minimization Measures/Special Conservation Measures

Resource Area	*Alternative 1 Pier Replacement and Associated Dredging*	*Alternative 2 Delayed Dredging Alternative*	*No-Action Alternative*
	Avoidance and Minimization Measures/SCMs: The following avoidance and minimization measures/SCMs would be implemented as part of Alternative 1 to reduce noise impacts to below a level of significance: • Construction activities, including pile driving, would only occur during daylight hours. • The educational facilities listed in Tables 3.8-1 and 3.8-2 would be informed of the dates of pile driving and advised to close classroom windows during the pile driving intervals. The following additional avoidance and minimization measures/SCMs could be implemented as part of Alternative 1 further attenuate noise levels if a greater reduction is desired. • Noise monitoring for classroom criteria • Acoustic blankets around the pile driver • Pile cushions could be used to reduce noise levels	**Avoidance and Minimization Measures/SCMs:** Under Alternative 2, avoidance and minimization measures/SCMs would be the same as those for Alternative 1.	**Avoidance and Minimization Measures/SCMs:** Under the No-Action Alternative, avoidance and minimization measures/SCMs would not be necessary.
Air Quality	Operational emissions would primarily be from mobile sources associated with the use of the pier, including Navy marine vessels and ground vehicles that would service the pier. Because the purpose of the Proposed Action is to replace the aging, seismically deficient, and obsolete pier with a new pier that would improve safety and fuel receipt and delivery capabilities, Alternative 1 is designed to serve existing needs and would not result in increases in mobile source emissions. Therefore, the air quality analysis focuses on construction activities required to replace the pier. Estimated annual construction emissions with implementation of Alternative 1 would be below the *de minimis* threshold levels for Clean Air Act (CAA) conformity. In addition, Alternative 1 would conform to the San Diego Air Basin Shore State Implementation Plan (SIP) and would not trigger a conformity determination under Section 176(c) of the CAA. The Navy has prepared a Record of Non-Applicability (RONA) for CAA conformity (Appendix G of this EA). No health effects would be anticipated from emission of hazardous air pollutants because the majority of project activities occur in restricted areas where there are no sensitive receptors (i.e., residents, schools, hospitals, etc.). Therefore, with implementation of Alternative 1 significant impacts to air quality would not occur.	Impacts associated with Alternative 2 would be the same as those for Alternative 1 with the exception that dredging would take place years after completion of the new fuel pier. Under Alternative 2, there would be no significant impacts to air quality. **Avoidance and Minimization Measures/SCMs:** Under Alternative 2, avoidance and minimization measures/SCMs would be the same as for Alternative 1.	Under the No-Action Alternative, existing conditions would remain unchanged. The Navy would continue to utilize the NBPL fuel pier without replacement of the pier and without implementation of safety improvements. There may be additional air quality impacts should vessels be required to wait until the pier is available and conduct additional maneuvering for safety purposes. **Avoidance and Minimization Measures/SCMs:**

Table ES-1. Summary of Potential Impacts and Avoidance and Minimization Measures/Special Conservation Measures

Resource Area	*Alternative 1 Pier Replacement and Associated Dredging*	*Alternative 2 Delayed Dredging Alternative*	*No-Action Alternative*
	Avoidance and Minimization Measures/SCMs: The following avoidance and minimization measures/SCMs would be implemented as part of Alternative 1 to reduce impacts to below a level of significance: • All necessary construction or operationally-related permits would be authorized by the San Diego County Air Pollution Control District (SDCAPCD) before project implementation occurs. • The demolition and construction contractor would certify all equipment used during demolition and construction activities with the SCDAPCD.		Under the No-Action Alternative, avoidance and minimization measures/SCMs would not be necessary.
Transportation and Circulation	Proposed demolition and construction associated with replacement of the NBPL fuel pier would cause minor, temporary changes to traffic and circulation in the Rosecrans Corridor area during the demolition/construction period. Avoidance and minimization measures would be used during the demolition/construction period to reduce construction traffic to below a level of significance. Temporary changes to traffic and circulation associated with temporary relocation of the Navy MMP to NMAWC would also be minor. Operations at the new fuel pier would not result in additional vehicle traffic to the pier because the number of workers and work vehicles would not change. Implementation of Alternative 1 would not result in changes in accessibility of public roads that would constitute long-term effects to transportation and circulation. Therefore, there would be no significant impacts with respect to transportation and circulation. **Avoidance and Minimization Measures/SCMs:** The following avoidance and minimization measures/SCMs would be implemented as part of Alternative 1 to reduce impacts to below a level of significance: • Non-construction truck traffic and some of the NBPL employees would be diverted away from the Rosecrans Gate towards the McClelland Gate, to relieve congestion on Rosecrans Street and balance traffic more evenly at both gates. • Trucks going to and from the fuel pier construction area would be staged or queued in a portion of the Navy-owned parking area at the intersection of North Harbor Drive and Nimitz Boulevard, to limit the flow of traffic onto Rosecrans Street.	Impacts associated with Alternative 2 would be the same as those for Alternative 1, with the exception that dredging activities would be delayed until completion of construction of the pier. Under Alternative 2, there would be no significant impacts to Transportation and Circulation. **Avoidance and Minimization Measures/SCMs:** Under Alternative 2, avoidance and minimization measures/SCMs would be the same as for Alternative 1.	Under the No-Action Alternative, roadway and vessel traffic conditions would remain unchanged. Therefore, no significant impacts to transportation and circulation would occur. **Avoidance and Minimization Measures/SCMs:** Under the No-Action Alternative, avoidance and minimization measures/SCMs would not be necessary.

Table ES-1. Summary of Potential Impacts and Avoidance and Minimization Measures/Special Conservation Measures

Resource Area	*Alternative 1 Pier Replacement and Associated Dredging*	*Alternative 2 Delayed Dredging Alternative*	*No-Action Alternative*
	• To ensure safety of all vessels using San Diego Bay, the Navy would coordinate with the U.S. Coast Guard to issue a Notice to Mariners when in-water components of this project are occurring, including temporary relocation of the Navy marine mammals and the Everingham Brothers Bait Company bait barges, dredging and sediment disposal.		
Socioeconomics, Environmental Justice, and Growth Inducement	There would be an overall beneficial impact to the economy of San Diego County from the fuel pier replacement and dredging project. Economic benefits associated with construction activities would more than offset reductions in economic activity in industries related to recreational fishing, leading to a net beneficial economic impact to San Diego County during the life of the project. No low-income or minority populations would be disproportionately or adversely affected, so no environmental justice impacts are expected. There would be no housing development or need for an in-migrating construction workforce, nor would any constraints to growth be removed, so there would be no impacts associated with induced growth.	Impacts associated with Alternative 2 would be the same as those for the Alternative 1, with the exception that dredging activities would be delayed until years after completion of construction of the replacement fuel pier. Under Alternative 2, there would be no significant impacts to socioeconomics or environmental justice.	Under the No-Action Alternative, socioeconomic conditions would remain unchanged. Therefore, no significant impacts to socioeconomics or environmental justice would occur. **Avoidance and Minimization Measures/SCMs:** Under the No-Action Alternative, avoidance and minimization measures/SCMs would not be necessary.

NAVAL BASE POINT LOMA (NBPL) FUEL PIER REPLACEMENT AND DREDGING (P-151) ENVIRONMENTAL ASSESSMENT

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CHAPTER 1
PURPOSE AND NEED FOR THE PROJECT

1.1 INTRODUCTION/BACKGROUND

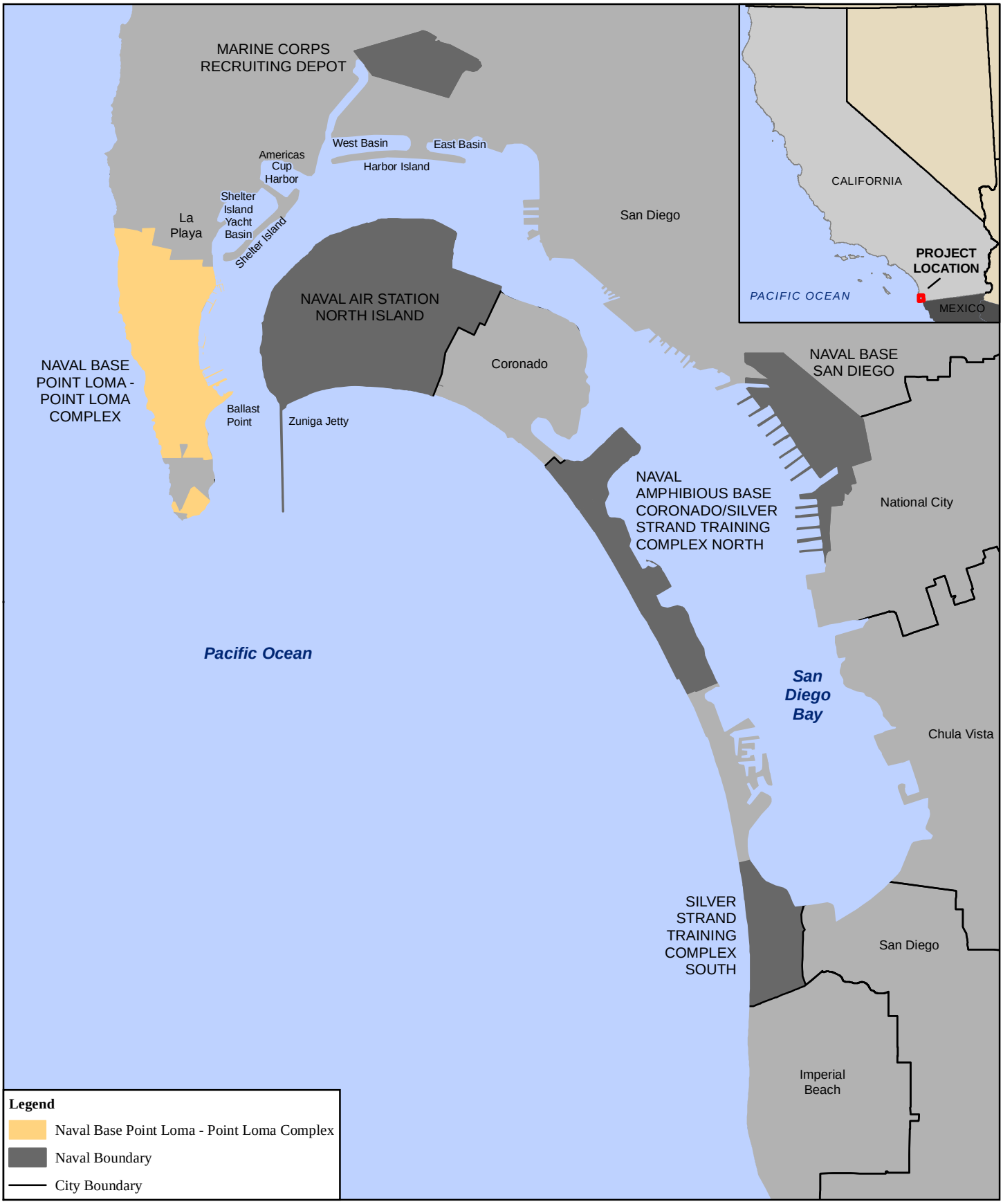
This EA has been prepared in compliance with the NEPA of 1969 (42 United States Code [USC] § 4321, as amended); the Council on Environmental Quality (CEQ) Regulations for Implementing the Procedural Provisions of NEPA (Title 40 Code of Federal Regulations [CFR] §§ 1500-1508, 1 July 1986); and Navy Procedures for Implementing NEPA (32 CFR § 775).

The existing fuel pier is located on San Diego Bay at NBPL (Figures 1-1, and 1-2). It currently serves as a fuel depot for loading and unloading tankers and U.S. Navy underway replenishment vessels that refuel ships at sea ("oilers") fueling Navy, DHS, Department of Defense (DoD), and foreign navy vessels, as well as transferring fuel to the local replenishment vessels and other small craft operating in San Diego Bay. The fuel pier at NBPL Defense Fuel Support Point (DFSP) is critical to the mission of the Navy and is the largest active Navy fueling facility in the vicinity. More than 42 million gallons of fuel are stored at NBPL DFSP and more than 11 million gallons of fuel are issued and received every month to an average of 43 ships including the Military Sealift Command, Expeditionary Warfare Training Groups, three carrier strike groups, National Oceanic & Atmospheric Administration (NOAA), DHS, foreign and small craft.

The approach (portion that connects to shore) and north segments are over 100 years old, constructed in 1908 as the La Playa Coaling Wharf. The south segment was constructed in 1942. The average design service life of this kind of structure in a marine environment is typically considered to be about 50 years (Navy 2010a). The pier, as such, is significantly past its designed service life. Further, the pier does not meet current California State Lands Commission (CSLC) - Marine Oil Terminal Engineering and Maintenance Standards (MOTEMS) Level 1 (operational) and Level 2 (survival) seismic criteria (Navy 2010a,b). According to the Structural Evaluation and Seismic Analysis (Navy 2010b) conducted for this project, the existing fuel pier is not structurally sufficient to comply with the following Level 2 Seismic Performance Requirements:

- Controlled inelastic structural behavior with repairable damage
- Prevention of structural collapse

Because of the structural deficiencies, significant damage in a moderate earthquake is considered to be likely, with potential catastrophic failure of the pile foundations occurring in a major seismic event (Navy 2010a).

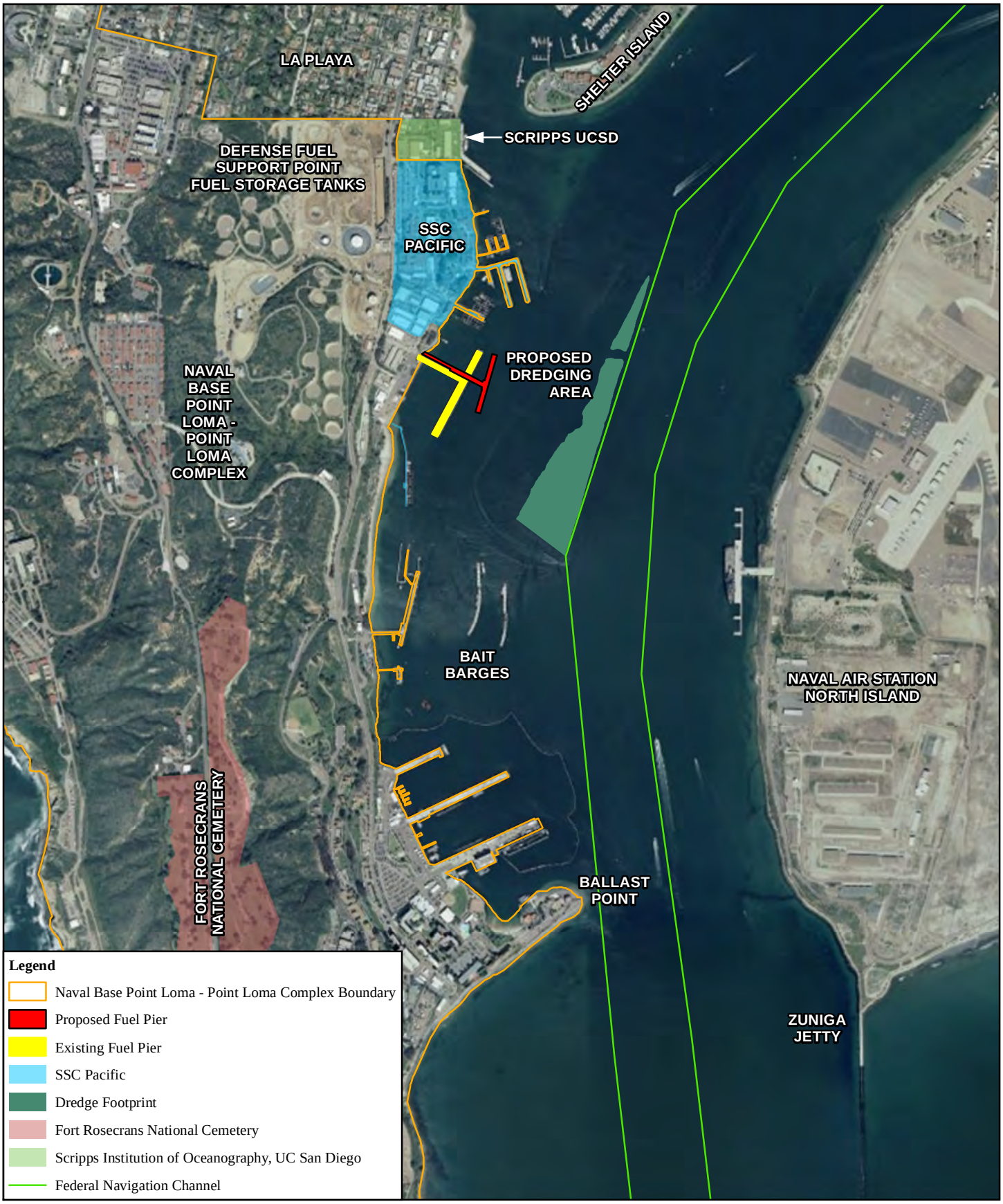


0 0.5 1 2 Kilometers

0 0.5 1 2 Miles

Figure 1-1
Regional Location - Pier 180 Replacement
Naval Base Point Loma - Point Loma Complex

Source: Navy, NAVFAC Southwest, and Port of San Diego 2010



0 250 500 Meters

0 1,000 2,000 Feet

Sources: Navy 2007; NOAA 2012; NAVFAC Southwest 2011a

Figure 1-2
Project Site Map

N

The State of California enforces special requirements for marine oil terminals, particularly with regard to seismic criteria. The Navy has agreed to comply with the California MOTEMS requirements for the fuel pier. However, the existing fuel pier is not consistent with the MOTEMS seismic criteria. The poor condition of the existing fuel pier has also been noted in the Navy Region Southwest (NRSW), Port Operations Shore Infrastructure Plan, dated April 2009 (Navy 2010a). Per the Defense Readiness Reporting System an overall rating of "F4" has been assigned to the existing fuel pier facility. The F4 rating translates into: "Facility has deficiencies that prohibit or severely restrict use of its designated functions." The Port Operations Shore Infrastructure Plan has listed P-151 "Replace Pier 180" as a planned project affecting port operations for NRSW. Additionally, the existing fuel pier is situated in waters where the natural bottom depth is between 30 to 40 feet (ft) thus requiring maintenance dredging because San Diego Bay has an open hydrologic circulation system that causes infill around piers and infrastructure. Dredging occurred most recently in 1999 to keep the pier accessible for larger vessels.

To support the fueling needs of the Navy and DHS, the NBPL DFSP must be able to provide adequate services, i.e., receive and issue fuel, to multiple ships at a time. To meet this requirement, ships and barges are received on both the inboard and outboard sides of the existing pier. The inboard south side of the pier is primarily used for fuel issues to small cutters, mine sweepers, and barges. The inboard north side is used for fueling small craft. The outboard side of the pier is currently used to issue and receive fuel from large ships, i.e., tankers, oilers, transport ships, dock landing ships, ocean going barges, and various other Navy and DHS vessels. When included with scheduling requirements, the demand of the existing pier has exceeded the facility capacity. In addition, the existing fuel pier has reached a maximum capacity for the deeper outer berth, resulting in the need to turn vessels away due to lack of available docking and mooring space.

It is anticipated that future classes of ships would generally be more multi-purpose, require more frequent fueling, and further increase the fuel capacity loading requirement for the new replacement fuel pier (Navy 2010a). The existing fuel pier lacks deep water berthing capability and is therefore limited in the range of vessels that can be accommodated (Navy 2010a).

The Proposed Action would generally allow the future year fueling of newer and larger ships that are generally anticipated in the future. However, no specific new ship fueling, homeporting, or operational actions with any relationship to the Proposed Action are currently planned or foreseen. As any future proposals for ship fueling, homeporting, and operations are developed over the next decade, they will be appropriately addressed in NEPA documentation at that time.

1.2 PROJECT LOCATION

The project site is located at the NBPL DFSP in the Point Loma Complex, San Diego California. NBPL-Point Loma Complex is located on the west side of San Diego Bay, near the mouth of the bay directly opposite Naval Air Station (NAS) North Island as shown in Figure 1-1. NBPL - Point Loma Complex includes Space and Naval Warfare Systems Center (SSC) Pacific. The

Point Loma Complex is bordered to the north by Scripps Institution of Oceanography (SIO) University of California San Diego (UCSD) and the communities of La Playa and Sunset Cliffs, to the east by the San Diego Bay, to the west by the Pacific Ocean and to the south by Cabrillo National Monument and the Pacific Ocean. Fort Rosecrans Military Cemetery runs down the middle of the peninsula (Figure 1-2). The shoreside of Pier 180 connects with NBPL roadways (Figure 1-3). All of the land within the NBPL boundaries is restricted from general public access. The adjacent waters of San Diego Bay are heavily used by the public and the Navy.

1.3 PURPOSE OF AND NEED FOR THE PROJECT

The Project is needed to provide improved safety features and improved fuel receipt and delivery capability at NBPL DFSP Pier 180 to service existing and future classes of naval vessels. As described in Section 1.1,*Introduction/Background*, there is a need for this project because: (1) the existing fuel pier is over 100 years old and is in poor condition; (2) the existing fuel pier does not meet MOTEMS seismic criteria for marine oil terminals; (3) the existing fuel pier lacks adequate deep water berthing capability, thus cannot safely accommodate all of the existing and future classes of vessels; (4) portions of the existing turning basin are too shallow to safely accommodate current and future deep draft berthing capabilities; (5) improved fueling features and capabilities are needed to service the current and projected future demand of vessels, which is currently expected to increase by about 30 to 35 percent by 2018 ; and (6) Navy and DHS need adequate and safe ship fueling facilities now and in the future to accomplish their mission of national defense.

Bringing this aging structure up to compliance levels with repairs or modifications to meet these needs is not economically feasible, because all of the pier's existing pile foundations would need to be replaced. New pier construction would provide a safe, secure, and environmentally compliant facility with a service life that can be expected to exceed fifty years.

The purpose of the project is to replace the aging, seismically deficient, and increasingly dysfunctional and obsolete fuel pier (Pier 180) at NBPL with a new pier that would meet current CSLC MOTEMS, and meet projected ship fueling requirements and enable the Navy and DHS to meet their national security and defense missions.

1.4 DECISION TO BE MADE

The decision to be made as a result of the analysis in this EA is firstly to decide if an Environmental Impact Statement (EIS) needs to be prepared. An EIS would need to be prepared if it is anticipated that the Proposed Action would have significant impacts on the human or natural environment. Should an EIS not be deemed necessary, then a Finding of No Significant Impact (FONSI) would be prepared. If a FONSI is prepared and executed, then the Navy may decide to move ahead with the Proposed Action or one of the analyzed alternatives in the EA without further procedures pursuant to NEPA.

a) Aerial View of Existing Fuel Pier 180

b) View of Existing Fuel Pier 180 to the northeast

Figure 1-3
Views of Existing Fuel Pier 180

1.5 SCOPE OF THE ANALYSIS

NEPA, CEQ regulations, and Navy procedures for implementing NEPA specify that an EA should address only those resource areas potentially subject to impacts. In addition, the level of analysis should be commensurate with the anticipated level of environmental impact. Relevant pre-planning studies that determined the scope of analysis include: Sampling and Analysis Report for NBPL Fuel Pier Replacement and Dredging (Naval Facilities Engineering Command [NAVFAC] Southwest 2011b); United States Environmental Protection Agency (USEPA) determination of NBPL Fuel Pier Replacement and Dredging suitability of dredge sediments for aquatic disposal (USEPA 2011); Sediment Grain Size Distribution and Mean Grain Size - Offshore Disposal Sites compared to Pier 180 Dredging Site (Tierra Data, Inc. [TDI] 2012; Acoustic Transmission Loss Model for North San Diego Bay]; and Marine Mammal Survey for North San Diego Bay.

Resources carried forward for detailed analysis in this EA include: biological resource habitats and communities; fisheries; birds; marine mammals; threatened and endangered species; water resources; hazardous materials and wastes; noise; air quality; transportation and circulation; and socioeconomics and environmental justice. Several resource areas have not been carried forward for detailed analysis in this EA since potential impacts were considered non-existent or negligible. The resources not carried forward for analysis, and the rationale for not carrying these resources forward are discussed below.

Geological Resources – Minimal surficial modifications associated with the proposed project would not result in impacts to geology and topography, and the proposed new fuel pier and associated infrastructure would be designed and constructed in accordance with UFC and MOTEMS seismic standards.

Cultural Resources – No known archaeological or cultural resources sites at NBPL or NMAWC would be affected by the proposed project, and the Navy would implement archaeological monitoring during excavation activities within a portion of the project area at NBPL that is identified to have buried archaeological potential.

Land Use – Land use at NBPL and NMAWC would not change, and the temporary changes to uses of the waters offshore from NMAWC and Harbor Island during the relocation of the Navy MMP and the bait barges, respectively, would not affect recreational or commercial navigation in San Diego Bay. Permanent amendments to the U.S. Coast Guard Security Zone to provide adequate security standoff distance for the proposed new pier alignment would not affect recreational or commercial navigation because there would still be 700 ft of open water between the new Security Zone Boundary and the federal navigation channel.

Recreation and Recreational Navigation – Pier demolition and construction, and dredging would not have significant impacts to recreation and recreational boaters because of the location and temporary nature of these activities. The Everingham Brothers Bait Company barges would not anchor at the temporary location during the busiest recreational sailing period (summer), and most bait barge operations take place overnight when recreational boaters are not active.

Aesthetics – The proposed new fuel pier would be consistent with its surroundings in a military industrial waterfront. The proposed temporary relocation of the Navy MMP and the Everingham Brothers Bait Company facilities would be visually consistent with the temporary relocation sites, and Under the Marine Mammal Protection Act (MMPA) Section 101(a) (4), private property owners may deter marine mammals from hauling out onto docks and/or vessels and potentially damaging private property.

Public Services and Utilities – No new public services would be constructed and the utility infrastructure and fuel system for the proposed new fuel pier would be accommodated without significantly affecting the NBPL system/network capacity.

Public Health and Safety – The storage and handling of bulk fuels, water quality, and construction safety are all extensively regulated to minimize risk. Public Health and Safety with respect to hazardous materials, hazardous wastes and explosives safety is analyzed in Section 3.7. The proposed potential bait barge relocation sites under consideration southeast of Harbor Island were selected because they avoid bird-aircraft strike hazards for Navy, U. S. Coast Guard, and Lindbergh Field (San Diego International Airport) aircraft (NRSW 2012; U. S. Coast Guard 2012). Under the Marine Mammal Protection Act (MMPA) Section 101(a) (4), private property owners may deter marine mammals from hauling out onto docks and/or vessels and potentially endangering personal safety.

1.6 INTERGOVERNMENTAL COORDINATION

The Navy is working with the following agencies to obtain the necessary authorizations, concurrences, or permits for implementation of the project (in progress unless otherwise noted):

- USEPA and U.S. Army Corps of Engineers (USACE): Suitability determination for ocean disposal of dredge sediments (completed).
- USACE: Clean Water Act (CWA) Section 404, and Rivers and Harbors Act Section 10, permits.
- U.S. Fish and Wildlife Service (USFWS): Concurrence on the informal Endangered Species Act (ESA) Section 7 consultation.
- National Marine Fisheries Service (NMFS): In compliance with the Marine Mammal Protection Act (MMPA), the Navy would obtain an Incidental Harassment Authorization before implementation of in-water demolition and construction activities. Reauthorization would be needed for each 12-month period of activity.
- NMFS: Concurrence on the Essential Fish Habitat (EFH) analysis and determination Regional Water Quality Control Board (RWQCB): CWA 401 Water Quality Certification
- California Coastal Commission: Approval of a notification filed under a programmatic agreement in accordance with the Coastal Zone Management Act.
- San Diego Air Pollution Control District potential permits: (to be obtained by the construction contractor before construction activities).

- U.S. Coast Guard (USCG) amendment to Security Zone 165.1102 for new pier headline and establishment of a temporary Security Zone for the Navy MMP at NMAWC.

1.7 PUBLIC AND AGENCY PARTICIPATION

Public agencies participating in this project include USEPA, USACE, USFWS, NMFS, RWQCB, and the California Coastal Commission as described in Section 1.6. Appendix A documents the correspondence between the Navy and the regulatory agencies involved in this project.

The 45-day public scoping period began on 28 April 2012 and ended on 11 June 2012. A public meeting was held on 3 May 2012 at the Loma Portal Elementary School. The Public Scoping Summary Report is provided as Appendix B of this document. The Draft EA will be provided to the public for review and comment. All applicable public comments received will be addressed in the Draft and Final EA and included in Appendix B of the respective documents.

1.8 ORGANIZATION OF THE ENVIRONMENTAL ASSESSMENT

Following Chapter 1, this EA is organized as follows: Chapter 2 describes the Proposed Action and alternatives; Chapter 3 describes the affected environment and the environmental consequences of each alternative; and Chapter 4 describes the cumulative impacts of the Proposed Action and alternatives in conjunction with other past, present, and reasonably foreseeable projects in the area, as well as various other considerations required by NEPA. This is followed by persons and agencies contacted (Chapter 5), references (Chapter 6), and a list of preparers and their qualifications (Chapter 7).

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CHAPTER 2
PROPOSED ACTION AND ALTERNATIVES

This chapter includes the reasonable alternative screening criteria, a description of the Proposed Action and alternatives, and alternatives considered but not carried forward for detailed analysis. It also includes a brief summary of the anticipated environmental impacts that would occur from each alternative.

2.1 REASONABLE ALTERNATIVES SCREENING FACTORS

The screening factors used to select reasonable alternatives that would allow mission, operational, and support functions to be fulfilled for modern United States (U.S.) Navy (Navy) ships are as follows:

- Location within a United States Coast Guard (USGC) Security Zone in waters offshore of Naval Base Point Loma (NBPL) where the pier fuel supply lines will align with shoreside access to NBPL Defense Fuel Support Point (DFSP) fuel storage tank facilities. The new pier location must be such that minimal on-shore excavation and construction are needed to connect the pier to the new fuel storage facilities that are in the process of being replaced on NBPL under military construction project P-401.
- New pier footprint achieving a minimum approach segment (the portion of the pier that connects to the shore) width of 50 feet (ft) while minimizing overall square footage and associated potential risks and effects to biological resources such as Essential Fish Habitat (EFH) and eelgrass beds and encroachment into navigable waters.
- Ability to accommodate mooring and fueling of all classes of Navy and Department of Homeland Security (DHS) vessels other than those that are nuclear-powered, e.g., the CVN class aircraft carriers and the SSN submarines. The fuel pier must be able to fuel one of the following vessels: military sealift replenishment "oiler" vessel (T-AO [649 ft long]); large, medium speed roll-on/roll-off ship (T-AKR [956 ft long]); or landing platform dock (LPD [684 ft long]) (Naval Facilities Engineering Command [NAVFAC] Southwest 2011c). To accommodate the T-AO the pier must have a minimum 1,095 ft of outboard mooring length with sufficient water depth (-40 ft mean lower low water [MLLW]).
- Provide greatest versatility in accommodating the wide range of vessels that use the fuel pier. A higher elevation fuel pier deck would be better suited to handle the larger vessels, with their higher top deck elevations (Navy 2010a). The height would provide additional reach for fuel load arms to safely reach fuel transfer points on the majority of larger Navy and DHS classes of ships, such as the new double hulled commercial tankers, dry cargo/ammunition ships (T-AKEs,) and older fast combat support ships (T-AOEs) (Navy 2010c).

- Pier design to maximize separation of fuel pipelines from pier deck vehicles and activities.
- Pier dimensions that meet Department of Defense (DoD) Unified Facilities Criteria (UFC). UFC are facility planning, design, construction, operations, and maintenance criteria for DoD components and participating organizations (Appendix C). As directed by the Office of the Deputy Under Secretary of Defense letter dated May 2001 and DoD Directive 4270.5 dated February 12, 2005, UFC apply all to DoD construction, repair, and maintenance projects (DoD 2006). UFC require a minimum of 50 ft of open deck width to ensure a safe operating area for personnel, forklifts, cranes, and fuel hose storage during fueling operations.
- Maintain operational capabilities at the existing fuel pier with no more than 45 days total downtime during the duration of the construction contract, which is estimated to require four years to complete (Navy 2012a). Operational requirements are defined by 2-4 fuel replenishment vessels per month (oilers), 5-7 U.S. Navy fuel oil barges (YONs) per month, 8-10 Navy and/or DHS vessels per month, and 13-20 small craft per month.
- Configuration to meet Navy Region Southwest (NRSW) force protection/antiterrorism requirements as well as 33 Code of Federal Regulations (CFR) Part 6.01.5 and 33 CFR 165.1104, with a minimum standoff distance of 200 ft on all sides as defined by 33 CFR 154.735(v).

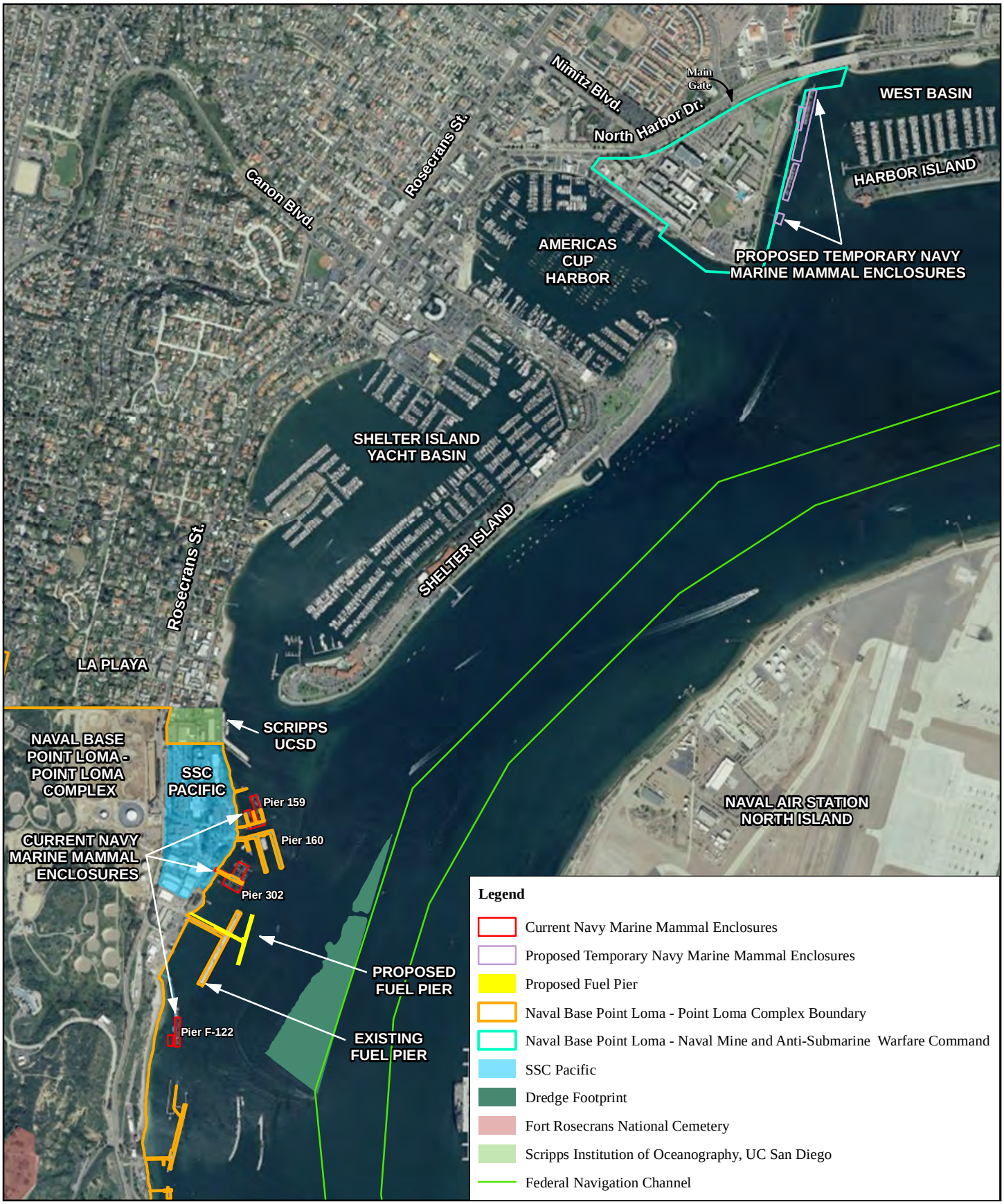
2.2 ALTERNATIVES CONSIDERED

Three alternatives are carried forward for detailed analysis in this Environmental Assessment (EA): Alternative 1 Pier Replacement and Associated Dredging; Alternative 2 Delayed Dredging Alternative; and the No-Action Alternative. Section 2.3, Alternatives Considered but Not Carried Forward for Detailed Analysis describes in detail why no other pier designs were carried forward for detailed analysis in this document.

2.2.1 Alternative 1 Pier Replacement and Associated Dredging

The scope of Alternative 1 would include the following five key elements, which are described in greater detail in the subsections shown.

- ***Temporary Relocation of the Navy MMP (Section 2.2.1.1) –*** Before the pier replacement activities begin, the Navy Marine Mammal Program, which is administered by Space and Naval Warfare Systems Command (SPAWAR) Systems Center (SSC), would be temporarily relocated to the Naval Mine and Anti-submarine Warfare Command (NMAWC), part of NBPL that is over three kilometers (km) away from the fuel pier (Space and Naval Warfare Systems Center [SSC] Pacific 2012a) (Figures 2-1 and 2-2). Limited construction at NMAWC would occur. The floating enclosures and the Navy



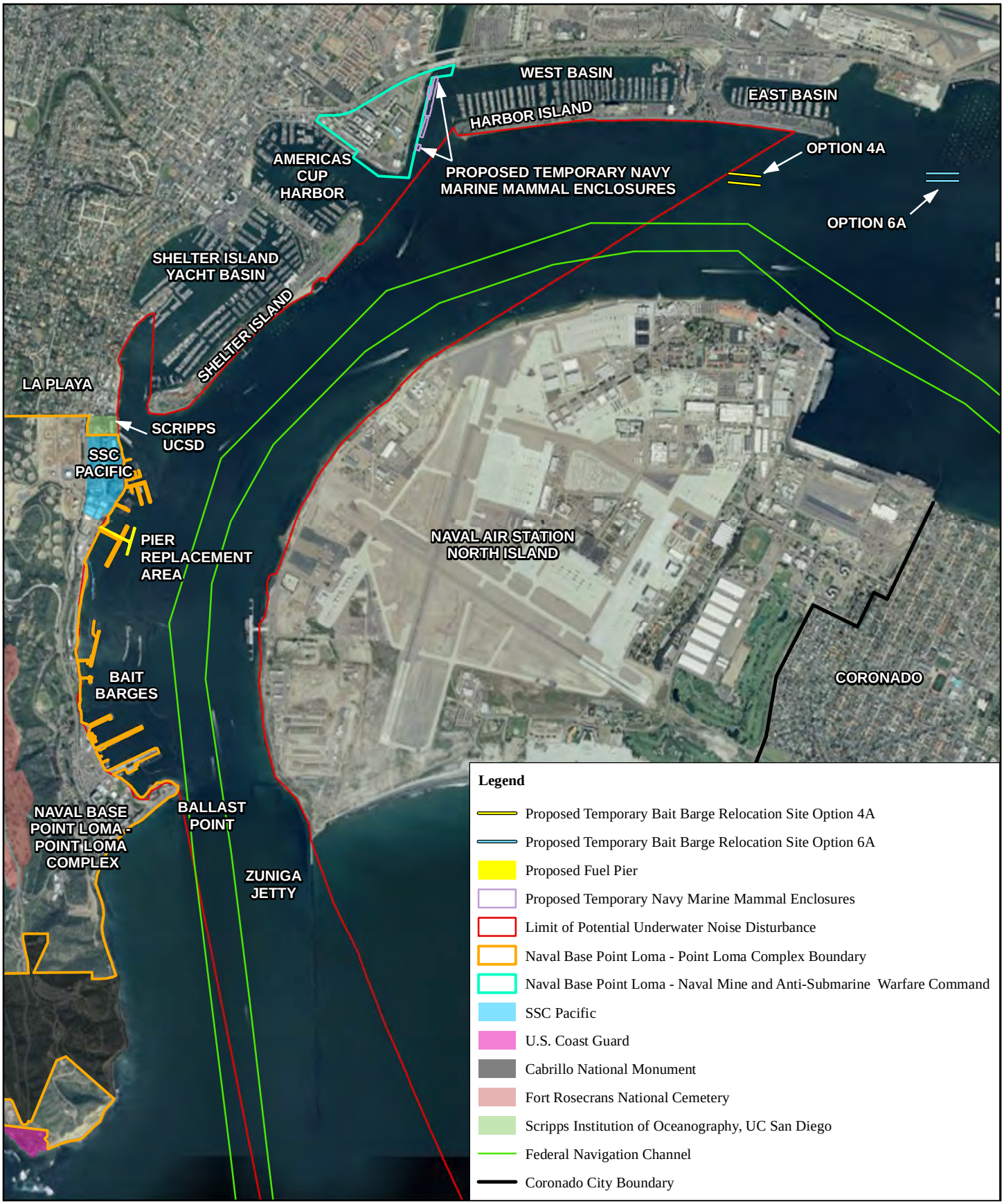
0 0.2 0.4 Kilometers

0 0.2 0.4 Miles

Source: NAVFAC Southwest 2011a

Figure 2-1
Navy Marine Mammal Program Current and Proposed Temporary Relocation Sites

N



0 0.2 0.4 Kilometers
0 0.2 0.4 Miles

Figure 2-2
Limit of Potential Underwater Noise Disturbance and Proposed Temporary Relocation Sites for Navy Marine Mammal Program and Bait Barges

Source: NAVFAC Southwest 2011a, 2012a; Navy 2007

N

marine mammals would be moved incrementally from the existing MMP location to the temporary NMAWC location. After completion of the new fuel pier the Navy marine mammal enclosures and the animals would be moved back to their original location adjacent to the fuel pier, and the temporary facilities at NMAWC would be removed.

- ***Phased Demolition and Removal of the Existing Fuel Pier (Section 2.2.1.2)*** – Demolition and removal of the existing Fuel Pier would take place in two phases to maintain the fueling capabilities of the existing fuel pier while the new pier is being constructed. The fuel pier has sufficient staff qualified to carry out fueling operations throughout the demolition and construction period, and to operate the new pier when it becomes operational. No additional personnel would be assigned to the new fuel pier (Navy 2012c).
- ***Phased Construction of a Replacement Fuel Pier (Section 2.2.1.3)*** – A new, double-deck fuel pier would be constructed that would provide flexibility in fueling multiple vessel types, meet MOTEMS requirements for seismic performance, and have a total area that is 5,315 square feet/0.12 acre smaller than the area of the existing fuel pier. There would be no pile driving or other in-water construction or demolition during the least tern foraging season, from April 1 through September 15 of each year that the project is ongoing. Due to these restrictions on in-water construction, pile driving could take up to three years to complete.
- ***Regulated Navigation Zones (Section 2.2.1.4)*** – The existing U.S. Coast Guard (USCG) Security Zone would be amended as needed to provide adequate security standoff distance to the east for the proposed new fuel pier alignment. A temporary Security Zone would be established to a distance of 100 ft offshore from the proposed temporary Navy marine mammal relocation site at NMAWC for the period that the Navy marine mammals are present.
- ***Dredging and Sediment Disposal (Section 2.2.1.5)*** – Dredging and sediment disposal are needed to deepen a high spot in an existing turning basin, so that the basin can safely accommodate current and future deep draft berthing capabilities. Ocean disposal of dredge sediments was considered and approved by the U.S. Environmental Protection Agency (USEPA) and USACE, but USEPA specified beneficial reuse for nearshore replenishment as the appropriate placement. Under Alternative 1, dredging in the existing turning basin to accommodate deep-draft berthing capability could be done before, during, or shortly after the pier replacement effort and could potentially occur while the Navy MMP is at its existing location, so long as pier replacement has not begun. However, there would be no dredging during the California least tern foraging season (April 1 to September 15). The resource-specific analysis in this EA is based on dredging occurring concurrently with pier replacement.

Relocation of Everingham Brothers Bait Company Bait Barges -Although not an element of the (P-151) NBPL Fuel Pier Replacement Project, the P-151 EA addresses the relocation of the Everingham Brothers San Diego Bay bait barges. Relocating the bait barges outside of the zone of influence (ZOI) for pile driving noise would reduce the exposure of wild marine mammals

to sound levels below thresholds for injury and behavioral disturbance (Levels A and B thresholds, respectively). In addition, moving the bait barges would help avoid potential damage to commercial bait fish that are important to the local fishing industry. The Navy is not relocating the bait barges. The viable bait barge relocation options and potential environmental impacts of relocating the bait barges are discussed in this EA. Following adoption of a Finding of No Significant Impact (FONSI) for this project, the Everingham Brothers Bait Company and the California State Lands Commission would be expected to execute a lease for a relocation site.

2.2.1.1 Temporary Relocation of Navy Marine Mammal Program

The Navy MMP in-water animal enclosures, which house its military working dolphins and sea lions, are located at Piers 159, 160, and 302 to the north of the fuel pier, and Pier F-122 to the south (refer to Figure 2-1).

The Navy is authorized to hold its marine mammals under the Defense Authorization Act of 1987, Marine Mammals: Use for National Defense Purposes (10 U.S. Code [USC] 645 Section 7524). Similar to other military working animal programs, the Navy MMP maintains a program of animal care that meets or exceeds U.S. Department of Agriculture Animal and Plant Health Inspection Service regulations in accordance with the Animal Welfare Act. However, as a U.S. government organization, the Navy MMP does not require a license from the Animal and Plant Health Inspection Service and is not subject to inspections. Rather, per DoD Directive, the Navy MMP is accredited by the Association for Assessment and Accreditation of Laboratory Animal Care International, a private nonprofit organization that promotes the humane treatment of animals in science through a voluntary accreditation program. This organization evaluates facilities that use animals in research, teaching, or testing and accredits those that exhibit excellence in animal care. In addition, the Navy MMP is a member of the Alliance of Marine Mammal Parks and Aquariums, a nonprofit organization of the world's preeminent marine mammal facilities that together have significant influence in shaping the current and future domestic and international regulatory and policy framework. The Alliance has developed standards and guidelines for animal care, personnel training, and education that are increasingly being adopted as the world standard for the marine mammal community. Per 10 USC 645 Section 7524, the Navy's authorization to hold marine mammals applies without regard to the provisions of the Marine Mammal Protection Act (MMPA) administered by the U.S. Department of Commerce National Marine Fisheries Service (NMFS), and its animals are not a coastal resource under the Coastal Zone Management Act (Navy 2007). The Navy's marine mammals are being relocated so that they will not be affected by noise and vibrations associated with demolition/construction-related activities. Temporary relocation of the existing MMP is also needed to safely maintain the Navy's program of excellence in marine mammal care during the fuel pier demolition and construction activities. The Navy investigated 13 sites (including the chosen NMAWC site) at various locations around San Diego Bay to find a suitable temporary location for the marine mammal program. Table 2-1 below presents the potential relocation sites that were considered but determined to be unsuitable.

Table 2-1. Navy Marine Mammal Program (MMP) Potential Relocation Sites Considered but Eliminated

Site	*Facility Category*	*Landside Space for Navy MMP Activities and Laydown Area*	*Impacts to Existing Civilian Uses?*	*Security Level*	*Additional Rationale for Elimination*
Pier 15, Naval Amphibious Base Coronado	Navy	Insufficient	No	High, Sufficient	• Too far from SSC Pacific NBPL and open ocean*. • Exposure to waves/boat wakes and lacks developed utility infrastructure. • Potential water quality issues.
Naval Air Station North Island, near Berths J and K	Navy	Insufficient	No	High, Sufficient	• Site lacks existing infrastructure. • Exposed to waves/boat wakes.
NBPL November Pier (Pier 5003), North Side	Navy	Insufficient and extremely limited	No	High; Sufficient	• Necessary waterside improvements would be extensive. • Facility is inside the Submarine Base's floating security barrier, an obstacle to moving the floating enclosures to and from the temporary relocation site.
Tuna Harbor, South of G Street Mole	Non-Navy	Insufficient	Yes	Minimal	• Too far from SSC Pacific NBPL and open ocean*.
Harbor Island East (Adjacent to the former Ruben E. Lee Restaurant)	Non-Navy	Insufficient	Yes	Minimal	• No existing waterside improvements. • Construction of a pile-supported stub pier long enough for a davit crane to lift mammals would impact eelgrass.
Shelter Island Fishing Pier	Non-Navy	Insufficient	Yes	Minimal	• Required floats and guide piles may intrude into the navigable waterway.
Driscoll's Wharf, Adjacent to NMAWC	Non-Navy	Sufficient	Yes	Minimal	• Facility is in poor condition. • Limited depths may eliminate use of near-shore portions of the facilities.
Grape Street Piers	Non-Navy	Insufficient	Yes	Minimal	• Pier 2 is in poor condition and would require structural rehabilitation. • Too far from SSC Pacific NBPL and open ocean*.
Embarcadero Wharf	Non-Navy	Insufficient	Yes	Minimal	• Too far from SSC Pacific NBPL and open ocean*.
Former Campbell Shipyard Site	Non-Navy	Insufficient	Yes	Minimal	• Mammal pen layout would need to avoid the shallow marine habitat pier. • Too far from SSC Pacific NBPL and open ocean*.
Embarcadero Marina Park	Non-Navy	Insufficient	Yes	Minimal	• Would require considerable waterside infrastructure development. • Too far from SSC Pacific NBPL and open ocean*.
Crosby Street Pier, Adjacent to 10th Avenue Marine Terminal	Non-Navy	Insufficient	Yes	Minimal	• Site access is problematic, crossing a Burlington Northern Santa Fe rail track. • Too far from SSC Pacific NBPL and open ocean*.

Note: *Proximity to existing SSC Pacific site needed to transport food and other needed supplies/equipment to the temporary relocation site.
Source: MNB 2011a.

Before demolition of the existing fuel pier, SSC Pacific would move the Navy marine mammal enclosures, associated equipment, and the animals from the existing location to the NMAWC property on the north side of San Diego Bay (SSC Pacific 2011a). Pier 619, recreational Marinas 548 and 607, Building 549, Building 606 (Navy Sailing Center Building) and associated parking spaces and open areas are suitable for temporary relocation of the Navy MMP and would be modified for use by the Navy MMP. There would be a twelve-month design period, beginning in March 2012, followed by approximately six months of procurement processing and six months of concurrent landside and waterside construction involved with preparing the NMAWC site and relocating the marine mammals (MNB 2012a).

Navy Morale, Welfare and Recreation (MWR) operates the facilities at Buildings 549, 606, and Marinas 548 and 607 (MNB 2011a). It is anticipated that these facilities would be vacated for use by the Navy MMP (MNB 2011a). Some of the privately-owned boats at Marinas 548 and 607 may relocate to the Navy MWR facility at Fiddler's Cove on North Island or the MWR marina facility at Camp Pendleton; others may relocate to other marinas in San Diego Bay or Mission Bay. Some owners may elect to remove their boats from the water. The Navy MMP would remain at the temporary facilities at NMAWC for approximately four years and would return to the existing SSC Pacific site when fuel pier construction is complete.

The Navy Explosive Ordnance Disposal (EOD) Technical Evaluation Unit uses Pier 619 (NAVFAC Southwest 2012b). This EOD unit would exchange places with another EOD unit, Mobile Unit 1, which uses a pier at Submarine Base NBPL. EOD Mobile Unit 1 is associated with the Navy MMP, so their temporary transfer to NMAWC would be compatible with the proposed SSC Pacific use (NAVFAC Southwest 2012b). NMAWC land use in the area surrounding the proposed temporary relocation facilities includes classroom training, barracks, and the Admiral Kidd Club conference center (NAVFAC Southwest 2011d). Temporary use of the Navy marina facilities and Pier 619 by SSC Pacific would be compatible with these surrounding uses.

With the complete relocation of the current occupants from the NMAWC site and use of the existing landside and waterside improvements (e.g., all three piers, Building 549, Building 606, and the lawn and parking areas) there would be sufficient space to relocate the Navy marine mammal facilities to NMAWC (MNB 2011a). The proposed arrangement also results in the Navy marine mammal enclosures being placed as close to the shoreline as the water depth would allow, which would avoid impact to eelgrass offshore from NMAWC while minimizing intrusion into the bayside channel used by Harbor Island West boat traffic (Figure 2-1) (MNB 2011a).

A total of 140 SSC Pacific personnel associated with the Navy MMP would be temporarily stationed at the NMAWC (SSC Pacific 2011b). Of these, approximately 120 would be present during peak hours (SSC Pacific 2011b). The landside facilities required for the Navy MMP at NMAWC include parking spaces for 120 vehicles and 28 boat trailers, temporary locker room facilities for 140 personnel, restroom facilities for 120 personnel, dive locker and equipment storage, and a concrete pad and associated pump intake infrastructure to support shoreside

Navy MMP quarantine pools (MNB 2011a; SSC Pacific 2011a). Food preparation facilities and the veterinary clinic would not be relocated (NAVFAC Southwest 2011d). No additional parking would be constructed. Space in the existing Navy-owned parking lot on the north side of North Harbor Drive, at the intersection of Nimitz Boulevard and North Harbor Drive, would be available for Navy MMP personnel (NAVFAC Southwest 2011d). Some of the MWR landside grass areas may be used to locate storage units and other portable and temporary infrastructure (MNB 2011a). Minor shoreside construction, including trenching, may be necessary to expand or upgrade the existing electrical distribution system to support the increased requirements of the Navy MMP.

No natural beach shoreline would be disturbed or shadowed at NMAWC, where the shoreline is reinforced with rock rip-rap. There would be minimal in-water construction at the NMAWC site (MNB 2011a). It is anticipated that 50, 18-inch (in) square concrete guide piles would be installed at the NMAWC site with a diesel hammer pile driver assumed to be similar to a DELMAG D-12 (MNB 2011b). The piles would be transported to the NMAWC site by barge (MNB 2011b). The guide piles would function as anchors for the floating enclosures and walkways. After the guide piles are installed at NMAWC, the floating enclosures and walkways would be disconnected from their current locations at the piers north and south of the existing fuel pier (Figure 2-1), towed to the NMAWC site, and connected to the piers and guide piles at the NMAWC site (MNB 2011c). Some welding would be done when installing the brackets to connect the floating walkways and enclosures to the piles (SSC Pacific 2011a).

The suitable portions of existing waterside infrastructure (access brows, floats, guide piles, utilities and miscellaneous appurtenances) located at NMAWC would be expanded as described above with the addition of 50 guide piles. The SSC PACIFIC waterside mammal facilities that would be relocated to the NMAWC site include:

- Existing 60 ft x 90 ft floating dolphin "pod" enclosures (14 total pods). The 60 ft x 90 ft elements are composed of 30 ft-square basic elements.
- Existing 30 ft x 30 ft dolphin enclosures (11 total). These are typically used to connect larger enclosures.
- Existing one approximately 8,000 (sf) floating training lagoon.
- Existing 30 ft x 30 ft floating sea lion enclosures (8 total).
- Existing floating walkways (marina-type floats). These are used as workspace and to connect enclosures to piers or guide piles. SSC PACIFIC has (10) 8 ft x 20 ft floating walkways that can be relocated.
- Existing 30 ft x 30 ft floating equipment huts (8 total).

The following new equipment would be constructed at the NMAWC site:

- One four-ft minimum (interior clear width) aluminum access gangway to be located at Pier 548 to reach the floating walkways. The existing gangway at NMAWC Pier 607 is adequate. The gangway located at pier 619 would remain.
- One new 1-ton (minimum) davit crane to remove the animals from the water, with a concrete pier support structure adjacent to the outboard end of Pier 548. The new pier

structure support structure would have a minimum of 225 sf of laydown area for animal transfer.

- Two new high capacity pumps and 220v/3-phase electrical power. These pumps would be used to intake seawater used by divers to water-blast clean the suspended nets of the mammal enclosures.
- Conventional float-supported electrical and potable water service.
- Lighting to support night-time operations.

The Navy marine mammal enclosures would be moved in conjunction with favorable tides. As enclosures are being moved, the animals that were living in those enclosures would be temporarily housed in the remaining existing enclosures (SSC Pacific 2011a). To avoid crowding, a few enclosures would be moved at one time, completely re-installed and made ready for the animals, and then those animals would be relocated to NMAWC. This incremental process would be repeated until all the enclosures and animals have been transferred to the NMAWC site. Up to four 25 ft–long small boats with dual 225 horsepower outboard engines would be used for towing the floating structures to NMAWC, and for maneuvering them into position (SSC Pacific 2011a). It is anticipated that approximately 90 days would be required to move all the enclosures and animals to NMAWC (SSC Pacific 2011a).

The temporary Navy marine mammal enclosures would extend about 150 ft beyond the NMAWC boundary into state waters, and a 100-ft bayward temporary Security Zone would be established around them (see Section 2.2.1.4). However, approximately 320 ft of open water would remain for navigation between the temporary Security Zone and West Harbor Island.

While the Navy MMP is at the NMAWC site, the current location next to the fuel pier would be generally vacant except for transporting food and equipment to and from the relocation site (NAVFAC Southwest 2011e). At the end of the construction period, the floating walkways, enclosures, and the animals would be moved back to the current Navy MMP location beside the new fuel pier following the incremental process described above. After all the floating walkways and enclosures are removed, the guide piles would be extracted by a barge-mounted crane, placed on the barge, and towed away to a recycle/resell site (MNB 2011c). One tug boat would be needed to move the barge. It is estimated that the guide piles would be removed within one week (MNB 2011c). The contractor would likely reinstall the guide piles at other marina locations, so there would be no demolition debris (MNB 2011c). A small landside crane would offload the piles at the recycle/reinstall site (MNB 2011c).

2.2.1.2 Phased Demolition and Removal of the Existing Fuel Pier

Demolition and construction would occur in two phases to maintain the fueling capabilities of the existing fuel pier while the new pier is being constructed. Each of the utilities, systems and pier features would be demolished as described in this section, but on a segment-by-segment basis to allow for continuous fueling operations during demolition and construction. Table 2-2 below summarizes the work that would be done in each phase, and the durations of each phase. Details of the demolition and construction work follow Table 2-2.

Table 2-2. Construction Phase Summary

PHASE ONE (approximately three years)	
1	Initial mobilization of equipment to the site, set up temporary office space
2	Temporary relocation of Navy MMP to NMAWC
3	Temporary relocation of Everingham Brothers Bait Company bait barges
4	Indicator Pile Program - Drive approximately 12 piles (several of them will be driven twice: once to the tip elevation, and again after 48 hours to check the set-up strength)
5	Construct temporary mooring dolphin south of existing fuel pier
6	Demolish north segment of the existing fuel pier
7	Construct abutments at landside end of approach segment for the new fuel pier
8	Construct portions of landside utilities and relocations
9	Construct the new pier: ramped approach pier (lower and upper deck) two northern mooring dolphins, and double deck fueling pier
10	Connect/construct fueling lines to new pier and begin fueling at the new fuel pier
PHASE TWO (approximately one year)	
1	Construct southern berthing dolphin and mooring dolphin
2	Demolish remainder of existing fueling pier (approach and south segments)
3	Complete abutment construction
4	Remove temporary mooring dolphin
5	Complete grading, paving, and landside utility work
6	Demobilize equipment from site, remove temporary offices

Notes: Under Alternative 1, dredging could be done any time before, during, or shortly after construction of the new fuel pier. Under Alternative 2, dredging would be done years after construction of the new fuel pier is completed. Total duration of demolition/construction is estimated to be approximately four years. Under either alternative, no dredging would take place during the least tern foraging season, April 1 to September 15.

Source: MNB 2012b.

Facilities to Be Removed

Alternative 1 would include demolition and removal of the existing fuel pier and its associated fueling systems. The majority of the work would be conducted over water and would include removal of the pier, pilings, plastic camels and fenders. All utility infrastructure would be removed, including water and sewer pipelines, lighting systems, and wiring. The fueling systems, including piping and pipe supports, would also be removed. Facility information for the existing fuel pier is included in Table 2-3.

Table 2-3. Existing Fuel Pier (Pier 180) Information

Existing Pier 180	*Pier Specifications*
Installation	Naval Base Point Loma (NBPL), San Diego, California
Activity	Defense Fuel Supply Point (DFSP)
Facility Name	Fuel Pier (Pier 180)
Pier Area	71,180 square feet (sf)
Description	T-shaped fuel pier, consisting of 3 sections with concrete deck
Approach Segment	Built in 1908, Size: 34 ft x 500 ft, timber support piles, steel caissons and superstructure, plastic fender piles
North Segment	Built in 1908, Size: 50 ft x 349 ft, timber support piles, steel caissons and superstructure, plastic fender piles
South Segment	Built in 1942, Size: 60 ft x 598 ft, concrete support piles and superstructure, plastic fender piles
Function	Loading and off-loading of fuels and contaminated petroleum products (CPP)
Current Ship Loading	Average: 43 ships/month
Condition of Facility	Facility is aging, is in poor condition, and is seismically deficient
Major Structural Repairs	Repairs to four undermined caissons on the Approach Pier in 1957 and two additional undermined caissons in 1987. The 1987 repairs included the installation of a submerged steel sheet pile bulkhead to prevent further undermining of the caissons.

Source: Navy 2010a.

The fuel pier is part of NBPL Defense Fuel Supply Point (DFSP), a bulk fuel storage and transfer facility that includes administrative and support facilities, fuel storage tanks, pumphouses, and pipelines (NAVFAC 2009). Figure 1-2 shows the NBPL DFSP storage tanks located onshore northwest of the fuel pier. Fuel is supplied to NBPL DFSP by an onshore pipeline and tank vessels, and can be issued by the same systems (NAVFAC 2009). Table 2-4 below lists the existing pipelines that run from the onshore NBPL DFSP storage facilities to the fuel pier (NAVFAC 2009). The fuel pier is also equipped with an 8-in diameter pipeline for offloading contaminated petroleum product (CPP [a mixture of fuel and water]) to be processed at the NBPL DFSP Fuel Oil Reclamation (FOR) system (NAVFAC 2009).

Storage tanks, piping, and supporting infrastructure at the NBPL DFSP are in the process of being replaced under the P-401 construction project (Navy 2010a). Fifty-four existing underground and aboveground storage tanks are being replaced with eight new, DoD multi-product, aboveground bulk fuel storage tanks with the same storage and operational capacity as the existing tanks (42 million gallons). The new fuel storage facility is being rebuilt at the same location because of established access to existing supply pipelines and to the fuel pier (Navy 2007). P-401 improves onshore fuel and piping and transfer systems between the new storage tanks under construction and the fuel pier (existing and proposed) (Navy 2007). Pumping, piping, and discharge requirements would be in accordance with 33 CFR 157.11, *Pumping, Piping and Discharge Arrangements* (Navy 2010c).

Table 2-4. Existing Fuel Pier (Pier 180) Pipeline Diameters and Contents

Pipeline Diameter (inches)	*Contents*
16	JP-5
16	DFM
10	JP-5
10	DFM
8	CPP
6	Lubricating oil

Notes: DFM = diesel fuel marine, JP-5 = jet fuel,
CPP = contaminated petroleum products.
Source: NAVFAC 2009.

The P-401 demolition and construction project also includes removal of eight aboveground lubricating oil storage tanks located beside the quaywall immediately north of the fuel pier. The P-401 project has completed a new lubricating oil facility elsewhere on NBPL, including approximately 2,000 linear ft (lf) of piping to connect it to the proposed new fuel pier (Navy 2007).

Also included in the fuel storage facility replacement project are demolition of Buildings 110 (two story wooden control tower) and 140 (single story wooden storage building) on the fuel pier (Navy 2007; 2010d). As part of P-401 a new control tower is being constructed onshore on the site vacated by the removal of the existing lubricating oil storage tanks (Navy 2007). The domestic water and sewer lines that serve the existing control tower Building 140 on the fuel pier would be cut and capped at the shore under P401 (Navy 2010c). The abandoned water and sewer utilities would be removed during the demolition of the fuel pier.

In addition to fueling vessels, NBPL DFSP supplies JP-5 (jet fuel) to Naval Air Station (NAS) North Island across San Diego Bay to the east through two underwater pipelines (NAVFAC 2009). The NAS North Island pipelines are not included in either the fuel pier or fuel storage facility replacement project (Navy 2007, 2010a). However the NAS North Island pipelines are in the fuel pier replacement project area, both onshore and offshore. The Navy would work with contractors to establish a safety buffer zone between the pipelines and the demolition and construction work zone footprint and would ensure that all contractors' equipment and vessels remain outside the buffer zone during demolition and construction.

<u>Demolition Process</u>

Hazardous Material Abatement. In 2009 Ninyo and Moore conducted a visual hazardous materials survey at the fuel pier (Navy 2010d). Hazardous materials described in Section 3.7.2 were identified and confirmed through laboratory analyses. Hazardous lead paint removal and asbestos-containing material (ACM) abatement would be completed by licensed contractors before demolition, as described in Section 3.7.3. The construction contractor would use the Navy's manifesting procedures for hazardous wastes.

Mechanical and Electrical Utilities. Shoreside, all water and sewer laterals connected to the fuel pier would be cut and capped at the mains to prevent the formation of dead-end pipes in the

water and sewer systems. Underground utilities would be located before performing any drilling or excavation work at the site. All electrical and mechanical utilities would be properly terminated before demolition. Demolition of utilities under the pier would either occur with a hydraulic crane from the pier topside, or a barge mounted crane. Salvageable piping and electrical materials would be loaded in dumpsters and transported to a local recycling facility. This work would occur concurrently with the hazardous material abatement.

Fueling System and Pipelines. All liquids, solids, or sludges would be evacuated from the fuel and CPP systems, and the systems and pipelines would be cleaned. The same procedure would be applied to the potable water and sewer lines that supply Building 140 on the fuel pier. All pipelines would then be properly terminated at the shoreline and dismantled topside. Salvageable metal would be loaded in dumpsters and transported to a local recycling facility. This work would occur concurrently with the hazardous material abatement.

*Cleat and Bollard Bases***.** This work would be performed with a mini-excavator with a concrete breaker. All bollards and cleats would be hauled away for recycling. This operation would occur concurrently with the removal of the pier deck.

Plastic Fendering System. This work would be performed from a barge-mounted crane. Salvageable materials from this demolition process would be loaded onto flatbed trucks and hauled away for recycling. All other materials removed from the fendering system would be sized and hauled away to an approved disposal facility. This work would occur concurrently with the hazardous material abatement.

Concrete Deck and Pier Pilings. Typical pier demolition takes place bayward to landward and from the top down. Table 2-5 below lists the types and numbers of piles to be removed. First, the fender piles and exterior appurtenances (such as utilities and the fuel piping systems) would be demolished above and below the pier deck. Then, the deck would be demolished using concrete saws and a barge-mounted excavator equipped with a hydraulic breaker (MNB 2011d). Next, structural and fender piles would be demolished.

Table 2-5. Existing Fuel Pier (Pier 180) Piles to be Removed

Pile Type	*Number*
Concrete structural	569
Concrete fender	105
16-inch Steel Pipe Filled with Concrete	24
Plastic fender	34
Wood	741
Total	**1,471**

Source: MNB 2011e.

Typically piles would be cut off at the mudline; however, the full length of the piles would be pulled at the area where the new approach segment would be constructed. An attempt would first be made to dry-pull the piles with a barge-mounted crane. A vibratory hammer or a pneumatic chipper may be used to loosen the piles. Jetting (the application of a focused stream

of water under high pressure) would be another option to loosen piles that could not be removed through the previous procedures. Once extracted, the piles would be loaded on to a support barge where they would be floated over to the quaywall. On shore, the debris would be crushed onsite or hauled to a concrete recycling facility.

Figure 2-3 shows the location of the contractors' laydown area for materials, equipment, and concrete recycling. The contractor may also stage some equipment and materials on barges (NAVFAC Southwest 2011a).

The Navy would require the contractor to prepare and implement a comprehensive debris management plan that would address the types of construction and demolition debris, expected separation and retrieval methods, and disposal methods. The contractor would be required to use catch devices and sheeting to capture and contain debris and materials that may be produced by project activities. Accidental releases of debris to San Diego Bay would be prevented by placing floating booms around the site to provide a complete barrier to floating debris. Debris from work on demolition and construction barges would also be captured on-board the barges. All captured material would be swept and disposed of in accordance with the debris management plan.

To minimize impacts to eelgrass and minimize sediment disturbance, steel sheet pile bulkheads along the south side of the approach segment and the outboard side of the north segment would not be removed. The bulkheads protrude about 10 ft above the mudline, and preserve a remnant soil mound that lies beneath the approach pier and main pier structure (Terra Costa Consulting Group, Inc. 2010). This remnant soil mound was created by dredging the bay floor adjacent to the pier (Terra Costa Consulting Group, Inc. 2010). Original engineering plans for the sheet pile bulkhead indicate that it was covered in rock rip-rap (Terra Costa Consulting Group, Inc. 2010).

<u>Discarded Military Munitions (DMM)</u>

The project area may contain discarded military munitions (DMM). The Navy would coordinate with the demolition and construction contractors to minimize health and safety risks posed by DMM.

<u>Demolition Debris</u>

The Navy's goal is to recycle 52 percent of project debris waste, which would be diverted from landfill disposal. 100 percent of the concrete debris would be recycled.

Four major types of debris would result from the demolition of the fuel pier: concrete; wood; steel; and plastic. Alternative 1 would be in accordance with the DoD Low-Impact Development Initiative requiring all demolition projects that take place after 2011 to recycle and divert materials from local landfills to the maximum extent practicable. Materials would be reused or recycled as appropriate. Materials that cannot be reused or recycled would be transported to a permitted landfill. No special permits would be required for disposal of non-hazardous solid waste. Debris would not be allowed to fall into the San Diego Bay.

0 25 50 Meters
0 100 200 Feet

Source: NAVFAC Southwest 2011a

Figure 2-3
Contractors' Laydown Area

N

- Concrete debris would comprise the largest volume of demolition material, approximately 4,280 cubic yards (cy) (Navy 2010e). Concrete debris not crushed for onsite reuse would be hauled to an offsite concrete recycling facility and processed for reuse as bulk construction material such as roadway fill. Wood debris, comprising approximately 739 creosote-treated timber support piles would be disposed at Miramar landfill in accordance with the NRSW special waste management policy (MNB 2011e; NRSW 2007).
- Approximately 680 tons of steel debris and 4 tons of wiring (e.g., 34,000 lf of utility wires estimated at 4 ft per pound in weight [Navy 2010e]) would also be recycled or appropriately disposed as a requirement of the demolition contract (NAVFAC Southwest 2011f). Steel debris that could not be recycled would receive authorization from the NRSW solid waste management program for disposal at Miramar landfill (NAVFAC Southwest 2011g).
- Approximately 3,100 lf of plastic fender material would be removed from the fuel pier (Navy 2010e). Reuse or recycling of the plastic fenders would be determined as appropriate. Any material not suitable for reuse or recycling would receive authorization from the NRSW solid waste management program for disposal at Miramar landfill (NAVFAC Southwest 2011g).

<u>Demolition/Construction Equipment and Phasing</u>

To avoid impacts to California least tern foraging habitat during the nesting season, in-water demolition and construction activities that generate underwater noise and/or turbidity that impact tern foraging would not occur from April 1 to September 15. Details of the least tern season avoidance plan for Phase 1 and Phase 2 demolition activities are listed below.

Demolition of the Existing Pier North Segment (Phase 1)

- During least tern foraging season the demolition activities would be limited to removal of the deck, underdeck, fender piles (pulled only, no vibratory or jetted removal) and all of the deck hardware.
- The removal of the caissons (six ft diameter steel with 13 wood piles each [25 caissons and 325 12-in diameter wood piles total] and concrete topping) would take place outside the least tern foraging season. The caisson elements could be removed with a barge-mounted derrick crane. The crane can be used to grasp and lift large components such as caissons and piles with attachments such as wire slings or clamshell buckets (i.e., dredge buckets). When a wooden pile cannot be completely pulled out, the pile may be cut at the mudline using crane-attached hydraulic jaws and/or a diver-operated underwater chainsaw.

Demolition of the Remainder of the Existing Pier Approach and South Segments (Phase 2)

- During least tern foraging season the demolition activities would be limited to removal of the deck, underdeck, fender piles (pulled only, no vibratory or jetted removal) and all of the deck hardware.
- The removal of the caissons in the approach segment(six ft diameter steel with 13 wooden piles each [32 caissons with 416 12-in diameter wood piles total] and concrete topping) would be accomplished outside the least tern foraging season and would be removed with a crane and attachments as described above, hydraulic jaws, and/or underwater diver-operated chainsaws to cut off the wooden piles at the mudline.

Demolition and construction work (including pile driving) would occur between the hours of 7:00 A.M. and 4:00 P.M., Monday through Friday (weekdays, daylight hours only). Demolition and construction contract specifications would provide work day and hour restrictions that are consistent with City of San Diego noise ordinances (MNB 2012b).

The new fuel pier would be constructed concurrently with demolition of the existing pier. The north segment of the existing pier would be demolished first while the existing approach and south segment would remain operational. Fueling capabilities would be provided by the south segment. During the estimated construction period of approximately four years, fuel pier operations would continue with no more than 45 days total downtime (Navy 2012a). As described below, the two phases are designed with some overlap to maintain operational capability and make full use of the available construction timeframe. Figure 2-4 shows the parts of the existing pier that would be demolished, and of the proposed new pier that would be constructed, during the two phases of demolition/construction. As shown on this figure, the proposed project area at NBPL is a developed waterfront where no natural beach shoreline would be disturbed during demolition and construction.

To maintain continuous fueling capability, access to the existing south pier would be required as the project gets underway. Access to the new north pier would be required later phases for both construction and fueling activities (MNB 2011d). According to engineering estimates there would be approximately 500 to 700 ft of open water between the pier construction activity and the dredging activity (MNB 2011d). Figure 2-5 shows the construction and navigation zones. In the event that construction and dredging take place concurrently, there would be sufficient space to accommodate both operations and normal nonmilitary boat traffic (Figure 2-5).

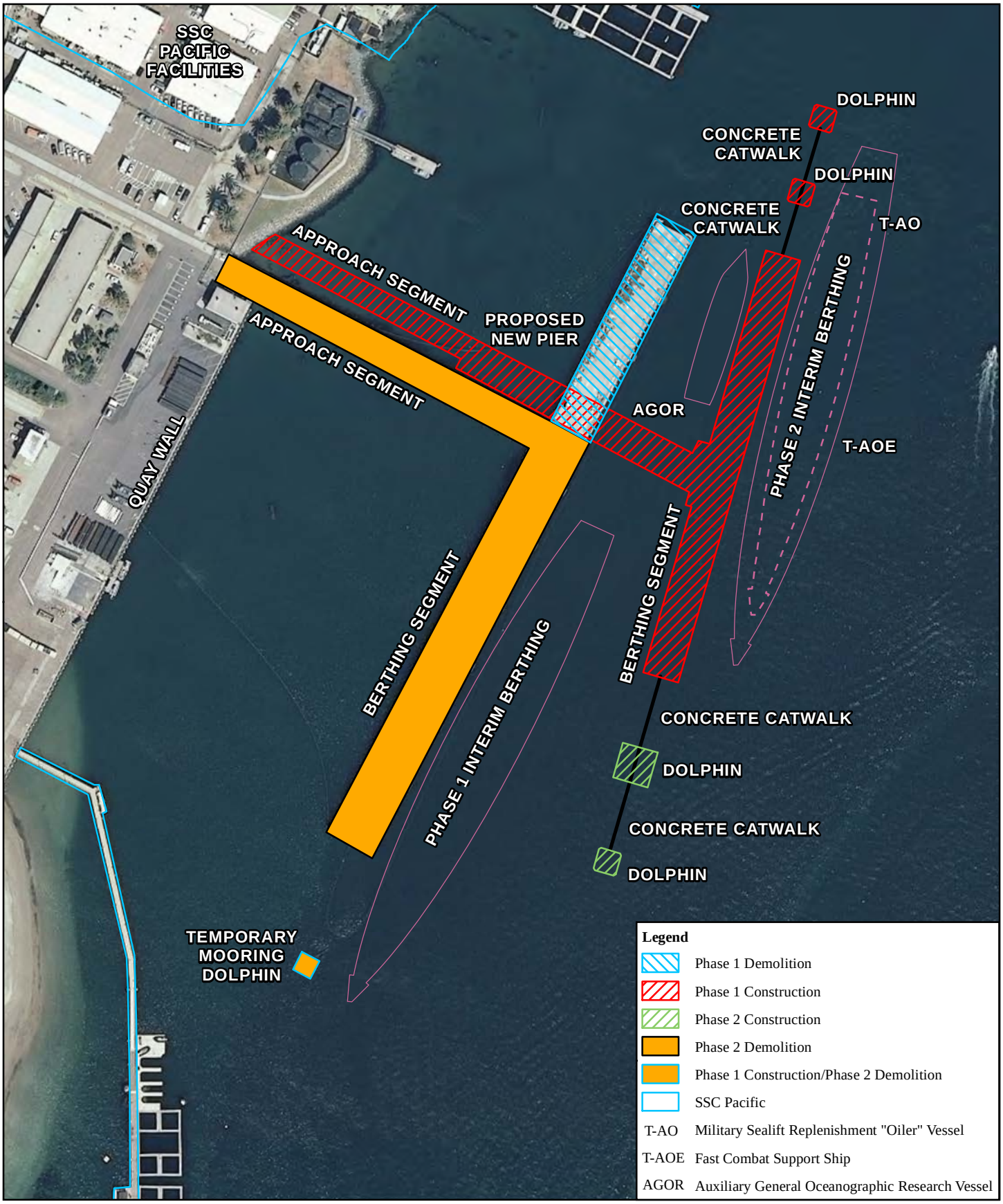
Construction and dredging activities would take place outside the San Diego Harbor navigation channel. The new fuel pier construction zone is approximately 1,200 ft from the channel. The dredge footprint, where the dredge vessels would operate, lies outside the channel. Most of the vessels involved with the project would transit the channel intermittently, with the exception of the sediment transport barges that may make more frequent trips to the nearshore dredged material beneficial reuse site (described in Section 2.2.1.6).

Phase 1 – Fuel Pier Construction: Project Indicator Pile Program, Temporary Mooring Dolphin, and North Segment Demolition (350 lf). A temporary mooring dolphin would be constructed to allow

vessels to berth and load/unload fuel while the north segment of the existing pier is under demolition. The same pile driving equipment and barges used to construct the temporary mooring dolphin would later be used to construct the new fuel pier (MNB 2012b). Approximately 12 steel pipe indicator piles (36-in and 48-in diameter, exact mix to be determined later) would be driven in the new pier alignment. The purpose of the indicator piles is to verify the driving conditions and establish the final driving lengths prior to fabrication of the final production piles that would be used to construct the new pier (MNB 2012b).

The north segment would be demolished by water access using barges to provide a working area for the crane and equipment (MNB 2011d). The demolition waste would be placed on two barges and hauled offsite for processing, recycling, and disposal. Water access is preferable for the heavy equipment and demolition waste to keep the existing pier operational during the demolition phase (MNB 2011d). Access to the existing pier is necessary for laborers, trucks, and removal of pier appurtenances. Some equipment used for demolition may include hydraulic hammers mounted to back-hoes for breaking concrete, front-end loaders, fork-lifts, concrete saws, steel cutting torches, and excavators with hydraulic thumb shears (MNB 2011d). The floating barges would be supported by tug boats and small work boats (MNB 2011d). While demolition of the north segment of the existing fuel pier is underway, the steel piles for the new pier approach segment would be fabricated offsite and transported to NBPL. Other construction equipment needed for Phase 2 would be mobilized to NBPL within this time.

Phase 1 - Approach Pier (Connection to Shore) Construction (700 lf). It is not necessary to wait for the complete demolition of the north segment to begin construction. The approach pier construction would begin after the piles have been fabricated offsite and delivered (MNB 2012b). The piles would likely be delivered by barge (MNB 2012b). The approach pier construction would require two barge-mounted cranes, one with a pile driving rig and one for constructing the pier (MNB 2011d). Two additional barges would be used to store the piles, concrete formwork, steel reinforcement, and precast concrete deck sections. The floating barges would be supported by tug boats and small work boats. Construction from shore and/or the remaining fuel pier approach segment is a possibility for a small percentage of the work (MNB 2011d). Additional equipment would include front-end loaders, fork-lifts, steel welding and cutting equipment, concrete placement and finishing equipment, concrete saws and drills, and carpentry tools for building formwork (MNB 2011d). Materials delivered by truck may include concrete, reinforcing steel, utility pipes, and other miscellaneous construction materials.



0 25 50 Meters
0 100 200 Feet

Source: MNB 2012b

Figure 2-4
Demolition and Construction Phasing Plan

N

0 50 100 Meters
0 150 300 Feet

Figure 2-5
Navigation/Construction Zone

Sources: NAVFAC Southwest 2011a; NOAA 2012

N

Phase 1 - North Pier Construction (600 lf) and two Mooring Dolphins). The north pier would be constructed concurrently with the approach pier (MNB 2011d). The pile driving for the north pier would begin after the pile driving for the approach pier is complete, most likely using the same pile driving rig (MNB 2011d). The north pier construction would require a second barge mounted crane for the pier construction (MNB 2011d). Two additional barges and equipment would also be required as described in Phase 2 (MNB 2011d). Two 14 ft MLLW mooring dolphins and connecting catwalks would also be constructed at this time.

Phase 2 – South Pier Construction (1,100 lf). The south berthing dolphin (13 ft MLLW) and mooring dolphin (14 ft MLLW) construction would begin after the approach pier, north pier, and mooring dolphins are operational (MNB 2012b). This segment would be constructed using a pile driving rig and two barge mounted cranes (MNB 2011d). Additional barges and equipment would also be required as described in Phase 1 (MNB 2011d). When the new south berthing segment and mooring dolphins are completed, catwalks would be constructed to connect the dolphins to the pier (MNB 2012b).

Phase 2 - South Pier and Approach Pier Demolition. The old south pier and old approach pier demolition would begin after the new south pier is operational (MNB 2011d). The temporary mooring dolphin near the north pier would also be demolished at this time, and the debris would be recycled along with the south pier demolition debris. This phase would require two barge mounted cranes to expedite the demolition of the existing pier. The other equipment used would be the same as Phase 1 (MNB 2011d).

Turning Basin Dredging. Dredging for the turning basin could occur any time before, during, or shortly after the construction process (MNB 2011d). There would be no dredging during the least tern foraging season, April 1 to September 15. There is no specific intent for the Navy MMP to remain at its existing location during the dredging phase. However, under Alternative 1, should dredging take place separately from the pier replacement effort (i.e., either before or after construction and demolition), the Navy MMP could occupy its current location if the assumptions listed in Section 2.2.2 are met (NAVFAC Southwest 2011h). A description of dredging equipment and timing is listed in Section 2.2.4.6.

2.2.1.3 Phased Construction of Replacement Fuel Pier

During development of the new pier design several measures were adopted to minimize impacts to eelgrass near the existing fuel pier. These measures include: pier alignment positioned to minimize eelgrass disturbance; pier extended into deeper water to minimize dredging; existing sheet piling left in place to minimize sediment and eelgrass disturbance; and use of mooring dolphins to reduce the size of new pier footprint and minimize bay shading.

The approach segment of the new fuel pier from shore bayward would be 700 ft long as compared with 500 ft for the existing fuel pier. The new fuel pier north and south berthing segments would be 50 ft wide, the same as the existing pier. The approach segment would be constructed approximately 5 ft north of the existing pier to minimize disturbance to eelgrass and to facilitate connecting the pier with pipelines to onshore NBPL DFSP fuel storage facilities. The new north/south berthing segments would be angled allowing vessels to align more easily at the pier, compared to the "T" shape of the existing fuel

pier (refer to Figure 2-6). Due to the angled alignment, the new pier berthing segment north end would extend about 100 ft beyond the existing fuel pier, and the berthing segment south end would extend bayward about 300 ft feet beyond the existing fuel pier (MNB 2012c). However, as with the existing fuel pier, the new fuel pier would lie entirely within a USCG navigation Restricted Area. As discussed in Section 2.2.1.5, the Restricted Area would be amended to allow for the bayward additional length of the new pier and there would still be approximately 700 ft of open water available between the Restricted Area and the navigation channel for use by civilian vessels.

The new pier approach segment would connect to shore as a single deck with a ramp leading to the upper deck of the double deck berthing segment. The berthing segment would be 605 ft long by 50 ft wide, supplemented with three mooring dolphins and one berthing dolphin to extend berthing length to 1,100 ft. The added 200 ft of approach pier length places the berthing segment of the new pier in a deeper, previously dredged location where most of the area to be used by vessels approaching the pier already meets the minimum depth requirement of 40 ft (MNB 2012b). This placement would accommodate a wider variety of ships than is currently possible at the existing fuel pier where depths are 30 to 40 ft (Figure 2-6). No dredging would be needed alongside the pier during construction, and the need for future maintenance dredging along the pier would be reduced or eliminated.

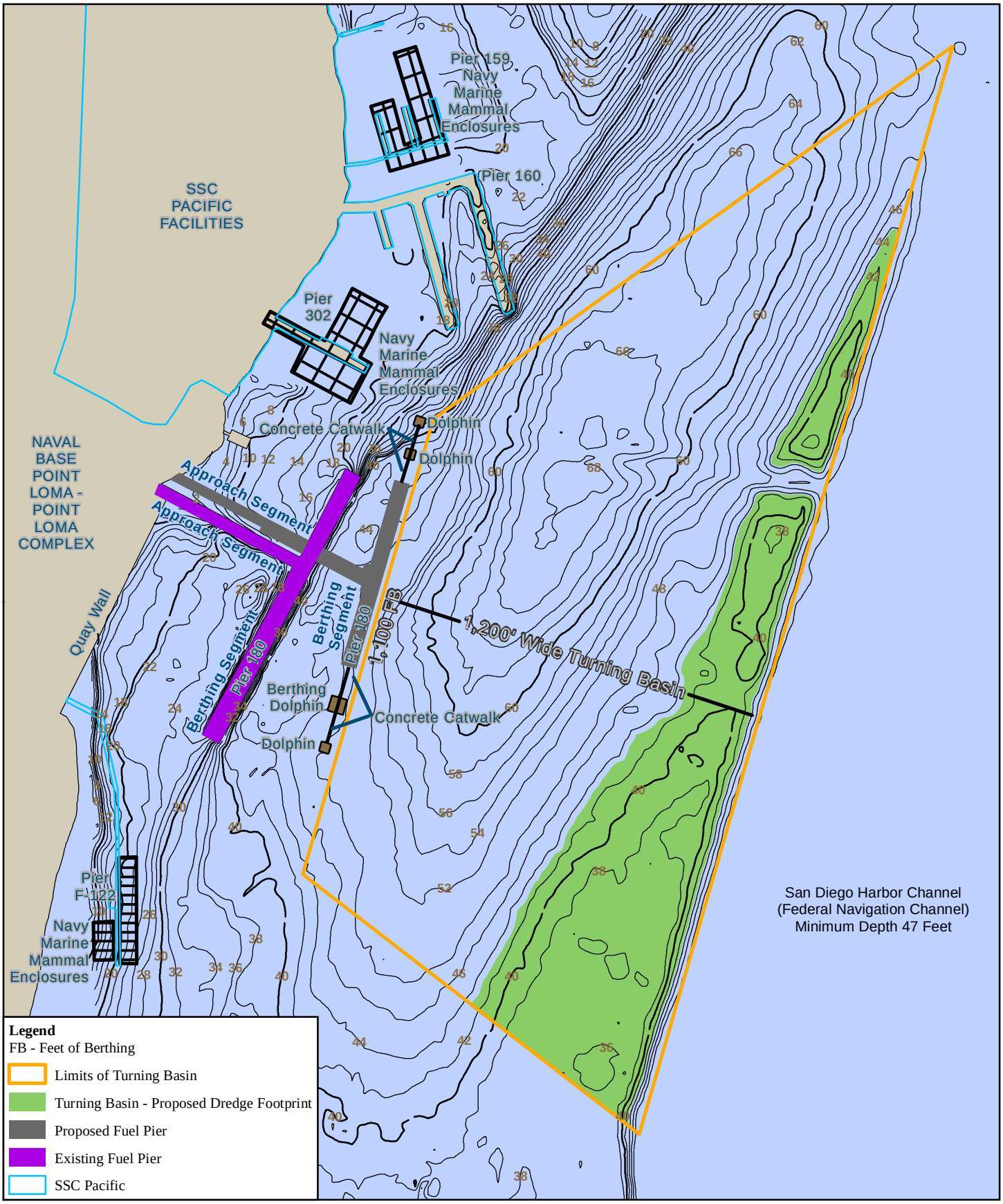
The top of the lower deck would be set at 13 ft MLLW, approximately 5 ft above extreme high tide. The new pier upper deck elevation would be 28 ft above MLLW and 20 ft above extreme high tide. The upper deck would have sufficient height needed for the pier fuel loading arms to safely reach fuel transfer points on the majority of larger ships (Navy 2010a) as described in Section 2.1. There would be a 3.5 ft-high concrete barrier around the upper deck perimeter, so the combined double deck structure would stand at 31.5 ft MLLW.

Table 2-6 below lists the height of equipment that would be mounted on the proposed new fuel pier upper deck and approach segment.

Table 2-6. New Fuel Pier Above Deck Equipment Heights

Deck	*Feature Name*	*Feature Height (ft)*	*Number to be installed*	*Height of feature installed on pier (ft above MLLW)*[1]
Upper	Fuel Loading Arm	30	6 (grouped into 3 load/unload stations)	58
Upper	Loading Station via Hose	5	6	33
Upper	Pole lighting[2]	25	7	56.75
Lower (Approach single level)[3]	Pipe rack	6	One rack supporting 11 pipes	19
Lower (Approach single level)	Pole lighting	25	6	29.25

Notes: [1] Lower pier deck elevation would be +13 ft MLLW; upper deck would be +28 ft MLLW.
[2] Pole lighting would be installed on top of the 3.75 ft-high barrier on the upper deck
[3] Pole lighting would be installed on top of the 1.25 ft-high barrier on the lower deck
Sources: Burns and McDonnell 2012a; NAVFAC Southwest 2011a



0 50 100 Meters

0 250 500 Feet

Figure 2-6
Proposed New Fuel Pier and
Turning Basin Dredge Footprint

Sources: NAVFAC Southwest 2011a; NOAA 2012

The 1,100 ft berthing length was chosen to provide flexibility in fueling multiple types of vessels at the proposed new fuel pier, including the TAKR (large, medium speed roll-on/roll-off ship 951 ft long) that requires the 1,100 ft berthing length (MNB 2012b). The inner berths provide two additional berthing areas, the south and north inner berths. The south inner berth would accommodate vessels up to 500 ft long and the north inner berth would provide a small craft berthing area for vessels up to 400 ft long. The existing fuel pier total area is 71,180 sf/1.63 acres (ac). The total area of the new pier (including the 700 ft long approach segment and dolphins) would be 65,865 sf/1.51 ac (MNB 2012b). This would be a decrease of 5,315 sf/0.12 ac of bay shading compared to the area of the existing fuel pier (MNB 2012b).

The replacement pier structure, including the mooring dolphins, would consist of steel pipe piles, supporting concrete pile caps and cast-in-place concrete deck slabs. Concrete material may be delivered from either trucks or barges (MNB 2012b). The upper 10 ft of the steel wall pipe piles of the lower deck would be filled with concrete as part of the connection between the piles and the lower pier deck. Approximately 554 total piles would be installed (MNB 2012b). Concrete pilings are not suitable to support the double-deck pier due to the structural seismic forces, so steel structural pilings would be used (MNB 2012b). Design of the fuel pier takes into account seismic loading, vessel loading, gravity loads and functionality of the overall system. The State of California enforces special requirements for marine oil terminals, particularly with regard to seismic criteria, and the Navy has agreed to comply with the California marine oil terminal requirements for this facility. The design of the piles is governed by loading conditions that include seismic loads (MNB 2011f). The structural analysis performed has determined that concrete piles of sizes available in southern California cannot develop sufficient strength and stiffness to withstand the design loads considering the water depth at the site, the geotechnical conditions, and with the deflection limitations needed for the fuel operations (MNB 2011f). The sizes of the steel piles are dependent on water depth, subsurface soil conditions, and the mass of the deck structure. In most areas, a 36-in diameter steel pile is adequate to meet the criteria (MNB 2011f). In other areas, a 48-in diameter pile is necessary (MNB 2011f).

The new steel piles would be protected from seawater corrosion with a combination of coating and cathodic protection systems with anodes (aluminum) that would require replacement approximately every 20 years (Burns and McDonnell 2012b). The existing sheet pile system would continue to be protected from corrosion with its existing (protected/reconnected) impressed current cathodic protection system (Burns and McDonnell 2012b). The service life of the entire pier structure would be 75 years (Burns and McDonnell 2012b).

Table 2-7 below lists the types and numbers of pilings to be installed. The project construction schedule limits pile driving to four "windows" of opportunity that would occur in Phase 1 and Phase 2. There would be no pile driving or other in-water construction or demolition during the least tern foraging season, from April 1 through September 15 of each year that the project is ongoing. Due to these restrictions on in-water construction, pile driving could take up to three years to complete.

Table 2-7. Proposed Replacement Fuel Pier Pilings to Be Installed

Pile Type	*Number*
48-in diameter x 1-in steel wall pipe piles	77
36-in diameter x 1-in steel wall pipe piles	228
24-in diameter x 1-in prestressed concrete piles	165
16-in diameter concrete-filled fiberglass piles	84
Total	**554**

Source: MNB 2012b.

It is assumed that the contractor would drive approximately 2 steel piles per day, and 5 concrete or fiberglass piles per day. Each pile is assumed to require up to 2 hours of driving. Steel piles would be driven initially with a vibratory pile driver, and then finished as necessary with an impact pile driver. Working assumptions are 1-1.5 hours of vibratory pile driving and up to 0.5 hour of impact pile driving for each steel pile. Concrete piles would be jetted then driven with an impact pile driver only. The fiberglass fender piles do not need to be embedded as deeply into the subsurface as the steel wall and concrete structural piles, so they would be driven with the impact hammer for the entire length (MNB 2012b). Use of steel wall pipe, concrete, and fiberglass rather than creosote wood pilings would be consistent with Navy policy and is preferred by the Regional Water Quality Control Board (RWQCB) because, unlike creosote pilings, these materials are not a potential source for polycyclic aromatic hydrocarbons (PAHs) to the bay. The fender system for the pier would include foam-filled fenders at the berths and plastic log camels.

The currently proposed construction schedule includes the following non-overlapping, consecutive episodes of pile driving within the first year:

- Installation of 50 18-inch square concrete piles to support the relocated facilities of the Navy Marine Mammal Program to NMAWC. Pile driving is estimated to occur on 16 days.
- Installation of steel indicator piles to occur over 17 days.
- Installation of steel temporary dolphin piles to occur over 5 days.
- Installation of 24 steel abutment piles to occur over 13 days.
- Installation of approximately 26 steel structural piles over 15 days.

During the second year of construction there would be several non-overlapping episodes of pile driving, including:

- Steel structural piles for the access pier, 45 days.
- Fiberglass-concrete secondary fender piles for the access pier, 10 days. This would occur in the same timeframe as concrete pile driving (below).
- Steel structural piles, 45 days.
- Steel mooring dolphin piles, 12 days.
- Concrete primary fender piles, 15 days.

During the third year of construction there would be several episodes of pile driving, including:

- Concrete primary fender piles, 15 days.

- Fiberglass-concrete secondary fender piles, 12 days.
- Steel mooring dolphin piles, 12 days.
- Steel abutment piles, 10 days.

The abutment piles and mooring dolphin piles would be driven within the same timeframe, over a combined 12-day period.

The contract specifications would provide construction work day restrictions that are consistent with City of San Diego construction noise ordinances (MNB 2012b). Pile driving would occur during normal working hours (7:00 A.M. to 4:00 P.M.) (MNB 2012b).

Concrete catwalks would connect the berthing and mooring dolphins to the main pier (refer to Figure 2-6). The approach segment would be of similar construction to the berthing pier. The main pier decks would be designed for a 50 ton mobile crane, 20 ton truck load and 10 ton forklifts (5 ton forklift on the lower deck); heavy equipment would not be operated on the berthing or mooring dolphins (MNB 2012b).

There would be fueling stations on the upper and lower decks of the new fuel pier berthing segment. Each fueling station would have the capability to supply diesel fuel marine (DFM) and JP-5 turbine (jet) fuel to vessels. The upper deck would be used for offloading fuel from tankers to the tank farm and for supplying fuel to higher profile vessels. The lower deck would be used for fueling smaller profile vessels. Table 2-8 below lists the fueling stations on the two decks of the berthing segment of the new fuel pier.

Table 2-8. New Pier Fueling Stations

Deck	*Side*	*Product*	*Number of Stations*
Upper	Outboard	Fuel	4
Upper	Outboard	Lube Oil	2
Upper	Inboard	Fuel	4
Upper	Inboard	Lube Oil	1
Lower	Outboard	Fuel	4
Lower	Outboard	Lube Oil	1
Lower	Inboard	Fuel	3
Lower	Inboard	Lube Oil	0

Source: NAVFAC Southwest 2011a.

The upper deck would also have six piping connections to receive ballast water from fleet tankers and other larger ships (Burns and McDonnell 2012b). An 8-in diameter oily water pipe would be used to transfer the ballast water to the NBPL FOR facility. The ships could either pump directly to the oily water receipt tank at the treatment system or transfer to the smaller collection tank located on the pier (Burns and McDonnell 2012b). A pump at the collection tank would then transfer the oily water to the receipt tank at the treatment system (Burns and McDonnell 2012b).

Pier deck design is such that all rainfall accumulating on the lower deck as well as rainfall from the 85th percentile storm event accumulating on the upper deck of the new pier would be collected on the pier and sent to the FOR receipt tank for treatment. The upper deck would be equipped with underflow scuppers that would permit a portion of the runoff from large storm events to discharge to the bay. The underflow design would prevent surface sheen and floating fuel from being discharged to the bay and also allow the "first flush" to be sent to the FOR Receipt Tank.

The pier operations would be supported by two pipelines for each fuel product and two for lube oil. There would be a 16-in and an 8-in pipeline for loading/unloading JP-5. For loading and unloading DFM, there would be a 16-in and a 10-in pipeline. There would be two 6-in pipelines for loading lube oil. The 16-in pipes would support the fueling stations on the outboard side while the 8-in JP-5 and 10-in DFM pipes would support the fueling stations on the inboard side.

The 50 ft top-of-deck width is the minimum requirement for a fuel pier per DoD UFC. The new fuel pier would provide adequate deck space on the berthing segment by using a double deck structure to separate the fuel lines from operations on the berthing segment and provide containment for fuel pipelines and utilities. On the berthing segment the pipelines and utilities would be hung beneath the upper deck. Utilities would be in a dedicated vault separate from the pipelines. On the approach segment, fuel lines would be stacked in pipe racks running along one side of the lower deck. Where the approach and berthing segments meet, the fuel lines' orientation would transition from horizontal along the lower deck to vertical to reach the upper deck, then horizontal again beneath the upper deck (NAVFAC Southwest 2011a).

Concrete containment curbs would be incorporated into the pier deck design surrounding all fueling arms, fueling risers, and fuel pipes. There would be sumps in curbed containment areas in both pier decks to capture spilled fuel as well as rain water. Sumps located in the upper deck would be fitted with drains that would be piped to a collection tank on the lower deck. Sumps in the lower deck would connect to the FOR. There would be a 1.25 ft high concrete curb around the perimeter of the lower deck and 3.75 ft high concrete barrier around the upper deck.

The total fuel volume of the new pier pipelines would be 49,000 gallons, an increase of 22,960 gallons (approximately 88 percent) from the existing pipeline capacity of 26,040 (Burns and McDonnell 2012c). The dual piping configuration would allow fueling operations to take place on both sides of the pier simultaneously, and include a cross-over capability so that fuel could be transferred from one side of the pier to the other should one side shut down temporarily (MNB 2010).

The following would all be upland work. An existing underground trench containing piping from the onshore fuel storage facilities would be extended to the pipelines on the new pier. The connection for the new pipelines would be located between 35 and 65 ft from the existing pier abutment. With the exception of some electrical duct bank work, shoreside excavation would take place near the abutments of the existing pier and the proposed new pier. In addition to the

fuel pipelines, a 12-in diameter fire suppression water line would be installed on the proposed pier and connected to the onshore potable water supply system (Burns and McDonnell 2012c).

The total disturbed area on shore would be less than one acre, comprising previously disturbed areas that are paved and unpaved. The paved area northwest of the existing fuel pier would be excavated (an area approximately 20 ft long, 6 ft wide, to a depth of about 5 ft) to extend the underground pipeline trench to the new pier and to install underground utilities and subsequently re-paved. The existing 12-in diameter storm water outfall located immediately north of the existing fuel pier abutment would be relocated to the north side of the new pier abutment. A portion of the landscaped area between the existing fuel pier and lube oil storage tanks would be paved as part of the new pier landside abutment. Three palm trees would be removed from the landscaped area. A new security fence with a motorized gate would be constructed at the entrance to the new pier.

After the new pier is completed, the quaywall at the entrance to the old fuel pier would be rebuilt. This work would include the placement of approximately 100 cy of concrete to repair the quay wall (MNB 2011g). There would also be some grading and asphalt repairs in this area (MNB 2011g). Repairs to the quaywall would also include removal of two closed underground storage tanks (Tanks 115A and 115B; refer to Section 3.3.2.4) (Burns and McDonnell 2012b).

The connection between the new and old pier abutments would be constructed by placing closely-spaced 48-in diameter steel pipe piles along the base of the new and existing bulkhead. The gaps between the piles would be closed by welding steel "wings" between the piles. A concrete cap would be placed at the top of the piles to support the new pier approach and provide a continuous surface. All the work would be performed above mean higher high water.

2.2.1.4 Regulated Navigation Zones

The approach segment of the new fuel pier from shore bayward (east) would be 700 ft long as compared with 500 ft for the existing fuel pier. The new pier berthing segment north end would be about 100 ft further east into San Diego Bay than the existing fuel pier, and the south end would be about 300 ft feet further bayward (MNB 2012c). While the new pier would not extend beyond the existing Security Zone east of the pier, there would not be sufficient security standoff distance between the new pier headline and the Security Zone boundary. The Navy Anti-Terrorism/Force Protection required standoff distance for the fuel pier is 500 ft (Navy 2012b). The Navy has coordinated with the USCG to amend the Security Zone east of the pier by 250 ft (200 ft for the additional approach length and 50 ft for the berthing pier width) to provide adequate security standoff distance of 500 ft for the proposed new fuel pier alignment. The new pier would also extend beyond Navy waters into waters that are under the jurisdiction of the California State Lands Commission (CSLC). Following completion of the National Environmental Policy Act (NEPA) process, Navy counsel would provide written notification to CSLC of the extension of Navy facilities into state waters (NAVFAC Southwest 2010). Regulated Navigation Zones in the vicinity of the fuel pier are shown in Figure 2-7.

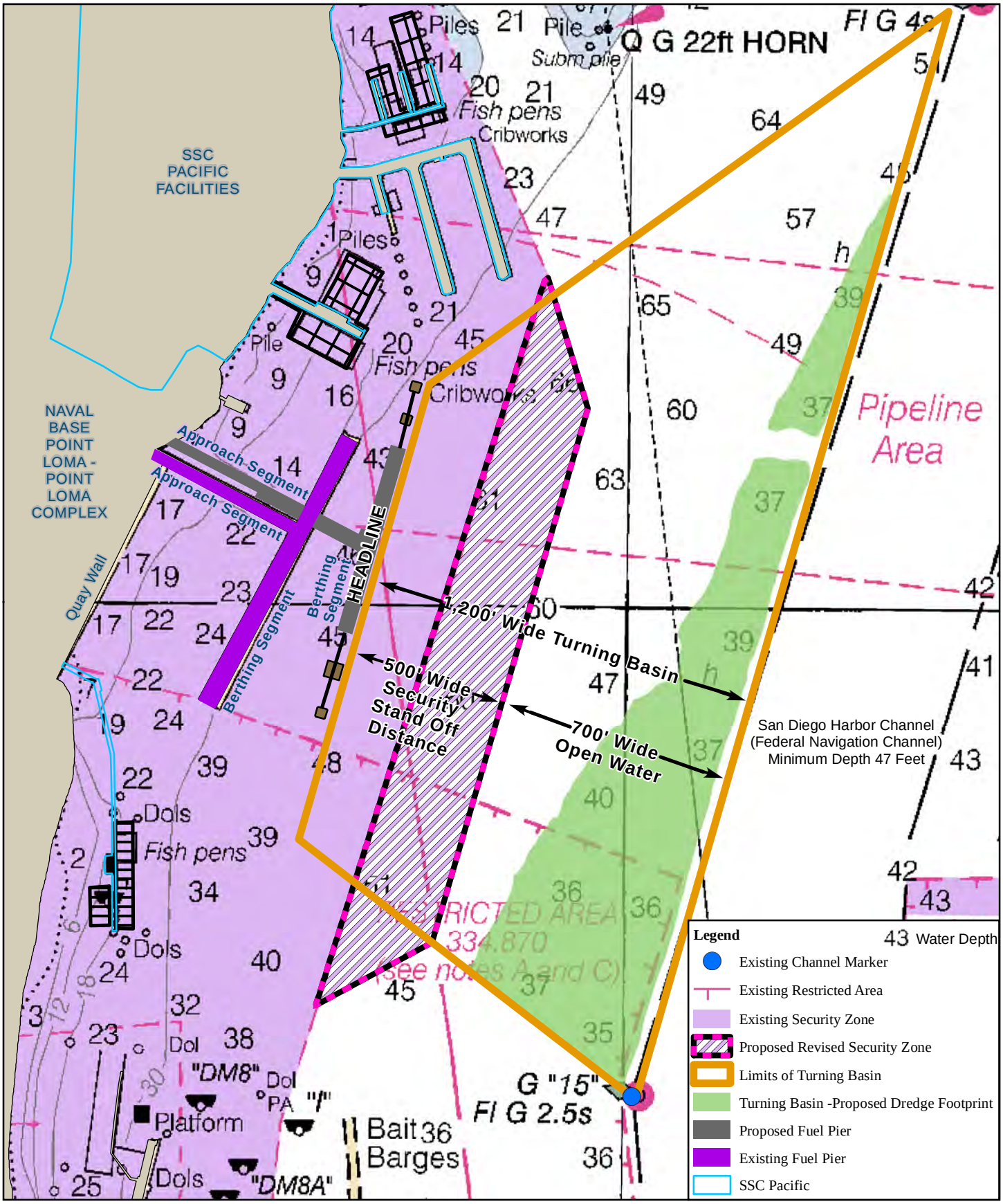


Figure 2-7
Regulated Navigation Zones

Sources: NAVFAC Southwest 2011a; Navy 2012b; NOAA Chart 18773 San Diego (NOAA 2012)

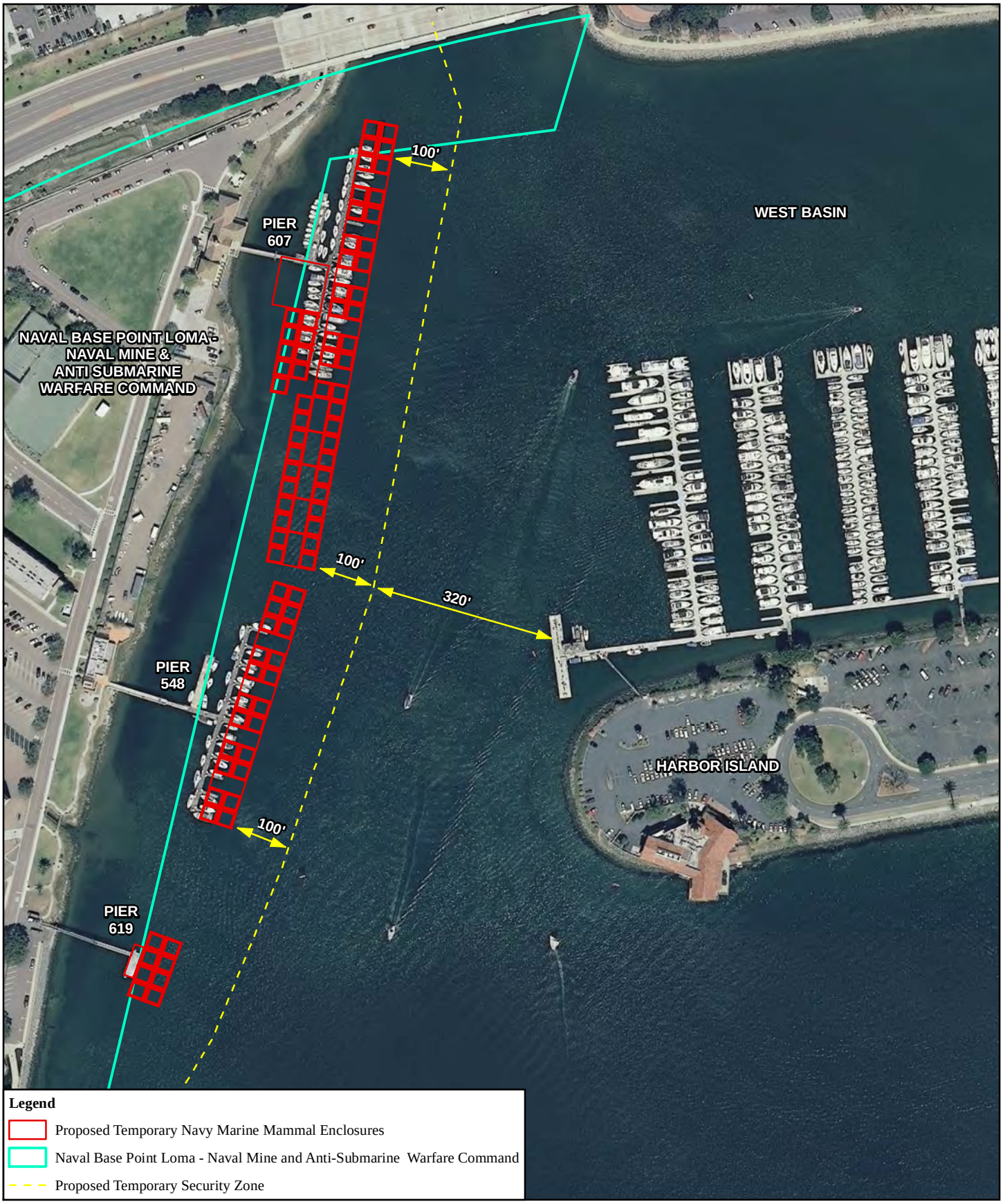
The proposed amended Security Zone would leave approximately 700 ft of open water between the Security Zone and the navigation channel for civilian vessels.

The Navy would also coordinate with the USCG to establish a temporary Security Zone that would extend 100 ft bayward from the temporary Navy marine mammal facilities to ensure civilian craft to do not interfere with restricted maneuverability of Navy small boats operating within immediate vicinity of Navy marine mammal enclosures (SSC Pacific 2012). Signs would be posted alerting vessels that entry into the temporary Security Zone is prohibited without permission of the Captain of the Port. There would be approximately 320- ft of open water for civilian boat traffic to navigate between the proposed temporary Security Zone and west Harbor Island (Figure 2-8). The temporary Security Zone would be removed when the Navy marine mammal program has returned to its existing location.

2.2.1.5 Dredging and Sediment Disposal

Vessel traffic moves in and out of San Diego Bay via the San Diego Harbor Channel (navigation channel) that is maintained at a depth of -47 ft MLLW by the USACE (Figures 2-6 and 2-7) (National Oceanic and Atmospheric Administration [NOAA] 2012). Large vessels approaching the fuel pier in the channel from the south (inbound) require an area of open water with sufficient depth, known as a turning basin, to safely align at the pier. The proposed new pier layout would include a minimum 1,200 ft wide turning basin between the outboard (eastern) side of the pier and the navigation channel, to provide safety for the berthing operations of the large vessels being serviced at the facility. The north and south limits of the turning basin would be bounded by the existing channel markers located to the northeast and southeast of the fuel pier (Figure 2-7). The design depth for the turning basin would be -40 ft MLLW (38 ft vessel draft plus 2 ft under keel). An additional 2 ft of dredge depth would be included as overdredge allowance, or tolerance that could vary depending on the precision of the dredging contractors' equipment and methods. Thus, the maximum project dredge depth would be -42 ft MLLW, but the entire overdredge volume might not be recovered if the contractor is able to excavate to 40 ft with less than 2 ft of tolerance.

The majority of the existing bathymetry is deep enough to accommodate safe vessel operation. However, there is a wedge-shaped high spot about 1,200 ft east of the existing fuel pier where bottom depths rise from -40 to -36 ft MLLW (refer to Figure 2-6). This wedge-shaped area (approximately 463,000 sf/10.6 ac) would need to be excavated to bring it to a minimum of -40 ft MLLW. The proposed dredge footprint would be located approximately 700 ft east of the new fuel pier, as illustrated in Figure 2-6. The dredge footprint would be limited to the area shown in green on Figure 2-6.



0 25 50 Meters
0 50 100 Feet

Figure 2-8
Proposed Configuration of Temporary Navy Marine Mammal Enclosures and Proposed Temporary Security Zone at Naval Mine and Anti-Submarine Warfare Command Piers 619/548/607

N

The estimated volume of dredging required is shown in Table 2-9.

Table 2-9. Proposed Dredging Volume

Site	*Design Depth (-40 ft MLLW)*	*Overdredge (2 ft)*	*Total*
Turning Basin	40,000 cy	40,000 cy	80,000 cy

Note: cy = cubic yards
Source: MNB 2012b.

As stated above in Section 2.2.1.3, underwater pipelines that supply jet fuel to NAS North Island are in the project area. The Navy would work with contractors to establish a safety buffer zone between the pipelines and the dredge footprint and would ensure that all contractors' vessels and equipment remain outside the buffer zone during dredging operations.

Sediment samples from the dredge footprint were collected in November 2010 and tested in accordance with regulations contained in Title 40 CFR Parts 220-228. The sediment characterization report is included as Appendix D of this EA. The sediment characterization report was provided to USEPA and USACE for review and comment on potential sediment disposal options. The agencies determined that the dredged material is suitable for unconfined aquatic disposal (USEPA 2011).

Depending on availability, a hopper (hydraulic) dredge or a medium size, 8-12 cy bucket, barge-mounted clamshell dredge would be used (MNB 2012d; Navy 2010f). If a clamshell dredge is used, the specific make and model of the bucket would be determined by the selected contractor and permit conditions. If a hopper dredge is used, the Navy would plan to coordinate dredging to occur after the MMP has been moved to the temporary relocation site at NMAWC. However, if availability does not permit this, the hopper dredge would be operated to minimize turbidity and maintain water quality necessary for the health and wellbeing of the Navy marine mammals (MNB 2012d).

Dredge material would be loaded into a 5,000-10,000 cy capacity barge and transported to the beneficial reuse site south of the Imperial Beach pier where it would be placed in the nearshore zone (Figure 2-9) (MNB 2012b). Daily dredge production, including transport and placement at the beneficial reuse site can be assumed to be 2,000 cy. Maintaining this as an average production rate would enable up to 80,000 cy of material dredged from the turning basin to be dredged and placed at the beneficial reuse site in approximately three months (Navy 2010f). Dredging and beneficial reuse for nearshore replenishment of dredged materials would comply with USACE requirements for dredging and sediment disposal. The sediment in the proposed dredging area is classified as fine sand; as such it is similar to sediments at the beneficial reuse site (Tierra Data, Inc. 2012).

0 100 200 Meters

0 200 400 Feet

Source: NAVFAC Southwest 2012

Figure 2-9
Imperial Beach Sediment
Beneficial Reuse Receiver Site

N

Table 2-10 below compares the sediments at the proposed dredge and beneficial reuse sites.

Table 2-10. Sediment Distribution Comparison, Proposed NBPL Dredging and Beneficial Reuse Areas

Site Location	*Sample Number*	*Units*	*Sediment Sizes*									*Total Silt + Clay*	*Mean Grain Size (mm)*	*Sample Description*
			Gravel	*Very Coarse Sand*	*Coarse Sand*	*Medium Sand*	*Fine Sand*	*Very Fine Sand*	*Total Sand*	*Silt*	*Clay*			
Imperial Beach Beneficial Reuse Area	IBNR-1	%	0	0.41	6.02	40.29	42.79	8.98	98.49	0.91	0.61	1.52	0.269	Medium Sand
	IBNR-2	%	0	0.38	5.51	27.01	51.11	13.8	97.81	1.48	0.71	2.19	0.238	Fine Sand
	IBNR-3	%	0	0	3.69	52.40	38.5	4.31	98.9	0.54	0.55	1.09	0.278	Medium Sand
	IBNR-4	%	0	0.32	2.08	13.69	61.14	19.98	97.21	1.99	0.8	2.79	0.189	Fine Sand
	IBNR-5	%	0.04	0.37	2.67	15.2	61.59	17.7	97.53	1.68	0.76	2.44	0.200	Fine Sand
	IBNR-6	%	0	0.52	2.85	19.4	60.69	14.3	97.76	1.53	0.72	2.25	0.212	Fine Sand
Proposed NBPL Dredge Footprint	Area 1	%	0.03	2.38	5.95	30.18	41.55	6.75	86.81	10.54	2.62	13.2	0.220	Fine Sand
	Area 2	%	0.24	8.23	19.2	33.97	18.55	6.72	86.67	10.41	2.69	13.1	0.320	Medium Sand

Source: Tierra Data, Inc. 2012.

2.2.1.6 Temporary Relocation of Everingham Brothers Bait Company Bait Barges

The two Everingham Brothers Bait Company San Diego Bay bait barges are anchored on Navy property about 1,800 ft south of the existing fuel pier and are oriented side-by-side (Figure 1-2). The Everingham Brothers Bait Company would need to move the bait barges before the pier demolition activities begin; this would accompany the Navy fuel pier replacement project but is not an element of the proposed project as such. Relocating the bait barges outside of the zone of influence (ZOI) for pile driving noise would reduce the exposure of wild marine mammals to sound levels below thresholds for injury and behavioral disturbance (Levels A and B thresholds, respectively). In addition, moving the bait barges would help avoid potential damage to the commercial bait fish that are important to the local fishing industry. This section discusses the bait barges, their operations, and proposed temporary relocation sites for the barges (Figure 2-2). The bait barges would anchor at the temporary site during the portion of the year that least terns do not forage (September 16 through March 29) while project activities are ongoing.

Each bait barge primarily consists of two rows of large wooden compartments tied together, called "receivers." One barge is equipped with a single-story shelter for personnel and equipment (Everingham Brothers Bait Company 2012). California sea lions and several species of seabirds frequently rest on top of the bait barges.

The wooden receivers hold live bait fish in underwater cages. Each of the 102 receivers is 28 ft long, 14 ft wide, and 12 ft high, although the lower 10 to 11 ft remain under water. At present, the western bait barge measures approximately 750 ft from buoy to buoy and 1,045 ft from mooring to mooring; the eastern bait barge is about 630 ft from buoy to buoy and 930 ft from mooring to mooring. The barges have several location requirements, including:

- Bait fish require a maximum water temperature of 70 degrees Fahrenheit and a linear current flow to maintain sufficient oxygen levels in the cages.
- The barges must be located away from the strong winds and waves outside the bay to prevent damage.
- Water depth must in the range of 35 ft below MLLW so that there is sufficient clearance between the bottom of the 11 ft-high receivers and the bay bottom that movements of swells at high and low tides do not push the receivers onto the bay bottom and break them.
- A minimum distance of 460 ft to shallow water is necessary to prevent the barges from being damaged by hitting the sea floor when moved by winds or currents.
- A minimum distance of 460 ft of open water is needed between the two barges to allow customer and Everingham Brothers Bait Company vessels adequate space to safely maneuver to and access the barge's compartments. Customers must be able to access both sides of both barges.

Due to the year-round demand for live bait fish in San Diego Bay, the bait barges operate 24 hours per day, 7 days per week, throughout the year to provide live bait for their customers (Everingham Brothers Bait Company 2012).

Repair and maintenance of the wooden receivers that support the bait cages is a critical component of the bait barge operations for two reasons: a) because the wooden receivers do not last more than two years in the marine environment, and b) nearly all the boxes must be continually in use to provide enough bait to meet customers' needs. Therefore, receivers are repaired one by one, year-round. The receivers must be removed from the water for repair and were serviced onshore until the 1990s when the Port of San Diego and Mission Bay Parks terminated the company's leases for the onshore repair areas (Everingham Brothers Bait Company 2012). Since then the company has used its own maintenance barge that operates alongside the two bait barges. The crane on the maintenance barge hauls each box on the maintenance barge's deck for inspection. Sections needing repair are cut out, replaced with new wood, and repainted with vinyl antifouling paint; the receiver is then returned to its place in the bait barge. Each receiver takes four days to repair onsite. In a typical year without any additional storm damage to the barges, the company's dedicated four-person repair crew works 200 days, often six days occasionally 7 days per week in two shifts, to keep the barges functional (Everingham Brothers Bait Company 2012). The ongoing, onsite unit-by-unit maintenance process is necessary and the added time, manpower and cost to transport the receivers elsewhere for maintenance would be prohibitive (Everingham Brothers Bait Company 2012).

The Navy is working with the Everingham Brothers Bait Company to find potential temporary relocation sites for the two bait barges. Based upon the operational requirements discussed above, multiple locations around San Diego Bay were considered. Other factors also restrict the bay-wide potential site options, such as bird air strike hazards for aircraft at potential sites near airfields and the presence of eelgrass. Table 2-11 below presents the potential bay wide sites considered and the reasons why they were found to be unsuitable for temporary relocation of the bait barges.

Table 2-11. Potential Bait Barge Bay-wide Temporary Relocation Areas Initially Considered

Initial Consideration	*General Location*	*Owner*	*Site Restrictions*
CSLC 1	East of Zuniga Jetty	CSLC	• Depth and swell issues.
CSLC 2	South of Ballast Point	CSLC	• Depth and swell issues.
NBC 3	NAS North Island (north)	Navy	• Bird air strike hazard for NAS North Island aircraft
NBC 4	NAS North Island (northeast)	Navy	• Bird air strike hazard for NAS North Island aircraft
NBPL 5	America's Cup Harbor, adjacent to NMAWC	Navy	• Eelgrass is present. • Ownership boundary issues.
SDUPD 6	*Harbor Island (southeast)*	*Port of San Diego*	• *No site restrictions. SDUPD 6 was carried forward for additional consideration, resulting in the options shown in Table 2-12.*
SDUPD 7	Harbor Island (central)	Port of San Diego	• Within the 120 dB Zone of Influence for underwater construction sound

Notes: CSLC = California State Lands Commission. NBC = Naval Base Coronado. NBPL = Naval Base Point Loma. SDUPD = San Diego Unified Port District. NAS = Naval Air Station. dB = Decibel. ZOI = Zone of Influence.
Source: NAVFAC Southwest 2012c; Everingham Brothers Bait Company 2012.

Of the seven bay-wide areas initially considered, only the area southeast of Harbor Island (Option SDUPD 6) was found to offer a range of water, wave, and depth conditions most likely to be suitable to the bait fish and bait barge operations in combination with safety for Navy aircraft operations. From the general area of SDUPD 6, seven site options around the southeastern end of Harbor Island were developed to determine the most feasible location to relocate the bait barges. Table 2-12 below presents the eight Harbor Island sites considered. Temporary relocation Options 4A and 6A on CSLC lands remain under consideration (refer to Figure 2-2). These two potential relocation sites have been approved by Navy Region Southwest Port Operations (NRSW 2012PO).). Following adoption of a Finding of No Significant Impact (FONSI) for this project, the Everingham Brothers Bait Company and the California State Lands Commission would be expected to execute a lease for a relocation site. Before moving the barges, the barge owners would deter sea lions from hauling out on the barges with sprinklers or other non-injurious methods, which is permissible under Section 109(h) of the MMPA and would not constitute harassment.

Table 2-12. Potential Bait Barge Harbor Island Relocation Sites

Option	*Location*	*Layout*	*Owner*	*Site Restrictions*
1	Southeast Harbor Island, parallel to Harbor Island Drive	End-to-end	Port of San Diego	• The side closest to Harbor Island would not be operational for both bait barges • The eastern bait barge would overlap eelgrass • Potential depth issues for both barges • Potential impacts to the Sea Level restaurant • Within the 120 dB ZOI
2	Southeast Harbor Island, parallel to Harbor Island Drive	Side-to-Side	Port of San Diego and CSLC	• One side of one bait barge would not be operational • The northern bait barge would overlap eelgrass • Potential depth issues for the northern barge • Potential impacts to the Sea Level restaurant
3	Southeast Harbor Island, parallel to Harbor Island Drive, west of Option 2	Side-to-Side	Port of San Diego and CSLC	• One side of one bait barge would not be operational • Potential eelgrass overlap • Potential depth issues for the northern barge • Within the 120 dB ZOI for underwater construction sound
4	West of Option 4A	Side-to-Side	CSLC	• Within the 120 dB ZOI for underwater construction sound
4A	*See Figure 2-2*	*Side-to-Side*	*CSLC*	• *Under consideration*
5	West of Option 6	Side-to-Side	CSLC	• Plotted underwater cable corridor in area • Proximity to viewfront of Harbor Island restaurant
6	East of Option 6A	Side-to-Side	CSLC	• Proximity to commercial boating facilities and underwater cables
6A	*See Figure 2-2*			• *Under consideration*

Notes: CSLC = California State Lands Commission. NBC = Naval Base Coronado. NBPL = Naval Base Point Loma. SDUPD = San Diego Unified Port District. NAS = Naval Air Station. dB = Decibel. ZOI = Zone of Influence
Source: NAVFAC Southwest 2012d; Everingham Brothers Bait Company 2012.

The two bait barge temporary relocation sites under consideration are very close to one another, and as required to maintain the health of the bait fish and support bait barge operations, by definition have the same physical conditions and surroundings. Therefore, for the purposes of analysis in this EA, it is assumed that temporary relocation of the bait barges would have the same impact(s) at either of the sites.

As described above in Section 2.2.1.3 under the subheading Demolition/Construction Equipment and Phasing, there would be no in-water demolition and construction during the least tern foraging season (April 1 to September 15). It is anticipated that it would be possible for the Everingham Brothers Bait Company to move the two bait barges back to their current position south of the fuel pier on approximately April 1 and return to the temporary relocation site by September 15 while project activities are ongoing. The current plan is for the Everingham Brothers Bait Company to return the barges to their existing site after the proposed new pier is constructed. Table 2013 below shows how much open water there would be for recreational navigation between the bait barges at either of the two proposed potential relocation sites and several points around San Diego Harbor.

Table 2-13. Approximate Open Water Distances Between Proposed Potential Temporary Bait Barge Locations and Points in San Diego Bay

From	*To*	*Distance (Feet)*
Option 4A	Harbor Island	1,000
	Federal Navigation Channel	800
	Naval Air Station North Island	2,400
	San Diego Bay East Shore	6,000
Option 6A	San Diego Bay North Shore (Coast Guard)	1,300
	San Diego Bay East Shore	1,800
	Federal Navigation Channel	2,900
	Naval Air Station North Island	3,800

2.2.2 Alternative 2 Delayed Dredging Alternative

Implementation of Alternative 2 would be the same as described under Alternative 1, except that dredging would occur years after completion of the fuel pier replacement. As with Alternative 1, it is anticipated that dredging would take approximately three months to complete and that a barge would haul the dredged material to the beneficial reuse site south of the Imperial Beach Pier.

After completion of the pier replacement, the Navy marine mammal enclosures would be returned to their current site. The Navy MMP relocation period is required only for the

duration of construction and demolition activities. Based on the following existing conditions, and with adoption of the following minimization measures, the Navy MMP could remain at its existing location and would not have to temporarily relocate during the dredge-only activities (NAVFAC Southwest 2011h):

- The dredge footprint sediment grain size is predominantly sand that does not lend itself to causing turbidity impacts.
- A clam shell bucket dredge, which causes less turbidity than a cutter head hopper dredge, would be used. Use of a hopper dredge and the associated increased turbidity could require a second relocation of the Navy MMP. Although a hopper (hydraulic) dredge or a clam shell bucket dredge would be capable of carrying out the proposed dredging, a clam shell bucket dredge and sediment transport by barge would be the most likely scenario. Very few hopper dredges are available on the west coast (MNB 2012e).
- Should a hopper dredge become available during the Alternative 2 time frame, the hopper dredge would be operated to minimize turbidity and maintain water quality necessary for the health and well-being of the Navy marine mammals (MNB 2012d).
- Dredging would occur during ebb tide when any turbidity that was actually caused would flow away from the Navy MMP facility.
- The dredging duration would be no more than 9 months.

The validity of laboratory analytical results for determination of suitability of dredge sediments for ocean disposal expires within approximately three years. Sediment characterization samples for Alternative 1 were collected and analyzed in November of 2010. If the turning basin dredging is not accomplished by late 2013/early 2014, it would be necessary to repeat the sampling and analysis to obtain current results. Therefore, should Alternative 2 be implemented, additional time (approximately six months) and funding would need to be built into the project to plan for another round of sampling, analysis, and coordination of second disposal suitability determination through USEPA and USACE.

All other components of Alternative 2 (i.e., demolition of the existing fuel pier, construction of a double deck and mooring dolphin replacement pier, and amendments to the security navigation zone) would be identical to those described under Alternative 1 and would begin in spring of 2014. Buildings 110 and 140 on the existing fuel pier would be demolished and a new onshore control tower would be constructed as part of P-401. Temporary relocation of the Everingham Brothers Bait Company bait barges would also occur, and the impacts would be the same as for Alternative 1.

2.2.3 No-Action Alternative

Under the No-Action Alternative, the Navy would not implement the demolition of the existing fuel pier, construction of the new fuel pier facility, or dredging activities. The Navy is making every effort to bring the existing fuel pier into compliance with Marine Oil Terminal

Engineering and Maintenance Standards (MOTEMS) requirements with the exception of geotechnical, structural, mooring/berthing, pipe stress, and other MOTEMS requirements (Navy 2012d). Bringing the aging structure up to seismic compliance levels through repairs is not feasible because all of the pier's existing pile foundations would need to be replaced (Navy 2010a). New construction is the only viable solution (Navy 2010a). The seismic structural deficiencies of the existing fuel pier would remain out of conformance with the current MOTEMS and the UFC (Navy 2010a). Notwithstanding the remaining seismic deficiencies, current and future demand for a fuel pier to safely accommodate deep draft vessels would not be met.

Under the No-Action Alternative the Navy MMP would not be temporarily relocated to NMAWC and the Everingham Brothers Bait Company barges would not be temporarily relocated southeast of Harbor Island. Although the fuel pier itself would not be demolished, Buildings 110 and 140 on the existing pier would be taken down, and a new onshore control tower would be constructed as part of P-401.

The No-Action Alternative is not considered a reasonable alternative because it does not meet the purpose of and need for the Proposed Action as required under Council on Environmental Quality (CEQ) regulations (40 CFR 1502.14[d]). However, it does provide a measure of the baseline conditions described in Chapter 3, against which the potential adverse impacts of the Proposed Action can be compared. As such, the No-Action Alternative is carried forward for analysis.

2.2.4 Alternatives Considered but Not Carried Forward for Detailed Analysis

Due to the requirement for the fuel pier to be located near the NBPL DFSP fuel storage facilities, an alternate shoreside access location for the new pier would not be viable and thus would not be considered a reasonable alternative. Five project design alternatives with the same shoreside access location as the existing pier were considered. As previously discussed, Alternative 1 was selected to be carried forward for detailed analysis in this EA. Application of the screening factors listed in Section 2.1 resulted in elimination of the other four design alternatives. The alternatives that were considered but not evaluated further in this EA due to specific screening factors for operational, safety, and natural resources constraints are discussed below.

2.2.4.1 Full-Fixed Double Deck Pier (No Mooring Dolphins)

This alternative would provide a 1,500 ft by 50 ft fixed double deck berthing pier, with a 700 ft long approach segment. The top of the lower deck would be set approximately 5 ft above extreme high tide. The top of the upper deck would be set approximately 15 ft above the lower deck elevation. This pier alternative would provide berthing for one T-AKR, T-AO, or LPD, and would provide greatest versatility in accommodating the wide range of vessels requiring fueling berths at this facility. The upper deck would have sufficient height to safely reach fuel transfer points on the majority of larger ships (Navy 2010c) as described in Section 2.1. Fuel pipelines would be hung beneath the upper deck, providing maximum separation between pipelines and vehicles and deck operations. This alternative would also meet the majority of the other selection criteria. However, with an overall area of 110,000 sf, the full-fixed double-

deck pier would have a larger footprint than Alternative 1 (65,865 sf). The 1,500 foot full-fixed pier would not meet the screening factor to minimize potential risks to aquatic resources and encroachment upon navigable waters. Therefore, this alternative was considered but eliminated from further evaluation.

2.2.4.2 Full-Fixed Single Deck Pier

This alternative would provide a single deck fuel pier, 1,500 ft long by 125 ft wide, with an area, including the 650 ft long approach segment, of 268,750 sf. This pier alternative would provide berthing for one T-AKR, T-AO, or LPD, but would not have sufficient height for fuel load arms to safely reach fuel transfer points on vessels as described above in Section 2.1. In addition, the single deck pier would be unable to physically separate the fuel pipelines from on-deck operations. Fuel lines would be placed on the deck of the berthing pier between 1 ft high concrete berms. With deck widths of 125 ft and the greatest overall square footage of any of the potential design alternatives, the single deck pier would require the most in-water construction. Therefore, the single deck pier would not meet the screening factor to minimize potential risks to aquatic resources and encroachment upon navigable waters. For these reasons, this alternative would not meet the screening factors described in Section 2.1, and therefore, was considered but eliminated from further evaluation.

2.2.4.3 Single Deck Pier with Mooring Dolphins

This alternative would provide a new single deck fuel pier, 1,100 ft long by 125 ft wide. This alternative would extend the outboard berthing length to 1,500 ft by the addition of two 30 ft square mooring dolphins on each end of the pier. The total area, including the 650 ft long approach segment, would be 223,900 sf. This pier alternative would provide berthing for one T-AKR, T-AO, or LPD, with slightly less square footage than the full-fixed single deck pier alternative described above. Like the full-fixed single deck pier this alternative would not have sufficient height needed for fuel load arms to safely reach fuel transfer points on larger vessels as described in Section 2.1.

Although the use of mooring dolphins for this alternative would reduce its area by 44,850 sf compared to the full-fixed single deck pier, it would be almost 158,035 sf larger than Alternative 1 and would require a correspondingly greater amount of in-water construction. This alternative would not meet the screening factor to minimize potential risks to aquatic resources and encroachment upon navigable waters. For these reasons, this alternative would not meet the screening factor described in Section 2.1, and therefore, was considered but eliminated from further evaluation.

2.2.4.4 Replace Fuel Pier "In-Kind"

This alternative would provide an "In-Kind" replacement fuel pier of a similar configuration. The replacement main pier would be a single deck pier, 950 ft long by 50 ft wide with a 600 ft long approach segment for a total of 77,500 sf. As such it would only provide 950 ft of berthing on the outboard face and would not accommodate fueling of the T-AKR. Increasing the pier's feet of berthing to 1,050 ft, with a larger deck or by the addition of mooring dolphins would

provide the required UFC berthing length for these vessels. As a single deck pier, this alternative would not have sufficient height needed for fuel load arms to safely reach fuel transfer points on larger vessels as described in Section 2.1. All 16 pipelines would have to be placed on top of the single deck between 1 ft high concrete curbs, leaving a narrow center lane less than 15 ft wide that would severely restrict mobile crane and forklift operations on the berthing deck. This alternative does not meet the UFC criterion of a 50 ft wide minimum deck work space for a fuel pier berthing deck as described in Section 2.1. This alternative would replace the existing fuel pier with a new pier 6,480 sf larger than the existing pier. However, Alternative 1 would replace the existing pier with new pier that would be 11,635 sf smaller than the in-kind alternative and 5,315 sf smaller than the existing pier. Thus the in-kind alternative would not meet the screening factor to reduce square footage and in-water construction. For these reasons, this alternative does not meet the selection screening factors in Section 2.1, and therefore, was considered but eliminated from further evaluation.

2.3 SUMMARY OF ENVIRONMENTAL CONSEQUENCES

Potential environmental impacts have been analyzed for the following resources: biological resource habitats and communities; fisheries; birds; marine mammals; threatened and endangered species; water resources; hazardous materials and wastes; noise; air quality; transportation and circulation; and socioeconomics and environmental justice. Resources that were not carried forward for analysis because impacts would be negligible or non-existent include: geology and topography; public services and utilities; aesthetics; land use; cultural resources; and public health and safety. The resources considered but eliminated from detailed analysis and the rationale for their elimination are presented at the beginning of Chapter 3 of this EA.

Table 2-14 provides a summary of environmental consequences for Alternative 1, Alternative 2, and the No-Action Alternative, by resource area Chapter 3 provides a detailed discussion of the baseline (existing) conditions and the environmental consequences.

Table 2-14. Summary of Potential Impacts and Avoidance and Minimization Measures/Special Conservation Measures

Resource Area	*Alternative 1 Pier Replacement and Associated Dredging*	*Alternative 2 Delayed Dredging Alternative*	*No-Action Alternative*
Biological Resource Habitats and Communities	Other than the incremental deepening of deep subtidal habitat by dredging the high spot in the turning basin, no permanent change would result from dredging, temporary relocation of the Everingham Brothers Bait Company bait barges, or the temporary relocation of the Navy Marine Mammal Program. Minor and short-term impacts to vegetated and nonvegetated soft bottom benthic habitat would occur. Impacts to eelgrass from the proposed fuel pier would be minor (approximately 0.05 ac of eelgrass surveyed in 2011, and an additional 0.05 ac of habitat that historically supported eelgrass) and would be offset by using the eelgrass mitigation bank. Eelgrass impacts from the temporary relocation of the Navy MMP would be minor (approximately 0.67 ac of eelgrass in 2011, and an additional 0.32 ac of habitat that historically supported eelgrass), temporary, and would be temporarily offset by using the eelgrass mitigation bank. The structural habitat of the existing pier would be removed but largely replaced by that of the new pier; differences would be inconsequential. Organisms occurring in the immediate area may be lost or displaced directly by project activities (equipment or noise) or indirectly by short-term changes suspended sediments, turbidity, dissolved oxygen, and light diffusion. However, organisms are expected to return to the project area upon project completion, and epifauna are expected to recolonize the new fuel pier from nearby, undisturbed areas within a relatively short time period. Therefore, through the use of the preventative measures described below, the minor and short-term impacts to biological resource habitats and communities would not be significant. **Avoidance and Minimization Measures/Special Conservation Measures (SCMs):** Before proceeding with the project, the Navy would obtain the required Clean Water Act (CWA) Section 404/Rivers and Harbors Act Section 10 permits. All required terms and condition of the permits would be implemented. The following avoidance and minimization measures are proposed to be utilized during the proposed activities to reduce the potential to impacts to habitats and communities. Fisheries, Birds, Marine Mammals, and Threatened and Endangered Species contain additional Avoidance and Minimization Measures applicable to those specific resources. • Sheet piling would be left in place to minimize sediment and eelgrass disturbance that would otherwise result from	Impacts associated with Alternative 2 would be the same as those for Alternative 1, with the exception that dredging activities would be delayed until years after completion of construction of the pier. Under Alternative 2, there would be no significant impacts to biological resource habitats and communities. **Avoidance and Minimization Measures/SCMs:** Under Alternative 2, avoidance and minimization measures/SCMs would be the same as those for Alternative 1.	Under the No-Action Alternative, existing conditions would remain unchanged. The Navy would continue to utilize the NBPL fuel pier without replacement of the pier and without implementation of safety improvements. **Avoidance and Minimization Measures/SCMs:** Under the No-Action Alternative, avoidance and minimization measures/SCMs would not be necessary.

Table 2-14. Summary of Potential Impacts and Avoidance and Minimization Measures/Special Conservation Measures

Resource Area	*Alternative 1 Pier Replacement and Associated Dredging*	*Alternative 2 Delayed Dredging Alternative*	*No-Action Alternative*
	vessel traffic. • In conjunction with a Caulerpa survey, a final pre-construction eelgrass survey would be made. Additionally, a post-construction eelgrass survey would be conducted and compared to both historical data and the pre-construction survey to determine the amount of eelgrass habitat permanently shaded, whichever is greater. This impact to eelgrass would be offset by using the eelgrass mitigation bank. Temporary impacts at NMAWC would also be offset by the mitigation bank, but upon successful reestablishment of eelgrass within impacted areas at the NMAWC location, the bank would be credited for the reestablished acreage. • The contractor would use only clean construction materials suitable for use in the oceanic environment. The contractor would ensure no debris, soil, silt, sand, sawdust, rubbish, cement or concrete washings thereof, chemicals, oil, or petroleum products from construction would be allowed to enter into or placed where it may be washed by rainfall or runoff into waters of the U.S. Upon completion of the project authorized, any and all excess material or debris would be completely removed from the work area and disposed of in an appropriate upland site. • Spill kits and cleanup materials would be present during construction should there be a leak into the surrounding water. • All debris would be transported to, and disposed of, at an appropriate upland disposal site, or recycled if appropriate. • During project implementation the Navy would regularly monitor construction activities to ensure that no deviation from the project as described herein are occurring. The Navy would report any violation of authorized impacts to the National Marine Fisheries Service (NMFS) within 24 hours of its occurrence. • The beach and adjacent strand/coastal scrub habitat inshore of the fuel pier and southward along the shore would not be used for any purpose.		
Fish	Fish communities and habitats would be temporarily affected by in-water construction and demolition. The potential for injury to fish would exist at close ranges to impact pile driving. Within the corresponding Zones of Influence (ZOIs), fish are likely to be move away from pile being driven. Disturbance to	Impacts associated with Alternative 2 would be the same as those for Alternative 1, with the exception	Under the No-Action Alternative, existing conditions would remain unchanged. The Navy would

Table 2-14. Summary of Potential Impacts and Avoidance and Minimization Measures/Special Conservation Measures

Resource Area	*Alternative 1 Pier Replacement and Associated Dredging*	*Alternative 2 Delayed Dredging Alternative*	*No-Action Alternative*
	fish is possible at greater ranges, but, if anything, only temporary behavioral reactions would be anticipated, without long-term consequences for fish populations. Impacts would not be significant. Approximately 0.05 ac of eelgrass habitat as of 2011, and an additional 0.05 ac of habitat that historically supported eelgrass, would be permanently shaded. This area represents a tiny fraction of that which is found within and adjacent to San Diego Bay (0.0027% and 0.0058%, respectively) and would be offset by using the eelgrass mitigation bank. The proposed temporary relocation site for the Navy MMP would temporarily impact 0.67 ac of eelgrass surveyed in 2011, and an additional 0.32 ac of habitat that historically supported eelgrass; this temporary impact at NMAWC would be offset by using the eelgrass mitigation bank. As such, implementation of Alternative 1 would not result in any significant impacts to fisheries or Essential Fish Habitat (EFH). **Avoidance and Minimization Measures/SCMs:** Avoidance and minimization measures integrated into the project design pertaining to Fisheries and EFH include the following: • Sheet piles beneath the existing pier would be left in place to minimize sediment and eelgrass disturbance. • In conjunction with a Caulerpa survey, a final pre-construction eelgrass survey would be made. Additionally, a post-construction eelgrass survey would be conducted and compared to both historical data and the pre-construction survey to determine the amount of eelgrass habitat permanently shaded, whichever is greater. This impact to eelgrass would be offset by using the eelgrass mitigation bank. Temporary impacts at NMAWC would also be offset by the mitigation bank but upon successful reestablishment of eelgrass within impacted areas at the NMAWC location, the bank would be credited for the reestablished acreage. • The contractor would use only clean construction materials suitable for use in the oceanic environment. The contractor would ensure no debris, soil, silt, sand, sawdust, rubbish, cement or concrete washings thereof, chemicals, oil, or petroleum products from construction would be allowed to enter into or placed where it may be washed by rainfall or runoff into waters of the U.S. Upon completion of the project authorized, all excess material or debris would be completely removed from the work area and disposed at an	that dredging activities would not take place until years after completion of the new fuel pier. Under Alternative 2, there would be no significant impacts to fisheries. **Avoidance and Minimization Measures/SCMs:** Under Alternative 2, avoidance and minimization measures/SCMs would be the same as those for Alternative 1.	continue to utilize the NBPL fuel pier without replacement of the pier and without implementation of safety improvements. **Avoidance and Minimization Measures/SCMs:** Under the No-Action Alternative, avoidance and minimization measures/SCMs would not be necessary.

Table 2-14. Summary of Potential Impacts and Avoidance and Minimization Measures/Special Conservation Measures

Resource Area	*Alternative 1 Pier Replacement and Associated Dredging*	*Alternative 2 Delayed Dredging Alternative*	*No-Action Alternative*
	appropriate upland site. • Spill kits and cleanup materials would be present during construction should there be a leak into the surrounding water. • During project implementation, the Navy would regularly monitor construction activities to ensure that no deviations from the project as described herein are occurring. The Navy would report any violation of authorized impacts to NMFS within 24 hours of its occurrence. The following avoidance and minimization measures would be followed during the proposed pile driving and dredging activities. • Soft Start - The use of a soft-start procedure is believed to provide additional protection to marine mammals by providing a warning and/or giving marine mammals a chance to leave the area prior to the hammer operating at full capacity. The Test Pile Program will utilize soft-start techniques (ramp-up/dry fire) recommended by NMFS for impact and vibratory pile driving. These measures are as follows: *"The soft-start requires contractors to initiate noise from vibratory hammers for 15 seconds at reduced energy followed by a 30-second waiting period. This procedure should be repeated two additional times. If an impact hammer is used, contractors are required to provide an initial set of three strikes from the impact hammer at 40 percent energy, followed by a 30-second waiting period, then two subsequent 3-strike sets."*		
Birds	Alternative 1 may disturb migratory bird foraging and resting in the immediate vicinity while construction and/or demolition activity is occurring. However, any impacts would be short-term, localized, and would not impact bird populations. Birds on the water regularly experience the noise and disturbance of passing vessels, while the project area is routinely subject to the elevated noise and activity of workers and equipment associated with common industrial practices. Hence, project-related noise is not expected to be a novel disturbance or to have strong effects on migratory birds. Indirect impacts to foraging because of reduced visibility or changes in prey distribution in response to noise or turbidity would similarly be localized, intermittent, and less than significant. No in-water demolition, construction, or dredging activities would occur during the least tern breeding season. (April 1 through September 15). Therefore, the Proposed	Impacts associated with Alternative 2 would be the same as those for Alternative 1, with the exception that dredging would not take place until years after completion of the new fuel pier. Under Alternative 2, there would be no significant impacts to birds. **Avoidance and Minimization**	Under the No-Action Alternative, existing conditions would remain unchanged. The Navy would continue to utilize the NBPL fuel pier without replacement of the pier and without implementation of safety improvements. **Avoidance and Minimization Measures/SCMs:**

Table 2-14. Summary of Potential Impacts and Avoidance and Minimization Measures/Special Conservation Measures

Resource Area	*Alternative 1 Pier Replacement and Associated Dredging*	*Alternative 2 Delayed Dredging Alternative*	*No-Action Alternative*
	Action would not have a significant impact under the MBTA and there would be no significant impacts on other non-migratory marine bird habitat or populations. **Avoidance and Minimization Measures/SCMs:** Avoidance and minimization measures for birds would be the same as those for biological resource habitats and communities. Avoidance and minimization measures to protect California least terns are provided in Threatened and Endangered Species.	**Measures/SCMs:** Under Alternative 2, avoidance and minimization measures/SCMs would be the same as those for Alternative 1.	Under the No-Action Alternative, avoidance and minimization measures/SCMs would not be necessary.
Marine Mammals	The Proposed Action would not result in any injuries or mortalities (Level A takes) of marine mammals. The Proposed Action has the potential, however, to result in minor behavioral changes (Level B takes) to four marine mammal species from underwater and airborne (only to harbor seals) noise associated with impulsive or vibratory pile driving, construction, and demolition. Considering the 6 ½-month work windows for all 3 years combined, total Level B behavioral harassments (takes) are expected as follows: California sea lions – 2,405; harbor seals – 270; gray whales – 45; and coastal bottlenose dolphins - 2,016. Marine mammals that are taken (harassed) may change their normal behavior patterns (e.g., swimming speed, foraging habits, etc.) or be temporarily displaced from the area of construction. Any takes would likely have only a minor effect on individuals and no effect on the population. As such, the Proposed Action would result in minor behavioral effects on individuals and localized, temporary effects on their habitat use but is not anticipated to have any detectable adverse impact on population recruitment, survival, or recovery (i.e., no more than a negligible adverse effect). Therefore, the implementation of Alternative 1 would not result in any significant impacts to marine mammals. **Avoidance and Minimization Measures/SCMs:** In conjunction with the NEPA process, the Navy is applying for an Incidental Harassment Authorization (IHA) from the National Marine Fisheries Service (NMFS), and will abide by all conditions of approval for IHA once it is issued. The IHA application contains proposed mitigation, monitoring, and reporting measures that are presently incorporated as SCMs, but are subject to modification through the consultation with NMFS on the IHA. Section 3.4.3.2 details the avoidance and minimization measures set in place to lessen the impacts to mammals, which include avoidance and minimization measures for pile driving,	Impacts associated with Alternative 2 would be the same as those for Alternative 1, except that dredging would not take place until years after the completion of the new fuel pier. Under Alternative 2, there would be no significant impacts to marine mammals. **Avoidance and Minimization Measures/SCMs:** Under Alternative 2, avoidance and minimization measures/SCMs would be the same as those for Alternative 1.	Under the No-Action Alternative, existing conditions would remain unchanged. The Navy would continue to utilize the NBPL fuel pier without replacement of the pier and without implementation of safety improvements. **Avoidance and Minimization Measures/SCMs:** Under the No-Action Alternative, avoidance and minimization measures/SCMs would not be necessary.

Table 2-14. Summary of Potential Impacts and Avoidance and Minimization Measures/Special Conservation Measures

Resource Area	*Alternative 1 Pier Replacement and Associated Dredging*	*Alternative 2 Delayed Dredging Alternative*	*No-Action Alternative*
	a discussion of the avoidance and minimization measure effectiveness, monitoring, and reporting.		
Threatened and Endangered Species	California Least Tern Conservation measures established in the Memorandum of Understanding Between U.S. Fish and Wildlife Service and the U.S. Navy Concerning Conservation of the Endangered California Least Tern in San Diego Bay, California (Appendix E.2) would be followed, resulting in the avoidance of noise- and turbidity-producing in-water activities in designated least tern foraging habitat, which includes the project area, from April 1 through September 15, when least terns are present nesting and foraging in San Diego Bay. No persistent effects on foraging conditions are expected once in-water construction/demolition activities are halted. At other times, the onshore noise and activity associated with the project would be similar to ongoing activities at NBPL and not expected to affect least tern foraging in the adjacent waters. There would be no effect on least tern nesting colonies, the nearest of which is across the bay at North Island. Based on this analysis, the Navy has concluded that Alternative 1 may affect, but is not likely to adversely affect, the California least tern, and is consulting informally with the U.S. Fish and Wildlife Service to request concurrence with this conclusion. There would be no significant impact on the California least tern. Green Sea Turtle No sea turtle habitat would be impacted by any project activities, and sea turtles are not expected to occur in northern San Diego Bay during the fall-winter timing of in-water construction/demolition and pile driving activities. Any sea turtles present in the general vicinity during any project activities would be able to detect and avoid the noise and associated in-water activities. Furthermore, increases in noise levels from dredging activities would not vary substantially from normal levels of North Bay activity. By following the avoidance and minimization measures, no injuries to sea turtles are expected. As such, the Navy has concluded that there would be no effect on sea turtles from the implementation of Alternative 1. Therefore, implementation of Alternative 1 would have no significant impact to sea turtles. Programmatically, the Navy will continue to consult informally with NMFS on other Navy construction activities	Impacts associated with Alternative 2 would be the same as those for Alternative 1, with the exception that dredging would not take place until years after completion of construction of the pier. Under Alternative 2, there would be no significant impacts to threatened and endangered species. **Avoidance and Minimization Measures/SCMs:** Under Alternative 2, avoidance and minimization measures/SCMs would be the same as those for Alternative 1.	Under the No-Action Alternative, existing conditions would remain unchanged. The Navy would continue to utilize the NBPL fuel pier without replacement of the pier and without implementation of safety improvements. **Avoidance and Minimization Measures/SCMs:** Under the No-Action Alternative, avoidance and minimization measures/SCMs would not be necessary.

Table 2-14. Summary of Potential Impacts and Avoidance and Minimization Measures/Special Conservation Measures

Resource Area	*Alternative 1 Pier Replacement and Associated Dredging*	*Alternative 2 Delayed Dredging Alternative*	*No-Action Alternative*
	and facilities projects throughout San Diego Bay to identify any risks that could negatively impact sea turtles and to agree upon related avoidance and minimization measures. These measures would support a programmatic "may affect, not likely to adversely affect" finding that would be subject to the regulator's written concurrence. Western Snowy Plover Since the western snowy plover is not known or expected to occur in the project area, and since the nearby sandy beach would not be used for any project-related purpose, there would be no effect on individuals or potential habitat for this species. Therefore, there would be no significant impact to western snowy plovers. Other Special Status Species The project sites are not in proximity to important foraging, resting, or breeding areas for bird species, and similar habitats are abundant throughout San Diego Bay. Potential disturbance of shoreline and adjacent open water areas that may be used on a transient basis by sensitive water and shore bird species would be short-term and less than significant. Noise generated during demolition, construction, and dredging activities would not substantially increase noise levels. Additionally, these increases in noise and activity would not vary substantially from normal levels of activity, vehicular traffic, and marine vessels operating in the immediate area and would cease upon completion of demolition, construction, and dredging activities. Therefore, with implementation of Alternative 1 there would be no adverse effect on these species' populations or habitats. **Avoidance and Minimization Measures/SCMs:** The following avoidance and minimization measures would be utilized during the proposed activities to reduce the potential to impact threatened and endangered species: • Dredging and other in-water demolition or construction would not occur during the endangered California least tern breeding season (April 1 - September 15). • The Navy would continue to follow the conservation measures established in the current Tern Memorandum of Understanding (MOU) (Appendix E.2). • In conjunction with marine mammal monitoring (Section 3.4.3.2) (currently part of the Navy's IHA application), qualified observers will also search for and document any		

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Resource Area	*Alternative 1 Pier Replacement and Associated Dredging*	*Alternative 2 Delayed Dredging Alternative*	*No-Action Alternative*
	occurrence of sea turtles within areas of potential effect or interaction with the project. During pile driving/extraction activities, monitoring will extend to the limit potential Level B behavioral harassment, specifically to the underwater 160 dB re 1 µPa (rms) isopleth for impact pile driving; and for vibratory pile driving or extraction, to either the underwater 120 dB re 1 µPa (rms) isopleth or to the point at which project sound becomes indistinguishable from background noise (maximum project sound SPL (rms) ≤ median ambient rms), whichever is less. A 10-meter buffer zone will also be monitored during other in-water operations of equipment and vessels. Monitoring will commence at least 15 minutes prior to the activities. • If any sea turtle is seen within these visual ranges prior or during the corresponding activity, the activity would not commence until the animal has moved out of the area or at least 15 minutes has passed since the last such sighting. • Programmatically, the Navy will continue to consult informally with NMFS on sea turtle occurrence and Navy construction activities and facilities projects throughout San Diego Bay to identify any risks that could negatively impact sea turtles.		
Water Resources	There would be no impact to bathymetry from temporary relocation of the Navy marine mammal program, the Everingham Brothers Bait Company bait barges, and pier demolition and construction. The impact to bathymetry from dredging the high spot in the existing turning basin would be less than significant because most of area, surrounding the proposed dredge footprint is already deeper than the proposed dredge depth (-40 feet mean lower low water level). Use of dredge sediments for nearshore replenishment at Imperial Beach would be a beneficial impact. There would be minor, localized temporary increases to circulation caused by vessel movement, in-water demolition, and construction, and dredging; these increases would cease when each particular activity ends. The piles for the proposed new fuel pier and guide piles for the temporary Navy MMP relocation site at NMAWC would be sufficiently spaced to allow water to circulate freely through the areas. Temporary relocation of the Everingham Brothers Bait Company bait barges would not involve in-water construction, dredging, or other activity that would affect circulation. Therefore, impacts to water circulation within San Diego Bay associated with	Under Alternative 2, dredging would be done years after the pier replacement effort is completed. Thus under this Alternative, there would be no potential intermittent overlap of increased turbidity associated with demolition and construction activities. Under Alternative 2, significant impacts to bathymetry and circulation would not occur. Under this alternative, significant impacts to marine and surface	Under the No-Action Alternative, no demolition or construction activities would occur and existing water resources would not be affected. However, under the No-Action Alternative the beneficial impact from the removal of creosote-treated pilings would not occur. **Avoidance and Minimization Measures/SCMs:** Under the No-Action Alternative,

Table 2-14. Summary of Potential Impacts and Avoidance and Minimization Measures/Special Conservation Measures

Resource Area	*Alternative 1 Pier Replacement and Associated Dredging*	*Alternative 2 Delayed Dredging Alternative*	*No-Action Alternative*
	demolition/construction activities and the presence of the proposed new pier would not be significant. Changes to bacteria and nutrient levels in the bay waters near NMAWC associated with proposed temporary relocation of the Navy MMP would be within normal levels. Changes to bacteria levels would be temporary and would not exceed standards established by the California Department of Health Services and the SWRCB to protect water contact recreation in coastal waters from bacterial contamination. Temporary relocation of the bait barges could bring a potential source of copper (in the form of antifouling paint) to the vicinity of the San Diego Bay shoreline at Harbor Island (west basin), listed as an impaired water body on the Clean Water Act Section 303(d) list due to copper from an unknown source. The barges would be present only for part of each year during the four-year construction period so any potential input of copper to the impaired waters would be restricted. The intervening distance and tidal flushing would be anticipated to reduce copper concentrations in the water actually reaching the impaired segment. Removal of the old fuel pier wood pilings would remove creosote, a source of polycyclic aromatic hydrocarbons, from the Bay waters. Thus, removing the wood pilings would represent a net beneficial water quality impact for the fuel pier area. The bait barge operation does not involve waste water discharges. With the minimization measure discussed below to reduce potential input of copper from antifouling paints, there would not be a significant impact to marine water quality due to temporary relocation of the bait barges. SSC Pacific is covered under NBPL's overall NPDES permit, which would be amended for the temporary relocation of the Navy marine mammal program to NMAWC. The new fuel pier would have stormwater management capabilities that would comply with current NBPL Permit requirements. All rainfall accumulating on the lower deck as well as rainfall from the 85th percentile storm event accumulating on the upper deck of the new pier would be captured and pumped to NBPL's fuel oil reclamation facility for treatment. Basewide and site-specific Best Management Practices (BMPs) to prevent impacts to surface water would be followed at the new fuel pier. Therefore, with implementation of Alternative 1 no significant impacts to water quality and would occur.	water resources, and beneficial uses within the bay would not occur. **Avoidance and Minimization Measures/SCMs:** Under Alternative 2, avoidance and minimization measures/SCMs would be the same as those for Alternative 1.	avoidance and minimization measures/SCMs would not be necessary.

Table 2-14. Summary of Potential Impacts and Avoidance and Minimization Measures/Special Conservation Measures

Resource Area	*Alternative 1 Pier Replacement and Associated Dredging*	*Alternative 2 Delayed Dredging Alternative*	*No-Action Alternative*
	During demolition, construction, and dredging, protective measures would be implemented to minimize impacts to marine water quality. Protective measures for demolition and construction would include implementation of a construction National Pollutant Discharge Elimination System (NPDES) permit; a construction Storm Water Pollution Prevention Plan;(SWPPP) the NBPL Integrated Contingency Plan (ICP) for Oil and Hazardous Substance Spill Prevention and Response Facility Response Plan NBPL ICP; and the use of catch devices and sheeting. Protective measures to minimize turbidity would include: retention of the existing sheet pile; cutting piles at the mudline; and use of a clamshell dredge for dredging rather than a hopper or cutter head dredge. All in-water work would comply with the requirements of a Section 401 Water Quality Certification from the Regional Water Quality Control Board (RWQCB) and Section 404/Section 10 permits from the USACE. Through compliance with USACE, EPA, and Regional Water Quality Control Board (RWQCB) permit requirements, no significant impacts to marine water quality would occur. **Avoidance and Minimization Measures/SCM's:** The following avoidance and minimization measures/SCMs would be implemented as part of Alternative 1 to reduce impacts to below a level of significance: • Sheet piles beneath the existing fuel pier would be left in place to minimize sediment and eelgrass disturbance. • The demolition and construction contractors would be required to prepare and implement a Construction Demolition Plan that would cover all phases of the work to be done. The contractors' plan would be required to specify materials, equipment, and procedures to be used to contain all construction and demolition waste and debris. • Contractors would be required to use catch devices and sheeting to capture and contain debris. • Before demolition begins, the contents of each pipeline would be pumped out. The pipelines would be cleaned to minimize accidental release of pipeline residue during demolition activities. Pipeline contents and cleaning water would be captured and properly disposed. • Discuss with the Everingham Brothers Bait Company the formulation of the antifouling coatings used in the maintenance operations to determine the concentration of copper. If copper-containing paints are used, consider substituting coatings with lower copper concentrations or		

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Resource Area	*Alternative 1 Pier Replacement and Associated Dredging*	*Alternative 2 Delayed Dredging Alternative*	*No-Action Alternative*
	no copper if feasible. • In accordance with the Navy's Stormwater Construction Permitting Policy, the contractor would be required to obtain a construction NPDES permit that would remain in effect for the length of the project. The NPDES permit would require preparation and implementation of a SWPPP that would identify project-specific BMPs to minimize impacts at the fuel pier construction site and at the NMAWC temporary relocation site. • Per the NBPL Integrated Contingency Plan (ICP) for Oil and Hazardous Substance Spill Prevention and Response Facility Response Plan, any petroleum release or petroleum sheen observed on the water surface would be reported to the USCG National Response Center and other agencies as required. • Booms and other spill containment equipment kept on hand would be immediately deployed, the source of the release would be determined and secured, and cleanup measures appropriate to the nature and extent of the spill would be implemented. These procedures would minimize the potential for contaminants related to project activities to enter marine waters. • Upon completion of the new fuel pier, the NBPL Storm Water Discharge Management Plan and the fuel pier BMPs would be reviewed, and revised/updated as needed to incorporate changes resulting from the changes to the fuel pier structure and/or operations. The NBPL Storm Water Discharge Management Plan and Basewide BMPs for preventing and minimizing contact of potential pollutants with stormwater would continue to be followed, including: restricting access, regular cleaning and sweeping, controlling spills and reducing waste, avoiding hosing down the site, and regular inspection and maintenance of the storm drain system. All BMPs specific to the fuel pier would also be followed. • A Section 401 Water Quality Certification from the RWQCB would be obtained, as would a Section 404/Section 10 permit from the USACE; these permits would apply to all in-water components of the project.		
Hazardous Materials and Wastes	Through the use of the preventive measures described below and implementation of the procedures described in the Integrated Contingency Plan (ICP) for Oil and Hazardous Substance Spill Prevention and Response NBPL in the event of	Under Alternative 2, the same project components would occur as for	Under the No-Action Alternative, fueling operations currently being conducted at

Table 2-14. Summary of Potential Impacts and Avoidance and Minimization Measures/Special Conservation Measures

Resource Area	*Alternative 1 Pier Replacement and Associated Dredging*	*Alternative 2 Delayed Dredging Alternative*	*No-Action Alternative*
	an accidental release, no increase in human health risk or environmental exposure to hazardous materials or hazardous wastes would occur with implementation of Alternative 1. Therefore, implementation of Alternative 1 would not have a significant impact with respect to the use, storage, or disposal of hazardous materials or hazardous wastes. Through adherence to Navy Region Southwest recycling and waste minimization requirements, reuse of the construction materials required for the Navy marine mammal temporary relocation component, implementation of Alternative 1 would have not have a significant impact to solid waste and regional landfill capacity. **Avoidance and Minimization Measures/SCMs** • The Navy would characterize all hazardous wastes associated with demolition of the existing fuel pier (building materials falling under the Universal Waste Rule, coal tar coating on the steel superstructure, lead-based paint, asbestos-containing materials (if determined to be present), and treated wood waste for proper disposal at an appropriately-permitted facility. • If discarded military munitions are encountered during project activities, the Navy would establish an explosives safety quantity distance arc for the location and conduct site remediation as needed. • Contractors involved with construction and demolition for all components of Alternative 1 would be subject to all federal, state, and San Diego County requirements for hazardous materials and hazardous waste management, and would be required to follow the requirements of the Navy Region Southwest Waste Management Plan (NRSW 2007). In addition, demolition and construction contractors would implement BMPs designed to minimize the potential for hazardous material releases during demolition and construction activities. • A safety buffer zone would be established between the underwater fuel pipelines to NAS North Island and the demolition/construction work zone and dredge footprint. All contractors' equipment and vessels would remain outside the safety buffer zone. • Before the fuel pier is demolished, all fuel, lubricating oil, and contaminated petroleum product inside the pipelines on the fuel pier would be pumped out and the pipelines would be cleaned. • The US Coast Guard and California State Lands Commission would continue to inspect fuel pier operations while the existing fuel pier remains in use during the first	Alternative 1, involving the same types and volumes of hazardous and non-hazardous materials and wastes. Therefore, no significant impacts associated with hazardous materials, hazardous wastes, public health and safety, and solid waste would occur. **Avoidance and Minimization Measures/SCMs:** Under Alternative 2, avoidance and minimization measures/SCMs would be the same as those for Alternative 1.	the existing fuel pier would continue. Therefore, there would be no change from the existing conditions. **Avoidance and Minimization Measures/SCMs:** Under the No-Action Alternative, avoidance and minimization measures/SCMs would not be necessary.

Table 2-14. Summary of Potential Impacts and Avoidance and Minimization Measures/Special Conservation Measures

Resource Area	*Alternative 1 Pier Replacement and Associated Dredging*	*Alternative 2 Delayed Dredging Alternative*	*No-Action Alternative*
	phase of construction, and would inspect the new pipelines when and fuel pier operations when the new pier is completed. . The pipelines on the new fuel pier would be constructed according to applicable federal and state regulations for pipelines and marine bulk fuel transfer facilities. • The contaminated petroleum product and ballast water pipelines for the new fuel pier would be designed and tested in accordance with the requirements of CCR Title 22, Chapter 15- Interim Status Standards for Owners and Operators of Hazardous Waste Transfer, Treatment, Storage, and Disposal Facilities, Article 10 Tank Systems and the applicable guideline standards in the American Petroleum Institute Standard 650 Welded Tanks for Oil Storage. • Hazardous wastes that would be generated at the new fuel pier would continue to managed according to federal, state and county regulations, and be recycled/disposed of appropriately per the by licensed contractors. The San Diego County Department of Environmental Health would continue their regulatory oversight of hazardous waste activities at the new fuel pier.		
Airborne Noise	Pile driving would be the dominant noise-generating activity associated with the proposed project. All pile driving would take place during daylight hours. During pile driving, outdoor airborne noise levels in residential areas beyond the NMAWC boundary and in the La Playa neighborhood north of NBPL would not exceed City of San Diego construction noise ordinances (75 decibels A-weighted [dBA]). During pile driving at NMAWC, the indoor noise levels at schools and day care centers beyond the NMAWC boundary would be slightly greater than the classroom criteria levels for effective hearing with windows closed (35dBA). Since the pile driving would be intermittent during the school day, and would last only about two weeks (eight days total) these levels would be considered acceptable. During pile driving at NBPL, the indoor noise levels with windows closed at the Child Development Center (CDC) at Building 377 at NBPL would be slightly greater than the classroom criteria levels for effective hearing (35dBA). Since the pile driving would be intermittent during the school day, and there would be 6 ½ months without pile driving (during the least tern foraging season) these noise levels would be considered acceptable.	Under Alternative 2, the noise impacts associated with the demolition, construction, and dredging activities would be the same as those discussed under Alternative. 1. However, dredging would take place years after construction was completed, so noise from dredging would occur in the absence of other project-related noise.	Under the No-Action Alternative, industrial activities currently being conducted in the area would continue, and the area's acoustical environment would remain unchanged. Therefore, there would be no noise impacts associated with the No-Action Alternative.

Table 2-14. Summary of Potential Impacts and Avoidance and Minimization Measures/Special Conservation Measures

Resource Area	*Alternative 1 Pier Replacement and Associated Dredging*	*Alternative 2 Delayed Dredging Alternative*	*No-Action Alternative*
	Avoidance and Minimization Measures/SCMs: The following avoidance and minimization measures/SCMs would be implemented as part of Alternative 1 to reduce noise impacts to below a level of significance: • Construction activities, including pile driving, would only occur during daylight hours. • The educational facilities listed in Tables 3.8-1 and 3.8-2 would be informed of the dates of pile driving and advised to close classroom windows during the pile driving intervals. The following additional avoidance and minimization measures/SCMs could be implemented as part of Alternative 1 further attenuate noise levels if a greater reduction is desired. • Noise monitoring for classroom criteria • Acoustic blankets around the pile driver • Pile cushions could be used to reduce noise levels	**Avoidance and Minimization Measures/SCMs:** Under Alternative 2, avoidance and minimization measures/SCMs would be the same as those for Alternative 1.	**Avoidance and Minimization Measures/SCMs:** Under the No-Action Alternative, avoidance and minimization measures/SCMs would not be necessary.
Air Quality	Operational emissions would primarily be from mobile sources associated with the use of the pier, including Navy marine vessels and ground vehicles that would service the pier. Because the purpose of the Proposed Action is to replace the aging, seismically deficient, and obsolete pier with a new pier that would improve safety and fuel receipt and delivery capabilities, Alternative 1 is designed to serve existing needs and would not result in increases in mobile source emissions. Therefore, the air quality analysis focuses on construction activities required to replace the pier. Estimated annual construction emissions with implementation of Alternative 1 would be below the *de minimis* threshold levels for Clean Air Act (CAA) conformity. In addition, Alternative 1 would conform to the San Diego Air Basin Shore State Implementation Plan (SIP) and would not trigger a conformity determination under Section 176(c) of the CAA. The Navy has prepared a Record of Non-Applicability (RONA) for CAA conformity (Appendix G of this EA). No health effects would be anticipated from emission of hazardous air pollutants because the majority of project activities occur in restricted areas where there are no sensitive receptors (i.e., residents, schools, hospitals, etc.). Therefore, with implementation of Alternative 1 significant impacts to air quality would not occur. **Avoidance and Minimization Measures/SCMs:** The following avoidance and minimization measures/SCMs	Impacts associated with Alternative 2 would be the same as those for Alternative 1 with the exception that dredging would take place years after completion of the new fuel pier. Under Alternative 2, there would be no significant impacts to air quality. **Avoidance and Minimization Measures/SCMs:** Under Alternative 2, avoidance and minimization measures/SCMs would be the same as for Alternative 1.	Under the No-Action Alternative, existing conditions would remain unchanged. The Navy would continue to utilize the NBPL fuel pier without replacement of the pier and without implementation of safety improvements. There may be additional air quality impacts should vessels be required to wait until the pier is available and conduct additional maneuvering for safety purposes. **Avoidance and Minimization Measures/SCMs:**

Table 2-14. Summary of Potential Impacts and Avoidance and Minimization Measures/Special Conservation Measures

Resource Area	*Alternative 1 Pier Replacement and Associated Dredging*	*Alternative 2 Delayed Dredging Alternative*	*No-Action Alternative*
	would be implemented as part of Alternative 1 to reduce impacts to below a level of significance: • All necessary construction or operationally-related permits would be authorized by the San Diego County Air Pollution Control District (SDCAPCD) before project implementation occurs. • The demolition and construction contractor would certify all equipment used during demolition and construction activities with the SCDAPCD.		Under the No-Action Alternative, avoidance and minimization measures/SCMs would not be necessary.
Transportation and Circulation	Proposed demolition and construction associated with replacement of the NBPL fuel pier would cause minor, temporary changes to traffic and circulation in the Rosecrans Corridor area during the demolition/construction period. Avoidance and minimization measures would be used during the demolition/construction period to reduce construction traffic to below a level of significance. Temporary changes to traffic and circulation associated with temporary relocation of the Navy MMP to NMAWC would also be minor. Operations at the new fuel pier would not result in additional vehicle traffic to the pier because the number of workers and work vehicles would not change. Implementation of Alternative 1 would not result in changes in accessibility of public roads that would constitute long-term effects to transportation and circulation. Therefore, there would be no significant impacts with respect to transportation and circulation. **Avoidance and Minimization Measures/SCMs:** The following avoidance and minimization measures/SCMs would be implemented as part of Alternative 1 to reduce impacts to below a level of significance: • Non-construction truck traffic and some of the NBPL employees would be diverted away from the Rosecrans Gate towards the McClelland Gate, to relieve congestion on Rosecrans Street and balance traffic more evenly at both gates. • Trucks going to and from the fuel pier construction area would be staged or queued in a portion of the Navy-owned parking area at the intersection of North Harbor Drive and Nimitz Boulevard, to limit the flow of traffic onto Rosecrans Street. • To ensure safety of all vessels using San Diego Bay, the Navy would coordinate with the U.S. Coast Guard to issue	Impacts associated with Alternative 2 would be the same as those for Alternative 1, with the exception that dredging activities would be delayed until completion of construction of the pier. Under Alternative 2, there would be no significant impacts to Transportation and Circulation. **Avoidance and Minimization Measures/SCMs:** Under Alternative 2, avoidance and minimization measures/SCMs would be the same as for Alternative 1.	Under the No-Action Alternative, roadway and vessel traffic conditions would remain unchanged. Therefore, no significant impacts to transportation and circulation would occur. **Avoidance and Minimization Measures/SCMs:** Under the No-Action Alternative, avoidance and minimization measures/SCMs would not be necessary.

Table 2-14. Summary of Potential Impacts and Avoidance and Minimization Measures/Special Conservation Measures

Resource Area	*Alternative 1 Pier Replacement and Associated Dredging*	*Alternative 2 Delayed Dredging Alternative*	*No-Action Alternative*
	a Notice to Mariners when in-water components of this project are occurring, including temporary relocation of the Navy marine mammals and the Everingham Brothers Bait Company bait barges, dredging and sediment disposal.		
Socioeconomics, Environmental Justice, and Growth Inducement	There would be an overall beneficial impact to the economy of San Diego County from the fuel pier replacement and dredging project. Economic benefits associated with construction activities would more than offset reductions in economic activity in industries related to recreational fishing, leading to a net beneficial economic impact to San Diego County during the life of the project. No low-income or minority populations would be disproportionately or adversely affected, so no environmental justice impacts are expected. There would be no housing development or need for an in-migrating construction workforce, nor would any constraints to growth be removed, so there would be no impacts associated with induced growth.	Impacts associated with Alternative 2 would be the same as those for the Alternative 1, with the exception that dredging activities would be delayed until years after completion of construction of the replacement fuel pier. Under Alternative 2, there would be no significant impacts to socioeconomics or environmental justice.	Under the No-Action Alternative, socioeconomic conditions would remain unchanged. Therefore, no significant impacts to socioeconomics or environmental justice would occur. **Avoidance and Minimization Measures/SCMs:** Under the No-Action Alternative, avoidance and minimization measures/SCMs would not be necessary.

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CHAPTER 3
AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This chapter describes the existing environmental conditions on and around Naval Base Point Loma (NBPL) for resources potentially affected by implementation of the alternatives discussed in Chapter 2. Information presented in this chapter represents baseline conditions and identifies potential impacts against which Alternative 1, Alternative 2, and the No-Action Alternative are evaluated.

In compliance with the National Environmental Policy Act (NEPA), Council of Environmental Quality (CEQ) regulations, and United States (U.S.) Department of Navy (Navy) procedures for implementing NEPA, the description of the affected environment and environmental consequences focuses only on those resources potentially subject to impacts. In addition, the level of analysis presented in this Environmental Assessment (EA) is commensurate with the anticipated level of impact. Accordingly, the discussion of the affected environment (and associated environmental analyses) focuses on the following resources: biological resource habitats and communities; fisheries; birds; marine mammals; threatened and endangered species; water resources; hazardous materials and wastes; noise; air quality; transportation and circulation; and socioeconomics and environmental justice. Conversely, the following resource areas were not carried forward for analysis in this EA, as potential impacts were considered to be negligible or non-existent:

Geology and Topography. No changes to terrain would occur as a result of Alternative 1 or Alternative 2. The majority of the proposed construction would occur within previously developed areas at NBPL, Naval Mine and Anti-submarine Warfare Command (NMAWC), and within the San Diego Bay. Minimal shoreside grading would be necessary at NMAWC to create a level surface for the temporary marine mammal pools. Since the replacement pier would be constructed just 5 feet (ft) from the existing pier, the shoreside excavation and finish grading necessary to accommodate the new fuel pier would be minimal as well. Localized excavation to extend the underground pipeline trench to the new pier, install underground utilities, and reroute the existing storm sewer would be minor. Additional grading and asphalt repairs would occur at the quaywall area. These minimal surficial modifications would not result in impacts to geology and topography. San Diego is a seismically active region, as is most of southern California. Seismic hazards can include landslides, ground shaking, surface displacement and rupture, liquefaction, and tsunamis. The new fuel pier, abutment, and associated shoreside facilities would be designed and constructed in conformance with Unified Facilities Criteria (UFC) and California State Lands Commission (CSLC) Marine Oil Terminal Engineering and Maintenance Standards (MOTEMS) requirements to withstand the forces of earthquakes with a 50 percent probability of occurrence with minor or no structural damage, as well as the forces of earthquakes with a 10 percent probability of occurrence with controlled, repairable damage (Naval Facilities Engineering Command [NAVFAC] Southwest 2011a).

Therefore, implementation of Alternative 1 or Alternative 2 would not have a significant impact to geology and topography. Disposal of dredged sediments in the offshore zone at Imperial Beach would be a beneficial impact, because the sediments (fine sand) would reworked by natural wave and current action to preserve the sandy beach profile.

Under the No-Action Alternative, no demolition, construction, or dredging activities would occur. The Navy Marine Mammal Program (MMP) and the Everingham Brothers Bait Company bait barges would not be temporarily relocated. The existing fuel pier, which has exceeded its design life and is substandard for existing seismic regulations, would not be replaced. Therefore, no potentially significant seismic impacts would occur under the No-Action Alternative.

Public Services and Utilities. No new public services would be constructed under Alternative 1 or Alternative 2. Electrical and potable water service would be supplied as needed to the temporary Navy marine mammal enclosures constructed at the NMAWC marina piers, and would be removed when the marine mammals return to their existing location. Alternative 1 or Alternative 2 would include removal of all existing utility infrastructure and fueling systems and replacing the existing infrastructure with upgraded utility infrastructure and fuel pipeline systems to adequately service the ships. The new fuel pier would provide adequate deck space by using a double deck structure to completely separate the fuel lines from the fueling operations. The pipelines and utilities would be hung beneath the upper deck. Utilities would be in a dedicated vault separate from the pipelines. An existing sanitary sewer main that runs near the abutment for the new pier would be inspected for defects and structurally reinforced before pile driving begins, to protect the sewer main from potential vibration damage (NAVFAC Southwest 2011a). The storm sewer on the north side of the existing pier abutment would be rerouted to the north side of the proposed new pier abutment. The utility infrastructure and fuel system for the new fuel pier would be accommodated without significant change to the NBPL utility system/network capacity. There are no utility corridors in the proposed project area and the demolition/construction contractor would locate and avoid utility service lines. Therefore, implementation of Alternative 1 or Alternative 2 would not have a significant impact to public services and utilities.

Under the No-Action Alternative, demolition, construction, and dredging activities would not occur. The Navy MMP and the Everingham Brothers Bait Company bait barges would not be temporarily relocated. There would be no changes to the existing public services and utility connections to the existing Fuel Pier 180 or at NMAWC. Therefore, implementation of the No-Action Alternative would not have a significant impact to public services and utilities.

Aesthetics. The guide piles and floating walkways to be installed at the NMAWC marina piers would be similar to those already present and would not change the visual profile of the waterfront at NMAWC. When the temporary relocation period is over, the guide piles would be completely dismantled and removed, so views of additional guide piles and floating walkways would be short term.

The height of the existing Pier 180 is +15 ft mean lower low water (MLLW) (Terra Costa Consulting Group, Inc. 2010). Under Alternative 1 or Alternative 2, the new fuel pier upper deck would be + 31.75 ft MLLW (28 ft deck elevation plus the 3.75 ft concrete barrier around the deck perimeter). The total elevation of the double-deck portion would more than twice as high as the existing pier. There would be six 30 ft-high fuel loading arms mounted on the upper deck floor, and 7 33-ft high light poles mounted on the concrete barrier. The mooring and berthing dolphins (+14 ft and +13 ft MLLW, respectively) would be about the same height as the existing pier (NAVFAC Southwest 2011a).

When viewed as one of a suite of piers within the bay, the new pier would be compatible with the visual characteristics of other piers in the surrounding area. The new fuel pier would have a smaller footprint than the existing pier, so the visual impact of this increase in height would be somewhat offset by the double deck pier occupying a smaller area overall than the existing pier. The beneficial impacts that would occur from removing the aging Pier 180 from the bay would also serve to balance the visual impact of the new pier. Views within San Diego Bay would remain consistent with the military and industrial nature of the surrounding area. Therefore, implementation of Alternative 1 or Alternative 2 would not have a significant impact to aesthetics.

With respect to temporary relocation of the Everingham Brothers Bait Company bait barges, the bait barges are long, narrow low-lying vessels that resemble extended floating docks. The two bait barges have been in San Diego Bay for decades, and one section of San Diego Bay is essentially just like the rest: military, commercial, and recreational features are all simultaneously visible from every viewshed in and of the bay. San Diego Bay is characterized by wildlife occupation of marine structures such as docks and buoys, and recreational and commercial fishing visitors night and day. The barges are consistent with a waterfront or marina seascape and would not change the visual character of either of the proposed temporary relocation options 4A or 6A, south or southeast of Harbor Island, respectively. Further, within the timeframe of the proposed project, the two barges would not anchor at the relocation site during summer, and it is anticipated that they would return to their current location after the proposed new fuel pier is completed. While at the temporary relocation site, the barge owners would continue their efforts to deter marine mammals from hauling out on the barges. Section 101 (a) (4) of the MMPA allows private citizens and marina owners to deter California sea lions and Pacific harbor seals from hauling out onto docks and/or vessels and potentially damaging private property with non-lethal methods and techniques, such as: fencing; bull rails; closely-spaced posts; netting; swim step protectors; various noisemakers and visual repellents; high or low pressure water hoses; blunt tip "bull poles"; and paint ball (non-toxic, water soluble paint only) or air soft guns (National Oceanic and Atmospheric Administration [NOAA] 2012a). Private owners of docks and vessels in the east Harbor Island area could use the potential deterrence methods for harbor seals and California sea lions as provided by NOAA (http://swr.nmfs.noaa.gov/deter/index.htm) if needed to deter animals from their property (NOAA 2012b). As allowed by Section 109 (h) of the MMPA, such deterrence does not constitute harassment, so there would be no significant impact to marine mammals. Therefore,

implementation of Alternative 1 or Alternative 2 would not result in a significant aesthetics impact relative to temporary relocation of the two bait barges.

Under the No-Action Alternative, no demolition, construction, or dredging activities would occur. There would be no temporary relocation of the Everingham Brothers Bait Company two San Diego bay bait barges. There would be no changes to the existing views at NBPL and NMAWC, and San Diego Bay southeast of Harbor Island. Therefore, implementation of the No-Action Alternative would not have a significant impact to aesthetics.

Land Use. The current project land uses comprise Navy bulk fuel receiving and issuing at the fuel pier, recreational marina buildings and piers at the NMAWC site, and recreational navigation (sailing and fishing) in San Diego Bay in the waters surrounding Harbor Island. Other than temporary use of the Navy's recreational piers by the MMP, no changes to land use would occur. Following construction of the new fuel pier, the Navy marine mammals would return to their existing location and recreational use of the NMAWC marina piers would resume. The existing military land use at the fuel pier would continue to support NBPL bulk fuel operations and no land use compatibility issues would occur. The Navy has filed a notice under a programmatic agreement with the California Coastal Commission. Amendments to the existing U.S. Coast Guard (USCG) Security Zone are needed to provide adequate security standoff distance of 500 ft for the proposed new fuel pier alignment (Navy 2012b).

The area proposed for temporary relocation of the Everingham Brothers Bait Company bait barges (refer to Figure 2-2) comprises commercial, recreational and military shoreside and waterside (US Coast Guard) uses, including privately-operated marinas. As stated in Section 3.11.3.1 of this EA, the Everingham Brothers Bait Company bait barges provide a service demanded by the local recreational fishing industry. As such, the Everingham Brothers Bait Company commercial bait supply operation would not be out of character with the surrounding uses. In addition, the bait barges would only occupy the temporary site for about 6.5 months out of the year, from September 16 through March 31. There is sufficient open water in the proposed relocation space for Everingham Brothers', their customers, and other vessels such as sail boats to maneuver (refer to Table 2-13 in Section 2.2.1.6). Exiting shoreside and waterside uses would be able to continue during the months that the bait barges would be anchored at the temporary relocation site. The current plan is for the Everingham Brothers Bait Company to return the barges to their existing site after the proposed new pier is constructed. Therefore, with implementation of Alternative 1 or Alternative 2 no significant impact to land use would occur.

The Navy has coordinated with USCG to amend the Security Zone at the fuel pier 250 ft to the east as described in Section 2.2.4.5. There would be 700 ft of open water between the amended Security Zone boundary and the federal navigation channel so there would be sufficient space for recreational vessels. The new pier and the temporary marine mammal enclosures would extend beyond Navy waters into waters that are under the jurisdiction of the CSLC. Following completion of the NEPA process, Navy counsel would provide written notification to CSLC of the extension of Navy facilities into state waters. Because there would be adequate

maneuvering space (320 ft) for civilian vessels between the temporary 100-ft bayward Security Zone that would be established at NMAWC and West Harbor Island and because the NMAWC Security Zone would be temporary, no significant impact to Land Use would occur at NMAWC. Therefore, with implementation of Alternative 1 or Alternative 2 no significant impact to Land Use would occur.

Under the No-Action Alternative, no demolition, construction, or dredging activities would occur. The Navy MMP and the Everingham Brothers Bait Company bait barges would not be temporarily relocated. There would be no changes to existing land and bay uses at NBPL or NMAWC. Therefore, implementation of the No-Action Alternative would not have a significant impact to land and bay use.

Cultural Resources. Implementation of Alternative 1 or Alternative 2 would not affect any archaeological sites or other cultural resources, as none are found within the Area of Potential Effect (APE), as defined under the Navy Region Southwest (NRSW) Metro San Diego Programmatic Agreement (Metro PA) (NRSW 2003; NAVFAC Southwest 2008). The Proposed Action is located more than 100 meters (m) from identified historic properties. Consistent with Stipulation 6.A. of the Metro PA, the APE is defined as the discrete site of the undertaking and any associated staging or laydown areas. Construction laydown areas would be staged outside the 100-m APE buffer of identified historic properties in the Fort Rosecrans Historic District.

Previous cultural resources investigations confirm that no historic properties are present within the APE. The DFSP Fuel Pier (Pier 180, built in 1908 and 1942) has previously been determined by consensus and consultation to be ineligible for the National Register of Historic Places because it lacks historic and architectural significance (California State Historic Preservation Officer [CASHPO] 2005; Schmidt and Byrd 2004). The area at NMAWC proposed for temporary relocation of Navy marine mammal program during the construction of the fuel pier, is composed of bay-fill, and does not possess the potential to yield historic or archeological resources. A 1997 investigation inventoried and evaluated all of NMAWC and concluded that the installation contains no built properties or archaeological resources eligible for listing in the National Register of Historic Places (KEA Environmental 1997). The State Historic Preservation Officer concurred on this determination in 2001.

While the project area has no known archaeological resources, its onshore quay wall lay-down area is on land created as a leveled platform cut-and-filled from original bay shore terrain ca. 1905 to provide for coal storage as part of the Navy's Point Loma Coaling Station (NAVFAC Southwest 2012). This and a subsequent 1940s filling that raised and extended the quay wall overlie a now-buried beach and adjacent tidelands of the original, late 18th and early 19th century port of San Diego. This area was referred to as La Playa and was originally used in the Spanish-Mexican-era hide trade with American merchant ships from New England (NAVFAC Southwest 2012). This now buried beach was the location of hide houses and a custom house, with residences and other associated structures set further back from the bay. From here cargos were hauled by road to the Pueblo of San Diego (now Old Town San Diego) (NAVFAC Southwest 2012).

The circa 1905 filling over the La Playa beach was done using relatively low-energy, horse-drawn technology that represents a potential archaeological evidence of this historic maritime activity to be preserved beneath the fill. However, no investigations have ever been made for the presence of such features or deposits. Accordingly, the project-derived ground disturbance on this onshore area of the project provides a currently unknown potential for affecting buried archaeological deposits, assuming such exist. If preserved with sufficient integrity, such potentially surviving archaeological content would be historically significant, so likely eligible to the National Register and subject to compliance on effect under Section 106 of the National Historic Preservation Act (NAVFAC Southwest 2012).

Compliance with Section 106 for the P-151 military construction project (MILCON) proceeds under the San Diego Metro Area PA (PA) (NAVFAC Southwest 2012). Under Stipulation 6.C of the PA for compliance with 36 CFR 800.4(a)(1), the NBPL Cultural Resources Program determined the area of potential effects (APE) the discrete project area, including lay down areas on the quay wall (NAVFAC Southwest 2012). However, while there are no identified built or archaeological historic properties within the APE, the written historic evidence identifies a buried archaeological potential under the quay wall fill. (NAVFAC Southwest 2012). Under Stipulation 9 of the PA, the Navy "will provide for archaeological monitoring of ground disturbing activities within areas of known or provisional archaeological sensitivity" for identifying the presence or absence of any sub-surface archaeological deposits of features during construction (NAVFAC Southwest 2012). Monitoring would not be required for in-water project activities like dredging or pier demolition.

In accordance with the PA, the project is therefore required to retain qualified contracted archaeological monitoring support to identify, and assist in quickly dealing with, any such features or deposits encountered during site preparation excavations on the quay wall portion of the APE (NAVFAC Southwest 2012). In consultation with the NBPL Cultural Resources Program Archaeologist, the contracted archaeological consultant would, prior to construction monitoring, prepare a Monitoring and Discovery Plan that would lay out monitoring protocols, historic context, eligibility thresholds, and other required procedures for approval by the Navy (NAVFAC Southwest 2012).

In the absence of known historic properties, but with an identified archaeological potential, assessing effect in conformance with Stipulation 8.A of the PA here requires that Section 106 compliance be as a conditional finding of "no historic properties affected" under 36 CFR 800.4(d)(1) (NAVFAC Southwest 2012). As such, the demonstration of Section 106 compliance here is provisional, pending results of the monitoring to be conducted during the ground disturbance site preparation phase described above (NAVFAC Southwest 2012).

If no historic-period deposits or features are identified during monitoring, or if those observed do not possess content or integrity sufficient to recommend their National Register eligibility, then the effects assessment under Stipulation 8 of the PA would be "no historic properties affected" (NAVFAC Southwest 2012). If eligible deposits or features are found, but the project work would not adversely affect these, then the current "no adverse effect" would stand and

the EA would remain unchanged (NAVFAC Southwest 2012). However, if newly-identified eligible deposits or features found would be adversely affected by project activities, then the project work affecting the deposits or features would stop for a period sufficient to provide for an expedited consultation to define resolution of the adverse effect, in accordance with 36 CFR 800.6, with the EA amended to reflect this change (NAVFAC Southwest 2012). This would require execution of a memorandum of agreement (MOA) with the California SHPO, and possibly the Advisory Council on Historic Preservation, stipulating actions required for resolving the adverse effect (NAVFAC Southwest 2012). Project work would continue following completion of the stipulated actions (NAVFAC Southwest 2012). Therefore, implementation of Alternative 1 or Alternative 2 would not have a significant impact to cultural resources.

Under the No-Action Alternative, no demolition, construction, or dredging activities would occur. Therefore, implementation of the No-Action Alternative would not have a significant impact to cultural resources.

Public Health and Safety. Existing regulations address the potential impacts to public health and safety by minimizing the risk of releases of bulk fuels, contact of stormwater with construction-related contaminants, and worker safety. There are strict federal and state regulations governing bulk fuel storage and handling, as described in Section 3.7. These regulations require that bulk fuel facilities have the appropriate containment and control components to prevent unexpected releases (NAVFAC 2009a). Federal and state regulations also require that bulk fuel facilities have contingency plans to minimize hazards to human health or the environment from fires, explosions, or any unplanned release of hazardous waste or constituents to air, soil, or surface water (NAVFAC 2009a). The contingency plan must describe the actions facility personnel would take, and must be carried out immediately whenever there is an incident that could threaten human health or the environment. In compliance with these regulations, the fuel pier has containment and control components to prevent releases, and NBPL has a contingency plan and procedures for the fuel pier that would be carried out to minimize the hazards to human health of any accidental release (NAVFAC 2009a). These same plans and procedures would be implemented under Alternative 1 or Alternative 2.

Other necessary regulations that would be adopted with implementation of Alternative 1 or Alternative 2 include the construction National Pollutant Discharge Elimination (NPDES) permit that would be obtained for the project. The NPDES permit would require preparation and implementation of a stormwater pollution prevention plan (SWPPP) that would identify project-specific Best Management Practices (BMPs) to minimize potential impacts to the environment and human health. Worker safety is monitored through required crane inspections by the NAVFAC Public Works Center. Cranes are inspected to ensure that they are operating in accordance with the specifications in NAVFAC P-307, *Management of Weight Handling Equipment* (NAVFAC 2009b; NAVFAC Southwest 2011c). Additionally, contractors would be required to comply with safety requirements of the Occupational Safety and Health Administration (OSHA), the most recent versions of USACE EM 385-1-1 Safety and Health

Requirements (USACE 2008), and multiple other NAVFAC Southwest and U.S. Navy health and safety instructions (NAVFAC Southwest 2011c). All of these requirements and regulations address the potential risks to health and safety and would be followed. In addition, public health and safety is discussed in Section 3.7 as it relates to hazardous materials and wastes and explosives safety. To ensure safety of all vessels using San Diego Bay, and nearshore waters, the Navy would coordinate with the U.S. Coast Guard to issue a Notice to Mariners when in-water components of this project are occurring, including moving the Navy marine mammal enclosures and the Everingham Brothers Bait Company bait barges to their respective temporary relocation sites, dredging, and sediment disposal at the receiver site at Imperial Beach.

Sediment disposal in the nearshore zone at Imperial Beach would take place over 1,000 ft from shore (Figure 2-9 in Section 2.2.1.5), so there would be no beach closure affecting swimmers or surfers. As described in Section 2.2.1.5, sediment samples from the proposed dredge footprint were analyzed in November 2010 and the material from the proposed dredge area was found to be suitable for nearshore disposal. Therefore, health threats to swimmers and surfers would not occur from nearshore disposal of dredge sediments at Imperial Beach. Temporary, intermittent increased turbidity would likely occur during sediment disposal. However disposal would last no more than three months. Sediment would be disposed intermittently, during the three months, when enough sand has been excavated to fill the transport vessel for the trip to Imperial Beach. Signs would be posted along the beach to notify swimmers and surfers of the sediment disposal vessel and activities, and potential for temporary increased turbidity. Therefore, with implementation of Alternative 1 or Alternative 2, no significant impacts to recreation at Imperial Beach would occur.

With respect to temporary relocation of the bait barges, the potential bait barge relocation sites under consideration southeast of Harbor Island were selected because they avoid bird-aircraft strike hazards for Navy, U. S. Coast Guard, and Lindbergh Field (San Diego International Airport) aircraft (NRSW 2012; U. S. Coast Guard 2012). No hazardous materials/waste concerns have been identified for the Everingham Brothers Bait Company bait barge operations. Hazardous materials/waste aboard the barges are managed according to applicable state and county regulations and through the current Navy license conditions, which are expected to be repeated in the CSLC lease. While anchored at the temporary relocation site, the bait barges would comply with nighttime navigation rules/restrictions as indicated by the U.S. Coast Guard. Under the Marine Mammal Protection Act (MMPA) Section 101(a) (4), private property owners may deter marine mammals from hauling out onto decks and/or vessels and potentially endangering personal safety.

For the reasons stated above, (compliance with existing hazardous materials regulations; compliance with Coast Guard rules and use of Notices to Mariners, potential barge temporary relocation sites that avoid aircraft hazards; and deterrence of marine mammals to protect personal safety) implementation of Alternative 1 or Alternative 2 would not have a significant impact to public health and safety.

Under the No-Action Alternative, no demolition, construction, or dredging activities would occur. The Navy MMP would not be temporarily relocated to NAMWC and the Everingham Brothers Bait Company bait barges would not be temporarily relocated to one of the two proposed temporary relocation sites (Option 4A or 6A). Therefore, implementation of the No-Action Alternative would not have a significant impact to public health and safety.

Recreation. Demolition and construction would take place inside a navigation restricted zone that recreational vessels currently avoid (Figures 2-5 and 2-7), so the majority of the project activities would not affect recreational navigation. Dredging is estimated to take three months. During this time, recreational boaters may need to detour around the dredge footprint; the temporary period when detours may be needed would not be a significant impact to recreational navigation. The Everingham Brothers Bait Company barges would not anchor at the temporary location during the busiest recreational sailing period (summer), and most bait barge operations take place overnight when recreational boaters are not active. Certain sailboat race courses may choose to relocate their start/finish lines further to the west while the bait barges are at their temporary location. Additionally, potential temporary relocation site 6A was selected with consideration of recreational boating facilities. Therefore, implementation of Alternative 1 or Alternative 2 would not have a significant impact to recreation or recreational navigation.

Signs would be posted at Imperial Beach and the La Playa beach, advising the public of the potential for sediment disposal and underwater noise to occur in those areas, respectively. The signs would alert beachgoers, swimmers, and surfers at Imperial Beach of the potential for increased turbidity to occur while sediment is being disposed into the nearshore zone, over 1,000 ft from shore. At the La Playa beach, the signs would advise the public that during the project in-water construction period (September 16 through March 31) pile driving would occur at the project area that would generate underwater noise extending to the area offshore of the La Playa beach. With Alternative 1 or Alternative 2 there would be no beach closure, therefore, with implementation of Alternative 1 or Alternative 2 there would be no significant impact to recreation.

Under the No-Action Alternative, no demolition, construction, or dredging activities would occur. The Everingham Brothers Bait Company bait barges would not be temporarily relocated to one of the two proposed temporary relocation sites (Option 4A or 6A). Therefore, implementation of the No-Action Alternative would not have a significant recreation.

3.1 BIOLOGICAL RESOURCE HABITATS AND COMMUNITIES

3.1.1 Definition of Resource

Biological resource habitats of San Diego Bay are differentiated by location, elevation or depth, substrate, and by manmade or natural features, including the associated biotic communities. For purposes of this EA, the general biotic features of different habitats, including assemblages of plants and invertebrates, are included in this section, whereas separate sections are provided for fisheries (Section 3.2), birds (Section 3.3), marine mammals (Section 3.4), and threatened and endangered species (Section 3.5).

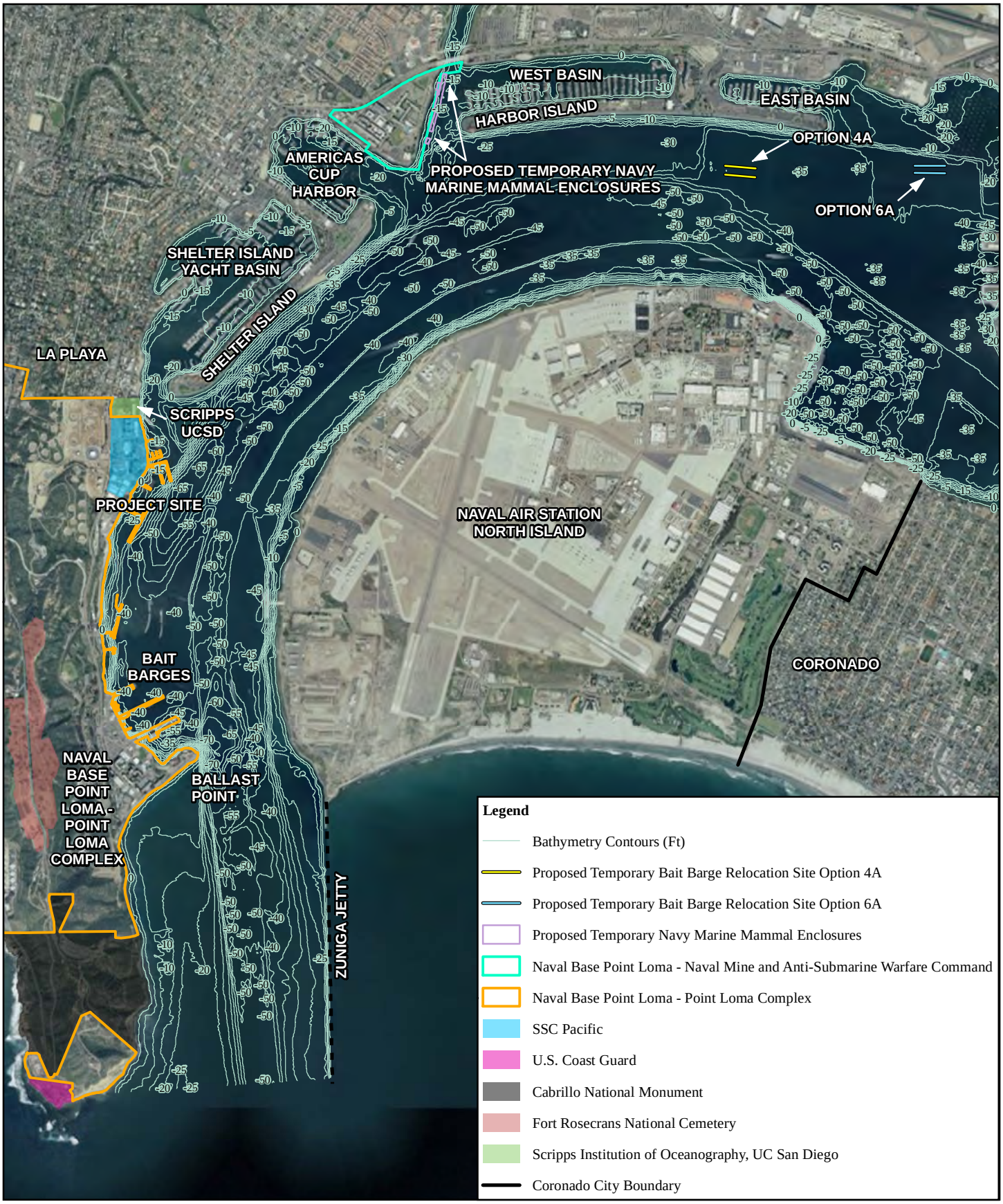
Habitats associated with the project area include an upland transition sandy beach; developed shoreline and artificial substrates such as the pier pilings and rock rip-rap; and marine benthic (bottom), water column, and open water habitats of varying depth as shown in Figure 3.1-1 (Merkel & Associates, Inc. 2009). Adjacent uplands include portions of the Point Loma Ecological Conservation Area (PLECA).

The marine habitats of the project area (seaward of the high tide line) are navigable waters of the U.S. under the Clean Water Act (CWA) (33 USC § 1344) and Rivers and Harbors Act (RHA) (33 USC § 403). Dredge and fill activities as well as in-water work affecting the navigable waters are regulated under these statutes by the U.S. Army Corps of Engineers under Section 404 of the CWA and Section 10 of the RHA, respectively; regulations are at 33 CFR 320-330.

3.1.2 Affected Environment

This section is organized by habitat, with the exception that the proposed Navy marine mammal relocation site at NMAWC and the dredged material reuse site (to be determined) are discussed separately in concluding subsections. The description of existing conditions is based on the following references:

- The San Diego Bay Integrated Natural Resources Management Plan (INRMP) (NAVFAC Southwest 2000; NAVFAC Southwest and Port of San Diego 2011);
- The NBPL INRMP (NAVFAC Southwest 2002);
- The 2008 San Diego Bay Eelgrass Inventory and Bathymetry Update (Merkel & Associates, Inc. 2009);
- The 2010 Characterization of Essential Fish Habitat (EFH) In San Diego Bay (NAVFAC Southwest 2010);
- Fish surveys conducted in San Diego Bay during 1994-1999 by Allen et al. (2002) and during 2005 and 2008 by Pondella and associates (Vantuna Research Group 2006, 2009);
- Silver Strand Training Complex Environmental Impact Statement (NAVFAC Southwest 2011a);
- Documentation on the Imperial Beach beneficial reuse site prepared for the Opportunistic Beach Fill Program (City of Encinitas et al. 2008) and the San Diego Regional Beach Sand Project II (SANDAG and U.S. Army Corps of Engineers 2011); and
- Site reconnaissance and other sources as cited.



0 0.25 0.5 Kilometers
0 0.25 0.5 Miles

Figure 3.1-1
Project Area Bathymetry

N

3.1.2.1 Coastal Upland

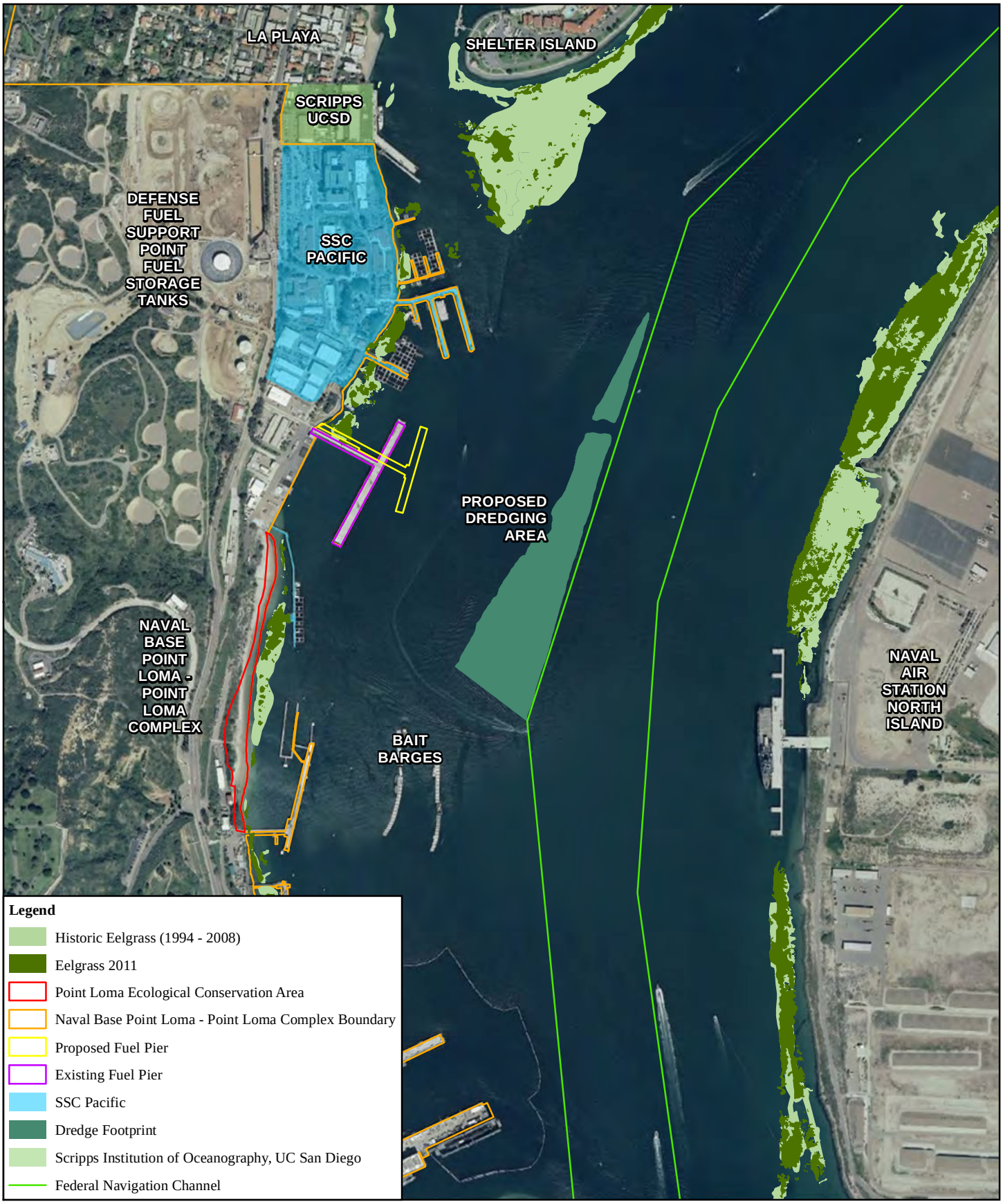
Inshore of the fuel pier and extending southward along the shore, the beach and adjacent strand/coastal scrub vegetation are part of the PLECA (Figure 3.1-2). This area is adjacent to and would not be directly affected by proposed construction and demolition activities. The wandering saltmarsh skipper butterfly (*Panoquina errans*, a federal species of concern), coast horned lizard (*Phrynosoma coronatum*, a federal species of concern), San Diego blacktailed jackrabbit (*Lepus californicus*), Nuttall's lotus (*Lotus nuttallianus*, California Native Plant Society [CNPS] rank 1B.1), coast horned lark (*Eremophila alpestris*), red sand verbena (*Abronia maritima*, CNPS rank 4.2), and coast woolly-heads (*Nemacaulis denudata* var. *denudata*, CNPS rank 1B.2) all occur here (NAVFAC Southwest 1994; Tierra Data, Inc. 2007; NAVFAC Southwest and Port of San Diego 2011). Otherwise, the coastal upland area surrounding the proposed project is a developed industrial site and does not offer habitat for native flora. Rosecrans Street, on the western border of the project area, is lined with exotic landscaping. Structures along the shoreline and surrounding open waters are heavily used by gulls, brown pelicans, cormorants, and surf scoters (*Melanitta perspicillata*) (NAVFAC Southwest 1994, 2000; Tierra Data, Inc. 2011).

3.1.2.2 Intertidal (+7.8 to -2.2 ft MLLW)

The shoreline of the affected environment consists of both manmade and natural features. Immediately north of the fuel pier's access way, the shoreline consists of concrete and rock riprap. A quaywall, approximately 12 ft above mean sea level, extends approximately 750 ft south of the fuel pier's access way. A sandy flat lies south of the quaywall, adjacent to one of the Navy marine mammal piers.

Despite its relatively small size, the intertidal zone has the greatest variability of any area in the bay, and this variability can occur within centimeters. This is due, at least in part, to the fact that the zone is exposed to air on a regular basis, and most physical factors show a wider range in air than in water. Organisms must adapt to extremes of temperature and desiccation, as well as salinity stress, mechanical wash, and backwash of waves. These extremes are more pronounced on sandy shores, where there is less animal life than on muddy shores. The abundance and diversity of fauna of a typical sand flat can also vary by orders of magnitude within and among years (NAVFAC Southwest and Port of San Diego 2011).

Artificial substrates, such as the pilings and bulkheads for the fuel pier, rock riprap, floating docks, seawalls, and mooring systems support a wealth of invertebrates and seaweeds. Invertebrates comprise a significant portion of the organisms present in the San Diego Bay and serve as important components of bay habitats and essential food sources for marine life. Invertebrate species diversity, abundance, and biomass of infaunal invertebrates in the north bay region is significantly higher than that of the south bay region, particularly in rock riprap when riprap niches are not filled with concrete (NAVFAC Southwest 2010). California spiny lobster (*Panulirus interruptus*) and a variety of crabs, worms, mussels, barnacles, echinoderms (sea stars and sea urchins), sponges, sea anemones, and tunicates (sea squirts) inhabit artificial structures (NAVFAC Southwest and Port of San Diego 2011).



0 100 200 Meters
0 350 700 Feet

Figure 3.1-2
Point Loma Ecological Conservation Area and Eelgrass Beds in the Vicinity of the Proposed Fuel Pier

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Sources: Navy 2007; NOAA 2012; NAVFAC Southwest 2011a, 2012

Since there are little to no natural hard surfaces in San Diego Bay, riprap and other artificial structures provide habitat that does not resemble any natural habitat in San Diego Bay. These structures provide microhabitats and support communities similar to those of natural rocky shores outside San Diego Bay. These areas may also provide refuge and feeding areas for juvenile and predatory fishes (NAVFAC Southwest and Port of San Diego 2011). Seventy-four percent (45.4 miles [mi]) of the shoreline of San Diego Bay is armored by man-made structures that protect developed sites (NAVFAC Southwest 2011a).

Hardened shorelines can also provide elevated roosting sites for bay waterbirds, such as California brown pelicans (*Pelicanus occidentalis californicus*), cormorants, and gulls, which allow them to conserve energy and avoid harsh weather conditions. The surface roughness and complexity of a structure can affect its ability to provide refuge niches and allow water retention at low tides (NAVFAC Southwest and Port of San Diego 2011). The fuel pier covers 1.6 acres (ac) and is used for resting by waterbirds.

Sandy flats, such as the slim sand flat adjacent to the mammal enclosures south of the fuel pier, lack vegetation except for decomposing patches of washed-up algae or eelgrass. Beach hoppers, sand fleas, and isopods may be expected on the upper beach whereas polychaetes, clams, and other burrowing animals are prevalent on the lower beach. In intertidal areas, birds are more abundant and diverse on sandy flats than on rocky substrates (NAVFAC Southwest and Port of San Diego 2011).

3.1.2.3 Shallow Subtidal (-2.2 to -12 ft MLLW)

Vegetated shallow subtidal habitats are highly productive and important in San Diego Bay, in part due to the presence of eelgrass (*Zostera marina*) beds and algal mats on shallow sandy to muddy substrates in many areas of the bay (Merkel & Associates, Inc. 2009; NAVFAC Southwest 2000, 2002, 2011a). Shallow soft-bottom areas, with their associated fauna and flora, were the primary subtidal habitat in San Diego Bay before its development (NAVFAC Southwest 2011a). In the north bay, eelgrass grows at depths of 0 to -13 ft MLLW. Eelgrass is one of the few plants that inhabit this zone; its roots and rhizomes form an interlocking matrix that stabilizes the substrate and resists erosion. Near the mouth of San Diego Bay, a variant of eelgrass with wider blades grows from -16 to -23 ft MLLW (NAVFAC Southwest 2011a). Eelgrass reduces water turbidity by trapping fine sediments and preventing their re-suspension, and its leaves cut down wave action and currents, further decreasing turbulence and causing more fine sediment to be deposited.

Due to their rapid growth rate and heterogeneous structure, eelgrass beds provide microhabitats for a wide variety of invertebrates and small fishes, primarily by increasing the available substrate surface and by providing effective refugia. Algae and invertebrates that grow on the leaf blades of eelgrass provide primary and secondary productivity for consumption by larval and juvenile fish. Fish produced from these beds are consumed by fish-eating birds, including the California least tern (*Sterna antillarum browni*). Waterfowl, especially surf scoter, scaup, and brant are present in high numbers in late fall and winter. Black brant, in

particular, rely heavily on eelgrass of the central and south bay as they are one of the few birds that consume it directly (NAVFAC Southwest and Port of San Diego 2011).

Eelgrass is a Special Aquatic Site under Section 404 of the Clean Water Act (40 CFR § 230.3[q-1]). The deposition of dredged or fill material in Special Aquatic Sites is prohibited unless there is no other practicable alternative. Regarding Essential Fish Habitat (Section 3.2 and Appendix E.1), eelgrass is also a Habitat Area of Particular Concern. To mitigate impacts on eelgrass that cannot be avoided, the Navy has an approved mitigation bank comprising several eelgrass restoration sites in San Diego Bay (Appendix E.3).

Within and adjacent to San Diego Bay, there were 1,831 ac of eelgrass as of 2011 and an additional 868 ac of habitat that historically supported eelgrass. There were 0.05 ac of eelgrass at the proposed new fuel pier location as of 2011 and an additional 0.05 ac of habitat that historically supported eelgrass (Figure 3.1-2).

Infaunal benthic invertebrates are the most abundant invertebrate found in the soft bottom sediment of the Bay and include polychaete worms, crustaceans, mollusks, and unidentified species of oligochaete and nematode worms (USACE 2009; NAVFAC Southwest and Port of San Diego 2011). During the Bight 1998 survey (Bay et al. 2000), a total of 1,172 megabenthic invertebrates, representing 43 taxa, were collected in San Diego Bay. The nonindigenous bivalve *Musculista senhousia* was present in more than 70 percent of the samples, making it the most widely distributed trawl-caught invertebrate in the Bay. Other common invertebrates that were present in at least one third of the samples included two undescribed species of sponge, the ascidian *Microcosmus squamiger*, the bivalve *Argopecten ventricosus*, and the gastropod *Crepidula onyx*. *Musculista senhousia,* together with another nonindigenous species *Microcosmus squamiger*, accounted for over 50 percent of the total catch (USACE 2009).

The base of the food chain for the benthic community in soft-bottom, unvegetated shallow subtidal habitat is provided by organic detritus that originates in shallower water and drifts or sinks into deeper water. Fauna residing in subtidal benthic habitats (across all depths) include the warty sea cucumber (*Parastichopus parvimensis*) and a diversity of infaunal species, such as suspension feeders, burrowers, and tube builders. Feeding by nematode and polychaete worms, clams, gastropod mollusks, brittlestars, crabs, isopods, and a wide variety of smaller crustaceans serves to transform detritus and small invertebrates into usable food for larger invertebrates and fishes. The soft bottom benthos provides other functional roles besides serving as a prey base for fish and birds. The less conspicuous mollusks, polychaete worms, small crustaceans, and other invertebrates living at the bottom of the bay mineralize organic wastes as it accumulates, consume algae, and return essential chemicals and organic matter to the water column (NAVFAC Southwest and Port of San Diego 2011).

The area immediately to the north of the fuel pier and around the small boat dock is largely a shallow subtidal zone (refer to Figure 3.1-1). Approximately half of this area is between 0 and -13 ft MLLW. Eelgrass occurs in this area and along the coast further north (refer to Figure 3.1-2) (Merkel & Associates, Inc. 2009). The proposed project's access way would be constructed in this area.

Eelgrass also occurs adjacent to the Navy marine mammal enclosures to the south. Large eelgrass beds also occur approximately 1,100 ft to the north of the proposed fuel pier, along the southern tip of Shelter Island, and 1,400 ft across the bay along the western edge of North Island (refer to Figure 3.1-2).

3.1.2.4 Moderately Deep Subtidal (-12 to -20 ft MLLW)

Nearly half of the area between the fuel pier and the quay wall/shoreline is moderately deep subtidal (refer to Figure 3.1-1). Approximately 2,219 ac (17 percent) of bay surface area falls into the moderately deep category, primarily in the south-central bay and in inlets of the north bay (NAVFAC Southwest and Port of San Diego 2011).

For both the moderately deep and deep subtidal (see below) habitats, primary production by phytoplankton and zooplankton occurs in the overlying water column. No information specific to this intermediate depth exists for invertebrates or plankton, although benthic primary production is limited due to low light penetration. As such, algal mats and eelgrass beds are lacking.

Typical fish species include round stingray (*Urobatis halleri*), spotted sand bass (*Paralabrax maculatofasciatus*), California halibut, and barred sand bass (*Paralabrax nebulifer*). The endangered California least tern (*Sterna antillarum browni*) forages in the project area as do many other diving waterbirds (NAVFAC Southwest 2010, NAVFAC Southwest and Port of San Diego 2011).

3.1.2.5 Deep Subtidal (>-20 ft MLLW)

Deep subtidal habitat includes the overlying surface water, water column, and sediments for areas greater than 20 ft (6 meters [m]) in depth, constituting about 4,440 ac (34 percent) of the bay surface area and is associated primarily with navigational channels (Figure 3.1-1). All of the project area on the east side of the fuel pier is deep subtidal, ranging from 30 to 73 ft deep. Approximately half of the area west of the southern portion of the fuel pier is also deep subtidal, ranging from 20 to 28 ft (6 to 9 m) deep; the shallowest deep subtidal area is adjacent to the quay wall (Figure 3.1-1). The current bait barge location, as well as both proposed temporary bait barge relocation options, are within deep subtidal habitat.

The deep subtidal water column is home to phytoplankton and zooplankton, including species that spend their entire lives (holoplankton), or only a portion of their life cycle, e.g., as eggs, larvae, or juveniles (meroplankton), in the plankton. For the meroplankton, which includes many fish and invertebrates, an important function of the deep subtidal environment is transport into and out of the relatively warm, sheltered waters of the bay, which provide

nursery habitats. The most common fish species found here are round stingray, spotted sand bass, and bat ray (*Myliobatis californica*) (NAVFAC Southwest and Port of San Diego 2011).

Diving birds, including the California least tern, forage in the open water and especially along the bay margins where schooling fish concentrate. Other common bird species include cormorants, grebes, the surf scoter (*Melanitta perspicillata*), the elegant tern (*Sterna elegans*), and other tern species.

All of the 17.9 ac proposed to be dredged occur in deep subtidal water and have been dredged historically.

3.1.2.6 Proposed Temporary Relocation of the Navy MMP and the Navy Marine Mammal Enclosures

The marine environment at the proposed temporary Navy marine mammal enclosure relocation site is similar to that of their current location. Like the present site, the relocation site at NMAWC is previously developed and located in the north bay. All surrounding upland areas are fully developed as buildings, parking lots, or manicured lawns with no remaining natural habitat. The proposed relocation site is also similar to the existing and proposed fuel pier location, with the exception that marinas typically have lower concentrations of piles and more light availability (NAVFAC Southwest 2010). Marinas 548 and 607 are used for recreational purposes (e.g., small sailboats). Navy Explosive Ordnance Disposal (EOD) Technical Evaluation Unit uses Pier 619.

As of 2011, there was 0.67 ac of eelgrass and an additional 0.32 ac of habitat that historically supported eelgrass located within the proposed temporary Navy marine mammal enclosure relocation site (Figure 3.1-3). This area is also within designated least tern foraging habitat. The closest known sea lion haul-out location is at navigational buoy Green 1, approximately 1,500 ft south of the proposed temporary Navy marine mammal enclosure relocation site.

3.1.2.7 Dredged Material Beneficial Reuse Site

The proposed beneficial reuse site at Imperial Beach consists predominantly of sandy bottom habitat, with cobble substrate present on the south and inshore edges, and kelp offshore in depths greater than 30 ft. Typical shallow to mid-depth sandy bottom epifauna and infauna occur at the site (City of Encinitas et al. 2008; SANDAG and U.S. Army Corps of Engineers 2011).

0 40 80 Meters

0 150 300 Feet

Figure 3.1-3
Eelgrass Beds in the Vicinity of the Proposed Temporary Marine Mammal Enclosure Relocation Site

Sources: Navy 2007; NOAA 2012; NAVFAC Southwest 2011a, 2012

3.1.3 Environmental Consequences

3.1.3.1 Approach to Analysis

The analysis identifies the potential significance of impacts to biological resource habitats and communities based on: 1) the importance (i.e., legal, commercial, recreational, ecological, or scientific) of the resource; 2) the proportion of the resource that would be affected relative to its occurrence in the region; 3) the sensitivity of the resource to proposed activities; and 4) the duration and ecological ramifications of the impact. For example, an impact would be considered significant if it would permanently reduce the population size or distribution of a protected species.

3.1.3.2 Avoidance and Minimization Measures

Before proceeding with the project, the Navy would obtain the required CWA Section 404/RHA Section 10 permits would be obtained. All required terms and condition of the permits would be implemented. The following avoidance and minimization measures are proposed to be utilized during the proposed activities to reduce the potential to impacts to habitats and communities. Fisheries (Section 3.2), Birds (Section 3.3), Marine Mammals (Section 3.4), and Threatened and Endangered Species (Section 3.5) contain additional Avoidance and Minimization Measures applicable to those specific resources.

1) Sheet piling would be left in place to minimize sediment and eelgrass disturbance that would otherwise result from vessel traffic.

2) In conjunction with a Caulerpa survey, a final pre-construction eelgrass survey would be made. Additionally, a post-construction eelgrass survey would be conducted and compared to both historical data and the pre-construction survey to determine the amount of eelgrass habitat permanently shaded, whichever is greater. This impact to eelgrass would be offset by using the eelgrass mitigation bank. Temporary impacts at NMAWC would also be offset by the mitigation bank, but upon successful reestablishment of eelgrass within impacted areas at the NMAWC location, the bank would be credited for the reestablished acreage.

3) The contractor would use only clean construction materials suitable for use in the oceanic environment. The contractor would ensure no debris, soil, silt, sand, sawdust, rubbish, cement or concrete washings thereof, chemicals, oil, or petroleum products from construction would be allowed to enter into or placed where it may be washed by rainfall or runoff into waters of the U.S. Upon completion of the project authorized, any and all excess material or debris would be completely removed from the work area and disposed of in an appropriate upland site.

4) Spill kits and cleanup materials would be present during construction should there be a leak into the surrounding water.

5) All debris would be transported to, and disposed of, at an appropriate upland disposal site, or recycled if appropriate.

6) During project implementation the Navy would regularly monitor construction activities to ensure that no deviation from the project as described herein are occurring. The Navy would report any violation of authorized impacts to the National Marine Fisheries Service (NMFS) within 24 hours of its occurrence.

7) The beach and adjacent strand/coastal scrub habitat inshore of the fuel pier and southward along the shore would not be used for any purpose.

3.1.3.3 Alternative 1 Pier Replacement and Associated Dredging

Pier demolition, pier construction, and turning basin dredging activities for Alternative 1 would cause minor and short-term impacts to existing vegetated and nonvegetated soft bottom benthic communities within the project area. Organisms occurring in the immediate area may be lost or displaced during demolition, construction, and dredging activities, either directly by equipment and noise associated with these activities or indirectly by exposure to short-term changes in suspended sediments, turbidity, dissolved oxygen, and light diffusion. As discussed in Section 3.7, *Hazardous Materials and Wastes*, resuspended sediments and associated high turbidity levels would decrease to background levels within a period of several hours after demolition or construction activities stop due to dilution and to particles settling and mixing. Potential impacts to plankton communities could include a localized decrease in primary productivity due to reduced photosynthesis. However, sediment resuspension, increased turbidity, or chemical changes would be limited to the areas of bottom disturbance and would persist for less than one hour following the disturbance. Therefore, the increased turbidity would not significantly impact benthic or water column habitats in the project area.

Pier demolition would impact benthic community resources (infauna and epifauna) by disturbing some organisms due to pile driving and removal. Some infaunal species (e.g. polychaete worms) and some epifaunal species (e.g. sea cucumbers) within the area would be disturbed or lost as a result of these activities, including pier piling epifauna (e.g. sea stars), due to pile removal. However, benthic species are expected to recolonize within a relatively short period of time from adjacent undisturbed areas, and new artificial structures would be available. Overall, the project would decrease the amount of bay shading by 5,315 square feet (sf)/0.12 ac, which represents less than 0.085 percent of the bay's 131 ac shaded by piers, docks, and marinas and 11 ac shaded by bridges (NAVFAC Southwest 2010). The amount of artificial habitat (pier pilings) would also be reduced. Pier demolition would have a low potential for mobilizing sediment contaminants into the water column; concrete, wood, steel, and plastic debris would be removed via barge cranes, then transported for recycling or disposed in a landfill. Therefore, implementation of Alternative 1 would not result in significant impacts to water quality or aquatic life due to pier demolition or construction.

The turning basin area to be dredged is, and would remain, deep subtidal habitat. As such, other than incrementally increasing the depth of the deep subtidal habitat, no permanent change would result from turning basin dredging. Any benthic flora within the immediate project area would be eliminated by the dredging activities because of site excavation and substrate removal. However, given the depths of dredging, no vegetation is expected to occur

within the dredging footprint. Invertebrates within the dredging footprint would either be lost or relocated with the sediment and are expected to recover from the disturbance upon completion of dredging activities. Any fish in the area should be capable of avoiding project equipment. Any impacts to marine algae and meioflora would be localized, minimal, and not significant. Dredged material would be moved to a previously permitted disposal site. Therefore, turning basin dredging may have some adverse, but less than significant, impacts to marine life.

A survey for the invasive alga *Caulerpa taxifolia* would be conducted before initiating in-water project activities, consistent with NMFS and California Department of Fish and Game (CDFG) requirements (NMFS 2008). If *Caulerpa taxifolia* is found in the study area during this survey, NMFS-approved *Caulerpa* Control Protocols would be followed. Therefore, Alternative 1 would not result in significant impacts to special aquatic sites due to *Caulerpa*.

Eelgrass is the only special aquatic site found in the project area. The nearest permanent eelgrass monitoring transect, North Bay (NB) 3, is approximately 490 ft southwest of the fuel pier, inshore of Pier F-122. Other nearby transects include NB4 on the south side of Shelter Island, approximately 1,540 ft northeast of the fuel pier, and NB2, on the opposite side of the harbor channel, approximately 3,020 ft to the east of the fuel pier. During development of the pier design, the pier alignment was positioned to minimize eelgrass disturbance. Similarly, sheet piling would be left in place to minimize sediment and eelgrass disturbance. However, not all eelgrass could be avoided, and approximately 0.05 ac of eelgrass surveyed in 2011, and an additional 0.05 ac of habitat that historically supported eelgrass, would be permanently shaded by construction of the new fuel pier. Eelgrass and additional habitat that historically supported eelgrass that would be shaded represent a tiny fraction of that which is found within and adjacent to San Diego Bay (0.0027% and 0.0058%, respectively). In conjunction with the *Caulerpa* survey, a final pre-construction eelgrass survey would be conducted. Additionally, a post-construction eelgrass survey would be conducted and compared to both historical data and the pre-construction survey to determine the amount of eelgrass habitat permanently shaded, whichever is greater. This impact to eelgrass would be offset by using the eelgrass mitigation bank. Therefore, deconstruction of the fuel pier and construction of the proposed fuel pier would not result in significant impacts to marine plants and no significant effects to special aquatic sites would occur, and any loss would be applied against the eelgrass mitigation bank.

Both proposed bait barge temporary relocation sites are located over deep subtidal habitat and would not shade any eelgrass. Therefore, the temporary relocation of the bait barges would not result in any impacts to habitats or communities.

The beach and adjacent strand/coastal scrub vegetation southward of the project site, which is also part of the PLECA, would not be used for any purpose. Therefore, implementation of Alternative 1 would not result in significant impacts to the PLECA, wandering skipper butterfly, or Nuttall's lotus. Similarly, neither upland nor shoreline habitat would be significantly impacted since all development that would occur is either on land previously

developed or is within the marine environment. Therefore, implementation of Alternative 1 would not result in significant impacts to marine or terrestrial plants, habitats, or communities, including special aquatic sites.

Proposed Temporary Relocation of the Navy MMP and the Navy Marine Mammal Enclosures

Since the relocation of the marine mammal enclosures used for the Navy MMP is temporary, potential impacts resulting from such relocation would also be temporary. As stated in Section 3.1.2.8, Pier 619 and Marinas 548 and 607 are actively used. Furthermore, the surrounding upland area is fully developed with no remaining natural habitat and there is no designated critical habitat for any species in the project vicinity. The only Habitat Area of Particular Concern (HAPC) is eelgrass (Figure 3.1-3), much of which is growing, or has previously grown, under the active pier and marinas. One permanent eelgrass monitoring transect, NB5, is located between Pier 619 and Marina 548 (NAVFAC Southwest 2008). Since the bottom of the Navy marine mammal enclosures consists of mesh and is not an opaque, solid structure, any eelgrass underlying the enclosures would be only partially shaded. Approximately 0.67 ac of eelgrass in 2011, and an additional 0.32 ac of habitat that historically supported eelgrass, would be partially shaded by the proposed temporary relocation of the Navy marine mammal enclosures. Temporary impacts at NMAWC would be offset by the mitigation bank, but upon successful reestablishment of eelgrass within impacted areas at the NMAWC location, the bank would be credited for the reestablished acreage. As such, the temporary relocation of the Navy MMP and the marine mammal enclosures would have no adverse effect on upland habitats or species, and impacts to marine habitats and species would be minor. Therefore, the temporary relocation of the Navy MMP and the marine mammal enclosures would not result in significant impacts to marine or terrestrial plants, habitats, or communities, including special aquatic sites.

Dredged Material Beneficial Reuse Site

Sediment deposition at the beneficial reuse site would temporarily bury epifaunal/infaunal habitat and the associated organisms. The sediments would be similar in composition to and compatible with the naturally occurring sediments. Waves and currents would rapidly disperse the mound of deposited sediment, resulting in no long-term alteration of habitat conditions in the area of deposition. The inshore beach habitat would be enhanced by the addition of sand. The constituent species of the nearshore and beach environments are adapted to natural sand migration and episodes of burial/unburial, and are expected to locally redistribute in response to changes in depth such that no long-term effects on invertebrate or fish populations are expected (City of Encinitas et al. 2008; SANDAG and U.S. Army Corps of Engineers 2011). No significant impact on habitats or communities would occur.

3.1.3.4 Alternative 2 Delayed Dredging Alternative

Alternative 2 would have the same impacts and the same avoidance and minimization measures as Alternative 1, although the impacts associated with dredging would occur separately from those associated with the other project components since the dredging would only take place after the new fuel pier construction was completed. Therefore, there would be no significant effects on biological resource habitats and communities as a result of Alternative 2.

3.1.3.5 Mitigation Measures

Because potential impacts to biological resource habitats and communities would be localized, would cease upon completion of project activities, and, with the implementation of avoidance and minimization measures described previously, would not be significant under either Alternative 1 or Alternative 2, no mitigation measures are proposed.

3.1.3.6 No-Action Alternative

Under the No-Action Alternative, temporary relocation of the Navy MMP, amendments to the existing navigation Security Zone, temporary relocation of the Everingham Bait Brothers Company bait barges, demolition and replacement of the existing fuel pier, and associated dredging of the turning basin would not occur and existing conditions would remain unchanged. Therefore, implementation of the No-Action Alternative would not have a significant impact on biological resource habitats and communities.

3.2 FISH

3.2.1 Definition of Resource

This section describes the fish species and their habitats that occur in the northern San Diego Bay project area. This section includes Essential Fish Habitat as designated under the Magnuson-Stevens Fishery Conservation and Management Act (16 USC 1801).

3.2.2 Affected Environment

3.2.2.1 Fish Species

Numerous surveys have been conducted over the last few decades in the San Diego Bay region to quantify fish diversity and abundance; among the most comprehensive were surveys by Allen et al. (2002) and the Vantuna Research Group (2006, 2009). These and other works related to fish and Essential Fish Habitat (EFH) were characterized by Merkel & Associates, Inc. (NAVFAC Southwest 2010). Approximately 90 species of bottom living and open water fishes occur in the bay. There is a greater variety of fish species in the north bay area than in the south bay, and the greatest fish diversity can be found at artificial reefs. Increased levels of flushing found in the north bay also increases food availability, the supply of larval recruits, and water quality (NAVFAC Southwest 2010). Sandy floors and eelgrass have approximately two-thirds the species diversity of artificial reefs; piers and rock riprap have approximately one-half the fish diversity of artificial reefs. Marinas, launch ramps, and muddy bottoms have the least diversity of all areas in the north bay. The ten most common fish species sampled in the north bay, each with over 500 individuals found between July 1994 and April 1999, make up approximately 98 percent of the total sample. These ten fish species are:

- Northern anchovy (*Engraulis mordax*)
- Topsmelt (*Atherinops affinis*)
- Pacific sardine (*Sardinops sagax caeruleus*)
- Slough anchovy (*Anchoa delicatissima*)
- California grunion (*Leuresthes tenuis*)

- Shiner surfperch (*Cymatogaster aggregata*)
- Giant kelpfish (*Heterostichus rostratus*)
- Round stingray (*Urolophus halleri*)
- Bay pipefish (*Syngnathus leptorhynchus*)
- Cheekspot goby (*Ilypnus gilberti*)

The northern anchovy (62 percent) and topsmelt (22 percent) were the most abundant species. Additional fish species sampled with 100-500 individuals found, accounting for 1.5 percent of the total sample, include:

- Jacksmelt (*Atherinopsis californiensis*)
- Barred pipefish (*Syngnathus auliscus*)
- California halibut (*Paralichtyhys californicus*)
- Barred sand bass (*Paralabrax nebulifer*)
- Black surfperch (*Embiotoca jacksoni*)
- Kelp bass (*Paralabrax clathratus*)
- Dwarf surfperch (*Micrometrus minimus*)
- Spotted sand bass (*Paralabrax maculatofasciatus*)
- Queenfish (*Seriphus politus*)
- Bay blenny (*Hypsoblennius gentilis*)
- Spotted turbot (*Pleuronichthys ritteri*)

Just below the quay wall immediately south of the fuel pier access way, the water is approximately 10 to 14 ft deep; the depth increases to as much as 28 ft near the southern portion of the fuel pier. Water depth north of the fuel pier access way ranges from 0 ft along the rock riprap to as much as 16 ft near the northern portion of the fuel pier. The nearshore habitat along the seawall and rock riprap is expected to contain marine algae, invertebrates, and fish species typically associated with shoreline to deep subtidal habitats. Based on Allen et al. (2002), areas extending out from the seawall that are deeper than -18 ft MLLW are likely to contain:

- Dungeness crab (*Cancer magister*)
- Pacific rock crab (*Cancer anternnarius*)
- Red tube worm (*Surpula vermicularis*)
- Giant green anemone (*Anthopleura xanthogrammica*)

Typical fish species expected to be found in and around shallow water intertidal habitats include:

- Juvenile northern anchovy (*Engraulis mordax*)
- Pacific sardine (*Sardinops sagax*)
- California grunion (*Leuresthes tenuis*)
- Shiner surfperch (*Cymatogaster aggregata*)
- Round stingray (*Urolophus halleri*)
- Spotted sand bass (*Paralabrax maculatofasciatus*)

- Bat ray (*Myliobatis californica*)
- Topsmelt (*Atherinops affinis*)

Eelgrass beds, such as those that occur within the project area, are recognized as nursery habitat for many species. Typical fish species associated with eelgrass and subtidal unvegetated habitats include shiner surfperch, black surfperch, spotted kelpfish (*Gibbonsia elegans*), giant kelpfish, Pacific seahorse (*Hypocampus ingens*), bay blenny, dwarf surfperch, kelp bass, reef finspot (*Paraclinus integripinnis*), barred pipefish and bay pipefish. Although density and abundance of infaunal species are usually considerably higher in eelgrass beds than in unvegetated soft bottom habitats (NAVFAC Southwest 2000), Merkel & Associates, Inc. found the greatest abundance of infaunal species in the north bay among rock riprap (NAVFAC Southwest 2010).

Fish associated with deep subtidal habitats include California horned shark (*Heterodontus francisi*), shovelnose guitarfish (*Mustelus californicus*), bat ray, round stingray, Pacific sardine, northern anchovy, slough anchovy, jacksmelt, topsmelt, pipefish, basses, croakers, surfperches, Pacific mackerel (*Scomber japonicus*), and turbots (NAVFAC Southwest 2000).

While there is no commercial fishing within the bay, at least fifteen fish species inhabiting the bay support commercial or recreational fisheries elsewhere in southern California waters. Examples of notable fishery populations found in the bay include California halibut and white seabass (*Atractoscion nobilis*) (Vantuna Research Group 2009). At least 58 species are involved in the recreational catch (NAVFAC Southwest 2011).

Fishes typical of southern California surf zone and shallow sandy habitats are expected at the Imperial Beach reuse site, including small, active planktivores (e.g., anchovies, sardines, jacksmelt, queenfish); roving substratum feeders, especially croakers (Sciaenidae); benthic flatfishes (e.g., sanddab [*Citharichthy stigmaeus*] California halibut); beach spawners (California grunion); and piscivores (e.g., barred sand bass, sharks) (Allen and Pondella 2006).

3.2.2.2 Essential Fish Habitat (EFH)

The 1996 amendments to the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) set forth the EFH provisions to identify and protect important habitats of federally managed marine and anadromous fish species. Section 305(b)(2) of the amended Magnuson-Stevens Act directs each Federal Agency to consult with the NMFS with respect to any action authorized, funded, or undertaken, or proposed to be authorized, funded, or undertaken, by such agency that may adversely affect any EFH identified under the Magnuson-Stevens Act. Implementing regulations for this requirement are at 50 CFR 600. Because the project area is located within an area designated as EFH for two Fishery Management Plans (FMPs) – the Pacific Coast Groundfish (Pacific Fishery Management Council [PFMC] 2011) and the Coastal Pelagic Species (PFMC 1998a) – and may adversely affect EFH, the U.S. Navy is required to consult with NMFS. As such, a complete, written assessment of the effects of the Proposed Action on EFH is provided in Appendix E.1 and is summarized in this EA.

The Pacific Coast Groundfish FMP manages at least 89 species, five of which are likely to occur within the project area (NAVFAC Southwest 2000; Allen et al. 2002; Vantuna Research Group 2006, 2009; PFMC 2011), and the FMP for Coastal Pelagic Species includes five species, four of which are likely to occur in the project area (PFMC 1998a). These species are listed in Table 3.2-1; additional details, such as life histories, are provided in Appendix E.1. Coastal pelagic species are those fish that live in the water column, from the surface to -3,300 ft MLLW. Although groundfish species are considered demersal and generally live on or near the sea floor, they occupy diverse habitats at all stages in their life histories.

Table 3.2-1. Fish Species with EFH Likely to Occur in the Proposed Project Area

Common Name	*Scientific Name*
Coastal Pelagics	
Northern anchovy	*Engraulis mordax*
Pacific sardine	*Sardinops sagax*
Jack mackerel	*Trachurus symmetricus*
Pacific mackerel	*Scomber japonicas*
Groundfish	
Curlfin sole	*Pleuronichthys decurrens*
English sole	*Pleuronichthys vetulus*
California scorpionfish	*Scorpaena guttata*
Grass Rockfish	*Sebastes rastrelliger*
Leopard shark	*Triakis semifasciata*

EFH that is considered to be particularly important to the long-term productivity of populations of one or more managed species, or to be particularly vulnerable to degradation, may also be identified by NMFS as HAPCs. HAPCs may include high value intertidal and estuarine habitats, offshore areas of high habitat value or vertical relief, and habitats used for migration, spawning and rearing of fish and shellfish. The Pacific Coast Groundfish FMP identifies several HAPCs (PFMC 2011), one of which, seagrass, occurs within the project area due to the presence of eelgrass (Merkel & Associates, Inc. 2009; NAVFAC Southwest 2012).

3.2.2.3 Vessel Traffic and the Ambient Underwater Soundscape

As illustrated by Table 3.2-2 below, San Diego Bay is heavily used by commercial, recreational, and military vessels, with an average of 82,413 vessel movements (in or out of the bay) per year. This equates to about 225 vessel transits per day, a majority of which are presumed to occur during daylight hours. The number of transits does not include the estimated 200,000 recreational boaters that use San Diego Bay (San Diego Harbor Safety Committee 2009).

Table 3.2-2. Port of San Diego Average Annual Vessel Traffic

VESSEL TYPE	VESSEL MOVEMENTS (Inbound and Outbound)		
	Subtotal by Vessel Type		*Total*
	Cargo	*Others*	
Total Annual Movements for All Vessel Types			**82,413**
Deep Draft Commercial Vessel (Cargo plus Cruise)			1,175
Cargo Ships (largest vessel: 1,000 ft length, 106 ft beam, 41 ft draft)		740	
Bulk	20		
Container Ships	100		
General Cargo	180		
Roll On/Roll Off	440		
Cruise Ships (largest vessel: 1,000 ft length, 106 ft beam, 34 ft draft)		435	
Excursion Ships (largest vessel: 222 ft length, 57 ft beam, 6 ft draft)		68,000	68,000
Commercial Sportfishing (average vessel size: 123 ft length, 32 ft berth, 13 ft draft)		10,094	10,094
Military (largest vessel: 1,115 ft length, 252 ft beam (flight deck), 39 ft draft)		3,144	3,144

Note: Tug traffic was not included in the above statistics since inner harbor tug movements alone exceed 7,000 for a typical year.

Source: San Diego Harbor Safety Committee 2009.

Based on acoustic monitoring of ship noise in Glacier Bay, Alaska (Kipple and Gabriele 2007), sound source levels from a variety of vessel types and sizes are typically within the range of 160-170 decibels (dB) at 1m. Ship noise occurs over a broad frequency range (roughly 100 Hz to 35 kilohertz [kHz]), with peak noise at higher frequency for smaller vessels. Ship noise thus has the potential to obscure underwater sound that would otherwise emanate from the project site to locations farther up the bay or offshore through the mouth.

In the project area, extensive measurements were made of underwater noise levels during March and April 2012 (Appendix F.5). Mean and median values were predominantly in the range of 120-130 dB referenced at 1 micropascal (abbreviated as re 1μPa), with substantially higher intermittent sound in excess of 150 dB re 1μPa due to passing ships, and sound energy concentrated between 100 Hz and 2 kHz, broadly overlapping the peak frequencies expected for pile driving.

3.2.3 Environmental Consequences

3.2.3.1 Approach to Analysis

The analysis identifies the potential significance of impacts to fisheries based on: 1) the importance (i.e., legal, commercial, recreational, ecological, or scientific) of the resource; 2) the proportion of the resource that would be affected relative to its occurrence in the region; 3) the sensitivity of the resource to proposed activities; and 4) the duration and ecological ramifications of the impact. For example, an impact would be considered significant if it would permanently reduce the population size or distribution of a protected species.

Impacts to fisheries associated with Alternative 1 or Alternative 2 would be primarily from increased underwater noise and turbidity associated with demolition of the fuel pier, construction of the new fuel pier, and dredging of the turning basin. For pile driving and extraction associated with fuel pier construction, as well as pile driving at the proposed temporary Navy MMP relocation site, the Navy worked with researchers from the University of Washington to develop a rigorous model of underwater transmission loss, taking into account site-specific bathymetry and shoreline characteristics. The model's description, the duration of the activities upon which the model is based, and the model's results (predicted underwater sound contours) are summarized below. Additional details related to the analysis are provided in Appendix E.1, and Section 3.2.3.3 discusses the predicted impacts to fish based on this model.

<u>Duration of Activities</u>

In conjunction with MMPA compliance (Section 3.4), proposed in-water construction and demolition work has been broken down into three consecutive one-year periods, beginning on 30 September 2013. The planned activities and their durations during each year are summarized below.

Year 1

Pile Driving. No work would begin on the Proposed Action until all required permits and approvals are in place. A total of 604 piles would be installed, including 554 for the new pier (see Table 2-7) and 50 18-in square concrete piles to support the temporary facilities for the Navy MMP at NMAWC. Pile driving would occur only during daylight hours, nominally 7:00 A.M. to 4:00 P.M.

It is assumed that the contractor will drive approximately two steel piles per day, and five concrete or fiberglass piles per day. Each pile is assumed to require up to two hours of driving. Steel piles would be driven initially with a vibratory pile driver, and then finished as necessary with an impact pile driver. Working assumptions are 1-1.5 hours of vibratory pile driving and up to 0.5 hour of impact pile driving for each steel pile. Concrete and fiberglass piles would be jetted then driven with an impact pile driver only; sound levels are much lower for these types of piles.

The currently proposed construction schedule includes the following non-overlapping, consecutive episodes of pile driving:

- Installation of 50 18-in square concrete piles to support the relocated facilities of the Navy MMP to NMAWC. Pile driving is estimated to occur on 16 days.
- Installation of steel indicator piles to occur over 17 days.
- Installation of steel temporary dolphin piles to occur over 5 days.
- Installation of 24 steel abutment piles to occur over 13 days.
- Installation of approximately 26 steel structural piles over 15 days.

Steel piles are assumed to be a mix of 36- and 48-in diameter. As noted above, pile driving would likely occur on only a few hours of each day.

Pile Extraction. Demolition of the existing pier would occur at the rate of approximately five piles per day. Demolition of the north segment of the existing pier is scheduled to occur within the period of this Proposed Activity. There are no steel piles in the north segment; only 12-in timber piles, 18- and 24-in square concrete piles, and 13-in diameter plastic piles. Demolition of the north segment of the pier is scheduled to occur in 2014. That activity is estimated to require 84 days, with approximately one fourth of the effort involving pile removal, a portion of which may involve the use of a vibratory extractor. For this analysis it is assumed that vibratory pile extraction could occur on up to 21 days.

Year 2

Pile Driving. During the second year of construction there would be several non-overlapping episodes of pile driving, including:

- Steel structural piles for the access pier, 45 days
- Fiberglass-concrete secondary fender piles for the access pier, 10 days. Since this would occur in the same timeframe as concrete pile driving (see below), which generates louder sound, this source does not need to be modeled.
- Steel structural piles, 45 days
- Steel mooring dolphin piles, 12 days
- Concrete primary fender piles, 15 days

Pile Extraction. No in-water demolition activities are scheduled during year 2.

Year 3

Pile Driving. During the third year of construction there would be several episodes of pile driving, including:

- Concrete primary fender piles, 15 days
- Fiberglass-concrete secondary fender piles, 12 days
- Steel mooring dolphin piles, 12 days
- Steel abutment piles, 10 days

The abutment piles and mooring dolphin piles would be driven within the same timeframe, over a combined 12-day period.

Pile Extraction. Demolition of the remaining structure is estimated to require 154 days, with vibratory extraction occurring on approximately ¼ of those days (39 days). It is assumed that

removal of the 24 concrete-filled steel piles would require vibratory extraction on 6 of the 39 days.

Underwater Sound Model Description

Underwater sound levels received at a given distance from an acoustic source such as pile driving are a function of the source level and transmission loss (TL). Empirically measured source levels from similar pile driving events were used to estimate pile driving sound source levels for this project. TL underwater is the decrease in acoustic intensity as an acoustic pressure wave propagates out from a source. TL parameters vary with frequency, temperature, sea conditions, current, source and receiver depth, water depth, water chemistry, and bottom composition and topography. The general formula for TL is:

$$TL = B * \log10(R) + C * R, \text{ where}$$

$$B = \text{logarithmic (predominantly spreading) loss}$$

$$C = \text{linear (scattering and absorption) loss}$$

$$R = \text{ratio of receiver distance to source reference distance (usually 1 m or 10 m)}$$

As widely used in the evaluation of underwater sound from pile driving, linear loss (C) is assumed equal to zero, and "practical spreading" (B=15) is assumed, resulting in the formula for transmission loss is TL = 15 * log10(R). For this analysis, however, a site-specific model was developed for TL from pile driving at a central point at the project site. The model is based on historical temperature-salinity data and location-dependent bathymetry. The model's predictions result in a slightly lower average rate of TL than practical spreading, and hence are conservative. For pile driving at the Navy MMP relocation site (NMAWC), no site-specific modeling was conducted, and practical spreading loss is assumed.

To estimate the sound exposure level (SEL) to which a fish at a given location would be exposed through multiple hammer strikes, a simple summation procedure is used where total SEL = Single Strike SEL + 10log (number of strikes), with a maximum of 100 repeat strikes per pile and 2 piles per day.

Model Results

The results of the model, predicted sound "contours" emanating from different sources, are shown in Figures 3.2-1 through 3.2-7. The figures reflect the conventional assumption of a "sound shadow" effect, wherein sound transmission from the source is truncated and not reflected where it intercepts a shoreline or structure. Although the influence of Zuniga Jetty was not modeled, it is reasonable to assume that project sound would not propagate east of the jetty (Dahl 2012). Hence the projection of sound through the mouth of the bay into the open ocean would be truncated along the jetty and narrower in reality than shown in the figures.

0 0.25 0.5 Kilometers
0 0.25 0.5 Miles

Figure 3.2-1
Underwater Sound from Impact Pile Driving,
36-48 " Steel Piles (Source = 195 dB rms)

N

0 0.25 0.5 Kilometers
0 0.25 0.5 Miles

Figure 3.2-2
Underwater Sound from Vibratory Pile Driving, 36-48" Steel Piles
(Source = 180 dB rms)

N

0 0.25 0.5 Kilometers
0 0.25 0.5 Miles

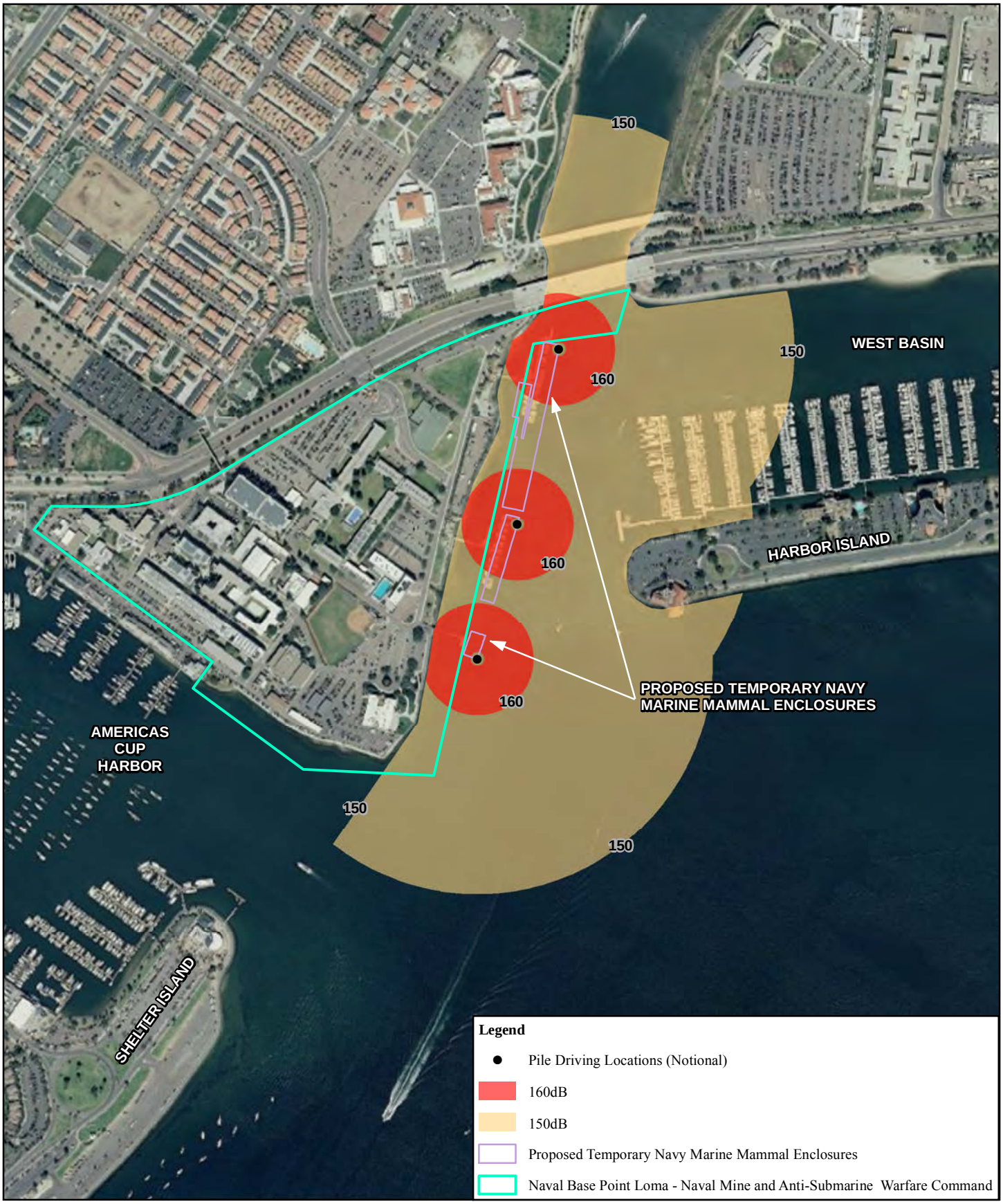
Figure 3.2-3
Underwater Sound from Impact Pile Driving,
24" Concrete Piles (Source = 176 dB rms)

N

0 0.25 0.5 Kilometers
0 0.25 0.5 Miles

Figure 3.2-4
Underwater Sound from Impact Pile Driving,
16" Fiberglass-Concrete Piles (Source = 173 dB rms)

N



0 100 200 Meters
0 300 600 Feet

Figure 3.2-5
Underwater Sound from Impact Pile Driving at Marine Mammal Relocation Site, 18" Concrete Piles (Source = 173 dB rms)

N

0 0.25 0.5 Kilometers
0 0.25 0.5 Miles

Figure 3.2-6
Underwater Sound from Vibratory Steel Pile Extraction
(Source = 172 dB rms)

N

0 0.25 0.5 Kilometers
0 0.25 0.5 Miles

Figure 3.2-7
Underwater Sound from Vibratory Non-Steel Pile Extraction
(Source = 160 dB rms)

N

Seaward of the entrance to the bay, underwater noise from vessels moving into and out of the bay would presumably fill in and dominate the underwater soundscape across the frequency range of pile driving, masking sound that is of lesser amplitude than typical vessel noise of 150-160 dB (Kipple and Gabrielle 2007). As such, the extension of the model 4-5 kilometers (km) south of the entrance is considered sufficient to cover all scenarios in which fish or marine mammals might reasonably be expected to respond to sound from pile driving or extraction.

3.2.3.2 Avoidance and Minimization Measures

Avoidance and minimization measures integrated into the project design pertaining to Fisheries and EFH include the following:

1. Sheet piling would be left in place to minimize sediment and eelgrass disturbance.
2. In conjunction with a Caulerpa survey, a final pre-construction eelgrass survey would be made. Additionally, a post-construction eelgrass survey would be conducted and compared to both historical data and the pre-construction survey to determine the amount of eelgrass habitat permanently shaded, whichever is greater. This impact to eelgrass would be offset by using the eelgrass mitigation bank. Temporary impacts at NMAWC would also be offset by the mitigation bank, but upon successful reestablishment of eelgrass within impacted areas at the NMAWC location, the bank would be credited for the reestablished acreage.
3. The contractor would use only clean construction materials suitable for use in the oceanic environment. The contractor would ensure no debris, soil, silt, sand, sawdust, rubbish, cement or concrete washings thereof, chemicals, oil, or petroleum products from construction would be allowed to enter into or placed where it may be washed by rainfall or runoff into waters of the U.S. Upon completion of the project authorized, any and all excess material or debris would be completely removed from the work area and disposed of in an appropriate upland site.
4. Spill kits and cleanup materials would be present during construction should there be a leak into the surrounding water.
5. During project implementation, the Navy would regularly monitor construction activities to ensure that no deviations from the project as described herein are occurring. The Navy would report any violation of authorized impacts to NMFS within 24 hours of its occurrence.

The following avoidance and minimization measure would be implemented during the proposed pile driving and dredging activities.

1. Prior to the start of pile driving or dredging each day, after each break of more than 30 minutes, and if any increase in the intensity is required, the Navy would use a ramp-up procedure. The procedure involves a slow increase in the pile driving to allow animals in the area to disperse.

3.2.3.3 Alternative 1 Pier Replacement and Associated Dredging

The primary impacts to fish communities and habitats in the project vicinity would be from pile installation and removal, which would result in increased underwater noise. Since many fish use their swim bladders for buoyancy, they are susceptible to rapid expansion/decompression due to peak pressure waves from underwater noises (Hastings and Popper 2005). At a sufficient level this exposure can be fatal. In 2008, NOAA Fisheries, USFWS, California Department of Fish and Game, and transportation agencies of California, Oregon, and Washington agreed in principle to assess project effects using Interim Criteria for Injury to Fish from Pile Driving Activities (Fisheries Hydroacoustics Working Group 2008). These interim criteria are provided in Table 3.2-3. The criteria were developed principally for endangered salmonids in the Northwest and are conservative, indicating the potential for the identified effect, rather than a likelihood of occurrence (Popper and Hastings 2009; Halverson et al. 2011). The Navy has not adopted these criteria.

Table 3.2-3. Interim Criteria for Fish Injury and Disturbance by Underwater Sound from Pile Driving

Effect	*Size of Fish*	*Underwater Impact Pile Driving Criteria*	*Underwater Vibratory Pile Driving Criteria*
Onset of Injury	All fish	206 dB peak re: 1μPa	N/A
	≥ 2 grams	187 dB SEL re: 1μPa²sec	N/A
	< 2 grams	183 dB SEL re: 1μPa²sec	N/A
Behavioral Impacts	All fish	150 dB rms re: 1μPa	150 dB rms re: 1μPa

Note: N/A = not available; rms = root mean square; SEL = sound exposure level

Transmission losses based on the model or practical spreading were calculated and mapped with GIS, resulting in the underwater sound contours provided above (Figures 3.2-1 through 3.2-7). Zones of Influence (ZOIs) corresponding to the interim criteria were then calculated for each of the project underwater sound sources (Table 3.2-4). The table also provides the maximum number of days per year for each activity and corresponding ZOI. In general, areas of potential injury are small and limited to the immediate area of pile driving, whereas the areas of potential behavioral effects, particularly for steel pile installation are relatively large, up to 10.8 km². The 206 dB injury threshold would only be exceeded during impact installation of the steel piles, and only encompassing 0.0022 km², within about 26 m of the pile driver. It is unlikely that fish would remain this close to the pile being driven after the ramp-up period. The areas encompassing the weight-based criteria for potential injury are somewhat larger (Table 3.2-4), but there is little evidence for injurious effects to fish at these SELs (Popper and Hastings 2009; CALTRANS 2010; Halverson et al. 2011).

Since the relocation of the marine mammal enclosures used for the Navy MMP is temporary, potential impacts to fish resulting from such relocation would also be temporary. Fish up to a

distance of 341 m from the pile driving location may be disturbed by underwater sound in excess of 150 dB, but the areas of potential injurious effects are very small (Table 3.2-4 and Figure 3.2-5), and fish would be expected to disperse away from or avoid the area during pile driving rather than remain stationary and risk injury. Therefore, there would be no adverse effect from sound levels on fisheries or EFH under the Magnuson-Stevens Act from the temporary relocation of the Navy marine mammal enclosures to Pier 619 and Marinas 548 and 607.

Fish species occurring in the immediate areas identified could also be displaced during project activities indirectly by short-term changes in suspended sediments, turbidity, dissolved oxygen, and changes in light diffusion. However, fish present during project activities should be capable of avoiding project equipment and areas affected by increased turbidity and increased noise from pile driving, concrete removal, and turning basin dredging. Furthermore, most if not all of the fish species occurring in the area routinely experience turbid and noisy conditions due to natural processes and ship traffic within the bay.

Table 3.2-4. Calculated ZOIs Corresponding to Interim Criteria for Fish

Description	*Area of Potential ZOI (km²)*						
	Source, dB peak @ 10m	*Source, dB rms @ 10m*	*Source, dB SEL @ 10m*	*All Fish Injury – 206 dB peak*	*Fish ≥2g Injury – 187 dB SEL*	*Fish < 2g Injury - 183 dB SEL*	*All Fish Behavior 150 dB rms*
Impact driving steel piles	210	195	180	0.0022	0.1949	0.5718	10.8251
Vibratory driving steel piles	195	180	180	N/A	N/A	N/A	4.0519
Impact driving 24-in concrete piles	188	176	166	0	0.0010	0.0052	2.3583
Impact driving 16-in concrete-fiberglass piles	184	173	163	0	0.0003	0.0014	1.3123
Impact driving 18-in concrete piles at marine mammal relocation site	184	173	163	0	0.0002	0.0008	0.2397
Vibratory extraction – steel piles	180	172	172	N/A	N/A	N/A	1.0240
Vibratory extraction – non-steel piles	170	160	160	N/A	N/A	N/A	0.0240

Notes: All sound levels expressed in dB re 1 µPa rms. dB = decibel; in = inch; N/A = not applicable; rms = root-mean-square; µPa = micropascal pile driving sound sources based on CALTRANS 2009; WSDOT 2010, 2012; NMFS 2010. SELs for fish injury were calculated by assuming 200 hammer strikes per day.

Typically, environmental assessments for San Diego Bay projects have considered the addition of hard substrate an environmental benefit to fishes because the attached fouling community serves as forage for fish. As such, the reduction of hard substrate that would result from implementation of Alternative 1 could be considered an adverse effect. However, such a reduction would represent a minor portion of the artificial hard substrate found within the bay and would not result in a significant impact. Furthermore, any adverse impact from artificial hard substrate reduction would be offset by the beneficial effect resulting from the decrease in pier shading and the corresponding increase in light availability.

Greater potential for impacts would exist if there were substantial amounts of fine sediments and organisms in the potential dredging area. However, testing of samples of material to be dredged indicated that grain sizes are predominately of coarser beach compatible grain sands, which is consistent with areas that consistently generate currents during tidal flushing (NAVFAC Southwest 2010). This material settles quickly instead of remaining suspended in the water column. On the beneficial side, dredging could increase water circulation, indirectly benefit fish resources, and dredging activities can suspend infauna and epifauna to temporarily enhance fish feeding activities. However, any such changes would be negligible given that the boundaries, bathymetry, configuration, and use of the piers would remain essentially unchanged. Thus, any minor changes to water circulation or bathymetry would not result in an adverse impact on EFH per the Magnuson-Stevens Act or per NEPA.

The deposition of dredged sediments for nearshore sand replenishment at Imperial Beach would have minor, temporary effects due to altered bottom topography and turbidity, but no persistent effects on the fish community, and no adverse effect on EFH. No significant impacts are associated with sediment disposal.

As described above, implementation of Alternative 1 would result in adverse impacts to fish species and communities. However, due to the temporary and limited nature of the project activities within a limited geographic area, and since fish species would return to the project area following the completion of in-water activities, implementation of Alternative 1 would not result in significant impacts to fish communities. Impacts to EFH under the Magnuson-Stevens Act are discussed in detail in Appendix E.1 and are summarized in the EFH section below.

<u>Essential Fish Habitat (EFH)</u>

The Navy consults with NMFS regarding actions, such as the proposed project, that have the potential to adversely affect EFH. Appendix E.1 contains the detailed EFH Assessment to support consultation.

Of the approximately 90 species of fish previously identified in San Diego Bay, nine are managed by the NMFS under two FMPs - the Coastal Pelagics and Pacific Groundfish Management Plans (PFMC 1998a, 1998b, 2011). Four are managed under the Coastal Pelagics FMP: northern anchovy; pacific sardine; pacific mackerel; and jack mackerel. Five species are covered under the Pacific Groundfish FMP and occur, although not in abundance, in San Diego Bay: California scorpionfish; grass rockfish; English sole; curlfin sole; and leopard shark (NAVFAC Southwest 2010; NAVFAC Southwest and Port of San Diego 2011).

Two species (northern anchovy and Pacific sardine) can be found throughout San Diego Bay. Jack mackerel were only found at the north bay survey area and Pacific mackerel were found at all but the southern survey station (Allen et al. 2002). All of these species are highly transient, are not tied to artificial substrates, and routinely experience turbid and noisy conditions due to natural processes and ship traffic within the bay.

Impacts from in-water project activities and the associated precautionary measures of either project alternative would be the same as described for other fish communities in the "Fisheries" section above. Namely, noise and turbidity associated with in-water construction and deconstruction activities would temporarily displace EFH species within a limited scope. Pier removal would reduce the algal and invertebrate production associated with encrusting communities on the pilings but would only impact eelgrass by increasing turbidity. When combined, these impacts would result an adverse effects per the Magnuson-Stevens Act but would not be considered significant under NEPA due to the temporary and limited nature of the impacts.

During development of the pier design, the pier alignment was positioned to minimize eelgrass disturbance and reduce the amount of eelgrass habitat shaded. However, not all eelgrass could be avoided. Approximately 0.05 ac of eelgrass surveyed in 2011, and an additional 0.05 ac of habitat that historically supported eelgrass, would be permanently shaded. Eelgrass and additional habitat that historically supported eelgrass that would be shaded represent a tiny fraction of that which is found within and adjacent to San Diego Bay (0.0027% and 0.0058%, respectively). Thus, there would be a minimal, adverse effect to EFH from pier construction under the Magnuson-Stevens Act, although this impact would be minimized by using the eelgrass mitigation bank. This impact would be further minimized by the increased abundance, diversity, and biomass found near the outer margins of pier structures compared to open water areas, as discussed in detail in Appendix E.1.

Approximately 0.67 ac of eelgrass in 2011, and an additional 0.32 ac of habitat that historically supported eelgrass, would be partially shaded by the proposed temporary relocation of the Navy marine mammal enclosures. Temporary impacts at NMAWC would be offset by the mitigation bank, but upon successful reestablishment of eelgrass within impacted areas at the NMAWC location, the bank would be credited for the reestablished acreage. As such, the temporary relocation of the Navy MMP and the marine mammal enclosures would have no adverse effect to EFH.

Both the proposed bait barge temporary relocation sites are located over deep subtidal habitat and would not shade any eelgrass. Therefore, the temporary relocation of the bait barges would not result in any impacts to essential fish habitat.

Although there would be reduced artificial hard substrate, sunlight in the water column would be increased and the net effect of the reduced artificial substrate would be negligible. Over time, algae and invertebrates would be expected to colonize the new pier. To the extent that structural and/or shaded habitats would be preferred or avoided by certain species, utilization of the project sites by different fish species may shift slightly toward or away from the project

site relative to the existing condition. Considering this, and the characteristics of the EFH species that may potentially occur in the project area and the habitat characteristics of the area itself, there would be no adverse effect to EFH from the small reduction of artificial hard substrate.

The use of dredged sediments for nearshore sand replenishment at Imperial Beach would have minor, temporary effects on the substrate and water column, but no adverse effects on EFH.

3.2.3.4 Alternative 2 Delayed Dredging Alternative

Alternative 2 would have the same impacts and the same avoidance and minimization measures as Alternative 1, although the impacts associated with dredging would occur separately from those associated with the other project components since the dredging would only take place after the new fuel pier construction was completed. Therefore, there would be no significant effects on fisheries as a result of Alternative 2.

3.2.3.5 Mitigation Measures

Because potential impacts to fisheries would be localized, would cease upon completion of project activities, and would not be significant under either Alternative 1 or Alternative 2, no mitigation measures are proposed.

3.2.3.6 No-Action Alternative

Under the No-Action Alternative, temporary relocation of the Navy MMP, amendments to the existing navigation Security Zone, temporary relocation of the Everingham Bait Brothers Company bait barges, demolition and replacement of the existing fuel pier, and associated dredging of the turning basin would not occur. Existing conditions would remain unchanged. Therefore, implementation of the No-Action Alternative would not have a significant impact to fisheries.

3.3 BIRDS

3.3.1 Definition of Resource

This section describes birds within or adjacent to areas directly or indirectly affected by the proposed project. The Migratory Bird Treaty Act (MBTA) of 1918 (16 U.S. Code [USC] 703 et seq.) and the Migratory Bird Conservation Act (16 USC 715 et seq.) of February 18, 1929 (45 Stat. 1222) are the primary legislation in the United States established to conserve migratory birds. These statutes implement the United States' commitment to four bilateral treaties, or conventions, with Canada, Mexico, Russia, and Japan for the protection of a shared migratory bird resource. The MBTA prohibits the taking, killing, or possessing of migratory birds, or the parts, nests, or eggs of such birds, unless permitted by regulation. The species of birds protected by the MBTA are listed in Title 50, Section 10.13, of the Code of Federal Regulations (50 CFR 10.13) and represent almost all avian species found in North America. All of the species mentioned below are protected under the MBTA.

Migratory bird conservation relative to non-military readiness is addressed separately in a MOU developed in accordance with Executive Order (EO) 13186, signed January 10, 2001,

"Responsibilities of Federal Agencies to Protect Migratory Birds." The MOU between the Department of Defense (DoD) and the USFWS was signed on July 31, 2006. DoD responsibilities discussed in the MOU include, but are not limited to:

1. Obtaining permits for import and export, banding, scientific collection, taxidermy, special purposes, falconry, raptor propagation, and depredation activities.
2. Encouraging incorporation of comprehensive migratory bird management objectives in the planning of DoD planning documents.
3. Incorporating conservation measures addressed in Regional or State Bird Conservation Plans in INRMPs.
4. Managing military lands and activities other than military readiness in a manner that supports migratory bird conservation.
5. Avoiding or minimizing impacts to migratory birds, including incidental take and the pollution or detrimental alteration of the environments used by migratory birds.
6. Developing, striving to implement, and periodically evaluating conservation measures for management actions to avoid or minimize incidental take of migratory birds, and if necessary, conferring with the service on revisions to these conservation measures.

Section 3.5, *Threatened and Endangered Species*, provides detailed information on the California least tern.

3.3.2 Affected Environment

The project area is located on the Point Loma side of northwestern San Diego Bay, and includes man-made structures, nearshore habitat, and open water habitat. Bird abundance ranges from 1-5 birds per hectare per month northeast of the fuel pier; 6-20 birds per hectare per month along the proposed Navy MMP temporary relocation site at NMAWC and to the north, south, and southeast of the fuel pier; and 101-292 birds per hectare per month near the bait barges. Bird richness ranges from 1-10 unique species east of the bait barges and southeast of the proposed Navy MMP temporary relocation site; and 11-25 unique species west of the bait barges, surrounding the fuel pier, and east of the proposed Navy MMP relocation site (NAVFAC Southwest and Port of San Diego 2011; Tierra Data, Inc. 2011).

San Diego Bay is part of a major bird migratory pathway, the Pacific Flyway, and supports large populations of over-wintering birds traveling between northern breeding grounds and southern wintering sites. More than 300 migratory and resident bird species have been documented to use San Diego Bay, including shore birds, gulls, marsh birds, and other waterfowl (NAVFAC Southwest and Port of San Diego 2011). Some of the most common waterfowl and seabird species in the bay include surf scoter (*Melanitta perspicillata*), eared grebe (*Podiceps nigricollis*), scaup species, bufflehead (*Bucephala albeola*), California brown pelican (*Pelecanus occidentalis californicus*), elegant tern (*Sterna elegans*), Heermann's gull (*Larus heermanni*), double-crested cormorant (*Phalacrocorax auritus*), Forster's tern (*Sterna forsteri*), California least tern (*Sternula antillarum*

browni), mallard (*Anas platyrhynchos*), and great blue heron (*Ardea herodias*) (NAVFAC Southwest and Port of San Diego 2011; Tierra Data, Inc. 2011). Several species, as noted below, are considered sensitive by the USFWS or California Department of Fish and Game (CDFG). See Section 3.5, *Threatened and Endangered Species*, for more detailed information on the California least tern.

Federal or state bird species of concern with the potential to occur in the project area include the double-crested cormorant, harlequin duck (*Histrionicus histrionicus*), California gull (*Larus californicus californicus*), common loon (*Gavia immer*), American merlin (*Falco columbiarus columbiarus*), osprey (*Pandion haliaetus carolinensis*), California brown pelican, black oystercatcher (*Haematopus bachmani*), elegant tern, great blue heron, black-crowned night heron (*Nycticorax nycticorax*), American peregrine falcon (*Falco peregrinus anatum*), and Forster's tern. Most of these species are considered sensitive only where breeding or nesting occurs, and there are no breeding seabirds in the project area. These birds use intertidal flats, shallow water habitat, or manmade structures for foraging or resting, similar to areas adjacent to the project area. However, the San Diego Bay National Wildlife Refuge, located at the southeast end of the bay, contains the greatest amount of intertidal mud flats and is well removed from the project area (NAVFAC Southwest and Port of San Diego 2011).

The beach and nearshore waters at Imperial Beach are used by shore- and waterbirds, respectively (SANDAG and U.S. Army Corps of Engineers 2011).

3.3.3 Environmental Consequences

3.3.3.1 Approach to Analysis

The analysis identifies the potential significance of impacts to birds based on: 1) the importance (i.e., legal, commercial, recreational, ecological, or scientific) of the resource; 2) the proportion of the resource that would be affected relative to its occurrence in the region; 3) the sensitivity of the resource to proposed activities; and 4) the duration and ecological ramifications of the impact. For example, an impact would be considered significant if it would permanently reduce the population size or distribution of a protected species.

3.3.3.2 Avoidance and Minimization Measures

Avoidance and minimization measures for birds would be the same as those for biological resource habitats and communities (Section 3.1.3.2). Avoidance and minimization measures to protect California least terns are provided in Section 3.5.3.2.

3.3.3.3 Alternative 1 Pier Replacement and Associated Dredging

Nearshore waters are the primary foraging habitat for many seabird species. Project activities would result in increases in noise and human activity, and decreases in water quality in the project area, during demolition, construction, and turning basin dredging. These activities may disturb migratory bird foraging and resting in the immediate vicinity while construction and/or demolition activity is occurring.

Responses to noise from pile driving would be limited to short-term behavioral or physiological

responses (e.g., alert response, startle response, and temporary increase in heart rate). Noise from pile driving close to shore could have a short-term adverse impact on nesting and nearshore foraging species. However, human activity such as vessel or boat movement, and equipment setting and movement, could cause seabirds to flee the activity area before the onset of pile driving. If seabirds were in the activity area, they would likely flee the area prior to, or just after, the initial strike of the pile at the beginning of the ramp-up procedure. In-air pile driving noise is not likely to disrupt major behavior patterns, such as migrating, breeding, feeding, and sheltering, or to result in serious injury to any seabirds.

Information regarding the impacts from acoustic sources on seabirds and the ability for seabirds to hear underwater is virtually unknown. The exposure to underwater sounds by seabirds, other than pursuit diving species, is likely to be very limited due to spending a very short time under water (plunge-diving or surface-dipping) or foraging only at the water surface. Pursuit divers may remain under water for minutes, increasing the chance of underwater sound exposure. However, assuming that a seabird disturbed by an underwater sound would avoid the stressor by swimming to the surface, a physiological impact, such as hearing loss, would only occur if a seabird is close to an intense sound source. Furthermore, birds are generally less susceptible to both temporary and permanent threshold shift than mammals (Saunders and Dooling 1974), so an underwater sound exposure would have to be intense and of a sufficient duration to cause temporary or permanent threshold shift. Avoiding the sound by returning to the surface would further limit the potential for extended or multiple sound exposures underwater. Therefore, any impacts would be short-term, localized, and would not impact bird populations.

Both of the proposed bait barge temporary relocation sites are similar to the existing location in that they are located over deep subtidal habitat. The temporary relocation of the bait barges may result in localized changes in bird densities but would otherwise not result in any impacts to birds. Area birds normally resting on the bait barges are not expected to follow the barges to their new (temporary) location at Harbor Island East. The birds on the bait barges are predominantly cormorants, western gulls, herons, and pelicans. The cormorants and herons nest in the eucalyptus trees at NBPL near the existing bait barge location. Pelicans nest in offshore islands. All three of these species are tightly tied to their nesting sites and would likely remain at or near their nesting sites despite the relocation of their intermittent resting site on the bait barges. Since the primary activity for the birds at the bait barges is loafing and their primary foraging area is in the north bay and offshore, the birds are expected to stay in the north bay area and to find another intermittent resting location or locations. At NBPL they may find such a resting location at Navy piers such as the Magnetic Silencing Pier or the beach area shoreward of that pier.

Dredging and in-water construction impacts would also alter fish behavior due to increased underwater noise levels (see Section 3.2, *Fisheries*), which may make fish more or less available as prey. However, impacts to marine birds are anticipated to be highly localized because marine birds are wide-ranging and have a large foraging habitat available in and around San Diego Bay relative to the foraging area that might be impacted by construction activities within the project area. Furthermore, these impacts would not be significant because of their limited duration and because birds on the water regularly experience the noise and disturbance of passing vessels,

while the project area is routinely subject to the elevated noise and activity of workers and equipment associated with common industrial practices. Bird perches on the existing fuel pier would be lost. However, this is not expected to create a significant impact to migratory birds, as there are several other structures in San Diego Bay that could be used for this purpose and because migratory birds are expected to recolonize the new fuel pier once constructed. Additionally, no in-water demolition, construction, or dredging activities would occur during the least tern breeding season without the Navy first consulting with the USFWS.

Sediment deposition at the Imperial Beach nearshore replenishment site would have minor, temporary, and hence non-significant effects on foraging conditions due the presence of the barge and turbidity.

In conclusion, implementation of Alternative 1 would not have a significant adverse effect under the MBTA and there would be no significant impacts on other non-migratory marine bird habitat or populations. Potential effects on California least tern are discussed in Section 3.5, *Threatened and Endangered Species*.

3.3.3.4 Alternative 2 Delayed Dredging Alternative

Alternative 2 would have the same impacts and the same avoidance and minimization measures as Alternative 1, although the impacts associated with dredging would occur separately from those associated with the other project components since the dredging would only take place after the new fuel pier construction was completed. Therefore, there would be no significant effects on birds as a result of Alternative 2.

3.3.3.5 Mitigation Measures

Because potential impacts to birds would be localized, would cease upon completion of project activities, and would not be significant under either Alternative 1 or Alternative 2, no mitigation measures are proposed.

3.3.3.6 No-Action Alternative

Under the No-Action Alternative, temporary relocation of the Navy MMP, amendments to the existing navigation Security Zone, temporary relocation of the Everingham Bait Brothers Company bait barges, demolition and replacement of the existing fuel pier, and associated dredging of the turning basin would not occur. Existing conditions would remain unchanged. Therefore, implementation of the No-Action Alternative would not have a significant impact to birds.

3.4 MARINE MAMMALS

3.4.1 Definition of Resource

This section describes marine mammals and the habitats in which they occur within areas directly or indirectly affected by the proposed project. Marine mammals are protected from "taking" under the Federal Marine Mammal Protection Act (MMPA) of 1972. Taking is defined as "to harass, hunt, capture, or kill, or attempt to harass, hunt, capture, or kill any marine

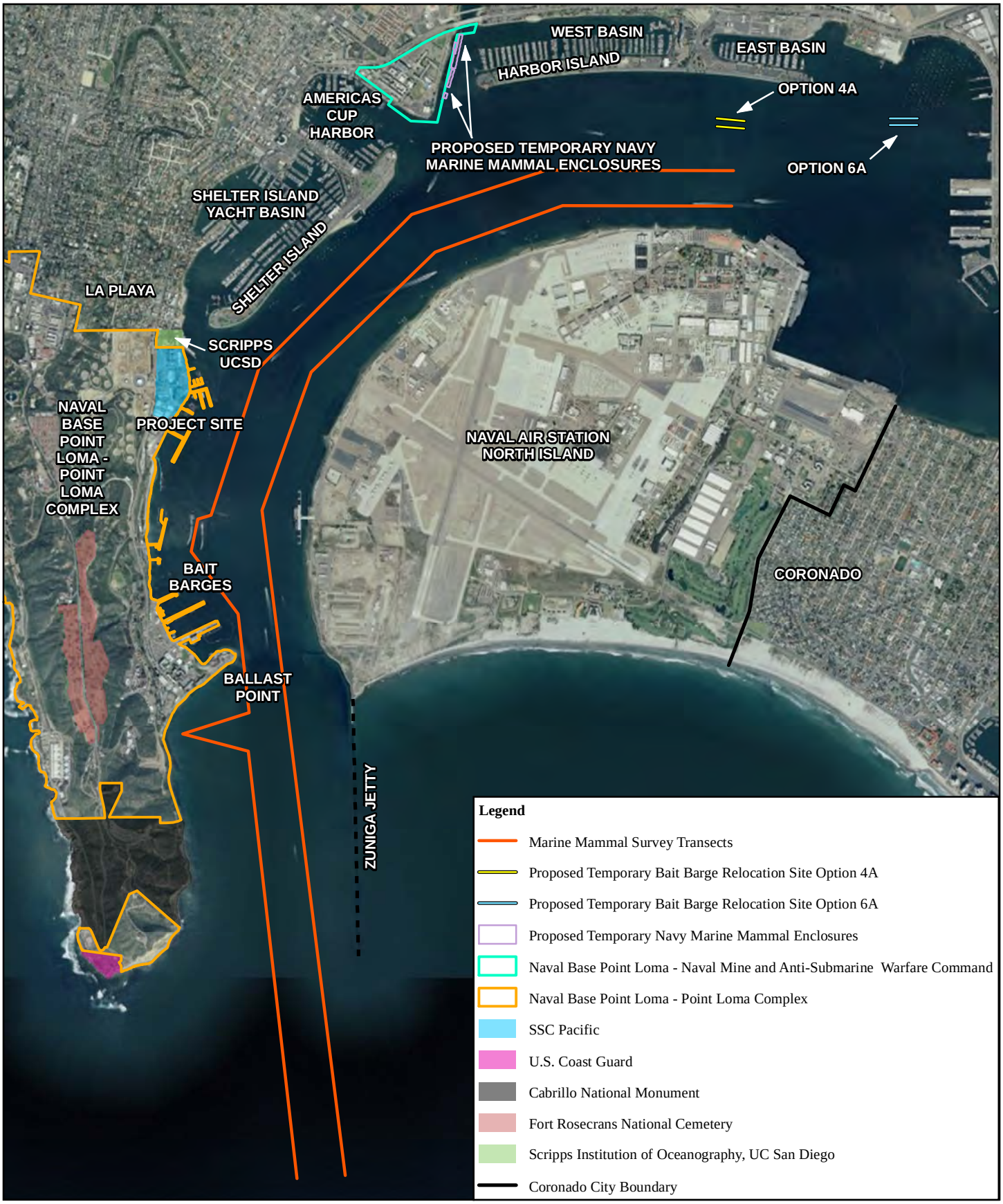
mammal." The term harassment is defined under the MMPA as any act of pursuit, torment, or annoyance that has the potential to do one or both of the following:

- Injure a marine mammal or marine mammal stock in the wild
- Disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering

As the project may result in non-injury takes of marine mammals under the MMPA, the Navy is consulting with NMFS on methods to minimize potential takes and will apply for and obtain an Incidental Harassment Authorization (IHA) for anticipated takes before beginning underwater demolition and pile driving activities.

3.4.2 Affected Environment

Recognizing that the results from regional offshore surveys for marine mammals are not representative of northern San Diego Bay, the Navy has conducted marine mammal surveys in the project area beginning in 2007 and continuing through March 2012 (Merkel & Associates, Inc. 2008; U.S. Pacific Fleet 2009-2012; Tierra Data, Inc. [TDI] 2012). Boat survey routes (Figure 3.4-1) established in 2007, which enable the detection of all marine mammals throughout the project area, have been resurveyed on 16 occasions, 12 of which were during the seasonal window for in-water construction (September 16 – March 31) and are hence applicable to the assessment of potential occurrence during pile driving activities. The IHA application and this analysis rely primarily on these surveys for the baseline on the species and numbers of marine mammals that occur in the activity area.



0 0.25 0.5 Kilometers
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Source: TDI 2012

Figure 3.4-1
Navy Marine Mammal Survey Routes

N

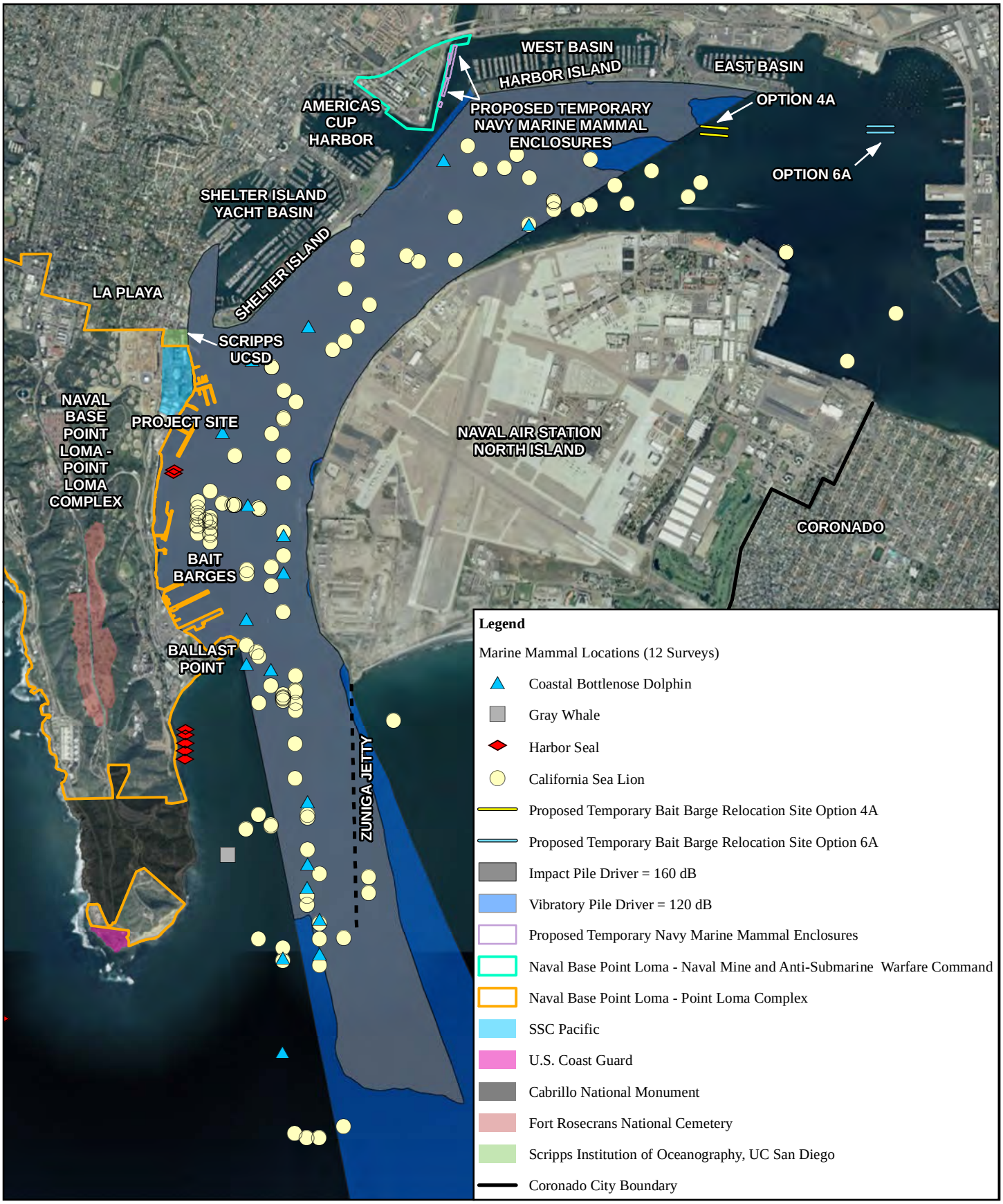
Figure 3.4-2 shows the locations of all marine mammals documented in the Navy's surveys of the project area. Of the approximately 41 marine mammal species that occur in southern California waters (Carretta et al. 2012), only three year-round species and one migratory species are expected to occur in the general area of northern San Diego Bay and/or the immediate offshore waters. These include two pinnipeds - the U.S. stock of California sea lion (*Zalophus californianus*) and California stock of harbor seal (*Phoca vitulina richardii*); and two cetaceans – the California coastal stock of bottlenose dolphin (*Tursiops truncatus*) and the Eastern North Pacific stock of the gray whale (*Eschrichtius robustus*) (Navy 2010; NAVFAC Southwest and Port of San Diego 2011). Other species that occur in the Southern California Bight may have the potential for isolated occurrence within San Diego Bay or just offshore (Navy 2010), but are very unlikely to occur in the affected Project Area, are expected to have zero density within potential acoustic zones of influence, and hence are not considered further. None of the four species that are likely to occur are listed under the Endangered Species Act (ESA), whereas all are protected under the MMPA. The relative abundance of these species in the project area is summarized in Table 3.4-1.

Table 3.4-1. Marine Mammals Occurring in the Vicinity of Naval Base Point Loma

Species	*Stock Abundance*[1]	*Relative Occurrence in North San Diego Bay*	*Season(s) of Occurrence*	*Abundance in the Project Area (density)*[2]
California sea lion *Zalophus californianus* U.S. Stock	296,750	Abundant	Year-round	Average 63.0 individuals in ZOI (5.48/km^2)
Harbor seal *Phoca vitulina* California stock	30,196 (CV= 0.157)	Uncommon, localized	Year-round	≤ 3 individuals in ZOI (≤ 0.26/km^2)
Bottlenose dolphin *Tursiops truncatus* California coastal stock	323 (CV = 0.13)	Occasional	Year-round	Average 8.8 individuals in ZOI (0.77/km^2)
Gray whale *Eschrichtius robustus* Eastern North Pacific Stock	19,126 (CV = 0.071)	Rare visitor	Late winter	≤1 individual (≤ 0.09/km^2)

Notes: CV= coefficient of variation; km^2 = square kilometers; ZOI = zone of influence.

Sources: [1]NMFS marine mammal stock assessment reports (Carretta et al. 2012; Allen and Angliss 2010). [2]Abundances from Navy Marine Mammal Surveys and monitoring (Merkel & Associates, Inc. 2008; U.S. Pacific Fleet 2009-2012; TDI 2012b; Jenkins 2012) sightings within the maximum ZOI for vibratory pile driving (11.49 km^2).



0 0.25 0.5 Kilometers
0 0.25 0.5 Miles

Figure 3.4-2
Marine Mammal Occurrences in the Project Area (Navy Surveys)

N

The U.S. stock of California sea lion and the California stock of harbor seal can be commonly found at haul-out sites on the mainland and on navigation buoys, barges, and docks within California harbors. California sea lions and harbor seals do not typically haul out at the same location at the same time. Within and adjacent to San Diego Bay, California sea lions are the dominant and by far the most numerous pinniped observed, which may explain the absence of harbor seals from most of the area. California sea lions are especially abundant on the bait barges, which are relatively close to the fuel pier and are within the ZOI for potential harassment.

In the Navy's surveys, harbor seals have only been observed hauled out along the shore south of Ballast Point, outside of the ZOI for project pile driving activities, or elsewhere outside of the potential ZOI. However, harbor seals were also been observed in Navy monitoring of another project at Pier 122, roughly 250 m south of the fuel pier (Jenkins 2012; location shown on Figure 3.4-2). Therefore harbor seals are considered potentially present and affected within the ZOI for harassment.

The Eastern North Pacific stock of gray whale occurs off southern California during their annual migration between summer feeding areas in the Bering and southern Chukchi seas and winter calving areas in Baja California and mainland Mexico. While gray whales may occasionally be found within a kilometer of shore during both their southward and northward migration periods, they are generally found farther offshore (Navy 2010e). There has been only a single sighting of gray whales (one juvenile) during the Navy's surveys. Although this individual was outside of the ZOI for potential harassment by pile driving (TDI 2012, location shown on Figure 3.4-2), it likely crossed through the ZOI, and on rare occasions, individual gray whales have entered San Diego Bay and lingered for up to two weeks (NAVFAC Southwest and Port of San Diego 2011; Jenkins 2012). Therefore, the gray whale is considered potentially present and affected within ZOIs for behavioral harassment.

The California coastal stock of the bottlenose dolphin is a toothed whale (odontocete) that regularly inhabits the nearshore waters of southern California. This species regularly moves along the California coast and occasionally enters northern San Diego Bay. This particular stock has limited site fidelity and can be distributed anywhere between Monterey to northern Baja Mexico depending on localized prey abundance (Navy 2011). Bottlenose dolphins have been sighted with increasing regularity in San Diego Bay (TDI 2012; Jenkins 2012).

The species accounts that follow are drawn from the Navy's IHA Application, which provides additional detail.

3.4.2.1 California Sea Lion

<u>Status and Management</u>

The California sea lion is now considered to be a full species, separated from Galapagos sea lion (*Z. wollebaeki*) and the extinct Japanese sea lion (*Z. japonicus*) (Carretta et al. 2012). The breeding areas of the California sea lion are on the Channel Islands, western Baja California, and the Gulf of California. Mitochondrial DNA analysis of California sea lions has identified five genetically

distinct geographic populations: (1) Pacific Temperate, (2) Pacific Subtropical, (3) Southern Gulf of California, (4) Central Gulf of California and (5) Northern Gulf of California. The Pacific Temperate population makes up the U.S. stock and includes rookeries within U.S. waters and the Coronado Islands just south of the U.S.-Mexico border. The U.S. stock of California sea lion is not considered strategic or depleted.

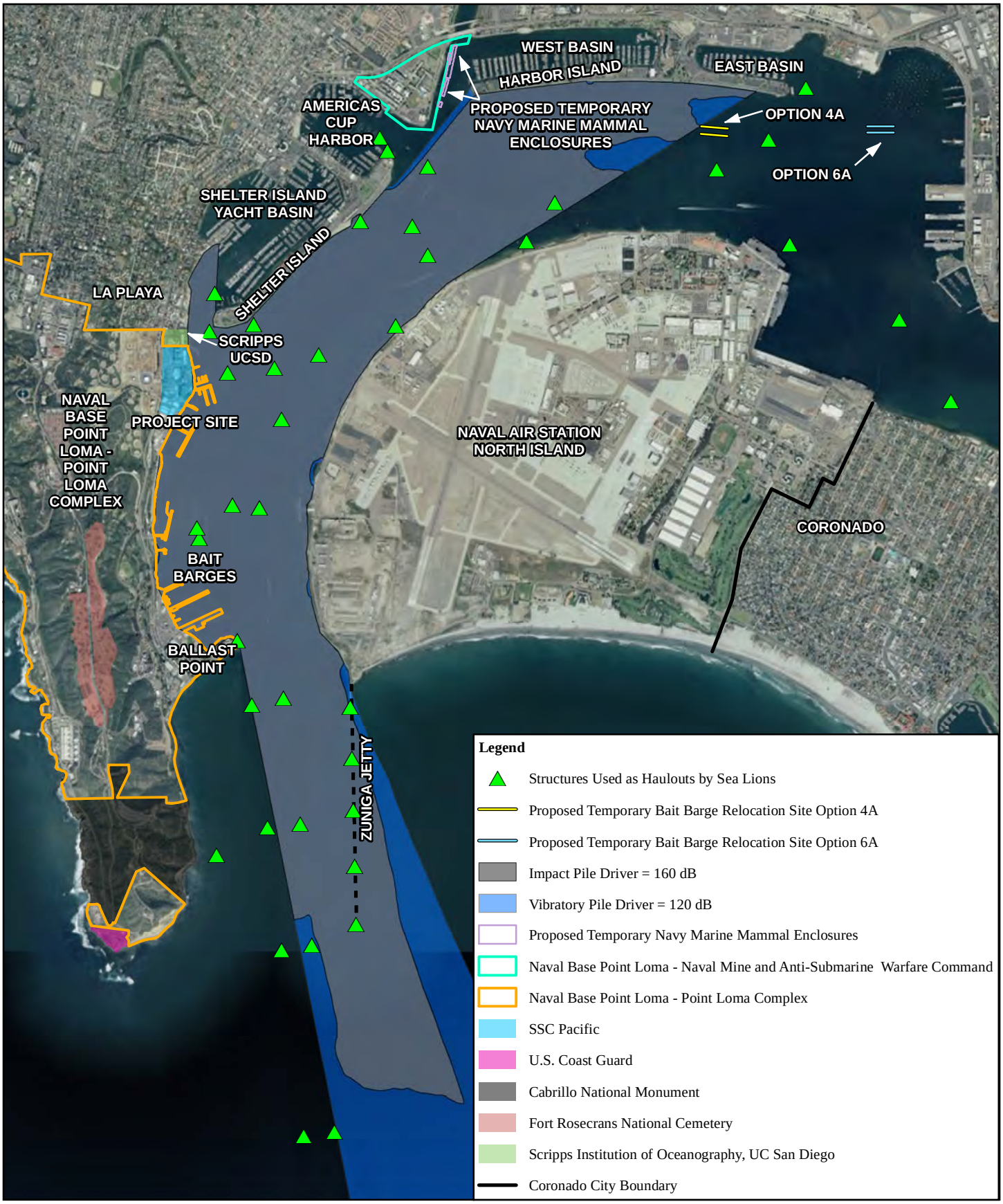
Distribution

More than 95 percent of the U.S. Stock breeds and gives birth to pups on San Miguel, San Nicolas, and Santa Barbara islands. Some movement has been documented between the U.S. Stock and Western Baja California, Mexico Stock, but rookeries in the United States are widely separated from the major rookeries of western Baja California. Smaller numbers of pups are born on San Clemente Island, the Farallon Islands, and Año Nuevo Island (Lowry et al. 1991). The California sea lion is by far the most commonly-sighted pinniped species at sea or on land in the vicinity of NBPL and northern San Diego Bay. In California waters, sea lions represented 97 percent (381 of 393) of identified pinniped sightings at sea during the 1998–1999 NMFS surveys (Carretta et al. 2000). They were sighted during all seasons and in all areas with survey coverage from nearshore to offshore areas (Carretta et al. 2000). Sea lions while potentially present at-sea, are most commonly seen hauled-out on piers and buoys within and leading into San Diego Bay, (Merkel & Associates, Inc. 2008). In a study of California sea lion reaction to human activity, Holcomb et al. (2009) showed that in general sea lions are rather resilient to human disturbance.

Population Abundance

The entire population cannot be counted because all age and sex classes are never ashore at the same time. In lieu of counting all sea lions, pups are counted when all are ashore, in July during the breeding season, and the number of births is estimated from pup counts (Carretta et al. 2012). The size of the population is then estimated from the number of births and the proportion of pups in the population. Based on these censuses, the U.S. stock has generally increased from the early 1900s, to a current estimate of 296,750, with a minimum estimate of 153,337 (Carretta et al. 2012). There are indications that the California sea lion may have reached or is approaching carrying capacity, although more data are needed to confirm that leveling in growth persists (Carretta et al. 2012).

San Diego Bay hosts a resident non-breeding population of California sea lions, numbers of which fluctuate as individuals move between the bay and rookeries on offshore islands. The Navy has conducted numerous marine mammal surveys overlapping the north San Diego Bay project area and the potential ZOI for impact and vibratory pile driving operations. California sea lions regularly occur on rocks, buoys and other structures, and especially on bait barges (Figure 3.4-3), although numbers vary greatly. Surveys were conducted along two survey routes through the northern part of the bay during 2007-2008 (Merkel & Associates, Inc. 2008). These transect surveys were recently repeated with minor modifications to thoroughly cover the northern part of the bay (U.S. Pacific Fleet 2009-2012; TDI 2012b).



0 0.25 0.5 Kilometers
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Figure 3.4-3
Structures Used as Haulouts by Sea Lions

N

Based on the survey results, the average abundance of sea lions within the maximum project ZOI in northern San Diego Bay is 63.00 individuals, which translates to a site-specific density estimate of 5.48 individuals/km^2.

Behavior and Ecology

California sea lions are gregarious during the breeding season and social on land during other times. California sea lions' food consists of squid, octopus, and a variety of fishes. While no studies have occurred of their diet in the bay, studies of food sources have been done in other California coastal areas (Antonelis et al. 1990; Lowry et al. 1990; Melin et al. 1993; Hanni and Long 1995; Henry et al. 1995). Fish species found in the bay that sea lions most likely feed on include spiny dogfish, jack mackerel, Pacific herring, Pacific sardine, and northern anchovy. They also eat octopus and leopard shark (NAVFAC Southwest and Port of San Diego 2011).

California sea lions show a high tolerance for human activity (Holcomb et al. 2009), modify their foraging in response to spatial and temporal variations in the availability of different prey species (Lowry et al. 1991), and make opportunistic use of almost any available structures as haulouts (NAVFAC Southwest and Port of San Diego 2011).

Acoustics

On land, California sea lions make incessant, raucous barking sounds; these have most of their energy at less than 2 kHz (Schusterman et al. 1967). Males vary both the number and rhythm of their barks depending on the social context; the barks appear to control the movements and other behavior patterns of nearby conspecifics (Schusterman 1977). Females produce barks, squeals, belches, and growls in the frequency range of 0.25 to 5 kHz, while pups make bleating sounds at 0.25 to 6 kHz. California sea lions produce two types of underwater sounds: clicks (or short- duration sound pulses) and barks (Schusterman et al. 1966, 1967, Schusterman and Baillet 1969), both of which have most of their energy below 4 kHz (Schusterman et al. 1967).

The range of maximal hearing sensitivity underwater is between 1 and 28 kHz (Schusterman et al. 1972). Functional underwater high frequency hearing limits are between 35 and 40 kHz, with peak sensitivities from 15 to 30 kHz (Schusterman et al. 1972). The California sea lion shows relatively poor hearing at frequencies below 1 kHz (Kastak and Schusterman 1998). Peak hearing sensitivities in air are shifted to lower frequencies; the effective upper hearing limit is approximately 36 kHz (Schusterman 1974). The best range of sound detection is from 2 to 16 kHz (Schusterman 1974). Kastak and Schusterman (2002) determined that hearing sensitivity generally worsens with depth—hearing thresholds were lower in shallow water, except at the highest frequency tested (35 kHz), where this trend was reversed. Octave band noise levels of 65 to 70 dB above the animal's threshold produced an average temporary threshold shift (TTS) of 4.9 dB in the California sea lion (Kastak et al. 1999). Center frequencies were 1 kHz for corresponding threshold testing at 1 kHz and 2 kHz for threshold testing at 2 kHz; the duration of exposure was 20 min.

3.4.2.2 Harbor Seal

Status and Management

Harbor seals, which are members of the family Phocidae ("true seals"), inhabit coastal and estuarine waters and shoreline areas from Baja California to western Alaska. For management purposes, differences in mean pupping date (i.e., birthing), movement patterns, pollutant loads and fishery interactions have led to the recognition of three separate harbor seal stocks along the west coast of the continental U.S. The three distinct stocks are: 1) inland waters of Washington State (including Hood Canal, Puget Sound, and the Strait of Juan de Fuca out to Cape Flattery), 2) outer coast of Oregon and Washington, and 3) California (Carretta et al. 2012). The California stock is the only stock that is expected to occur within the Project Area. The California Stock of harbor seal is not considered strategic or depleted under the MMPA.

Distribution

Harbor seals are considered abundant throughout most of their range from Baja California to the eastern Aleutian Islands. An unknown number of harbor seals also occur along the west coast of Baja California, at least as far south as Isla Asuncion, which is about 100 miles south of Punta Eugenia. Peak numbers of harbor seals haul-out on land during late May to early June, which coincides with the peak of their molt. They favor sandy, cobble, and gravel beaches (Stewart and Yochem 1994), with multiple haul-outs identified along the California mainland and Channel Islands (Carretta et al. 2012).

Population Abundance

Based on post-breeding counts of individuals at known haul-outs, corrected for the proportion of the population that is out at sea, the population estimate for the California stock of harbor seal is 30,196 (CV = 0.157). The minimum population size is estimated as 26,667, with numbers apparently stabilizing during the past decade (Carretta et al. 2012). Harbor seals are relatively uncommon within San Diego Bay. Sightings in the Navy transect surveys of northern San Diego Bay cited above were limited to individuals outside of the ZOI, on the south side of Ballast Point. Therefore, the use of transect data would result in a density estimate of zero, which is unrealistic given the known occurrence of harbor seals in the general vicinity and the likelihood that a small number of individuals could occur (TDI 2012b; Jenkins 2012). The Navy Marine Species Density Database (Hanser et al. 2012) developed an estimate for all of the waters of the Southern California Range Complex during winter and spring of 0.0202/km^2. Recent observations suggest the occurrence of 3 individuals within the ZOI just south of the Fuel Pier for approximately one month during the early spring (Jenkins 2012). Rather than rely on regional density estimates, this EA conservatively assumes the presence of these individuals as recently observed within the ZOI, for up to 30 days during the period of in-water activities.

Behavior and Ecology

Harbor seals prefer sheltered coastal waters and feed on schooling benthic and epibenthic fish species in shallow water (Bonnell and Dailey 1993). While not studied in the bay, specific prey species have been studied in other California waters (Stewart and Yokem 1985, 1994; Oxman

1993; Henry et al. 1995). Of particular note to San Diego Bay are these potential prey species: specklefin midshipman, plainfin midshipman, jack mackerel, shiner surfperch, yellowfin goby, and English sole. Harbor seals also eat octopus, of which two species are found in the bay (NAVFAC Southwest and Port of San Diego 2011). Although their ecological niche in the bay has not been studied, this pinniped is not likely to play a significant role because of their low numbers (NAVFAC Southwest and Port of San Diego 2012). Harbor seals mate at sea and females give birth during the spring and summer; although the "pupping season" varies by latitude.

Acoustics

In air, harbor seal males produce a variety of low-frequency (<4 kHz) vocalizations, including snorts, grunts, and growls. Male harbor seals produce communication sounds in the frequency range of 100 to 1,000 Hz (Richardson et al. 1995). Pups make individually unique calls for mother recognition that contain multiple harmonics with main energy below 0.35 kHz (Bigg 1981, Thomson and Richardson 1995). Harbor seals hear nearly as well in air as underwater and had lower thresholds than California sea lions (Kastak and Schusterman 1998). Kastak and Schusterman (1998) reported airborne low frequency (100 Hz) sound detection thresholds at 65.4 dB re 20 µPa for harbor seals. In air, they hear frequencies from 0.25 kHz - 30 kHz and are most sensitive from 6 to 16 kHz (Richardson et al. 1995; Terhune and Turnbull 1995; Wolski et al. 2003).

Adult males also produce underwater sounds during the breeding season that typically range from 0.025 to 4 kHz (duration range: 0.1 s to multiple seconds; Hanggi and Schusterman 1994). Hanggi and Schusteman (1994) found that there is individual variation in the dominant frequency range of sounds between different males, and Van Parijs et al. (2003) reported oceanic, regional, population, and site-specific variation that could be vocal dialects. In water, they hear frequencies from 1 to 75 kHz (Southall 2007) and can detect sound levels as weak as 60 to 85 dB re 1 µPa within that band. They are most sensitive at frequencies below 50 kHz; above 60 kHz sensitivity rapidly decreases.

3.4.2.3 Gray Whale

Status and Management

The Eastern North Pacific stock of gray whale occurs off southern California during their annual migration between summer feeding areas in the Bering and southern Chukchi seas and winter calving areas in Baja California and mainland Mexico. The southward migration occurs during November-December, whereas the return northward migration occurs during February-May. In 1994, due to steady increases in population abundance, the Eastern North Pacific stock of gray whales was removed from listing under the ESA. This stock is not considered strategic or depleted under the MMPA.

Distribution

The Eastern North Pacific population is found from the upper Gulf of California (Tershy and Breese 1991), south to the tip of Baja California, and up the Pacific coast of North America to the

Chukchi and Beaufort seas. There is a pronounced seasonal north-south migration. The eastern North Pacific population summers in the shallow waters of the northern Bering Sea, the Chukchi Sea, and the western Beaufort Sea (Rice and Wolman 1971). The northern Gulf of Alaska (near Kodiak Island) is also considered a feeding area; some gray whales occur there year-round (Moore et al. 2007). Some individuals spend the summer feeding along the Pacific coast from southeastern Alaska to central California (Sumich 1984; Calambokidis et al. 1987, 2002). Photo-identification studies indicate that gray whales move widely along the Pacific coast and are often not sighted in the same area each year (Calambokidis et al. 2002). In October and November, the whales begin to migrate southeast through Unimak Pass and follow the shoreline south to breeding grounds on the west coast of Baja California and the southeastern Gulf of California (Braham 1984; Rugh 1984). The average gray whale migrates 4,050 to 5,000 nm (7,500 to 10,000 km) at a rate of 80 nm (147 km) per day (Rugh et al. 2001; Jones and Swartz 2002). Although some calves are born along the coast of California (Shelden et al. 2004), most are born in the shallow, protected waters on the Pacific coast of Baja California from Morro de Santo Domingo (28°N) south to Isla Creciente (24°N) (Urbán- Ramírez et al. 2003). The main calving sites are Laguna Guerrero Negro, Laguna Ojo de Liebre, Laguna San Ignacio, and Estero Soledad (Rice et al. 1981).

Peak abundance of gray whales off the coast of San Diego is January during the southward migration, and in March during the migration north; although females with calves, which depart Mexico later than males or females without calves, can be sighted from March through May or June (Leatherwood 1974; Poole 1984; Rugh et al. 2001; Stevick et al. 2002; Angliss and Outlaw 2008). Gray whales are infrequent migratory transients offshore of San Diego Bay only during cold-water months (Carretta et al. 2000). Migrating gray whales that might infrequently transit the nearshore waters would not be expected to forage, and would likely be present for min to less than one or two hours at typical travel speeds of 3 knots (approximately 3.5 miles per hour) (Perryman et al. 1999, Mate and Urbán-Ramirez 2003).

A mean group size of 2.9 gray whales was reported for both coastal (16 groups) and non-coastal (15 groups) areas around San Clemente Island. The largest group reported was nine animals. The largest group reported by U.S. Navy (in 1998) was 27 animals (Carretta et al. 2000). Gray whales are not expected in the project area except during the northward migration, when they are closest to the coast (Rice et al. 1981).

<u>Population Abundance</u>

The Eastern North Pacific stock has continued to increase at rate of approximately 2.5 to 3.3 percent per year on average, with the most recent estimate of abundance being 19,126 individuals (Allen and Angliss 2010). Gray whales can occur near the mouth of San Diego Bay, and occasionally enter the bay (NAVFAC Southwest and Port of San Diego 2011). However, their occurrence in San Diego Bay is sporadic and unpredictable. Estimates of regional cold season abundance and density in the offshore waters (Hanser et al. 2012) are not representative of the project area. Even though gray whale transitory occurrence near the mouth of San Diego

Bay is infrequent, for the purposes of this IHA, it is conservatively assumed that one individual would be present in the ZOI during up to 15 days of the northward migration.

Behavior and Ecology

Gray whales use their baleen to sift out crustaceans, molluscs, and other invertebrates that they suck from bottom sediments. Bay species of potential benefit to gray whales for food would include medium to large size bivalve molluscs and decapod crustaceans, depending on the spacing between the baleen elements. However, they are unlikely to be feeding in the bay.

Gray whales dive to 160 to 200 ft for 5 to 8 min when foraging. In the breeding lagoons, dives are usually less than 6 min (Jones and Swartz, 2002), although dives as long as 26 min have been recorded (Harvey and Mate 1984). Gray whales may remain submerged near the surface for 7 to 10 min and travel 1600 ft or more before resurfacing to breathe when migrating. The maximum known dive depth is 560 ft (Jones and Swartz 2002). Migrating gray whales sometimes exhibit a unique snorkeling behavior—they surface cautiously, exposing only the area around the blow hole, exhale quietly without a visible blow, and sink silently beneath the surface (Jones and Swartz 2002). Mate and Urbán-Ramirez (2003) noted that 30 of 36 locations for a migratory gray whale with a satellite tag were in water <330 ft deep, with the deeper water locations all in the SCB within the Channel Islands. Whales in that study maintained consistent speed indicating directed movement. There has been only one study yielding a gray whale dive profile, and all information was collected from a single animal that was foraging off the west coast of Vancouver Island (Malcolm and Duffus 2000; Malcolm et al. 1996). They noted that the majority of time was spent near the surface on interventilation dives (<10 ft depth) and near the bottom (extremely nearshore in a protected bay with mean dive depth of 60 ft, range 46-72 ft depth). There was very little time spent in the water column between surface and bottom. Foraging depth on summer feeding grounds is between 160-200 ft (50-60 meters [m]) (Jones and Swartz 2002). Based on this very limited information, the following is a rough estimate of depth distribution for gray whales: 50 percent at <13 ft (surface and interventilation dives) and 50 at 13-59 ft. However, most gray whales would be expected at shallower depths during transit through southern California where foraging does not occur due to migration and limited suitable bottom prey habitat.

Acoustics

Au (2000) reviewed the characteristics of gray whale vocalizations. Gray whales produce broadband signals ranging from 100 Hz to 4 kHz (and up to 12 kHz) (Dahleim et al. 1984; Jones and Swartz 2002). The most common sounds on the breeding and feeding grounds are knocks (Jones and Swartz 2002), which are broadband pulses from about 100 Hz to 2 kHz and most energy at 327 to 825 Hz. The source level for knocks is approximately 142 dB re 1μPa at 1 m (Cummings et al. 1968). During migration, individuals most often produce low-frequency moans (Crane and Lashkari 1996). The structure of the gray whale ear is evolved for low-frequency hearing (Ketten 1992). The ability of gray whales to hear frequencies below 2 kHz has been demonstrated in playback studies (Cummings and Thompson 1971; Dalhheim and Ljungblad 1990; Moore and Clark 2002). Gray whale responses to noise include changes in

swimming speed and direction to move away from the sound source; abrupt behavioral changes from feeding to avoidance, with a resumption of feeding after exposure; changes in calling rates and call structure; and changes in surface behavior, usually from traveling to milling (e.g., Moore and Clark 2002). Gailey et al. (2007) reported no apparent behavioral disturbance for Western Pacific Gray whales in response to low-frequency seismic survey.

3.4.2.4 Coastal Bottlenose Dolphin

Status and Management

The California coastal stock of bottlenose dolphin is distinct from the offshore population and is resident in the immediate (within 1 km of shore) coastal waters, occurring primarily between Point Conception, California, and San Quintin, Mexico. The California Coastal Stock of bottlenose dolphin is not considered strategic or depleted under the MMPA.

Distribution

The bottlenose dolphin California Coastal stock occurs at least from Point Conception south into Mexican waters, at least as far south as San Quintin, Mexico. In southern California, animals are found within 500 m of the shoreline 99 percent of the time and within 250 m 90 percent of the time (Hanson and Defran 1993). Occasionally, during warm-water incursions such as during the 1982–1983 El Niño event, their range extends as far north as Monterey Bay (Wells et al. 1990). Bottlenose dolphins in the Southern California Bight (SCB) – the coastal waters between Point Conception and just south of the Mexican border - appear to be highly mobile within a narrow coastal zone (Defran et al. 1999), and exhibit little seasonal site fidelity to the SCB region (Defran and Weller 1999) and along the California coast; over 80 percent of the dolphins identified in Santa Barbara, Monterey, and Ensenada have also been identified off San Diego (Navy 2010e).

Population Abundance

Based on photographic mark-recapture surveys conducted along the San Diego coast in 2004 and 2005, population size for the California Coastal Stock is estimated to be 323 individuals, with a 95 percent confidence interval of 259-430 (Carretta et al. 2012). If the 35 percent of animals encountered that lack identifiable dorsal fin marks were included within this stock, the true population size would be closer to 450-500 animals (Carretta et al. 2012). In the aforementioned surveys of San Diego Bay, numbers of coastal bottlenose dolphins were highly variable (from 0 to 40), with an average of 8.8 individuals within the maximum project ZOI.

Behavior and Ecology

The coastal stock utilizes a limited number of fish prey species with up to 74 percent being various species of surfperch or croakers, a group of non-migratory year-round coastal inhabitants (Defran et al. 1999, Allen et al. 2006). For southern California, common croaker prey species include spotfin croaker, yellowfin croaker, and California corbina, while common surfperch species include barred surfperch and walleye surfperch (Allen et al. 2006). The corbina and barred surfperch are the most common surf zone fish where bottlenose dolphins

have been observed foraging (Allen et al. 2006). Defran et al. (1999) postulated that the coastal stock of bottlenose dolphins showed significant movement within their home range (Central California to Mexico) in search of preferred but patchy concentrations of nearshore prey (i.e., croakers and surfperch). Bearzi et al (2009), in an analysis of coastal bottlenose dolphins in the vicinity of Santa Monica, also concluded that low individual re-sighting rates indicates a large coastal bottlenose dolphin distribution influenced by prey distribution. After finding concentrations of prey, animals may then forage within a more limited spatial extent to take advantage of this local accumulation until such time that prey abundance is reduced; the dolphins then shift location once again to be over larger distances (Defran et al.1999; Bearzi et al. 2009). Specific prey items of bottlenose dolphins along the California coast were studied by Defran et al. (1986). San Diego Bay bottlenose dolphins forage on species such as jack mackerel, Cortez grunt, striped mullet, black croaker, white sea bass, white croaker, spotted croaker, yellowfin croaker, California corbina, queenfish, Pacific mackerel, Pacific bonito, and sierra (NAVFAC Southwest and Port of San Diego 2011).

Acoustics

Sounds emitted by bottlenose dolphins have been classified into two broad categories: pulsed sounds (including clicks and burst-pulses) and narrow-band continuous sounds (whistles), which usually are frequency modulated. Whistles range in frequency from 0.8 to 24 kHz but can also go much higher. Clicks and whistles have a dominant frequency range of 110 to 130 kHz and a source level of 218 to 228 dB re 1 µPa at 1 m (peak to peak levels; Au 1993) and 3.5 to 14.5 kHz with a source level of 125 to 173 dB re 1 µPa at 1 m, respectively (Ketten 1998). The bottlenose dolphin has a functional high-frequency hearing limit of 160 kHz (Au 1993) and can hear sounds at frequencies as low as 40 to 125 Hz (Turl 1993). Inner ear anatomy of this species has been described (Ketten 1992). Electrophysiological experiments suggest that the bottlenose dolphin brain has a dual analysis system: one specialized for ultrasonic clicks and the other for lower-frequency sounds, such as whistles (Ridgway 2000). The audiogram of the bottlenose dolphin shows that the lowest thresholds occurred near 50 kHz at a level around 45 dB re 1 µPa (Nachtigall et al. 2000; Finneran and Houser 2006, 2007). Below the maximum sensitivity, thresholds increased continuously up to a level of 137 dB re 1 µPa at 75 Hz. Above 50 kHz, thresholds increased slowly up to a level of 55 dB re 1 µPa at 100 kHz, then increased rapidly above this to about 135 dB re 1 µPa at 150 kHz. Scientists have reported a range of best sensitivity between 25 and 70 kHz, with peaks in sensitivity occurring at 25 and 50 kHz at levels of 47 and 46 dB re 1 µPa (Nachtigall et al. 2000).

Temporary threshold shifts (TTS) in hearing have been experimentally induced and behavioral responses observed in captive bottlenose dolphins (Ridgway et al. 1997; Schlundt et al. 2000; 2006, Nachtigall et al. 2003; Finneran et al. 2002, 2005, 2007). Ridgway et al. (1997) observed changes in behavior at the following minimum levels for 1 second tones: 186 dB re 1 µPa at 3 kHz, 181 dB re 1 µPa at 20 kHz, and 178 dB re 1 µPa at 75 kHz. TTS levels were 194 to 201 dB re 1 µPa at 3 kHz, 193 to 196 dB re 1 µPa at 20 kHz, and 192 to 194 dB re 1 µPa at 75 kHz. Schlundt et al. (2000) exposed bottlenose dolphins to intense tones (0.4, 3, 10, 20, and 75 kHz); the animals demonstrated altered behavior at source levels of 178 to 193 dB re 1 µPa, with TTS after

exposures between 192 and 201 dB re 1 µPa at 1 m (though one dolphin exhibited TTS after exposure at 182 dB re 1 µPa). Nachtigall et al. (2003) determined threshold for a 7.5 kHz pure tone stimulus. No shifts were observed at 165 or 171 dB re 1 µPa, but when the sound level reached 179 dB re 1 µPa, the animal showed the first sign of TTS. Recovery apparently occurred rapidly, with full recovery apparently within 45 min following sound exposure. TTS measured between 8 and 16 kHz (negligible or absent at higher frequencies) after 30 min of sound exposure (4 to 11 kHz) at 160 dB re 1 µPa (Nachtigall et al. 2004).

3.4.3 Environmental Consequences

3.4.3.1 Approach to Analysis

The analysis identifies the potential significance of impacts to marine mammals based on: 1) the importance (i.e., legal, commercial, recreational, ecological, or scientific) of the resource; 2) the proportion of the resource that would be affected relative to its occurrence in the region; 3) the sensitivity of the resource to proposed activities; and 4) the duration and ecological ramifications of the impact. An impact would be considered significant if it would permanently reduce the population (stock) size or distribution of a marine mammal.

Impacts to marine mammals associated with Alternative 1 or Alternative 2 would be primarily from increased underwater noise associated with demolition of the fuel pier, construction of the new fuel pier, and dredging of the turning basin. For pile driving and extraction associated with fuel pier construction, as well as pile driving at the proposed temporary Navy MMP relocation site, the Navy worked with researchers from the University of Washington to develop a rigorous model of underwater transmission loss, taking into account site-specific bathymetry and shoreline characteristics. The model's description, the duration of the activities upon which the model is based, and the model's results (predicted underwater sound contours) are summarized in Section 3.2.3.1. Additional details related to the underwater noise model's analysis are provided in Appendix E.4.

In addition to the underwater noise model, the predicted number of sea lions and bottlenose dolphins impacted, provided in Section 3.4.3.3, are also based on the spatial distribution of submergence both species, discussed below. The airborne sound propagation model and the take calculation are also discussed below.

<u>Fundamentals of Sound</u>

Sound is a physical phenomenon consisting of regular pressure oscillations that travel through a medium, such as air or water. Sound frequency is the rate of oscillation, measured in cycles per second or Hertz (Hz). The amplitude (loudness) of a sound is its pressure, whereas its intensity is proportional to power and is pressure squared. The standard international unit of measurement for pressure is the Pascal, which is a force of 1 Newton exerted over an area of 1 square meter; sound pressures are measured in microPascals (µPa).

Due to the wide range of pressure and intensity encountered during measurements of sound, a logarithmic scale is used, based on the decibel (dB), which, for sound intensity, is 10 times the $\log_{10}$ of the ratio of the measurement to reference value. For sound pressure level (SPL), the

amplitude ratio in dB is 20 times the $\log_{10}$ ratio of measurement to reference. Hence each increase of 20 dB in SPL reflects a 10-fold increase in signal amplitude (whether expressed in terms of pressure or particle motion). That is, 20 dB means 10 times the amplitude, 40 dB means 100 times the amplitude, 60 dB means 1,000 times the amplitude, and so on. Because the dB is a relative measure, any value expressed in dB is meaningless without an accompanying reference. In describing underwater sound pressure, the reference amplitude is usually 1 µPa, and is expressed as "dB re 1 µPa." For in-air sound pressure, the reference amplitude is usually 20 µPa and is expressed as "dB re 20 µPa."

The method commonly used to quantify airborne sounds consists of evaluating all frequencies of a sound according to a weighted filter that mimics human sensitivity to amplitude as a function of frequency. This is called A-weighting and the decibel level measured is called the A-weighted sound level (dBA). Methods of frequency weighting that reflect the hearing of marine mammals have been proposed (Southall et al. 2007; Finneran and Jenkins 2012) and are being used in new analyses of Navy testing and training effects, but have not been adopted for pile driving and other non-explosive impulsive sounds (Marine Species Modeling Team 2012). Therefore, underwater sound levels are not weighted and measure the entire frequency range of interest. In the case of marine construction work, the frequency range of interest is 10 Hz to 10 kHz.

Table 3.4-2 summarizes commonly used terms to describe underwater sounds. Two common descriptors are the instantaneous peak SPL and the root mean square (rms) SPL. The peak pressure is the instantaneous maximum or minimum overpressure observed during each pulse or sound event and is presented in dB re 1 µPa. The rms level is the square root of the mean of the squared pressure (= intensity) level as measured over a specified time period. All underwater sound levels throughout the remainder of this application are presented in dB re 1 µPa unless otherwise noted.

<u>Sound Exposure Criteria and Thresholds</u>

Under the MMPA, NMFS has defined levels of harassment for marine mammals. Level A harassment is defined as "Any act of pursuit, torment, or annoyance which has the potential to injure a marine mammal or marine mammal stock in the wild." Level B harassment is defined as "Any act of pursuit, torment, or annoyance which has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including but not limited to migration, breathing, nursing, breeding, feeding or sheltering."

Since 1997, NMFS has used generic sound exposure thresholds to determine when an activity in the ocean that produces sound might result in impacts to a marine mammal such that a take by harassment might occur (NMFS 2005). Recent studies of pile driving used to construct offshore wind turbines have validated the distances over which underwater sound from pile driving may exceed NMFS thresholds (Bailey et al. 2010), as well as behavioral responses of harbor porpoises (*Phocoena phocoena*) to intense sound from pile driving (Brandt et al. 2011; Thompson et al. 2010). Current NMFS practice regarding exposure of marine mammals to high level

sounds is that cetaceans and pinnipeds exposed to impulsive sounds of 180 and 190 dB rms or above, respectively, are considered to have been taken by Level A (injurious) harassment.

Level A harassment is assumed to result in a "stress response," which refers to an increase in energetic expenditure that results from exposure to the stressor and which is predominantly characterized by either the stimulation of the sympathetic nervous system or the hypothalamic-pituitary-adrenal axis (Reeder and Kramer 2005). The presence and magnitude of a stress response in an animal depends on the animal's life history stage, environmental conditions, reproductive state, and experience with the stressor (Navy 2010e).

Table 3.4-2. Definitions of Acoustical Terms

Term	*Definition*
Decibel, dB	A unit describing the amplitude of sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure of the sound measured to the reference pressure. The reference pressure for water is 1 microPascal (μPa) and for air is 20 μPa (approximate threshold of human audibility).
Sound Pressure Level, SPL	Sound pressure is the force per unit area, usually expressed in microPascals where 1 Pascal equals 1 Newton exerted over an area of 1 square meter. The SPL is expressed in decibels as 20 times the logarithm to the base 10 of the ratio between the pressure exerted by the sound to a reference sound pressure. SPL is the quantity that is directly measured by a sound level meter.
Frequency, Hz	Frequency is expressed in terms of oscillations, or cycles, per second. Cycles per second are commonly referred to as hertz (Hz). Typical human hearing ranges from 20 Hz to 20 kHz.
Peak Sound Pressure, dB re 1 μPa	Peak SPL is based on the largest absolute value of the instantaneous sound pressure over the frequency range from 20 Hz to 20 kHz. This pressure is expressed in this application as dB re 1 μPa.
Root-Mean-Square (rms), dB re 1μPa	The rms level is the square root of the mean of the squared pressure level(s) as measured over a specified time period. For pulses, the rms has been defined as the average of the squared pressures over the time that comprise that portion of waveform containing 90 percent of the sound energy for one impact pile driving impulse.
Sound Exposure Level (SEL), dB re 1 μPa2 sec	Sound exposure level is a measure of energy. Specifically, it is the dB level of the time integral of the squared-instantaneous sound pressure, normalized to a 1-sec period. It can be an extremely useful metric for assessing cumulative exposure because it enables sounds of differing duration, to be compared in terms of total energy.
Waveforms, μPa over time	A graphical plot illustrating the time history of positive and negative sound pressure of individual pile strikes shown as a plot of μPa over time (i.e., seconds).
Frequency Spectrum, dB over frequency range	The amplitude of sound at various frequencies, usually shown as a graphical plot of the mean square pressure per unit frequency ($\mu Pa^2/Hz$) over a frequency range (e.g., 10 Hz to 10 kHz in this application).
A-Weighting Sound Level, dBA	The SPL in decibels as measured on a sound level meter using the A- or C-weighting filter network. The A-weighting filter de-emphasizes the low and high frequency components of the sound in a manner similar to the frequency response of the human ear and correlates well with subjective human reactions to noise.
Ambient Noise Level	The background sound level, which is a composite of noise from all sources near and far. The normal or existing level of environmental noise at a given location.

Behavioral harassment (Level B) is considered to have occurred when marine mammals are exposed to sounds at or above 160 dB rms for impulse sounds (e.g., impact pile driving) and 120 dB rms for continuous noise (e.g., vibratory pile driving), but below injurious thresholds. Behavioral harassment may or may result in a stress response. The criteria for vibratory pile driving would also be applicable to vibratory pile extraction or the use of a pneumatic chipper. The application of the 120 dB rms threshold can sometimes be problematic because this threshold level can be either at or below the ambient noise level of certain locations. As a result, these levels are considered precautionary (NMFS 2009, 74 FR 41684). NMFS is developing new science-based thresholds to improve and replace the current generic exposure level thresholds, but the criteria have not been finalized (Southall et al. 2007). The current Level A (injury) and Level B (disturbance) thresholds are provided in Table 3.4-3.

Table 3.4-3. Injury and Disturbance Thresholds for Underwater and Airborne Sounds

Marine Mammals	*Airborne Marine Construction Criteria (Impact and Vibratory Pile Driving) (re 20 µPa)*	*Underwater Vibratory Pile Driving Criteria (e.g., non-pulsed/continuous sounds) (re 1 µPa)*		*Underwater Impact Pile Driving Criteria (e.g., pulsed sounds) (re 1 µPa)*	
	Disturbance Guideline Threshold (Haulout)[1]	*Level A Injury Threshold*	*Level B Disturbance Threshold*	*Level A Injury Threshold*	*Level B Disturbance Threshold*
Cetaceans (whales, dolphins, porpoises)	N/A	180 dB rms	120 dB rms	180 dB rms	160 dB rms
Pinnipeds (seals, sea lions, walrus; except harbor seal)	100 dB rms (unweighted)	190 dB rms	120 dB rms	190 dB rms	160 dB rms
Harbor seal	90 dB rms (unweighted)	190 dB rms	120 dB rms	190 dB rms	160 dB rms

Notes: [1]Sound level at which pinniped haulout disturbance has been documented. Not an official threshold, but used as a guideline. N/A = not applicable.

Limitations of Existing Noise Criteria

To date, there is no research or data supporting a response by pinnipeds or odontocetes to continuous sounds from vibratory pile driving as low as the 120 dB threshold. The 120 dB rms threshold level for continuous noise originated from research conducted by Malme et al. (1984, 1986) for California gray whale response to continuous industrial sounds such as drilling operations. The 120 dB continuous sound threshold should not be confused with the 120 dB pulsed sound criterion established for migrating bowhead whales in the Arctic as a result of research in the Beaufort Sea (Richardson et al. 1995; Miller et al. 1999). Southall et al. (2007) reviewed studies conducted to document behavioral responses of harbor seals and northern elephant seals to continuous sounds under various conditions, and concluded that those limited

studies suggest that exposures between 90 dB and 140 dB re 1 µPa rms generally do not appear to induce strong behavioral responses.

Ambient Noise

Ambient noise by definition is background noise and it has no single source or point. Ambient noise varies with location, season, time of day, and frequency. Ambient noise is continuous, but with much variability on time scales ranging from less than one second to one year (Richardson et al. 1995). Ambient underwater noise in San Diego Bay is highly variable over time, largely because of anthropogenic sources that include vessel engines and cranes, generators, and other types of mechanized equipment on piers and wharves or the adjacent shoreline (Urick 1983).

Underwater sound levels are comprised of multiple sources, including physical noise, biological noise, and anthropogenic noise. Physical noise includes waves at the surface, earthquakes, ice, and atmospheric noise. Biological noise includes sounds produced by marine mammals, fish, and invertebrates. Anthropogenic noise consists of vessels (small and large), dredging, aircraft overflights, and construction noise. Known noise levels and frequency ranges associated with anthropogenic sources similar to those that would be used for this project are summarized in Table 3.4-4. Details of each of the sources are described in the following text.

Table 3.4-4. Representative Noise Levels of Anthropogenic Sources

Noise Source	*Frequency Range (Hz)[1]*	*Underwater Noise Level (dB re 1 µPa)*	*Reference*
Small vessels	250 – 1,000	151 dB rms at 1 m	Richardson et al. 1995
Tug docking gravel barge	200 – 1,000	149 dB rms at 100 m	Blackwell and Greene 2002
Vibratory driving of 72-in Steel Pipe pile	10 – 1,500	180 dB rms at 10m	CALTRANS 2007
Impact driving of 36-in Steel Pipe pile	10 – 1,500	195 dB rms at 10m	WSDOT 2007
Impact driving of 66-in Cast in Steel Shells (CISS) piles	100 – 1,500	195 dB rms at 10 m	Reviewed in Hastings and Popper 2005

Notes: [1]These are the dominant frequency ranges but there is often considerable energy outside these ranges.

In-water construction activities associated with the Project would include impact pile driving and vibratory pile driving. The sounds produced by these activities fall into one of two sound types: pulsed and non-pulsed (defined below). Impact pile driving produces pulsed sounds, while vibratory pile driving produce non-pulsed (or continuous) sounds. The distinction between these two general sound types is important because they have differing potential to cause physical effects, particularly with regard to hearing (e.g., Ward 1997 as cited in Southall et al. 2007).

Pulsed sounds (e.g., explosions, gunshots, sonic booms, seismic airgun pulses, and impact pile driving) are brief, broadband, atonal transients (American National Standards Institute 1986; Harris 1998) and occur either as isolated events or repeated in some succession (Southall et al. 2007). Pulsed sounds are all characterized by a relatively rapid rise from ambient pressure to a maximal pressure value followed by a decay period that may include a period of diminishing, oscillating maximal and minimal pressures (Southall et al. 2007). Pulsed sounds generally have an increased capacity to induce physical injury as compared with sounds that lack these features (Southall et al. 2007).

Non-pulse (intermittent or continuous sounds) can be tonal, broadband, or both (Southall et al. 2007). Some of these non-pulse sounds can be transient signals of short duration but without the essential properties of pulses (e.g., rapid rise time) (Southall et al. 2007). Examples of non-pulse sounds include vessels, aircraft, machinery operations such as drilling or dredging, vibratory pile driving, and active sonar systems (Southall et al. 2007). The duration of such sounds, as received at a distance, can be greatly extended in highly reverberant environments (Southall et al. 2007).

In the project area, extensive measurements were made of underwater noise levels during April-May of 2012 (Figures 3.4-4 and 3.4-5; Appendix E.5). Median values were predominantly in the range of 120-130 dB re 1μPa, with substantially higher maximum rms and peak SPL readings (in excess of 150 dB re 1μPa) due to passing ships. From section 3.2.2.3, given there are about 225 commercial ship transits per day, most during daylight hours, plus an unknown but potentially equal number of recreational vessels moving in and out of San Diego Bay, underwater noise from passing ships is expected every few minutes in the North Bay. This pattern is expected to continue through the period of demolition and construction activities.

The ambient sound data for the project area suggest that with increasing distance from the project site, particularly for vibratory pile driving, as received sound levels drop below approximately 140 dB re 1μPa rms (compare to Figure 3.4-5), project sound would become undetectable with regards to potential monitoring and verification of sound levels, and that it would not be perceived by marine mammals as louder or significantly different than regularly occurring background noise due to vessels. As such it would be unlikely to elicit biologically significant behavioral reactions.

Figure 3.4-4
Ambient Underwater Sound Locations

Ambient sound levels measured over 10 minutes, labels denote observation # in summary .xls

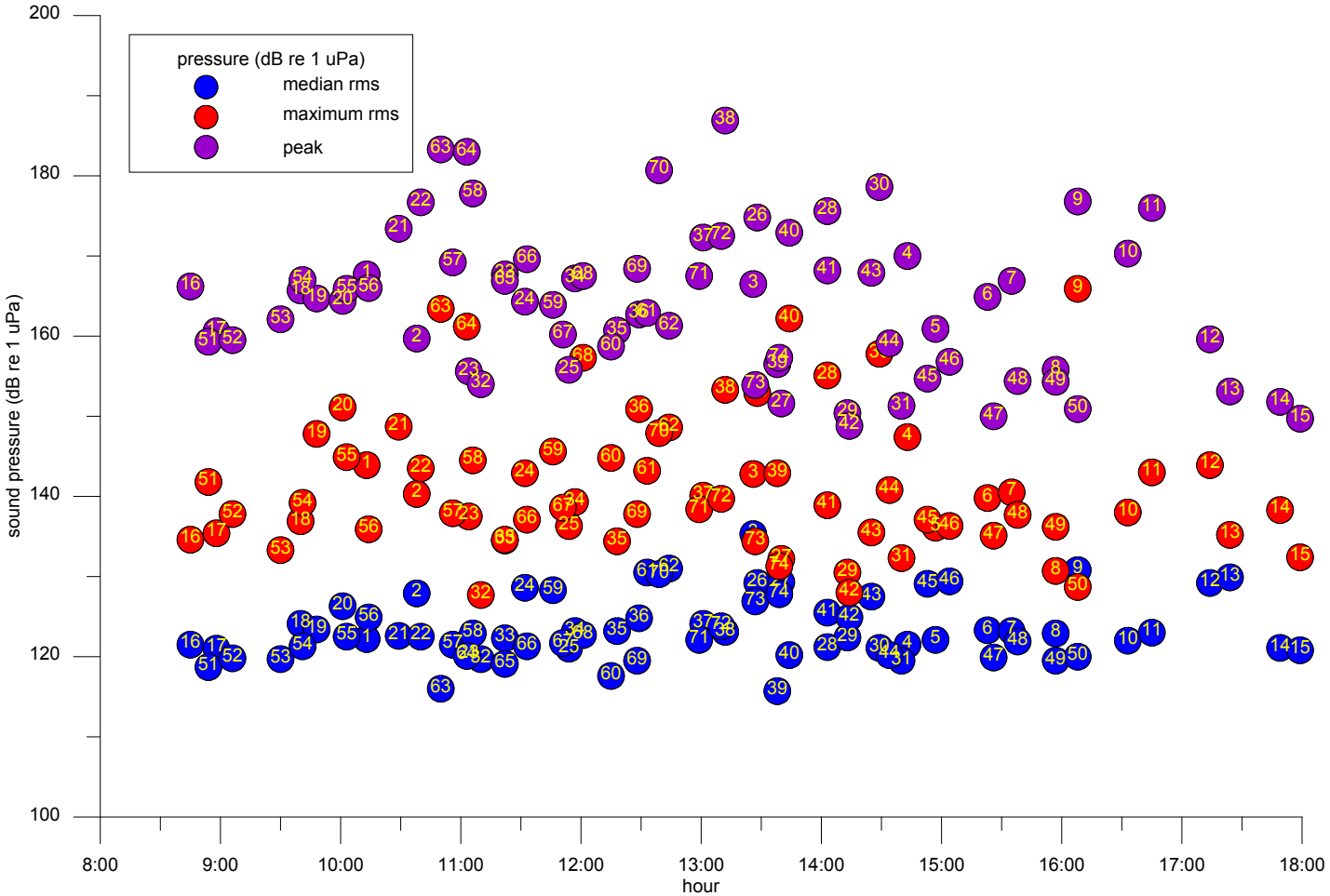


Figure 3.4-5. Ambient Sound Data from the Project Area

Underwater Sound Propagation Formula

Pile driving and vibratory pile extraction would generate underwater noise that potentially could result in disturbance to marine mammals swimming by the Project Area. Transmission loss (TL) underwater is the decrease in sound intensity due to sound spreading and chemistry- and viscosity-based absorption as an acoustic pressure wave propagates out from a source. TL parameters vary with frequency, temperature, sea conditions, current, source and receiver depth, water depth, water chemistry, and bottom composition and topography. The general formula for transmission loss is:

$$TL = B * \log_{10}(R) + C * R, \text{ where}$$

B = logarithmic (predominantly spreading) loss

C = linear (scattering and absorption) loss

R = ratio of receiver distance to source reference distance (usually 1m or 10m)

The C term is strongly dependent on frequency, temperature, and depth, but is conservatively assumed to equal zero for pile driving. The B term has a value of 10 for cylindrical spreading and 20 for spherical spreading. A practical spreading value of 15 is often used in shallow water conditions where spreading may start out spherically but then end up cylindrically as the sound in constrained by the surface and the bottom. For this application, however, a site-specific model was developed for TL from pile driving at a central point at the project site (Appendix E.4). The model is based on historical temperature-salinity data and location-dependent bathymetry. The model's predictions result in a slightly lower average rate of TL than practical spreading, and hence are conservative. For pile driving at the Navy Marine Mammal Program relocation site (NMAWC), no site-specific modeling was conducted, and practical spreading loss is assumed.

Airborne Sound Propagation Formula

Pile driving can generate airborne noise that could potentially result in disturbance to marine mammals (pinnipeds) which are hauled out or at the water's surface. As a result, the Navy analyzed the potential for pinnipeds hauled out or swimming at the surface near the project site to be exposed to airborne SPLs that could result in Level B behavioral harassment. The appropriate airborne noise thresholds for behavioral disturbance for all pinnipeds, except harbor seals is 100 dB re 20 μPa rms (unweighted) and for harbor seals is 90 dB re 20 μPa rms (unweighted) (see Table 3.4-3). A spherical spreading loss model, assuming average atmospheric conditions, was used to estimate the distance to the 100 dB and 90 dB re 20 μPa rms (unweighted) airborne thresholds. The formula for calculating spherical spreading loss is:

$$TL = 20\log r$$

where:

TL = Transmission loss

r = ratio of receiver distance to reference distance (equates to straight line distance from source when reference is at 1 m)

*Spherical spreading results in a 6 dB decrease in SPL per doubling of distance.

Basis for Estimating Take by Harassment

The U.S. Navy is seeking authorization for the potential taking of small numbers of California sea lions, harbor seals, gray whales, and coastal bottlenose dolphins in northern San Diego Bay as a result of pile removal and pile driving during demolition and construction activities associated with the Fuel Pier Replacement Project. The takes requested are expected to have no more than a minor effect on individual animals and no effect on the populations of these species. Any effects experienced by individual marine mammals are anticipated to be limited to short-term disturbance of normal behavior or temporary displacement of animals near source of the noise.

Spatial Distribution

Density assumes that marine mammals are uniformly distributed within a given area, although this is rarely the case. Marine mammals are usually clumped in areas of greater importance, for example, areas of high productivity, lower predation, safe calving, foraging, etc. The site-specific surveys of northern San Diego Bay provide high resolution of the distribution of marine mammals within the affected area. The distribution of sightings (Figure 3.4-2) indicates that the assumption of uniform or random distribution throughout the affected area is reasonable, with two qualifiers: 1) sea lions are strongly concentrated on the bait barges; and 2) the area adjacent to and inshore of the fuel pier is not used to an appreciable extent.

Submergence

Cetaceans spend their entire lives in the water and spend most of their time (>90 percent for most species) entirely submerged below the surface. When at the surface, cetacean bodies are almost entirely below the water's surface, with only the blowhole exposed to allow breathing. This makes cetaceans difficult to locate visually and also exposes them to underwater noise, both natural and anthropogenic, essentially 100 percent of the time because their ears are nearly always below the water's surface.

Seals and sea lions (pinnipeds) spend significant amounts of time out of the water during breeding, molting, and "hauling out" (resting out of the water on land or structures) periods. Sea lions in San Diego Bay are most commonly observed out of water, especially on bait barges, navigation aids, and other structures. Within the bay, harbor seals would be most likely to occur in the water. When not actively diving, pinnipeds at the surface often orient their bodies vertically in the water column and often hold their heads above the water surface. Consequently, pinnipeds would not be exposed to underwater sounds to the same extent as cetaceans occurring in the same location, but would be subject to airborne noise to a greater degree.

For the purpose of assessing impacts from underwater sound at NBPL, the Navy assumed that that both cetaceans and pinnipeds that occur in the vicinity would be submerged and at the same water depth as the source, and would thereby experience the maximum received SPLs predicted to occur at a given distance from the acoustic source on the basis of acoustic modeling.

However, pinnipeds are also conservatively assumed to be out of the water for sufficient periods to be exposed to whatever airborne noise is generated by construction activities as well.

California Sea Lion

California sea lions are present in northern San Diego Bay year-round and are by far the dominant marine mammal in the bay. The local population comprises adult females and sub-adult males and females, with adult males being uncommon (Merkel & Associates, Inc. 2008; Navy 2010e; TDI 2012b). The Navy has conducted surveys by boat for marine mammals in northern San Diego Bay and adjacent waters on 16 separate occasions between 2007 and the end of March 2012. These surveys were conducted at slow speed (approximately 3-5 knots) along the same general routes (Figure 3-1) during calm weather and excellent viewing conditions. Observers were able to closely investigate and confirm sightings. Individuals that conducted the surveys (D. Lerma, C. Johnson, K. Merkel) are of the opinion that the detectability of animals within the study area at the time of the survey approached 100 percent. However, to account for the possibility that some parts of the study area may not have been covered due to access limitations, and to allow for variation in the accuracy of counts of large numbers of animals, a 95 percent detection rate is assumed.

During the surveys, the maximum number of sea lions observed within the study area, defined as the 120 dB ZOI for potential behavioral disturbance by vibratory pile driving, was 114, with an average abundance of 63.00 individuals per survey day; this translates to an average density of 5.48/km^2. Adjusting based on 95 percent detection results in an average abundance of 66.32, and density of 5.77/km^2. This estimate is remarkably close to that of the Navy Marine Species Density Database (NMSDD) (Hanser et al. 2012) for North and Central San Diego Bay, which is 5.75/km^2 for the summer and fall periods. Although the NMSDD estimate for winter and spring is lower (2.51/km^2), this difference appears largely due to the inclusion of more recent (2012) surveys in this IHA application (U.S. Pacific Fleet 2012; TDI 2012b), which found higher numbers during winter and spring 2012 than were seen in previous surveys.

In the surveys analyzed for this IHA application, an average of 50.33 animals was observed on or swimming next to the bait barges. Assuming the same proportion of the population continues to spend most of their time at the bait barges when they are moved out of the ZOI, there would be an average of 12.67 individuals within the ZOI (1.11/km^2). Assuming 95 percent detection results in an estimated average abundance of 13.36 and density of 1.16/km^2 in the ZOI without the bait barges' influence.

Potential takes would likely involve sea lions that are loafing on or in the vicinity of structures or moving through the area en route to foraging areas or structures where they haul out. California sea lions that are taken could exhibit behavioral changes such as increased swimming speeds, increased surfacing time, or decreased foraging. Most likely, California sea lions may move away from the sound source and be temporarily displaced from the areas of pile driving. With the absence of any major rookeries and only a few isolated haul-out areas near or adjacent to the project site, potential takes by disturbance will have a negligible short-term effect on individual California sea lions and would not result in population-level impacts.

Harbor Seal

Harbor seal occurrence within potential ZOIs for project activities is expected to consist of up to 3 individuals for approximately one month in the vicinity of Pier 122, roughly 250 m south of the fuel pier. The take estimate for harbor seals is based on these individuals experiencing both airborne and underwater sound from the project when they are present.

Potential takes would likely involve harbor seals that are on the shoreline or structures at the identified location, or swimming in the vicinity. The most likely movements of harbor seals would be to and from foraging areas in the kelp beds south of Ballast Point. Harbor seals that are taken could exhibit behavioral changes such as entering the water in response to airborne noise, increased swimming speeds, increased surfacing time, or decreased foraging. Most likely, harbor seals may move away from the sound source and be temporarily displaced from the areas of pile driving. With the absence of any major rookeries and only a few isolated haul-out areas near or adjacent to the project site, potential takes by disturbance will have a negligible short-term effect on individual harbor seals and would not result in population-level impacts.

Gray Whale

Gray whale occurrence within northern San Diego Bay is sporadic and would likely consist of one-few individuals that venture close to, or enter the bay for a brief period, then continue northward. The take estimate for gray whales assumes the presence of 1 individual for 15 days near the mouth of the bay during the month of March. Note that this could represent the same individual for 15 days, 15 individuals that pass through the area, or intermediate numbers for varying periods.

Coastal Bottlenose Dolphin

Coastal bottlenose dolphins can occur at any time of year in northern San Diego Bay. Numbers sighted have been highly variable, ranging from zero (5 out of 12 surveys) to more than 30 individuals. The Navy has conducted surveys by boat for marine mammals in northern San Diego Bay and adjacent waters on 16 separate occasions between 2007 and the end of March 2012. These surveys were conducted at slow speed (approximately 3.5 knots) along the same general routes (Figure 3.4-1) during calm weather and excellent viewing conditions. Observers were able to closely investigate and confirm sightings. Individuals that conducted the surveys (D. Lerma, C. Johnson, K. Merkel) were of the opinion that the detectability of animals within the study area at the time of the survey approached 100 percent. However, to account for the possibility that some parts of the study area may not have been covered due to access limitations, and to allow for variation in the accuracy of counts of large numbers of animals, a 95 percent detection rate is assumed. Unidentified dolphins recorded in the surveys are assumed to have been coastal bottlenose dolphins, which is the only dolphin that regularly occurs in San Diego Bay and adjacent waters (Navy 2011; NAVFAC SW and Port of San Diego 2011b).

During the surveys, the maximum number of bottlenose dolphins observed within the study area, defined as the 120 dB ZOI for potential behavioral disturbance by vibratory pile driving,

was 40, with an average abundance of 8.83 individuals per survey day; this translates to an average density of 0.77/km^2. Adjusting based on 95 percent detection results in an average abundance of 9.29, and density of 0.81/km^2. This estimate is higher than that of the NMSDD, which is 0.36/km^2 (Hanser et al. 2012) estimate for all of California coastal waters south of San Francisco within 1 km of the coast. The higher density used in this application is consistent with the regular occurrence of bottlenose dolphins in all 4 surveys conducted in San Diego Bay during the month of March, 2012.

Potential takes could occur if bottlenose dolphins move through the area on foraging trips when pile driving would occur. Bottlenose dolphins that are taken could exhibit behavioral changes such as increased swimming speeds, increased surfacing time, or decreased foraging. Most likely, bottlenose dolphins may move away from the sound source and be temporarily displaced from the areas of pile driving. With the absence of any regular occurrence adjacent to the project site, potential takes by disturbance will have a negligible short-term effect on individual bottlenose dolphins and would not result in population-level impacts.

3.4.3.2 Avoidance and Minimization Measures

The following avoidance and minimization measures are divided into four sections: 1) Avoidance and Minimization Measures for Pile Driving Activities; 2) Avoidance and Minimization Measure Effectiveness; 3) Monitoring Plan; and 4) Reporting.

<u>Avoidance and Minimization Measures for Pile Driving Activities</u>

Proposed Measures

The modeling results for ZOIs were used to develop avoidance and minimization measures for pile driving activities at NBPL. The ZOIs effectively represent the avoidance and minimization zone that would be established to prevent Level A harassment to marine mammals.

1. Shutdown and Buffer Zone During Pile Driving and Removal

   - During pile driving and removal, the shutdown zone shall include all areas where the underwater SPLs are anticipated to equal or exceed the Level A (injury) harassment criteria for marine mammals (180 dB rms isopleth for cetaceans; 190 dB rms isopleth for pinnipeds). During all pile driving and removal activities, regardless of predicted SPLs, a conservative 10 m (33 ft) shutdown zone shall be established and monitored to prevent injury to marine mammal species from their physical interaction with construction equipment during in-water activities.
   - During pile driving and removal, the buffer zone shall include areas where the underwater and airborne SPLs are anticipated to equal or exceed the Level B (disturbance) harassment criteria for marine mammals (underwater: 160 dB rms isopleths for impact pile driving, 120 dB rms isopleth for vibratory pile driving; airborne: 90 dB rms isopleth for harbor seals, 100 dB isopleth for sea lions). The distance encompassing these zones will be adjusted to accommodate any difference between predicted and measured sound levels.

- The shutdown and buffer zones will be monitored throughout the time required to drive or extract a pile. If a marine mammal is observed entering the buffer zone, an exposure would be recorded and behaviors documented. However, that pile segment would be completed without cessation, unless the animal approaches or enters the shutdown zone, at which point pile driving or extraction will be halted.
- All buffer and shutdown zones will initially be based on the distances from the source that were predicted for each threshold level. However, in-situ acoustic monitoring will be utilized to determine the actual distances to these threshold zones , and the size of the shutdown and buffer zones will be adjusted accordingly (increased or decrease) based on received SPLs.

2. Shutdown Zone During Other In-water Construction or Demolition Activities

- During all in-water construction or demolition activities having the potential to affect marine mammals, in order to prevent injury from physical interaction with construction equipment, a shutdown zone of 10 m (33 ft) will be monitored to ensure marine mammals are not present within this zone. These activities could include, but are not limited to: (1) the movement of a barge to the pile location, or (2) the removal of a pile from the water column/substrate via a crane (i.e. "dead pull").

3. Visual Monitoring

a. Impact Installation: Monitoring will be conducted within the Level A harassment shutdown zone and Level B harassment buffer zone during impact pile driving before, during, and after pile driving activities. Monitoring will take place from 15 min prior to initiation through 15 min post-completion of pile driving activities.

Vibratory Installation and Removal: Monitoring will be conducted for a 10 m (33 ft) shutdown zone. Given ambient underwater sound of approximately 124 dB re 1 μPa (rms), punctuated by louder sound from passing ships, as well as the difficulty of effectively monitoring the full extent of the predicted 120 dB re 1 μPa (rms) Level B behavioral disturbance ZOI for vibratory pile driving/extraction, the Navy intends initially to monitor a buffer zone equivalent to the full extent of the predicted Level B disturbance ZOI, but to adjust the extent of the monitored buffer zone based on acoustic monitoring (see below). The outer limits of the buffer zone would be defined by the point at which the measured SPL (maximum rms) produced by the equipment either declines to 120 dB re 1 μPa or falls below the median ambient SPL (rms) and hence becomes indistinguishable from background. Monitoring will take place from 15 min prior to initiation through 15 min post-completion of vibratory installation/removal activities.

Other In-Water Activities: Monitoring will take place from 15 min prior to initiation until the action is complete.

b. Monitoring will be conducted by qualified observers. All observers would be trained in marine mammal identification and behaviors, have experience conducting marine mammal monitoring or surveys, and would have no other construction-related tasks while monitoring. A trained observer will be placed from the best vantage point(s)

practicable (e.g., from a small boat, the pile driving barge, on shore, or any other suitable location) to monitor for marine mammals and implement shut-down/delay procedures when applicable by calling for the shut-down to the hammer operator.

c. Prior to the start of pile driving activity, the shutdown and safety zones will be monitored for 15 min to ensure that it is clear of marine mammals. Pile driving will only commence once observers have declared the shutdown zone clear of marine mammals; Animals will be allowed to remain in the buffer zone and their behavior will be monitored and documented.

d. If a marine mammal approaches/enters the shutdown zone during the course of pile driving operations, pile driving will be halted and delayed until either the animal has voluntarily left and been visually confirmed beyond the shutdown zone or 15 min have passed without re-detection of the animal.

e. In the unlikely event of conditions that prevent the visual detection of marine mammals, such as heavy fog, activities with the potential to result in Level A or Level B harassment will not be conducted.

4. Acoustic Measurements – Acoustic measurements will be used to empirically verify the proposed shutdown and buffer zones. For further detail regarding our acoustic monitoring plan see the "Monitoring Plan" subsection below.

5. Timing Restrictions – The Navy has set timing restrictions to avoid noise and turbidity generating in-water construction and demolition activities in designated foraging habitat of the ESA-listed California least tern, from 1 April through 15 September. Underwater noise-generating activities would only occur from 16 September through 31 March.

6. Soft Start – The use of a soft-start procedure is believed to provide additional protection to marine mammals by providing a warning and/or giving marine mammals a chance to leave the area prior to the hammer operating at full capacity. The Test Pile Program will utilize soft-start techniques (ramp-up/dry fire) recommended by NMFS for impact and vibratory pile driving. These measures are as follows:

   "The soft-start requires contractors to initiate noise from vibratory hammers for 15 seconds at reduced energy followed by a 30-second waiting period. This procedure should be repeated two additional times. If an impact hammer is used, contractors are required to provide an initial set of three strikes from the impact hammer at 40 percent energy, followed by a 30-second waiting period, then two subsequent 3-strike sets."

   The 30-second waiting period is proposed based on the Navy's recent experience and consultation with NMFS on a similar project at Naval Base Kitsap at Bangor.

7. Daylight Construction – Pile driving will only be conducted during daylight hours.

Measures Considered but not Proposed

The use of bubble curtains to reduce underwater sound from impact pile driving was considered but is not proposed because strong tidal currents at the project site would disperse the bubbles and compromise the effectiveness of sound attenuation. Other considerations were that the potential for Level A exposures and the number and relative intensity of Level B

exposures has already been reduced by 1) relocation of the bait barges; 2) primary reliance on vibratory installation of steel piles – in itself an accepted avoidance and minimization measure to reduce the intensity of underwater sound from pile driving (CALTRANS 2009) - except for final testing of load bearing capacity and structural integrity as needed with an impact hammer; 3) and relatively small ZOIs associated with impact pile driving of concrete piles.

The use of a coffer dam surrounding each pile to absorb sound was also considered. The installation and take-down of the coffer dam around each pile would substantially increase the time required to drive each pile. With the construction schedule already maximizing the amount of work that can be done during daylight hours and outside of the least tern nesting season, this would translate into several additional years of construction. Reasons 1 through 3 above also indicated this measure would not be cost effective.

Silt curtains were considered but rejected as an avoidance and minimization measure for turbidity because 1) the sediments of the project site are sandy and will settle out rapidly when disturbed; 2) fines that do remain suspended would be rapidly dispersed by tidal currents; and 3) tidal currents would tend to collapse the silt curtains and make them ineffective.

Avoidance and Minimization Measure Effectiveness

It should be recognized that although marine mammals will be protected from Level A harassment by marine mammal observers (MMOs) monitoring the near-field injury zones, avoidance and minimization may not be one hundred percent effective at all times in locating marine mammals in the buffer zone. The efficacy of visual detection depends on several factors including the observer's ability to detect the animal, the environmental conditions (visibility and sea state), and monitoring platforms.

All observers utilized for avoidance and minimization activities will be experienced biologists with training in marine mammal detection and behavior. Due to their specialized training the Navy expects that visual avoidance and minimization measures will be highly effective. Trained observers have specific knowledge of marine mammal physiology, behavior, and life history that may improve their ability to detect individuals or help determine if observed animals are exhibiting behavioral reactions to construction activities.

Visual detection conditions in northern San Diego Bay are generally excellent. By its orientation, the bay is sheltered from large swells and infrequently experiences strong winds; winds are less than 17 knots 98 percent of the time between November and April (San Diego Bay Harbor Safety Committee 2009). Fog is anticipated on 10-20 percent of the days, typically in late night and early morning hours (San Diego Bay Harbor Safety Committee 2009) and could occasionally limit visibility for marine mammal monitoring. However, observers will be positioned in locations which provide the best vantage point(s) for monitoring, such as on nearby piers or on a small boat, and the shutdown and buffer zones cover relatively small and accessible areas of the bay. As such, proposed avoidance and minimization measures are likely to be very effective.

Monitoring Plan

The following monitoring measures would be implemented along with the avoidance and minimization measures for pile driving activities in order to reduce impacts to marine mammals to the lowest extent practicable. A marine mammal monitoring plan will be developed further and submitted to NMFS for approval prior to the start of construction. The monitoring plan includes the following components: acoustic measurements and visual observations.

The Navy intends to continue its marine mammal and acoustic surveys of the project area up until the in-water activities begin, at which time the monitoring described below would be implemented. The Navy would conduct post-project surveys as well on a quarterly basis to document any changes in the San Diego Bay populations of marine mammals.

Acoustic Measurements

The Navy will conduct acoustic monitoring for impact driving of steel piles in order to determine the actual distances to the 190 dB re 1µPa rms/180 dB re 1µPa rms and the 160 dB re 1µPa rms isopleths; for impact driving of other piles to determine the actual distance to the 160 dB re 1µPa rms isopleth; and for vibratory pile driving and extraction, including use of the pneumatic chipper, to determine the actual distance to either the 120 dB re 1µPa rms isopleth or the point at which the SPL (maximum rms) from the equipment diminishes to the median ambient SPL (rms) and hence becomes indistinguishable. The monitoring plan addresses both underwater and airborne sounds.

At a minimum, the methodology includes:

- Acoustic monitoring will be conducted for a minimum of 5 piles for each different type of pile and each different method of installation and removal.
- For underwater recordings, a stationary hydrophone system with the ability to measure SPLs will be placed in accordance with NMFS most recent guidance for the collection of source levels.
- For airborne recordings, reference recordings will be attempted at approximately 50 feet (15.2 meters) from the source via a stationary microphone. However, other distances may be utilized to obtain better data if the signal cannot be isolated clearly due to other sound sources (i.e., barges or generators).
- Hydrophones will be placed various distances and depths from piles using a static line or buoy. A weighted tape measure will be used to determine the depth of the water. The hydrophone will be attached to a nylon cord or steel chain if current is swift enough, to maintain a constant distance from the pile. The nylon cord or chain will be attached to a float or tied to a static line.
- Each hydrophone (underwater) and microphone (airborne) will be calibrated at the start of the action and will be checked at the beginning of each day of monitoring activity.

- For each monitored location, a two-hydrophone set-up will be used, with the first hydrophone at mid-depth and the second hydrophone at approximately 1 meter from the bottom in order to evaluate site specific attenuation and propagation characteristics that may be present throughout the water column.
- In addition to determining the area encompassed by the 190, 180, 160, and 120 dB rms isopleths for marine mammals, hydrophones would also be placed at other distances as appropriate to accurately capture source levels and spreading loss.
- Ambient conditions, both airborne and underwater, would be measured at the project site in the absence of construction activities to determine background sound levels. Ambient levels are intended to be recorded over the frequency range from 10 Hz to 20 kHz. Ambient conditions will be recorded for 1 minute every hour of the work day, for one week of each month of the period of the IHA.
- Sound levels associated with soft-start techniques will also be measured.
- Underwater SPLs would be continuously monitored during the entire duration of each pile being driven. Sound pressure levels will be monitored in real time. Sound levels will be measured in Pascals, which are easily converted to decibel (dB) units.
- Airborne levels would be recorded as unweighted, as well as in dBA and the distance to marine mammal and/or avian thresholds (respectively) would be measured.
- Environmental data would be collected including but not limited to: wind speed and direction; air temperature; humidity, surface water temperature; water depth; wave height; weather conditions and other factors that could contribute to influencing the airborne and underwater sound levels (e.g., aircraft, boats, etc.).
- The chief inspector would supply the acoustics specialist with the substrate composition, hammer model and size, hammer energy settings and any changes to those settings during the piles being monitored, depth of the pile being driven, and blows per foot for the piles monitored.
- For acoustically monitored piles, post-analysis of the sound level signals will include frequency spectra between 10 Hz and 20 kHz; determination of absolute peak overpressure and under pressure levels recorded for each pile; average, minimum, and maximum rms values; for each absolute peak pile strike, the rise time, average duration of each pile strike, number of strikes per pile, Sound Exposure Level (SEL) of the absolute peak pile strike, mean SEL, and cumulative SEL (Accumulated SEL = single strike SEL + 10*log (# hammer strikes) and a frequency spectrum for up to eight successive strikes with similar sound levels.

Visual Marine Mammal Observations

The Navy will collect sighting data and behavioral responses to construction for marine mammal species observed in the region of activity during the period of construction. All observers will be trained in marine mammal identification and behaviors. NMFS requires that the observers have no other construction related tasks while conducting monitoring.

Methods of Monitoring

The Navy will monitor the shutdown zone and safety zone before, during, and after pile driving and removal. Based on NMFS requirements, the Marine Mammal Monitoring Plan would include the following procedures:

- MMOs would be located at the best vantage point(s) in order to properly see the entire shut down zone and safety zone. This may require the use of a small boat to monitor certain areas while also monitoring from one or more land based vantage points.
- During all observation periods, observers would use binoculars and the naked eye to search continuously for marine mammals.
- Monitoring distances will be measured with range finders.
- In-water activities would be curtailed under conditions of fog or poor visibility that would obscure the presence of a marine mammal within the shutdown zone.
- The shutdown and safety zones around the pile will be monitored for the presence of marine mammals before, during, and after any pile driving or removal activity.
- Pre-Activity Monitoring: The shutdown and buffer zones will be monitored for 15 min prior to in-water construction/demolition activities. If a marine mammal is present within the shutdown zone, the activity would be delayed until the animal(s) leave the shutdown zone. Activity would resume only after the MMO has determined, through sighting or by waiting approximately 15 min that the animal(s) has moved outside the shutdown zone.
- During Activity Monitoring: The shutdown and buffer zones will also be monitored throughout the time required to drive and remove piles. If a marine mammal is observed entering the buffer zone, a "take" would be recorded and behaviors documented. However, that pile segment would be completed without cessation, unless the animal enters or approaches the shutdown zone, at which point all pile driving activities will be halted. Pile driving can only resume once the animal has left the shutdown zone of its own volition or has not been re-sighted for a period of 15 min.
- Post-Activity Monitoring: Monitoring of the shutdown and buffer zones would continue for 15 min following the completion of the activity.

Data Collection

NMFS requires that the MMOs use NMFS-approved sighting forms. NMFS requires that a minimum, the following information be collected on the sighting forms:

- Date and time that pile driving or removal begins or ends;
- Construction activities occurring during each observation period;
- Weather parameters identified in the acoustic monitoring (e.g., wind, humidity, temperature);
- Tide state and water currents;

- Visibility;
- Species, numbers, and if possible sex and age class of marine mammals;
- Marine mammal behavior patterns observed, including bearing and direction of travel, and if possible, the correlation to SPLs;
- Distance from pile driving activities to marine mammals and distance from the marine mammal to the observation point;
- Locations of all marine mammal observations; and
- Other human activity in the area.

To the extent practicable, the Navy will record behavioral observations that may make it possible to determine if the same or different individuals are being "taken" as a result of project activities over the course of a day.

Reporting

A draft report would be submitted to NMFS within 45 days of the completion of acoustic measurements and marine mammal monitoring. The results would be summarized in graphical form and include summary statistics and time histories of sound values for each pile. A final report would be prepared and submitted to the NMFS within 30 days following receipt of comments on the draft report from the NMFS. At a minimum, the report shall include:

- General data:
  - Date and time of activities.
  - Water conditions (e.g., sea-state, tidal state).
  - Weather conditions (e.g., percent cover, visibility).
- Specific pile data for acoustically monitored piles:
  - Description of the activities being conducted.
    - Size and type of piles.
    - The machinery used for installation or removal.
  - The power settings of the machinery used for installation or removal
- Specific acoustic monitoring information:
  - A description of the monitoring equipment.
  - The distance between hydrophone(s) and pile.
  - The depth of the hydrophone(s).
  - The physical characteristics of the bottom substrate where the piles were driven or extracted (if possible).
  - Acoustic data (per the "Acoustic Measurements" subsection above) for each monitored pile and activity.

- Pre-activity observational survey-specific data:
  - Dates and time survey is initiated and terminated.
  - Description of any observable marine mammal behavior in the immediate area during monitoring.
  - If possible, the correlation to underwater sound levels occurring at the time of the observable behavior.
  - Actions performed to minimize impacts to marine mammals.
- During-activity observational survey-specific data:
  - Description of any observable marine mammal behavior within monitoring zones or in the immediate area surrounding monitoring zones.
  - If possible, the correlation to underwater or airborne sound levels occurring at the time of this observable behavior.
  - Actions performed to minimize impacts to marine mammals.
  - Times when pile extraction is stopped due to presence of marine mammals within the shutdown zones and time when pile driving resumes.
- Post-activity observational survey-specific data:
  - Results, which include the detections of marine mammals, species and numbers observed, sighting rates and distances, behavioral reactions within and outside of safety zones.
  - A refined take estimate based on the number of marine mammals observed during the course of construction.

3.4.3.3 Alternative 1 Pier Replacement and Associated Dredging

<u>Potential Effects of Underwater Noise</u>

The effects of pile driving on marine mammals are dependent on several factors, including the size, type, and depth of the animal; the depth, intensity, and duration of the pile driving sound; the depth of the water column; the substrate of the habitat; the standoff distance between the pile and the animal; and the sound propagation properties of the environment. Impacts to marine mammals from pile driving activities are expected to result primarily from acoustic pathways. As such, the degree of effect is intrinsically related to the received level and duration of the sound exposure, which are in turn influenced by the distance between the animal and the source. The further away from the source, the less intense the exposure should be. The substrate and depth of the habitat affect the sound propagation properties of the environment. Shallow environments are typically more structurally complex which leads to rapid sound attenuation. In addition, substrates which are soft (i.e., mud) will absorb or attenuate the sound more readily than hard substrates (rock) which may reflect the acoustic wave. Soft porous substrates would also likely require less time to drive the pile, and possibly less forceful equipment, which would ultimately decrease the intensity of the acoustic source.

Impacts to marine species are expected to be the result of physiological responses to both the type and strength of the acoustic signature (Viada et al. 2008). Behavioral impacts are also expected, though the type and severity of these effects are more difficult to define due to limited studies addressing the behavioral effects of impulsive sounds on marine mammals. Potential effects from impulsive sound sources can range from brief acoustic effects such as behavioral disturbance, tactile perception, physical discomfort, slight injury of the internal organs and the auditory system, to death of the animal (Yelverton et al. 1973; O'Keeffe and Young 1984; Navy 2001).

Physiological Responses

Direct tissue responses to impact/impulsive sound stimulation may range from mechanical vibration or compression with no resulting injury, to tissue trauma (injury). Because the ears are the most sensitive organ to pressure, they are the organs most sensitive to injury (Ketten, 2000). Sound related trauma can be lethal or sub-lethal. Lethal impacts are those that result in immediate death or serious debilitation in or near an intense source (Ketten 1995). Sub-lethal impacts include hearing loss, which is caused by exposure to perceptible sounds. Severe damage, from a pressure wave, to the ear can include rupture of the tympanum, fracture of the ossicles, damage to the cochlea, hemorrhage, and cerebrospinal fluid leakage into the middle ear (NMFS 2008). Moderate injury implies partial hearing loss. Permanent hearing loss can occur when the hair cells are damaged by one very loud event, as well as prolonged exposure to noise. Instances of temporary threshold shifts (TTS) and/or auditory fatigue are well documented in marine mammal literature as being one of the primary avenues of acoustic impact. Temporary loss of hearing sensitivity (TTS) has been documented in controlled settings using captive marine mammals exposed to strong sound exposure levels at various frequencies (Ridgway et al. 1997; Kastak et al. 1999; Finneran et al. 2005), but it has not been documented in wild marine mammals exposed to pile driving. While injuries to other sensitive organs are possible, they are less likely since pile driving impacts are almost entirely acoustically mediated, versus explosive sounds which also include a shock wave which can result in damage.

No physiological responses are expected from pile driving operations occurring during the Fuel Pier Replacement Project for several reasons. Firstly, vibratory pile driving which is being utilized as the primary installation method, does not generate high enough peak SPLs that are commonly associated with physiological damage. Any use of impulsive pile driving will only occur from a short period of time (approximately 30 to 120 min per steel pile). Additionally, the avoidance and minimization measures which the Navy will be employing (see Section 3.4.3.2) will greatly reduce the chance that a marine mammal may be exposed to SPLs that could cause physical harm. The Navy will have trained biologists monitoring a shutdown zone equivalent to the Level A Harassment zone (inclusive of the 180 dB re 1 μPa (cetaceans) and 190 dB re 1 μPa (pinnipeds) isopleths to ensure no marine mammals are injured.

Behavioral Responses

Behavioral responses to sound are highly variable and context specific. For each potential behavioral change, the magnitude of the change ultimately determines the severity of the response. A number of factors may influence an animal's response to noise, including its previous experience, its auditory sensitivity, its biological and social status (including age and sex), and its behavioral state and activity at the time of exposure.

Habituation can occur when an animal's response to a stimulus wanes with repeated exposure, usually in the absence of unpleasant associated events (Wartzok et al. 2003/04). Animals are most likely to habituate to sounds that are predictable and unvarying. The opposite process is sensitization, when an unpleasant experience leads to subsequent responses, often in the form of avoidance, at a lower level of exposure. Behavioral state may affect the type of response as well. For example, animals that are resting may show greater behavioral change in response to disturbing noise levels than animals that are highly motivated to remain in an area for feeding (Richardson et al. 1995; National Research Council (NRC) 2003; Wartzok et al. 2003/04).

Controlled experiments with captive marine mammals showed pronounced behavioral reactions, including avoidance of loud sound sources (Ridgway et al. 1997; Finneran et al. 2003). Observed responses of wild marine mammals to loud pulsed sound sources (typically seismic guns or acoustic harassment devices, and also including pile driving) have been varied but often consist of avoidance behavior or other behavioral changes suggesting discomfort (Morton and Symonds 2002; CALTRANS 2001, 2006; also see reviews in Gordon et al. 2004; Wartzok et al. 2003/04; and Nowacek et al. 2007). Responses to continuous noise, such as vibratory pile installation, have not been documented as well as responses to pulsed sounds.

With both types of pile driving, it is likely that the onset of pile driving could result in temporary, short term changes in the animal's typical behavior and/or avoidance of the affected area. A marine mammal may show signs that it is startled by the noise and/or may swim away from the sound source and avoid the area. Other potential behavioral changes could include increased swimming speed, increased surfacing time, and decreased foraging in the affected area. Pinnipeds may increase their haul-out time, possibly to avoid in-water disturbance (CALTRANS 2001, 2006). Since pile driving will likely only occur for a few hours a day, over a short period of time, it is unlikely to result in permanent displacement. Any potential impacts from pile driving activities could be experienced by individual marine mammals, but would not cause population level impacts, or affect the long-term fitness of the species.

<u>Potential Effects of Airborne Noise</u>

Marine mammals that occur in the project area could be exposed to airborne sounds associated with pile driving that have the potential to cause harassment, depending on their distance from pile driving activities. Airborne pile driving noise would have less impact on cetaceans than pinnipeds because noise from atmospheric sources does not transmit well underwater (Richardson et al. 1995); thus airborne noise would only be an issue for hauled-out pinnipeds in

the Project Area. Most likely, airborne sound would cause behavioral responses similar to those discussed above in relation to underwater noise. For instance, anthropogenic sound could cause hauled out pinnipeds to exhibit changes in their normal behavior, such as reduction in vocalizations, or cause them to temporarily abandon their habitat and move further from the source. Studies by Blackwell et al. (2004) and Moulton et al. (2005) indicate a tolerance or lack of response to unweighted airborne sounds as high as 112 dB peak and 96 dB rms. Based on these observations marine mammals could exhibit temporary behavioral reactions to airborne noise, however, exposure is not likely to result in population level impacts.

Underwater Sound from Pile Driving and Extraction

The intensity of pile driving or sounds is greatly influenced by factors such as the type of piles, hammers, and the physical environment in which the activity takes place. A large quantity of literature regarding SPLs recorded from pile driving projects is available for consideration. In order to determine reasonable SPLs and their associated effects on marine mammals that are likely to result from pile driving at NBPL, studies with similar properties to the proposed proposed action were evaluated. Piles to be installed include 36- and 48-in steel pipes, 24- and 18-in concrete piles, and 16-in fiberglass-concrete piles. In addition, a vibratory pile driver could be used in the extraction of 16-in steel, 14- 16- and 24-in concrete, 13-in plastic, and 12-in timber piles.

Table 3.4-5 details representative pile driving activities that have occurred in recent years. Due to the similarity of these actions and the Navy's proposed action in terms of pile size and type, installation method, and water depth, as well as substrate and expected sound speed, they represent reasonable SPLs, which could be anticipated.

Table 3.4-5. Underwater Sound Pressure Levels from Similar *in-situ* Monitored Construction Activities

Project and Location	*Pile Size and Type*	*Installation Method*	*Water Depth*	*Measured Sound Pressure Levels*
Mukilteo Test Piles, WA[1]	36-in Steel Pipe	Impact	7.3 m (24 ft)	195 dB re 1 µPa (rms) at 10 m
Richmond-San Rafael Bridge, CA[2]	66-in CISS Pile	Impact	4.0 m (13.1 ft)	195 dB re 1 µPa (rms) at 10 m
Unknown Location, CA[2]	72-in Steel Pipe Pile	Vibratory	approximately 5 m (16.4 ft)	180 dB re 1 µPa (rms) at 10 m
San Francisco Bay, CA[2]	24-in Concrete	Impact	10-15 m (33-50 ft)	176 dB re 1 µPa (rms) at 10 m
San Francisco Bay, CA[2]	16-in Concrete	Impact	10 m (33 ft)	173 dB re 1 µPa (rms) at 10 m
Columbia River Crossing, WA[3]	24- and 48-in Steel Pipe Piles	Vibratory extraction	10 m (33 ft)	172 dB re 1 µPa (rms) at 10 m

Sources: [1]WSDOT 2007; [2]CALTRANS 2009; [3]WSDOT 2012.

Underwater sound levels from pile driving for this project are assumed to be as follows:

- For 36- and 48-in steel pipes, 195 dB re 1 μPa (rms) at 10 m when driven by impact hammer, 180 dB re 1 μPa (rms) at 10 m when driven by vibratory hammer;
- For 24-in concrete piles driven by impact hammer, 176 dB re 1 μPa (rms) at 10 m; and
- For 16- and 18-in concrete piles driven by impact hammer, 173 dB re 1 μPa (rms) at 10 m.

As noted by NMFS (2010), there is a paucity of data on airborne and underwater noise levels associated with vibratory hammer extraction. However, it can reasonably be assumed that vibratory extraction emits SPLs that are no higher than SPLs caused by vibratory hammering of the same materials, and results in lower SPLs than caused by impact hammering comparable piles (NMFS 2010). The only available data regarding underwater sound from vibratory pile extraction are from the Columbia River Crossing Test Pile Project in Washington state (WSDOT 2012). In that project, underwater sound from vibratory extraction of several 24- and 48-in diameter steel pipes was found to range from 167 to 176 dB, averaging 172 dB re 1 μPa (rms) at 10 m. Because pile driving and extraction are less noisy for concrete than steel piles (CALTRANS 2009), this is almost certainly greater than what would occur at the project site during removal of the existing pier structure, except possibly for the 16-in concrete-filled steel pipes. For vibratory extraction of concrete piles up to 24-ines diameter, as well as the 12-in timber piles, a reduction of 10-20 dB from the sound produced by an impact driver can reasonably be assumed (CALTRANS 2009). Accordingly, for this IHA application it is assumed that vibratory extraction of concrete, wood, or plastic piles would generate sound levels of up to 160 dB re 1 μPa (rms) at 10 m. This approach is consistent with NMFS' recent evaluation of a pier demolition project (NMFS 2010) and is likely to overestimate the potential for MMPA harassment during pier demolition.

There is scant information on underwater sound produced by pneumatic chippers or underwater cutting tools. The only data cited in recent IHA and LOA applications (http://www.nmfs.noaa.gov/pr/permits/incidental.htm) were combined from a variety of diver tools, including jackhammers, drills, grinders, bolt guns, and hydraulic wrenches, showing peak source levels of up to 200 dB re 1μPa at 1 m and averaged levels of up to 161 dB re 1μPa at 1 m (Nedwell and Howell 2004). The averaged source levels would equate to approximately 141 dB re 1μPa at 10 m (assuming spherical spreading loss), but given the variability and uncertain applicability of these measurements to the proposed NBPL fuel pier replacement project, it is conservatively assumed that the pneumatic chipper could have up to the same sound source levels as vibratory extraction, i.e. 160 dB re 1μPa at 10 m, which equates to approximately 180 dB re 1μPa at 1 m.

Table 3.4-6 provides the calculated areas of ZOIs associated with different types of pile driving and extraction. It should be noted that the ZOIs for level A harassment would be closely monitored and subject to shutdowns if a marine mammal approaches the area. These calculations are based on the site-specific modeling of transmission loss at the project site, and practical spreading loss at the Marine Mammal Program relocation site. Predicted sound "contours" emanating from different sources are shown in Figures 3.2-1 through 3.2-7. The figures reflect the conventional assumption that the natural or manmade shoreline acts as a barrier to underwater sound. Although it is known that there can be leakage or diffraction

around such barriers, the prediction of resulting sound levels remains in the research modeling world, and it is generally accepted practice to model underwater sound propagation from pile driving as continuing in a straight line past a shoreline projection such as Ballast Point (Dahl 2012). Although the influence of Zuniga Jetty was not modeled, it is reasonable to assume that project sound would not propagate east of the jetty (Dahl 2012). Hence the projection of sound through the mouth of the bay into the open ocean would be truncated along the jetty and narrower in reality than shown.

Table 3.4-6. Calculated Areas of ZOIs Corresponding to MMPA Thresholds

Description	*Figure*		*Area of ZOI (km²)*				
		Source Level, dB @ 10m	*Pinniped Level A – 190 dB[1]*	*Dolphin Level A – 180 dB[1]*	*Impact Level B – 160 dB[1]*	*Vibratory Level A – 180 dB[1,2]*	*Vibratory Level B – 120 dB[1]*
Impact driving steel piles	3.2-1	195	0.0034	0.1477	8.5069	N/A	N/A
Vibratory driving steel piles	3.2-2	180	N/A	N/A	N/A	0.0004	11.4895
Impact driving 24-in concrete piles	3.2-3	176	N/A	N/A	0.1914	N/A	N/A
Impact driving 16-in concrete-fiberglass piles	3.2-4	173	N/A	N/A	0.0834	N/A	N/A
Impact driving 18-in concrete piles	3.2-5	173	N/A	N/A	0.0620	N/A	N/A
Vibratory extraction – steel piles	3.2-6	172	N/A	N/A	N/A	0	11.4895
Vibratory extraction – non-steel piles[3]	3.2-7	160	N/A	N/A	N/A	0	11.4890

Notes: [1]All sound levels expressed in dB re 1 µPa rms; N/A = not applicable.
[2]The vibratory driving steel pile Level A ZOI for pinnipeds (190 dB) is less than 3 m from the source (<0.0001 km²).
[3]Including use of a pneumatic chipper.

Airborne Sound from Pile Driving

The intensity of pile driving sounds is greatly influenced by factors such as the type of piles, hammers, and the physical environment in which the activity takes place. A large quantity of literature regarding SPLs recorded from pile driving projects is available for consideration. In order to determine reasonable airborne SPLs and their associated effects on marine mammals that are likely to result from pile driving at NBPL, studies with similar properties to the proposed action were evaluated. Studies that met the following parameters were considered: 1) Pile materials - steel pipe piles (36-48 in diameter); 2) Hammer machinery - vibratory and impact; and 3) Physical environment - shallow depth (<100 foot). Table 3.4-7 details representative pile driving activities that have occurred in recent years. Due to the similarity of

these actions and the Navy's proposed action, they represent reasonable SPLs that could be anticipated.

Table 3.4-7. Airborne Sound Pressure Levels from Similar *in-situ* Monitored Construction Activities

Project and Location	*Pile Size and Type*	*Installation Method*	*Water Depth*	*Measured Sound Pressure Levels*
Northstar Island, AK[1]	42-in Steel Pipe Pile	Impact	approximately 12 m (40 ft)	97 dB re 20 µPa (rms) at 525 ft
Keystone Ferry Terminal, WA[2]	30-in Steel Pipe Pile	Vibratory	approximately 9 m (30 ft)	98 dB re 20 µPa (rms) at 36 ft

Sources: [1]Blackwell et al. 2004; [2]WSDOT 2010.

Based on in-situ recordings from similar construction activities, the maximum airborne noise levels that would result from impact and vibratory pile driving are estimated to be 97 dB re 20 µPa (rms) at 525 ft and 98 dB re 20 µPa (rms) at 36 ft, respectively (Blackwell et al. 2004; WSDOT 2010). The distances to the airborne thresholds were calculated with the airborne transmission loss formula presented in section 6.4.3. All calculated distances to and the total area encompassed by the airborne marine mammal noise thresholds are provided in Tables 3.4-8 and 3.4-9, respectively.

Table 3.4-8. Calculated Distances to the Marine Mammal Noise Thresholds in Air from Pile Driving

Species	*Threshold*	*Airborne Behavioral Disturbance*	
		Distance to Threshold Impact Pile Driving	*Distance to Threshold Vibratory Pile Driving*
Pinnipeds (seals, sea lions, walrus, except harbor seal)	100 dB re 20 µPa rms (unweighted)	113 m (371 ft)	9 m (30 ft)
Harbor seal	90 dB re 20 µPa rms (unweighted)	358 m (1175 ft)	28 m (92 ft)

Table 3.4-9. Calculated Area Encompassed (Per Pile) by the Marine Mammal Noise Thresholds In-air from Pile Driving

Species	*Threshold*	*Airborne Behavioral Disturbance*	
		Area Encompassed by the Threshold for Impact Pile Driving	*Area Encompassed by the Threshold for Vibratory Pile Driving*
Pinnipeds (except harbor seal)	100 dB re 20 µPa rms (unweighted)	0.040 km^2	0.000 km^2
Harbor seal	90 dB re 20 µPa rms (unweighted)	0.403 km^2	0.002 km^2

The distance to the sea lion airborne threshold would be 113 m (371 ft) for impact pile driving, and 9 m (30 ft) for vibratory pile driving. The distance to the harbor seal airborne threshold would be 358 m (1,175 ft) for impact pile driving, and 28 m (92 ft) for vibratory pile driving. The nearest location for harbor seals is approximately 250 m away and hence would be subject to airborne behavioral disturbance. These distances are all less than the corresponding distances calculated for underwater sound thresholds. Other types of pile driving and extraction would generate far lower airborne sound pressures, with much smaller distances and areas of potential disturbance and for that reason are not considered further in this application.

Since protective measures are in place out to the distances calculated for the underwater Level A threshold for sea lions, the distances for the airborne thresholds will be covered fully by monitoring.

Auditory Masking

Natural and artificial sounds can disrupt behavior by masking, or interfering with a marine mammal's ability to hear other sounds. Masking occurs when the receipt of a sound is interfered with by another coincident sound at similar frequencies and at similar or higher levels. If the second sound is manmade and disrupts hearing-related behavior such as communications or echolocation (Wartzok et al. 2003/04), it could be considered harassment under the MMPA. Noise can only mask a signal if it is within a certain "critical band" around the signal's frequency and its energy level is similar or higher (Holt 2008). Noise within the critical band of a marine mammal signal will show increased interference with detection of the signal as the level of the noise increases (Wartzok et al. 2003/04). In delphinid subjects, for example, relevant signals needed to be 17 to 20 dB louder than masking noise at frequencies below 1 kHz in order to be detected and 40 dB greater at approximately 100 kHz (Richardson et al. 1995). It is important to distinguish TTS and permanent threshold shift (PTS), which persist after the sound exposure, from masking, which occurs during the sound exposure. Because masking (without a resulting in a threshold shift) is not associated with abnormal physiological function, it is not considered a physiological effect in this IHA application, but rather a potential behavioral effect.

The most intense underwater sounds in the proposed action are those produced by impact pile driving. Given that the energy distribution of pile driving covers a broad frequency spectrum, sound from these sources would likely be within the audible range of California sea lions, harbor seals, gray whales, and bottlenose dolphins. Impact pile driving activity is relatively short-term, with rapid pulses occurring for approximately 15 min per pile. Vibratory pile driving is also relatively short-term, with rapid oscillations occurring for approximately 1.5 hours per pile. It is possible that impact and vibratory pile driving resulting from this proposed action may mask some acoustic signals that are relevant to the daily behavior of marine mammal species, but the short-term duration and limited areas affected make it very unlikely that survival would be affected. Masking effects are, therefore, treated as negligible. Any masking event that could possibly rise to Level B harassment under the MMPA would occur concurrently within the zones of behavioral harassment already estimated for vibratory

and impact pile driving, and which have already been taken into account in the exposure analysis.

Description of Take Calculation

The take calculations presented here rely on the best data currently available for marine mammal populations in San Diego Bay. The population data used for each species' take calculation is provided in Section 3.4.3.1. The formula was developed for calculating take due to pile driving and extraction as applicable and applied to the species-specific noise impact threshold. The formula is founded on the following assumptions:

- Each species' density is based on the average number seen (per day), adjusted upward assuming 95 percent detection, in Navy Marine Mammal surveys within the largest project ZOI - which is the 120 dB threshold for vibratory pile driving.
- ZOIs for underwater sound generating activities at the fuel pier location are based on sound emanating from a central point in the water column slightly offshore of the existing pier, at the source levels specified in Table 3.4-6, and rates of transmission loss derived from the site-specific model in Appendix E.4. Graphical representations of each ZOI were provided in Figures 3.2-1 through 3.2-7.
- Pile driving or vibratory extraction is conservatively estimated to occur on every day within the scheduled window for that component of project construction, as defined in Section 3.2.3.1.
- An individual can only be taken once due to underwater or airborne sound from pile driving, whether from impact or vibratory pile driving, or vibratory extraction, during each 24 hour period of that activity.
- Although sea lions and harbor seals in the project area spend a considerable amount of time above water, when they would not be subject to underwater sound, the conservative assumption is made that all sea lions within the ZOI are underwater during at least a portion of the noise generating activity, and hence exposed to sound at the predicted levels. However, all sea lions within each airborne sound ZOI are also assumed to be exposed to the airborne sound of each activity.

The calculation for marine mammal takes is estimated by:

$$\text{Take estimate} = (n * ZOI) * \text{days of activity}$$

where:

n = density estimate used for each species

ZOI[1] = noise threshold zone of influence (ZOI) impact area

n * ZOI produces an estimate of the abundance of animals that could be present in the area for exposure, this must be a whole number, therefore, this value was rounded (down if <0.5, up if >0.5).

[1] Zone of Influence (ZOI) is the area encompassed by all locations where the SPLs equal or exceed the threshold being evaluated.

The exposure assessment methodology is an estimate of the numbers of individuals exposed to the effects of pile driving and extraction activities exceeding NMFS established thresholds. Of significant note in these exposure estimates, additional mitigation methods (i.e. visual monitoring and the use of shutdown zones to ensure there are no Level A takes) were not quantified within the assessment and successful implementation of this mitigation is not reflected in exposure estimates. Results from acoustic impact exposure assessments should be regarded as conservative estimates that are strongly influenced by limited biological data. While the numbers generated from the pile driving exposure calculations provide conservative overestimates of marine mammal exposures for consultation with NMFS, the intermittent duration and limited geographic extent of in-water construction and demolition activities would further limit actual exposures and their potential biological effects.

California Sea Lion

As described in Section 3.4.3.1, the density of California sea lions observed within the maximum project area ZOI, subtracting out individuals that have been on or next to the bait barges, and which are assumed to move out of the ZOI with the bait barges when they are moved during the tern season, is 1.16/km^2. Table 3.4-10 provides the number of potential exposures constituting takes under the MMPA that would be caused by each project component during the first year of in-water activities.

Since steel pile installation involves a combination of vibratory and impact hammering, both are assumed to occur on the same day, and the number of animals taken is given by the maximum of either type of exposure. Given that the vibratory (120 dB) ZOI is larger, all animals considered behaviorally harassed by impact pile driving are also considered to be harassed by vibratory pile driving, whereas animals outside of the ZOI for impact hammering but within the ZOI for vibratory hammering would only be harassed by the latter. The total estimate for pile driving is thus 650 sea lion harassments by continuous sound from vibratory hammering, of which 500 would also constitute harassment by impulsive sound from impact hammering. This represents a daily take of 13 individuals, which may or may not be the same individuals from day to day. No harassments are anticipated from airborne sound of any type. Vibratory removal of concrete, plastic, and wood piles as part of demolition of the existing pier would result in 273 harassments, also representing a daily take of 13 individuals which may or may not be the same individuals from day to day (Table 3.4-10). To provide a more conservative estimate of total harassments, demolition use of vibratory extraction is assumed not to overlap the driving of steel piles for the new pier. Overall, a total of 923 California sea lion takes are predicted during the first 12-month period.

Table 3.4-10. Number of Potential Exposures Constituting Takes of California Sea Lions within Acoustic Threshold ZOIs During First 12-Month Period

Activity	*# Days*	*Underwater*				*Airborne*
		Impact Injury Threshold (190dB)	*Impact Disturbance Threshold (160dB)*	*Vibratory Injury Threshold (190 dB)*	*Vibratory Disturbance Threshold (120dB)*	*Impact and Vibratory Disturbance Threshold (100dB)**
Impact driving steel piles	50	0	500	N/A	N/A	0
Vibratory driving steel piles	50	N/A	N/A	0	650	0
Impact driving 24-in concrete piles	16	0	0	N/A	N/A	0
Vibratory removal non-steel piles	21	N/A	N/A	0	273	0

Note: * The airborne exposure calculations assumed that 100 percent of the in-water densities were available at the surface to be exposed to airborne sound.

Take estimates for the second and third years of in-water activities, based on the same assumptions and methods applied to planned activities are provided in Tables 3.4-11 and 3.4-12, respectively.

Table 3.4-11. Number of Potential Exposures Constituting Takes of California Sea Lions within Acoustic Threshold ZOIs During Second 12-Month Period

Activity	*# Days*	*Underwater*			*Airborne*
		Impact Injury Threshold (190dB)	*Impact Disturbance Threshold (160dB)*	*Vibratory Disturbance Threshold (120dB)*	*Impact & Vibratory Disturbance Threshold (100dB)**
Impact driving steel piles	102	0	1,020	N/A	0
Vibratory driving steel piles	102	N/A	N/A	1,326	0
Impact driving 24-in concrete piles	15	0	0	N/A	0

Note: * The airborne exposure calculations assumed that 100 percent of the in-water densities were available at the surface to be exposed to airborne sound.

Table 3.4-12. Number of Potential Exposures Constituting Takes of California Sea Lions within Acoustic Threshold ZOIs During Third 12-Month Period

Activity	*# Days*	*Underwater*			*Airborne*
		Impact Injury Threshold (190dB)	*Impact Disturbance Threshold (160dB)*	*Vibratory Disturbance Threshold (120dB)*	*Impact & Vibratory Disturbance Threshold (100dB)**
Impact driving steel piles	12	0	120	N/A	0
Vibratory driving steel piles	12	N/A	N/A	156	0
Impact driving 24-in concrete piles	15	0	0	N/A	0
Impact driving 16-in fiberglass-concrete piles	12	0	0	N/A	0
Vibratory extraction non-steel piles	33	N/A	N/A	429	0
Vibratory extraction steel/concrete piles	6	0	0	78	0

Note: * The airborne exposure calculations assumed that 100 percent of the in-water densities were available at the surface to be exposed to airborne sound.

Harbor Seal

The take estimate for harbor seals is based on the presence of 3 animals during 30 days within both airborne and underwater ZOIs for Level B harassment by pile driving and extraction. Therefore, the worst-case total number of takes equals 90, the same 3 animals being taken repeatedly during the first year of in-water construction and demolition. During the second year, the 102 days of planned steel pile installation is assumed to overlap the period when harbor seals are present, again resulting in 3 individuals x 30 days of underwater and airborne noise exposure equals 90 takes. In the third year, the only potential harassments due to airborne noise would occur during 12 days of steel pile installation. Other activities causing harassment by underwater noise are assumed to occur on the remaining 18 days when harbor seals are present, resulting again in a total of 90 takes.

Gray Whale

The take estimate for gray whales is based on the presence of an individual animal during 15 days within the underwater ZOIs for pile driving and extraction near the mouth of the bay. Therefore, the worst-case take estimate for gray whales during each of the three years is 15, representing up to 15 different individuals taken.

Coastal Bottlenose Dolphin

As described in Section 6.5.4, the estimated density of coastal bottlenose dolphins observed within the maximum project area ZOI is 0.81/km^2. Table 3.4-13 provides the number of

potential exposures constituting takes under the MMPA that would be caused by each project component during the first year.

Table 3.4-13. Number of Potential Exposures Constituting Takes of Coastal Bottlenose Dolphins within Acoustic Threshold ZOIs During First 12-Month Period

Activity	*# Days*	*Impact Injury Threshold (180dB)*	*Impact Disturbance Threshold (160dB)*	*Vibratory Injury Threshold (180 dB)*	*Vibratory Disturbance Threshold (120dB)*
Impact driving steel piles	50	0	350	N/A	N/A
Vibratory driving steel piles	50	N/A	N/A	0	450
Impact driving 24-in concrete piles	16	0	0	N/A	N/A
Vibratory removal non-steel piles	21	N/A	N/A	0	189

Since steel pile installation involves a combination of vibratory and impact hammering, both are assumed to occur on the same day, and the number of animals taken is given by the maximum of either type of exposure. Given that the vibratory (120 dB) ZOI is larger, all animals considered behaviorally harassed by impact pile driving are also considered to be harassed by vibratory pile driving, whereas animals outside of the ZOI for impact hammering but within the ZOI for vibratory hammering would only be harassed by the latter. The total estimate for pile driving is thus 400 bottlenose dolphin harassments by continuous sound from vibratory hammering, of which 300 would also constitute harassment by impulsive sound from impact hammering. Vibratory removal of concrete, plastic, and wood piles as part of demolition of the existing pier would result in 189 harassments (Table 3.4-13). To provide a more conservative estimate of total harassments, demolition use of vibratory extraction is assumed not to overlap with the driving of steel piles for the new pier. Overall, a total of 639 coastal bottlenose dolphin takes are predicted during the first 12-month period. The total number of individuals taken is estimated as 9 per day, which may or may not be the same individuals on different days, during 71 days of vibratory/impact hammering and vibratory extraction.

Take estimates for the second and third years of in-water activities, based on the same assumptions and methods applied to planned activities are provided in Tables 3.4-14 and 3.4-15, respectively.

Table 3.4-14. Number of Potential Exposures of Coastal Bottlenose Dolphins within Acoustic Threshold ZOIs During Second 12-Month Period

Activity	*# Days*	*Impact Injury Threshold (180dB)*	*Impact Disturbance Threshold (160dB)*	*Vibratory Disturbance Threshold (120dB)*
Impact driving steel piles	102	0	714	N/A
Vibratory driving steel piles	102	N/A	N/A	918
Impact driving 24-in concrete piles	15	0	0	N/A

Table 3.4-15. Number of Potential Exposures of Coastal Bottlenose Dolphins within Acoustic Threshold ZOIs During Third 12-Month Period

Activity	*# Days*	*Impact Injury Threshold (180dB)*	*Impact Disturbance Threshold (160dB)*	*Vibratory Disturbance Threshold (120dB)*
Impact driving steel piles	12	0	84	N/A
Vibratory driving steel piles	12	N/A	N/A	108
Impact driving 24-in concrete piles	15	0	0	N/A
Impact driving 16-in fiberglass-concrete piles	12	0	0	0
Vibratory extraction non-steel piles	33	N/A	N/A	297
Vibratory extraction steel/concrete piles	6	N/A	N/A	54

Summary

Based on the modeling results presented above, the total number of expected takes under MMPA is provided in Table 3.4-16. The Navy will submit sequential IHA applications for each year of in-water activities. All takes are anticipated to occur during fall through spring, September 16 through March 31. All takes are anticipated to be Level B, disturbance. The totals for each species are as follows: California sea lions (2,405); harbor seals (270); gray whales(45); and coastal bottlenose dolphins (2,016).

Table 3.4-16. Summary of Potential Exposures Constituting Takes for All Species, All Years

Species	*Underwater*				*Airborne*	*Totals*
	Impact Injury Threshold (190 dB)	*Impact Injury Threshold (180 dB)*	*Both Impact Disturbance Threshold (160 dB) and Vibratory Disturbance Threshold (120 dB)*	*Vibratory Disturbance Threshold Only (120 dB)*	*Impact & Vibratory Disturbance Threshold (100 dB)**	
Year 1, 30 September 2013 through 29 September 2014						
California sea lion	0	N/A	500	423	0	923
Harbor seal	0	N/A	90	0	90	90*
Gray whale	0	0	15	0	N/A	15
Coastal bottlenose dolphin	0	0	350	289	N/A	639
Year 1 Total	**0**	**0**	**955**	**712**	**90**	**1,667***
Year 2, 30 September 2014 through 29 September 2015						
California sea lion	0	N/A	1,020	306	0	1,326
Harbor seal	0	N/A	90	0	90	90*
Gray whale	0	0	15	0	N/A	15
Coastal bottlenose dolphin	0	0	714	204	N/A	918
Year 2 Total	**0**	**0**	**1,839**	**510**	**90**	**2,349***
Year 3, 30 September 2015 through 29 September 2016						
California sea lion	0	N/A	120	543	0	663
Harbor seal	0	N/A	90	0	90	90*
Gray whale	0	0	15	0	N/A	15
Coastal bottlenose dolphin	0	0	84	375	N/A	459
Year 3 Total	**0**	**0**	**309**	**918**	**90**	**1,227***
Total, All Years						
California sea lion	0	N/A	1,640	765	0	2,405
Harbor seal	0	N/A	270	0	270	270*
Gray whale	0	0	45	0	N/A	45
Coastal bottlenose dolphin	0	0	1,148	868	N/A	2,016
Total All Years	**0**	**0**	**3,103**	**1,633**	**270**	**4,736***

Note: *In each year, the same 3 individual harbor seals would be subject to harassment by both underwater and airborne sound.

Conclusions Regarding Impacts to Species or Stocks

Individual marine mammals may be exposed to SPLs during pile driving and extraction operations at NBPL may result in Level B Behavioral harassment. Any marine mammals that are taken (harassed), may change their normal behavior patterns (i.e., swimming speed, foraging habits, etc.) or be temporarily displaced from the area of construction. Any takes would likely have only a minor effect on individuals and no effect on the population. The sound generated from vibratory pile driving is non-pulsed (e.g., continuous) which is not known to cause injury to marine mammals. Mitigation is likely to avoid most potential adverse underwater impacts to marine mammals from impact pile driving. Nevertheless, some level of impact is unavoidable. The expected level of unavoidable impact (defined as an acoustic or harassment "take") is described in Sections above. This level of effect is not anticipated to have any detectable adverse impact on population recruitment, survival or recovery (i.e., no more than a negligible adverse effect).

<u>Impacts to Marine Mammal Habitat</u>

The proposed activities at NBPL will include the temporary relocation of bait barges used as haulouts by California sea lions, which is expected to result in a temporary redistribution of sea lions within northern San Diego Bay. The factors that currently attract sea lions to the barges are expected to operate equally in their new locations. There are no known foraging hotspots, or other ocean bottom structure of significant biological importance to marine mammals that may be present in the marine waters in the vicinity of the Project Area. Therefore, the main impact issue associated with the proposed activity will be temporarily elevated noise levels and the associated direct effects on marine mammals, as discussed above. The most likely impact to marine mammal habitat occurs from pile driving effects on likely marine mammal prey (i.e., fish) nearby NBPL and minor impacts to the immediate substrate during installation and removal of piles.

Pile Driving Effects on Potential Prey (Fish)

Construction activities will produce both pulsed (i.e., impact pile driving) and continuous sounds (i.e., vibratory pile driving). Fish react to sounds that are especially strong and/or intermittent low-frequency sounds. Short duration, sharp sounds can cause overt or subtle changes in fish behavior and local distribution. Hastings and Popper (2005, Popper and Hastings 2009) identified several studies that suggest fish may relocate to avoid certain areas of noise energy. Additional studies have documented effects of pile driving (or other types of continuous sounds) on file, although several are based on studies in support of large, multiyear bridge construction projects (Scholik and Yan 2001, 2002; Govoni et al. 2003; Hawkins 2005; Hastings 1990, 2007; Popper et al. 2006; Popper and Hastings 2009). Sound pulses at received levels of 160 dB re 1 μPa may cause subtle changes in fish behavior. SPLs of 180 dB may cause noticeable changes in behavior (Chapman and Hawkins 1969; Pearson et al. 1992; Skalski et al. 1992). SPLs of sufficient strength have been known to cause injury to fish and fish mortality (CALTRANS 2001; Longmuir and Lively 2001). The most likely impact to fish from pile driving activities at the Project Area would be temporary behavioral avoidance of the

immediate area. The duration of fish avoidance of this area after pile driving stops is unknown, but a rapid return to normal recruitment, distribution and behavior is anticipated. In general, impacts to marine mammal prey species are expected to be minor and temporary.

Pile Driving Effects on Potential Foraging Habitat

The area likely impacted by the Fuel Pier Replacement Project is relatively small compared to the available habitat in northern San Diego Bay. Given that the Navy's marine mammal surveys have documented no marine mammal occurrences in the immediate vicinity of the fuel pier (Figure 3-2), the affected area is used little, if at all, as foraging habitat. As a result, the removal and replacement of pilings, substrate disturbance, and high levels of activity at the project site would be inconsequential in terms of effects on marine mammal foraging.

The duration of fish avoidance of this area after pile driving stops is unknown, but a rapid return to normal recruitment, distribution and behavior is anticipated. Any behavioral avoidance by fish of the disturbed area would still leave significantly large areas of fish and marine mammal foraging habitat in northern San Diego Bay.

The project design has minimized effects on eelgrass beds and would mitigate any unavoidable losses by replacement. Hence the project would not negatively impact eelgrass beds and the important nursery and foraging habitat functions they provide for fish, which in turn serve as prey for marine mammals.

Summary of Impacts to Marine Mammal Habitat

Given the short daily duration of noise associated with individual pile driving\removal, seasonal limitations on the in-water activities that have the greatest potential to disturb marine mammals and their prey, and the relatively small areas being affected, pile driving and extraction activities associated with the proposed action are not likely to have a permanent, adverse effect on any EFH, or population of fish species. Therefore, pile driving\removal is not likely to have a permanent, adverse effect on marine mammal foraging habitat at the Project Area.

<u>Conclusion</u>

The Proposed Action would result in minor behavioral effects on individuals and localized, temporary effects on their habitat use but is not anticipated to have any detectable adverse impact on population recruitment, survival or recovery (i.e., no more than a negligible adverse effect). Therefore, the implementation of Alternative 1 would not result in any significant impacts to marine mammals.

3.4.3.4 Alternative 2 Delayed Dredging Alternative

Alternative 2 would have the same impacts and the same avoidance and minimization measures as Alternative 1, although the impacts associated with dredging would occur separately from those associated with the other project components since the dredging would only take place after the new fuel pier construction was completed. Therefore, the implementation of Alternative 2 would not result in any significant impacts to marine mammals.

3.4.3.5 Mitigation Measures

Because potential impacts to marine mammals would be localized, would cease upon completion of project activities, and would not be significant under either Alternative 1 or Alternative 2, no mitigation measures are proposed.

3.4.3.6 No-Action Alternative

Under the No-Action Alternative, temporary relocation of the Navy MMP, amendments to the existing navigation Security Zone, temporary relocation of the Everingham Bait Brothers Company bait barges, demolition and replacement of the existing fuel pier, and associated dredging of the turning basin would not occur. Existing conditions would remain unchanged. Therefore, implementation of the No-Action Alternative would not have a significant impact to marine mammals.

3.5 THREATENED AND ENDANGERED SPECIES

3.5.1 Definition of Resource

This section describes species protected by the ESA that may occur within areas directly or indirectly affected by the proposed project.

3.5.2 Affected Environment

The three federally threatened or endangered species that occur or have the potential to occur in or adjacent to the proposed project area are provided in Table 3.5-1 and are discussed in detail below. Of these species, only the California least tern regularly occurs within the vicinity of the proposed project area. There is no designated critical habitat for these species in the proposed project area.

3.5.2.1 California Least Tern

The California least tern was listed as endangered in 1970; there is currently no designated critical habitat for this species (USFWS 2006). It is the smallest North American tern and is found along seacoasts, beaches, bays, estuaries, lagoons, lakes, and banks of rivers and lakes.

Least terns are inshore foragers and surface-feeding fish eaters who are opportunistic in their search for prey, eating fish that are small enough to catch including anchovies and smelt (NAVFAC Southwest and Port of San Diego 2011). Studies conflict as to whether piers, docks, sea walls, and other artificial structures along the shoreline may attract least terns; these structures typically act as artificial reefs for juvenile schooling fish, which terns feed upon, whereas human activity may be a deterrent (USACE 2009; NAVFAC Southwest and Port of San Diego 2011). Terns will also frequently forage in the open waters of the ocean and bays, and although eelgrass is an important habitat for several prey species, terns do not demonstrate any preference for feeding in eelgrass (NAVFAC Southwest and Port of San Diego 2011).

Table 3.5-1. Federally Threatened and Endangered Species Occurring or Having the Potential to Occur in the Vicinity of the Proposed Project Area

Species	*Status*	*Habitat*	*Occurrence*
California least tern (*Sterna antillarum browni*)	Endangered	Bays, estuaries, lagoons, shoreline, river mouths, sandy unvegetated strips. Spring-summer breeding resident.	Locally common spring-summer resident, feeding in bay and ocean waters. Nesting colonies outside of the project area around San Diego Bay. Foraging habitat is present within the project area, off shore west of Naval Base San Diego (NBSD).
Green sea turtle (*Chelonia mydas*)	Endangered	Warm oceans, eelgrass beds. Non-breeding migrant.	Occurs in south bay, Coronado Bridge, South Bay Power Plant's warm water discharge channel. Feeds on marine algae and sea grasses, such as eelgrass. No breeding sites occur in San Diego Bay. Possible rare transient in the project area.
Western snowy plover (*Charadrius alexandrinus nivosus*)	Threatened	Intertidal mudflats, beaches, dunes, salt flats and dikes.	Local spring-summer breeding resident, migrant and wintering individuals at other times; inhabits sandy beaches. Breeding and foraging sites are known within San Diego Bay at Silver Strand Training Complex, Naval Amphibious Base (NAB), and Naval Air Station (NAS) North Island. Feeds on terrestrial and aquatic invertebrates such as amphipods, sand hoppers, and flies. Not known or likely in the project area.

Note: Endangered = Listed as endangered under the federal ESA. Threatened = Listed as threatened under the federal ESA.

California least terns are residents in San Diego Bay from late spring to early fall, with the breeding season beginning April 1st and ending September 15th. In the spring of 2012, the first least tern nest was discovered on 28 April at Silver Strand Beach (Naval Base Coronado 2012). There are six recognized least tern nesting colonies in the bay, spanning from an area near the San Diego International Airport at the northern portion of the bay to the Sweetwater Marsh National Wildlife Refuge in the southern portion of the bay (Figure 3.5-1; NAVFAC Southwest 2004). Central portions of the bay house the largest nesting populations in the bay (NAVFAC Southwest 2004). The nesting population closest in proximity to the project area is located approximately 0.6 mi to the east of the proposed dredging area.

Five key foraging areas exist in the San Diego Bay region. Two are located outside of the Bay in the shallow ocean waters off of Coronado and Silver Strand Beach; a third is at the mouth of the bay; the fourth is inside the bay along the silver strand; and the fifth is in southern San Diego Bay, within the Sweetwater Marsh National Wildlife Refuge. The proposed project area is located almost entirely within the foraging area at the mouth of the bay (Figure 3.5-1).

California least terns nest in open expanses of sand or light-colored dirt on or near beaches and the shores of coastal bays. The nest is a small depression that may be natural, man-made, or excavated by the birds. One to four eggs are laid, although most nests have two or three. This species forages over shallow waters within 2 to 3 mi of the nest, feeding primarily on small fish, including silversides (*Atherinidae* spp.) and northern anchovy (Massey and Atwood 1985).

0 0.2 0.4 Kilometers
0 0.2 0.4 Miles

Figure 3.5-1
California Least Tern Nesting Sites and Foraging Areas Identified in the Tern MOU Within the Vicinity of the Proposed Project

Source: NAVFAC Southwest 2010a, 2010b

Least tern nesting populations for the bay have increased dramatically, from 187 in 1993 to 1,606 in 2006 (U.S. Navy 2006). In 2010, the estimated number of breeding pairs throughout San Diego Bay ranged from 1,418 to 1,478 (California Department of Fish and Game [CDFG] 2011). Tern populations have increased in the bay due to coordinated management strategies with the USFWS and the Navy on Navy lands. These strategies include predator management, tern monitoring, site preparation of tern nesting colonies, and biological information gathering (NAVFAC Southwest 2004).

The closest least tern nesting colonies to the project area are located at NAS, North Island; specifically, the Runway 1-1 and the Ammo Dump alternative sites, all of which are on Navy land, approximately 2,800 ft (850 m) to the east of the proposed project area. All nesting sites at NAS, North Island have close proximity to foraging areas. The only other nesting colony within the north bay is found at Lindberg Field. Other nesting colonies within central and south bay are found at North Delta Beach, South Delta Beach, NAB Ocean Beach, "D" Street, Chula Vista Wildlife Reserve, and South Bay Refuge (NAVFAC Southwest 2004). All of these nesting areas, with the exception of the airport location, have been used annually since 1994.

The Navy implements an extensive program of research, monitoring, protection, nest site enhancement, and avoidance measures to minimize the take of California least tern from Navy activities. An MOU between the USFWS Ecological Services and Refuges and NAVFAC Southwest and NRSW (USFWS and U.S. Navy 2004; Navy Region Southwest 2008) summarizes efforts and commitments by the U.S. Navy and USFWS to California least tern conservation and enhancement in San Diego Bay. The MOU is included in this EA as Appendix E.2.

3.5.2.2 Green Sea Turtle

The green sea turtle is federally threatened throughout its eastern North-Pacific range. A small population primarily resides in southern San Diego Bay's warmer waters, which are heated by cooling water discharge from the South Bay Power Plant. It is also believed that other green sea turtles migrate from nesting sites in Mexico to San Diego Bay to forage on red algae, sea lettuce, and eelgrass. The number of turtles using the Bay varies but is estimated to range from 30 to 60 animals, increasing to nearly 100 during peak migratory time periods (NAVFAC Southwest and Port of San Diego 2011). As such, transient green sea turtles may occur in the proposed project area, although they have not been detected in the North Bay in recent years (Richter 2012).

3.5.2.3 Western Snowy Plover

The western snowy plover is a federally threatened bird species that nests in colonies on sandy beaches along the west coast of the United States and into southern Baja California. They occur on the beaches in the San Diego Bay area and on the salt work levees in the south Bay. The majority (78 percent) of the coastal breeding colonies in California occur on eight sites from San Francisco Bay to Oxnard and the Channel Islands (NAVFAC Southwest and Port of San Diego 2011). There were an estimated 248 snowy plovers in San Diego County in 2010 and 277 in 2011 during the breeding season (USFWS 2011). Of the 126 nests in the county in 2006, approximately 54 percent were at Camp Pendleton, 6 percent at Batiquitos lagoon, and 34 percent were in the San Diego Bay area at several sites (in decreasing order of importance—NAB Coronado

[Ocean], NASNI, Silver Strand State Beach [Ocean], Silver Strand Training Complex, Saltworks, and NAB Coronado [Bay]) (NAVFAC Southwest and Port of San Diego 2011). Navy 2012 surveys to date show that there are 22 active nests on the beach southeast of the North Island airfield and that three of the five nests located on the airfield have been collected to protect the snowy plovers (Naval Base Coronado 2012).

An estimated 70 percent of the snowy plover population migrates in the winter; the remainder are present year-round. The San Diego Bay area also serves as the over-wintering grounds for plovers from Monterey Bay and Oregon and now holds much of the remaining nesting grounds for snowy plovers in Southern California. As its natural nesting areas have come under development or heavy human usage, the undeveloped Naval training beaches have become increasingly important for this species locally (NAVFAC Southwest and Port of San Diego 2011). There is no designated critical habitat within or adjacent to the project area; the closest designated critical habitat is on the southeast side of North Island at Coronado Beach, 2.5 mi to the southeast (USFWS 2012). Snowy plovers are not known or likely to use the small areas of beach near the proposed project.

3.5.3 Environmental Consequences

3.5.3.1 Approach to Analysis

The analysis identifies the potential significance of impacts to threatened and endangered species based on: 1) the importance (i.e., legal, commercial, recreational, ecological, or scientific) of the resource; 2) the proportion of the resource that would be affected relative to its occurrence in the region; 3) the sensitivity of the resource to proposed activities; and 4) the duration and ecological ramifications of the impact. For example, an impact would be considered significant if it would permanently reduce the population size or distribution of a protected species.

3.5.3.2 Avoidance and Minimization Measures

The following avoidance and minimization measures would be utilized during the proposed activities to reduce the potential to impact threatened and endangered species:

1) Dredging and other in-water demolition or construction would not occur during the endangered California least tern breeding season (April 1 - September 15).

2) The Navy would continue to follow the conservation measures established in the current Tern Memorandum of Understanding (MOU) (Appendix E.2).

3) In conjunction with marine mammal monitoring (Section 3.4.3.2) (currently part of the Navy's IHA application), qualified observers will also search for and document any occurrence of sea turtles within areas of potential effect or interaction with the project. During pile driving/extraction activities, monitoring will extend to the limit potential Level B behavioral harassment, specifically to the underwater 160 dB re 1 μPa (rms) isopleth for impact pile driving; and for vibratory pile driving or extraction, to either the underwater 120 dB re 1 μPa (rms) isopleth or to the point at which project sound

becomes indistinguishable from background noise (maximum project sound SPL (rms) ≤ median ambient rms), whichever is less. A 10-meter buffer zone will also be monitored during other in-water operations of equipment and vessels. Monitoring will commence at least 15 minutes prior to the activities.

4) If any sea turtle is seen within these visual ranges prior or during the corresponding activity, the activity would not commence until the animal has moved out of the area or at least 15 minutes has passed since the last such sighting.

5) Programmatically, the Navy will continue to consult informally with NMFS on sea turtle occurrence and Navy construction activities and facilities projects throughout San Diego Bay to identify any risks that could negatively impact sea turtles.

3.5.3.3 Alternative 1 Pier Replacement and Associated Dredging

California Least Tern

Most of the proposed project (i.e., the existing fuel pier, the proposed fuel pier, the proposed dredging area, and the proposed temporary Navy MMP relocation site) is located within a foraging area identified in the existing Tern MOU between the USFWS and U.S. Navy (Figure 3.5-1, Appendix E.2). Various studies have confirmed that terns forage in both shallow and deep water habitats, although studies conflict as to whether artificial structures attract or deter tern foraging (USACE 2009; NAVFAC Southwest and Port of San Diego 2011). The nearest nesting habitat areas are across the bay, on the western edge of North Island, approximately 700 m east of the dredging footprint.

Conservation measures established in the Memorandum of Understanding Between U.S. Fish and Wildlife Service and the U.S. Navy Concerning Conservation of the Endangered California Least Tern in San Diego Bay, California (Appendix E.2) would be followed, resulting in the avoidance of noise- and turbidity-producing in-water activities in designated least tern foraging habitat, which includes the project area, from April 1 through September 15, when least terns are present nesting and foraging in San Diego Bay. No persistent effects on foraging conditions are expected once in-water construction/demolition activities are halted. At other times, the onshore noise and activity associated with the project would be similar to ongoing activities at NBPL and not expected to affect least tern foraging in the adjacent waters. There would be no effect on least tern nesting colonies, the nearest of which is across the bay at North Island. Based on this analysis, the Navy has concluded that Alternative 1 may affect, but is not likely to adversely affect, the California least tern, and is consulting informally with the USFWS to request concurrence with this conclusion. There would be no significant impact on the California least tern.

Green Sea Turtle

Potential impacts to green sea turtles would primarily be from noise generated during demolition, construction, or dredging activities. In-water activities would only overlap the tail end of the warm-water period when sea turtles are most likely to move through the project area (NAVFAC Southwest and Port of San Diego 2011). In any case, proposed monitoring would

limit the potential exposure of sea turtles to underwater sound and in-water activities, and sea turtles would be able to detect and avoid these activities.

No sea turtle habitat would be impacted by any project activities and all avoidance and minimization measures described in Section 3.5.3.2 would be implemented to avoid potential impacts to green sea turtles from pile driving activities. Although there are no empirical data on the effects of pile driving on sea turtles, NMFS has identified impact pile driving underwater sound criteria for sea turtles as 190 dB re 1 μPa (rms) for Level A physiological effects, and 160 dB re 1 μPa (rms) for Level B behavioral effects. For vibratory pile driving, NMFS criteria are 190 dB rms for Level A and 120 dB re 1 μPa (rms) for Level B. However, sea turtles are not expected to occur in northern San Diego Bay during the fall-winter timing of in-water construction/demolition and pile driving activities. Furthermore, any sea turtles present in the general vicinity would be able to detect the noise and associated in-water activities and may avoid the project area during project activities. Although it is unlikely that a sea turtle would move within a distance of potential Level B effect, sound generating activities would cease upon detection. Therefore, the Navy has concluded that Alternative 1 may affect, but is not likely to adversely affect, the green sea turtle, and is consulting informally with NMFS to request concurrence with this conclusion. There would be no significant impact on the green sea turtle.

<u>Western Snowy Plover</u>

Since the western snowy plover is not known or expected to occur in the project area, and since the nearby sandy beach would not be used for any project-related purpose, there would be no effect on individuals or potential habitat for this species. Therefore, there would be no effect on western snowy plovers; no consultation is required. There would be no significant impact to western snowy plovers.

<u>Other Special Status Species</u>

The project sites are not in proximity to important foraging, resting, or breeding areas for bird species, and similar habitats are abundant throughout San Diego Bay. Potential disturbance of shoreline and adjacent open water areas that may be used on a transient basis by sensitive water and shore bird species would be short-term and less than significant. Noise generated during demolition, construction, and dredging activities would not substantially increase noise levels. Additionally, these increases in noise and activity would not vary substantially from normal levels of activity, vehicular traffic, and marine vessels operating in the immediate area and would cease upon completion of demolition, construction, and dredging activities. Therefore, there would be no adverse effect on these species' populations or habitats as a result of Alternative 1.

3.5.3.4 Alternative 2 Delayed Dredging Alternative

Alternative 2 would have the same impacts and the same avoidance and minimization measures as Alternative 1, although the impacts associated with dredging would occur separately from those associated with the other project components since the dredging would only take place after the

new fuel pier construction was completed. Therefore, there would be no significant effects on threatened and endangered species as a result of Alternative 2.

3.5.3.5 Mitigation Measures

Because potential impacts to threatened and endangered species would be localized, would cease upon completion of project activities, and would not be significant under either Alternative 1 or Alternative 2, no mitigation measures are proposed.

3.5.3.6 No-Action Alternative

Under the No-Action Alternative, temporary relocation of the Navy MMP, amendments to the existing navigation Security Zones, temporary relocation of the Everingham Bait Brothers Company bait barges, demolition and replacement of the existing fuel pier, and associated dredging of the turning basin would not occur. Existing conditions would remain unchanged. Therefore, implementation of the No-Action Alternative would not have a significant impact to threatened and endangered species.

3.6 WATER RESOURCES

3.6.1 Definition of Resource

Water quality describes the chemical and physical composition of water as affected by natural conditions and human activities. Water resource regulations focus on the right to use water and protection of water quality. The principal federal laws enforced by the USEPA to protect water quality are the Clean Water Act (CWA), as amended (33 USC § 1251 et seq.), and the Safe Drinking Water Act (42 USC § 300f et seq.). The CWA provides protection of surface water quality and preservation of wetlands. Section 404 of the CWA regulates discharge of dredged material in U.S. coastal waters (USEPA 2005). The Marine Protection, Research, and Sanctuaries Act (also known as the Ocean Dumping Act) governs transportation for the purpose of disposal into ocean waters (USEPA 2005). The Safe Drinking Water Act is directed at protection of drinking water supplies. At the state level, the Porter-Cologne Water Quality Control Act (California Water Code §§ 13000-13999.10) gives the State Water Resources Control Board (SWRCB) and nine Regional Water Quality Control Boards (RWQCBs) responsibilities for protection of the waters within their regions. The regional boards are also responsible for implementing provisions of the CWA delegated to states, such as the NPDES, which regulates point (industrial) and non-point (stormwater) sources of pollutants.

In the Water Quality Control Plan for the San Diego Basin (Basin Plan) the California RWQCB, San Diego Region designated beneficial uses for the surface and ground waters in the San Diego Region, including San Diego Bay (RWQCB 1994). Beneficial uses are defined as the uses of water necessary for the survival or well-being of man, plants, and wildlife, and are protected against degradation of their quality under the state Porter-Cologne Act (RWQCB 1994). Examples include drinking, swimming, industrial, and agricultural water supplies, and the support of fresh and saline aquatic habitats. Specific beneficial uses established for San Diego Bay include the following (RWQCB 1994): Industrial Service Supply; Navigation; Contact Water Recreation; Non-contact Water Recreation; Commercial and Sport Fishing; Preservation

of Biological Habitats of Special Significance; Estuarine Habitat; Wildlife Habitat; Rare, Threatened, or Endangered Species; Marine Habitat; Migration of Aquatic Organisms; and Shellfish Harvesting. The Basin Plan sets objectives for water quality that must be maintained to protect the designated beneficial uses of water resources in the San Diego region and conform to the state's antidegradation policy. The California Ocean Plan establishes limits or levels of water quality characteristics for ocean waters to ensure the reasonable protection of beneficial uses and the prevention of nuisance (California State Water Quality Control Board [SWRCB] 2005).

3.6.2 Affected Environment

The following section describes existing conditions for water resources at the proposed project site located in San Diego Bay. The region of influence (ROI) for water resources for the proposed project is San Diego Bay.

3.6.2.1 Existing Conditions

San Diego Bay is a narrow, crescent-shaped natural embayment oriented northwest-southeast with an approximate length of 15 mi (Port of San Diego 2007). The width of the bay ranges from 0.2 to 3.6 mi, and depths range from -74 ft MLLW near the tip of Ballast Point (refer to Figure 1-2) to less than four ft at the southern end (Merkel & Associates, Inc. 2009). About half of the bay is less than 15 ft deep and most of it is less than 50 ft deep (Merkel & Associates, Inc. 2009).

On average, the San Diego region receives 10 inches of rainfall per year, occurring mostly between November and March (Port of San Diego 2007). Seasonal inputs of freshwater from the land to the east are conveyed to the bay through the three sub-watersheds of the San Diego Bay watershed (Port of San Diego 2007). The Pueblo San Diego sub-watershed encompasses the northern portion of the bay including the project area. This sub-watershed has the smallest drainage area, but is the most densely developed and populated because it includes the City of San Diego (Port of San Diego 2007). Freshwater contribution to the Bay comes primarily from the Otay and Sweetwater Rivers in the south portion of the Bay, and secondarily from Chollas and Paleta Creeks in the central portion (USACE 2009). For approximately nine months of the year, the Bay receives no significant amount of fresh water input. The fresh water that does flow into the bay is limited to surface runoff from urban areas (e.g., the over 200 storm drains and intermittent flows from the rivers and creeks after storms) (USACE 2009). The Point Loma peninsula has no creeks or rivers. In the northern, developed urban portion of the peninsula, seasonal runoff is conveyed to the ocean via gutters and storm drains. Some of the natural drainage pattern remains in the undeveloped western and southern portions (Figure 1-2). West (upslope) of the project site, runoff is diverted to containment basins and concrete channels to prevent contact with potential contaminants at the NBPL DFSP fuel storage facilities before outflow to the bay (Navy 2007).

<u>Bathymetry and Circulation</u>

The northern and central portions of the bay have been shaped by historic dredging to support large ship navigation, and filling (Merkel & Associates, Inc. 2009). Only the far southern

portion retains its natural shallow bathymetry (Merkel & Associates, Inc. 2009). The bathymetry and bedform of the bay are defined by a main navigation channel that steps up to shallower dredged depths toward the sides and bottom of the bay (Merkel and Associates 2009). USACE dredges the navigation channel to maintain it a depth of -47 ft MLLW (NOAA 2012). Outside the navigation channel, the bay floor consists of platforms at depths that vary slightly (Merkel and Associates 2009). Within the north bay, typical depths range from -36 to -38 ft MLLW to support large ship turning and anchorage (Merkel & Associates, Inc. 2009). Small vessel marinas are typically dredged to depths of -15 ft MLLW (Merkel & Associates, Inc. 2009).

Bathymetry at the proposed project site has been altered by filling and dredging as well. The quay wall at the fuel pier has been artificially filled to its elevation of approximately +12 ft MLLW (Terra Costa Consulting Group, Inc. 2010). The bay bottom on the south side of the fuel pier approach segment has been dredged to a depth of about -20 ft MLLW, while the bathymetry of the north side retains a more gradual downward slope to the east. Beneath the fuel pier itself, the bottom was protected from historical dredging by the pier pilings and thus stands several feet higher than immediately adjacent depths (Terra Costa Consulting Group, Inc. 2010; NAVFAC 2009a). Beyond the fuel pier headline, the bottom drops sharply to -30 ft and then -40 ft, the result of dredging. Bayward (east) of the headline, most of the bathymetry out to the navigation channel is at least -41 ft MLLW. However, there is one wedge-shaped high spot along the western edge of the navigation channel where bottom depths rise from -40 to -36 ft MLLW (refer to Figure 2-6).

Circulation within San Diego Bay is affected by the bay's crescent shape and narrow bay mouth, tides, and seasonal salinity and temperature variations (Port of San Diego 2007). San Diego Bay can be divided into four regions based upon circulation characteristics. The North Bay – Marine Region extends from the bay mouth to the area offshore from downtown San Diego. Tidal action has the greatest influence on circulation in this area where bay water is exchanged with sea water over a period of two to three days (Port of San Diego 2007). The North-Central Bay – Thermal Region runs from the north bay to Glorietta Bay (south of Coronado Island). In the Thermal Region, currents are mainly driven by surface heating (Port of San Diego 2007). The incoming tide brings cold ocean water from deeper areas, which is then replaced with warm bay surface water when the tide recedes. These tidal processes lead to strong vertical mixing (Port of San Diego 2007). The region between Glorietta Bay and Sweetwater Marsh is characterized as the South-Central Seasonally Hypersaline (i.e., higher salt content than seawater) Region. Here, variations in salinity due to warm-weather evaporation at the surface separate the water into upper and lower zones driven by density differences (Port of San Diego 2007). The South Bay estuarine region south of Sweetwater marsh receives occasional freshwater inflows from the Otay and Sweetwater Rivers (Port of San Diego 2007). Residence time of bay water in the estuarine region may be greater than one month (Port of San Diego 2007). Common salinity values for the bay range from 33.3 to 35.5 practical salinity units for the bay mouth and the south bay, respectively (Chadwick et. al. 1999).

San Diego Bay has mixed diurnal/semi-diurnal tides, with the semi-diurnal component being dominant (Largier 1995). The interaction between these two types of tides is such that the higher high tide occurs before the lower low tide, creating the strongest currents on the larger ebb tide (Largier 1995). The tidal range (difference between MLLW and mean highest high water) is about 5.5 ft (Largier 1995). In general, tidal currents are strongest near the bay mouth, with maximum velocities of 1.6 to 3.3 ft per second (Largier 1995). Tidal current direction generally follows the center of the bay channel (Chadwick et. al. 1999). Residence time for water in the bay increases from approximately five to 20 days in mid-bay to over 40 days in south bay (Chadwick et. al. 1999). During an average tidal cycle, about 13 percent of the water in the bay mixes with ocean water and then moves back into the bay (Port of San Diego 2007). The complete exchange of all the water in the bay can take 10 to 100 days, depending on the amplitude of the tidal cycle (Port of San Diego 2007). Tidal flushing and mixing are important in maintaining water quality within the bay. The tidally-induced currents regulate salinity, moderate water temperature, and disperse pollutants (Port of San Diego 2007).

Marine Water Quality

San Diego Bay

Before the 1960s, San Diego Bay was one of the most polluted harbors in the world. This was due to over 70 years of discharge of raw sewage and industrial waste as the population of the City of San Diego increased and became a major harbor for the U.S. Navy and civilian commerce (Chadwick et. al. 1999). In 1963, the City of San Diego constructed its Wastewater Treatment Plant on the west side of the Point Loma peninsula to properly treat sanitary sewage before ocean discharge via an offshore pipeline. Use of the treatment plant and elimination of industrial discharges in the 1970s resulted in rapid water quality improvements in the bay (Port of San Diego 2007).

Water quality is commonly assessed by measuring dissolved nutrients, dissolved oxygen, pH, turbidity, chlorophyll *a*, and coliform bacteria (Chadwick et. al. 1999). Measured values for dissolved nutrients in San Diego bay such as phosphate and silicates range from 0.9 to 4 parts per million (ppm) for silicon and 0.02 to 0.3 ppm phosphorus in the winter, to 0.3 to 1.3 ppm for silicates and 0.2 ppm phosphorus in the summer (Chadwick et. al. 1999). This variation is the result of inflow of these nutrients with winter runoff, and uptake by phytoplankton growth in the summer (Chadwick et. al. 1999). Dissolved oxygen levels range from about 4 (summer) to 8 milliliters per liter (winter) (Chadwick et. al. 1999). These oxygen levels are typically at or near atmospheric equilibrium levels. The pH of seawater in San Diego Bay is relatively uniform, ranging from about 7.9 to 8.1 throughout the bay and the year (Chadwick et. al. 1999).

Turbidity is a measure of water clarity or murkiness, and can be caused by suspended sediments transported in runoff or increased algal/bacterial growth (Tierra Data, Inc. 2010). Turbidity can also be created by natural and man-made resuspension of bottom sediments. Bottom sediments are resuspended by the action of tides, winds, and movements of ships with drafts deeper than 22 ft in the shallow waters of the south bay around Naval Base San Diego (NBSD) (Chadwick et. al. 1999). Increased turbidity reduces the amount of light available for

plant growth underwater, so it can affect the entire ability of the Bay to support living organisms (Tierra Data Inc. 2010). Turbidity in San Diego Bay varies, depending on the tides, seasons, and location within the Bay (Tierra Data, Inc. 2010). The monthly average for the northern portion of the bay varies from approximately 1.0 to 3.7 nephelometric turbidity units (NTU), (Tierra Data, Inc. 2012). The Basin Plan sets limits for allowable increases in turbidity over existing conditions (RWQCB 1994).

Chlorophyll *a* (a measure of the amount of phytoplankton present in the bay) ranges from 0.2 to 25 micrograms per liter (Chadwick et. al. 1999). The highest values were measured in the south bay in winter, when runoff carries high levels of nutrients into the south bay. In summer chlorophyll *a l*evels return to background levels of 1 to 2 micrograms per liter. These chlorophyll *a l*evels are generally much high than those found in the adjacent open ocean. Before 1964, when untreated sewage was still being discharged into San Diego Bay, bacterial counts (fecal coliform) were as high as 82 per milliliter in the south bay (Chadwick et. al. 1999). Since these discharges ended, bacterial counts typically remain below 10 per milliliter except during some winter storms. These levels are below federal limits for water contact, implying that the bay is generally safe for recreational use (Chadwick et. al. 1999).

Current sources of pollution to the bay include underground dewatering, industries on the bay and upstream, marinas and anchorages, U.S. Naval activities, materials used for underwater hull cleaning and vessel antifouling paints, and urban runoff (Chadwick et. al. 1999). Additional pollution sources include creosote-treated wood pier pilings, which are a source of PAHs, stormwater runoff from land used for industrial, commercial, and transportation purposes, bilge water discharge, and oil spills (Chadwick et. al. 1999). Recent changes in Navy procedures have included replacing approximately half of the pier pilings with plastic, concrete or untreated wood, and eliminating bilge water inputs (Chadwick et. al. 1999). Overall, the levels of contamination in the water and sediment in San Diego Bay appear to be lower now than in decades past, including levels of some metals and PAHs (Port of San Diego 2007). However, copper concentrations remain routinely higher than federal and state limits for dissolved copper (Port of San Diego 2007).

Pacific Ocean Nearshore Waters Imperial Beach Sediment Receiver Site

Ocean water quality along the San Diego coast is affected by seasonal upwelling and downwelling; El Nino-Southern Oscillation that raises ocean temperatures on average every 4 years; and stormwater runoff from coastal rivers and streams carrying suspended sediments that cause large turbidity plumes and reduce surface salinity (San Diego Association of Governments [SANDAG] 2011). Stormwater runoff can also carry bacteria, nutrients, and chemical contaminants to nearshore waters. Publicly-owned treatment works discharge treated sewage effluent to the ocean through subsurface outfalls. Treated sewage is discharged about 90 ft offshore of Imperial Beach (SANDAG 2011).

General water quality values for coastal waters include salinity, dissolved oxygen, pH, and nutrients. Water salinity along the coast ranges from approximately 32 to 34 parts per thousand. Dissolved oxygen varies in response to upwelling, inflow of water masses, and algal

photosynthesis, but typically ranges from 5.0 to 11.6 mg/L. Nearshore waters generally have higher dissolved oxygen content that offshore areas because of shallow water depths and continuous wave action that promote mixing (SANDAG 2011). The pH of coastal waters typically ranges from 7.7 to 8.4. The salinity in nearshore coastal waters ranges from approximately 33.4 to 33.7 parts per thousand. Nutrient levels are higher near the bottom than at the surface, and may be elevated where there are waste water discharges and near river, lagoon, and bay outlets (SANDAG 2011). Phosphate levels in coastal waters range from 0.5 to 0.8 mg/L (SANDAG 2011).

Turbidity of nearshore coastal waters varies by location and time period, as a result discharges from coastal lagoons, sediment resuspension, and plankton blooms. Turbidity increases in winter due to greater wave energy, surface runoff, and river discharges (SANDAG 2011). Natural turbidity from runoff tends to occur in pulses, not continual discharges, or consistent seasonal inflows (SANDAG 2011). Rip currents increase turbidity in the nearshore zone by carrying suspended sediment past the surf zone. Total suspended solids of more than 1,000 mg/L were measured in rip currents off Imperial Beach (SANDAG 2011). Rip currents are more pronounced in conditions of high waves, high winds, and/or storm swells. In general, water clarity and light transmittance tend to increase with distance from shore.

With some exceptions, the quality of nearshore ocean water is good (SANDAG 2011). However, bacterial levels along the beaches in South San Diego County (Imperial Beach to Coronado) are occasionally affected by winter discharges from the Tijuana River (SANDAG 2011).

<u>Surface Water Quality</u>

Fuel Pier

Stormwater runoff from the fuel pier is regulated as an industrial discharge under NBPL's NPDES Permit (Permit No. CA 0109363 Order No. R9-2002-0002) (RWQCB 2002a). This permit prohibits the discharge of wastes including water contaminated with oils, fuels, lubricants, solvents, and oily bilge water (RWQCB 2002a). The NPDES permit states that the discharger (i.e., NBPL and the fuel pier) shall not cause pollution, contamination, or nuisance, and the discharge of wastes shall not cause or contribute to an exceedence of any applicable State or San Diego regional water quality objective or standard (RWQCB 2002a). The NPDES permit also regulates discharges from two point sources associated with the fuel pier: miscellaneous (potable water and fire system maintenance) and pier boom cleaning (RWQCB 2002b). Twice per year the oil containment booms surrounding the fuel pier are cleaned with high-pressure potable water to remove marine growth (RWQCB 2002b). The NPDES permit requires the removal of any oily booms to the 32nd Street Naval Station for cleaning (including those used to contain spills) and an annual reporting log of boom cleaning activity (RWQCB 2002b). At the designated cleaning area, the used cleaning water discharges to the sanitary sewer system (RWQCB 2002b).

To fulfill the requirements of the NBPL NPDES permit, NBPL has implemented a Stormwater Discharge Management Plan (NAVFAC Southwest 2009). This Plan includes Basewide and

facility-specific best management practices (BMPs) for preventing and minimizing contact of stormwater with potential pollutants that are present at the fuel pier. The Basewide BMPs include restricting access, regular cleaning and sweeping, controlling spills and reducing waste, avoiding hosing down the site, and regular inspection and maintenance of the storm drain system (NAVFAC Southwest 2009). The BMPs specific to operations at the fuel pier include: the pier perimeter where fueling operations take place has an 8-in high concrete containment berm; drainage ports in the pier deck are covered during fueling operations to prevent pollutants, in the event of a spill, from entering San Diego Bay; drip pans are used to contain leaking fluids from valves and piping until leaks are repaired; fill pipes are protected by berms from potential vehicle damage; spill kits are provided to mitigate liquid spills; and an oil containment boom surrounds the entire fuel pier (NAVFAC Southwest 2009). The floating boom is extended to surround vessels while they are berthed at the pier as well (Navy 2010a). To further minimize impacts of potential spills, additional absorbent booms, three boats to deploy them, and an oil skimmer boat are kept on the quay wall south of the fuel pier at all times (Navy 2010a). A vacuum truck is generally staged at the foot of the fuel pier as well (NAVFAC 2009b). Implementation of the Basewide and site specific BMPs, and compliance with the NPDES permit ensure that ongoing fuel pier operations do not result in significant impacts to surface water. No NPDES permit violations were issued to NBPL DFSP at the fuel pier in the period from January 2004 through November 2010 (RWQCB 2011).

NMAWC Site

NMAWC is covered under NBPL's NPDES Permit it but does not have any permitted discharges (NAVFAC Southwest 2012).

3.6.3 Environmental Consequences

3.6.3.1 Approach to Analysis

Water quality impacts are evaluated based on the potential for a substantial increase in turbidity, discharge of suspended sediments, or discharge of contaminants that exceeds Federal or state water quality standards or objectives. Impacts to water resources would occur if implementation of the Proposed Action would cause major changes to bathymetry; alter or obstruct patterns of circulation in San Diego Bay; substantially degrade surface water, groundwater, or marine water quality or cause impairment to beneficial use.

3.6.3.2 Alternative 1 Pier Replacement and Associated Dredging

<u>Bathymetry and Circulation</u>

Pier Demolition

No dredging is needed near the fuel pier itself (only in the high spot in the turning basin) so there would be no changes to bathymetry at the existing pier site. A remnant soil mound (created by historical dredging of the bay floor adjacent to the fuel pier) lies beneath the existing fuel pier (Terra Costa Consulting Group, Inc. 2010). The height of the soil mound varies from approximately elevation -1 ft (MLLW) under the approach segment at the shoreline, to approximately elevation -8 ft (MLLW) near the in the center of the main pier, and -10 ft below

the south segment and -20 ft beneath the north (Terra Costa Consulting Group, Inc. 2010). Sheet pile bulkheads that protrude 10 ft above the mudline would be left in place beneath the north and approach segments, which would preserve the soil mound beneath. It is likely that when the individual pilings are cut off at the mudline, the soil mound would remain beneath the south segment as well. Vessels berthing at the new fuel pier would be operating approximately 300 ft east of the old pier berthings, so the old sheet piles, pile stubs, and remnant bathymetry would not affect navigation uses.

Demolition of the existing fuel pier would involve the use of barges, tugs, and other vessels that would move about the work area, the use of a vibratory hammer and/or jetting outside the least tern foraging season (April 1 through September 15) and pulling out the pier piles with a crane or clam shell dredge bucket used as a crane. These operations would increase water movement in the area where the removal occurs, but the effect would be strictly limited to the duration of the demolition period and work area. As stated in Section 3.6.2.1, the primary mechanisms controlling circulation in San Diego bay are tidal currents and seasonal variations in temperature and salinity. Temporary localized increases in water movements would not be expected to have a significant effect on circulation. The sheet pile bulkheads would remain in place so the absence of the individual piles would represent a negligible change from existing conditions. Because water already circulates freely around the bulkheads and the individual pilings, this change would not have a significant impact to circulation in the Bay overall. Therefore, impacts to bathymetry and circulation associated with demolishing the existing fuel pier would not be significant.

Pier Construction

There would be no dredging or other changes to bathymetry at the proposed new pier construction site. Construction of the new fuel pier would require installation of approximately 554 structural and fender piles. The first 400 ft of the new pier approach segment would be constructed within 5 ft of the existing fuel pier approach. As such, this segment of the new pier would not represent a change from existing conditions with regard to circulation. The new pier approach segment would extend about 250 ft bayward (east) beyond the old pier, where the 1,100 ft-long berthing segment would be located. Throughout the new pier structure, pier pilings would be spaced 10 ft apart. This spacing would be wide enough so that the new pier would not form a barrier to local circulation. Construction of the new fuel pier would involve the use of barges, tugs, other vessels that would move about the work area, and jetting, a vibratory hammer and a diesel hammer to install the piles. These operations would increase water movement in the area where the construction occurs, but the effect would be strictly limited to the duration of the construction period and work area. Therefore, impacts to the bathymetry and circulation of the bay overall associated with pier construction would not be significant and existing patterns of circulation would continue.

Turning Basin

The sediments in the dredge footprint generally consist of a 0.5 to 1 ft layer of fine sand and silty sand (bay/beach deposits) overlying medium and coarse grained sand with shell

fragments (Bay Point Formation) (Sampling and Analysis Report for Naval Base Point Loma Fuel Pier Replacement and Dredging [Navy Military Construction Project P-151] in Appendix D). The Bay Point Formation is native material that was deposited in the San Diego area near the end of the last ice age (more than 10,000 years ago) (USACE 2009). The bay/beach deposits are sediments transported by current movements in the Bay (USACE 2009).

The wedge-shaped high spot in the turning basin adjacent to the west of the navigation channel would be dredged to a depth of -40 ft MLLW, removing the bay/beach deposits and several feet of Bay Point Formation. Most of the area surrounding the dredge footprint is already deeper than -40 ft MLLW (Figure 2-6) due to historical dredging. Reducing the high spot in the turning basin to a depth similar to existing surrounding depths would not be a major change to bathymetry. The dredging operations would temporarily increase water movement in the area where dredging is taking place, but the effect would be strictly limited to the duration of the dredging period and work area. The minor changes to bathymetry would not be sufficient to affect circulation patterns in the Bay. Therefore, dredging associated with Alternative 1 would not have a significant impact to bathymetry and circulation.

Imperial Beach Sediment Receiver Site

Sediment deposited at the replenishment site would be gradually reworked by the forces of wave action, longshore currents, and seasonal storms into offshore sandbars and the natural beach profile. The coastline at Imperial Beach is included in the San Diego Association of Governments (SANDAG) Regional Beach Sand Project II, an effort to restore sand to selected beaches in San Diego County (see Section 4.1.2.6). The sediments from the proposed P-151 dredging would be an additional source of sediment for the beach restoration program. Therefore, it is anticipated that use of the dredge sediments for nearshore replenishment would be a beneficial impact for bathymetry.

Temporary Relocation of the Navy MMP

Temporary relocation of the Navy MMP would not involve dredging or other alteration of the bay bottom so there would be no changes to bathymetry at either the existing or proposed temporary relocation site. The marine mammal enclosures consist of floating walkways and enclosures anchored to concrete guide piles (MNB 2011). The guide pile spacing and floating structures at the existing location permit free movement of water through this area. Removal of the floating walkways and enclosures would not affect circulation at the existing site; the guide piles would be left in place to re-anchor the floating facilities after the temporary relocation period.

Some guide piles and walkways are already in place at the NMAWC site; however, 50 guide piles and additional floating walkways would be installed. Guide piles are assumed to be required at a minimum of approximately 30 ft on centers along the floats; certain configurations could require additional guide piles between enclosures (MNB 2011a). The relatively small number of guide piles needed, and the distance between the guide piles, would minimize the potential for the Navy mammal facilities to obstruct water movement at the NMAWC site. The guide piles would be removed when the temporary relocation period is over, so any changes to

circulation patterns would be short-term. Therefore, the proposed temporary relocation of the Navy MMP to the NMAWC site as described above would not have a significant impact to bathymetry and circulation.

Proposed Temporary Relocation of Everingham Brothers Bait Company Bait Barges

Temporary relocation of the bait barges does not involve dredging or other alteration of the bay bottom so there would be no changes to bathymetry at either the existing or the temporary relocation site. The bait fish are held in enclosures that have 1-in wide slots on the sides allowing sea water to flow through freely. Thus, temporary relocation of the bait barges to the would not have a significant impact to bathymetry and circulation.

In summary, limited dredging would occur in a portion of the existing turning basin, and pier piles would be installed in areas where piles already exist. Temporary relocation of the Everingham Brothers Bait Company Bait Barges would not involve alternation of the bay bottom or obstruct the free flow of water. For the reasons stated above (the dredging would level a high spot in the turning basin); piles would be spaced at a sufficient distance to allow free movement of water) implementation of Alternative 1 would not have a significant impact to bathymetry and circulation.

<u>Marine Water Quality</u>

Pier Demolition

Marine water quality in the vicinity of the fuel pier could be affected by fuel spills, demolition debris, dust, and contaminated stormwater runoff, for the duration of the demolition/construction period (approximately four years). The Navy would require the contractor to prepare and implement a comprehensive debris management plan that would address the types of construction and demolition debris, expected separation and retrieval methods, and disposal methods. The contractor would be required to use catch devices and sheeting to capture and contain debris and materials that may be produced by project activities. Accidental releases of debris to San Diego Bay would be prevented by placing floating booms around the site to provide a complete barrier to floating debris. Debris from work on demolition and construction barges would also be captured on-board the barges. All captured material would be swept and disposed of in accordance with the debris management plan.

Before demolition begins, the contents of each pipeline would be pumped out and each pipeline would be disconnected from the fuel supply. All fuel dispensing ports would be sealed, and each pipeline would be flushed with high-pressure water. The water from flushing the pipelines would be treated at the NBPL DFSP Fuel Oil Reclamation (FOR) system. Sanitary sewage pipelines would also be flushed with high pressure water, which would be pumped to the NBPL sanitary sewer system for discharges. Flushing the pipelines would minimize accidental release of pipeline residue during demolition activities.

In accordance with the Navy's Stormwater Construction Permitting Policy, a construction NPDES permit would be obtained that would remain in effect for the length of the project (NAVFAC Southwest 2011a; Navy 2005). The NPDES permit would require preparation and

implementation of a Storm Water Pollution Prevention Plan (SWPPP) that would identify project-specific BMPs to minimize such impacts (RWQCB 2011). Per the NBPL ICP for Oil and Hazardous substance Spill Prevention and Response Facility Response Plan any petroleum release or petroleum sheen observed on the water surface would be reported to U.S. Coast Guard National Response Center and other agencies as required (NAVFAC 2009b). Booms and other spill containment equipment kept on hand would be immediately deployed, the source of the release would be determined and secured, and cleanup measures appropriate to the nature and extent of the spill would be implemented (NAVFAC 2009b). These procedures would minimize the potential for contaminants related to project activities to enter marine waters.

Vessel movement associated with demolition activities, jetting, and extraction of the existing piers would cause disturbance of bottom sediments and increased turbidity as a result of sediment resuspension. However, the sediment resuspension and increased turbidity would be short-term and would be limited to the areas of bottom disturbance. To limit sediment disturbance and turbidity, the sheet pile bulkheads would be left in place beneath the north and approach segments. Beneath the north and south segments, piles would be cut at the mudline rather than pulled; this would also limit sediment disturbance and turbidity. Turbidity would return to background conditions when all demolition is completed. As stated in Section 2.2.1.4 removal of the old fuel pier wood piles would remove creosote, a source of PAHs, from the Bay waters. Thus, removing the wood piles would represent a net beneficial water quality impact for the fuel pier area.

Pier Construction

Construction of the new fuel pier would require installation of approximately 554 new pier pilings using jetting, a vibratory hammer, and a pile driver with a diesel hammer. Pre-cast concrete and cast-in-place concrete deck slabs would be assembled and multiple pipelines and their fittings would be installed, as well as utilities. Sediment resuspension and increased turbidity due to pile installation would be temporary and limited to the areas of bottom disturbance. The potential for construction-related materials and hazardous materials to enter San Diego Bay would be minimized through implementation of the construction NPDES Permit, the SWPPP, catch devices and sheeting as described above, and the NBPL ICP. Therefore, impacts from pier construction would be not significant.

Turning Basin

A barge-mounted clamshell bucket dredge (or a hopper [hydraulic] dredge if available) would be used during dredging activities (MNB 2012a, b). Potential sources of impacts to marine water quality associated with dredging activities would include potential release of vessel and equipment fuels and hydraulic fluids, and increased turbidity as bottom sediments become resuspended in the water column during the dredging process.

Increased turbidity would cause impacts to water quality that would include temporary decreases in light penetration and levels of dissolved oxygen. Analysis of core samples taken from the proposed dredge footprint in the turning basin in November 2010 indicated that the dredge sediments are composed of approximately 14 percent fine-grained material (i.e. silt and

clay) and 86 percent coarser material (sand), and low or no concentrations of contaminants detected for the suite of analyses tested (Sampling and Analysis Report for Naval Base Point Loma Fuel Pier Replacement and Dredging [Navy Military Construction Project P-151] in Appendix D). Sands tend to settle out quickly, and contaminants do not typically adhere to larger-grained material such as sand, so contaminants would not be anticipated in the dredged material (USACE 2008, 2009). The vast majority of sediments resuspended by dredging settle out of the water column near the dredge within one hour, and only a small fraction takes longer to resettle (USACE 2008). The clam shell bucket dredge or the hopper dredge could be used (MNB 2012b). Increases in turbidity would be low due to the physical characteristics (mainly sand) of the dredge sediments, and limited to the immediate vicinity of the operation. Decreases in levels of light penetration and dissolved oxygen would occur only within a few hundred feet of the dredging site, and end several hours from the cessation of dredging activities, making a permanent decline in aquatic primary productivity unlikely. Because the material to be dredged is mostly sand in which analytical testing did not indicate elevated levels of contaminants, it is unlikely that temporary turbidity associated with dredging would mobilize significant levels of dissolved-phase contaminants into the water column. Impacts to water quality due to increased turbidity, therefore, would not be significant.

As stated in Section 2.2.1.2 under Alternative 1, dredging could take place before, during, or shortly after pier demolition and construction, it is possible that some of the pile removal/installation activities could happen at the same time as dredging, although all dredging would occur outside the least tern foraging season (April 1 through September 15). At its closest point, the dredge footprint is about 1,200 ft from the existing fuel pier and 700 ft from the new fuel pier. The dredging schedule and plan would be designed to keep the dredge work as far as possible from the pier work to avoid concentrating the effects of increased turbidity in one area.

Sediment samples from the proposed dredge footprint were collected in November 2010 and tested in accordance with regulations contained in Title 40 CFR Parts 220-228. The sediment characterization report is included as Appendix D of this EA. The sediment characterization report was provided to USEPA and USACE for review and comment on potential sediment disposal options. Based upon the analytical results, the agencies determined that the sediments from the proposed dredge footprint are suitable for unconfined aquatic disposal for nearshore replenishment (USEPA 2011). The Navy is in the process of evaluating nearshore replenishment site options.

A Section 401 Water Quality Certification from the Regional Water Quality Control Board (RWQCB) would be obtained, as would a Section 404/Section 10 permit from the USACE; these permits would apply to all in-water components of the project (NAVFAC Southwest 2011b). Compliance with the RWQCB and USACE permit requirements would ensure that water quality impacts from the demolition/construction, dredging, and sediment disposal associated with Alternative 1 would not be significant.

Imperial Beach Sediment Receiver Site

Increased turbidity associated with nearshore discharge of the dredge sediments would be short-term (approximately 90 days) and would cease shortly after (several hours) the sediment discharge ends. There would be no dredging or sediment placement during the least tern foraging season (April 1 to September 15). The proposed dredged sediments were determined by USEPA and USACE to be suitable for unconfined aquatic disposal (USEPA 2011). As such, the dredged sediments would not present a risk of toxicity or bioaccumulation to marine organisms. Therefore, impacts to marine water quality would not be significant.

Temporary Relocation of the Navy MMP

The in-water construction activities associated with temporary relocation of the marine mammals would be the same as those for the replacement fuel pier; therefore, the potential temporary impacts would be the same, i.e., a short-term increase in turbidity, potential for dust and debris to fall into the Bay, potential releases of construction and vessel-related fuel and hazardous materials. However, the construction and demolition period associated with temporary relocation of the marine mammals is much shorter than that of the replacement fuel pier: approximately 8 days of pile driving to install the guide piles and an overall construction timeframe of 90 days. The demolition period is similarly brief: 90 days to remove/rebuild the enclosures and transfer the animals to their current location; one week to remove the guide piles. Thus, the duration of the temporary impacts would be considerably shorter for this component of Alternative 1 than for the pier replacement effort. The potential for construction and demolition related materials and hazardous materials to enter San Diego Bay would be minimized through implementation of the construction NPDES Permit, the SWPPP, catch devices and sheeting as described above, and the NBPL ICP. Therefore, impacts from construction and demolition associated with temporary relocation of the Navy MMP would not be significant.

The San Diego Bay shoreline at Harbor Island (west basin), listed as an impaired water body on the Clean Water Act Section 303(d) list due to copper from an unknown source is about 600 feet east of the proposed temporary Navy MMP relocation site at NMAWC (SWRCB 2012). Sediment disturbance associated with construction and demolition for the fuel pier and NMAWC components of the project would be short-term and localized to the construction/demolition areas. No additional input of pollutants at the Harbor Island shoreline is anticipated due to construction of the temporary MMP facilities.

The levels of marine mammal waste released into bay waters at the proposed NMAWC site would be similar to the levels released at the Navy marine mammals' current location (SSC Pacific 2012a). The Navy takes weekly water samples in the immediate vicinity of the current marine mammal enclosures, as well as at several locations in San Diego Bay (SSC Pacific 2012a). The presence of the Navy marine mammals is detectable against background levels, but the difference in bacteria levels associated with the Navy marine mammals remains well within normal limits, and is three orders of magnitude lower than increased levels routinely observed after rain fall events (SSC Pacific 2012a). The total coliform

count levels rise dramatically after a rain event, and then quickly subside due to the tidal flushing of the channel (SSC Pacific 2012a).

The bacteria levels measured weekly at the current Navy marine mammal enclosures are on average, an order of magnitude below the State Water Resources Control Board Water-Contact Standards for total and fecal coliform bacteria. (SSC Pacific 2012b; State Water Resources Control Board 2005). Because bacteria levels associated with Navy marine mammal enclosures at NMAWC would be the similar to those at their existing location, at NMAWC they would not exceed standards established by the California Department of Health Services and the SWRCB to protect water contact recreation in coastal waters from bacterial contamination. Water quality at private marinas located about 500 ft to the east across San Diego Bay and Spanish Landing Beach, 0.6 mile northeast of the proposed temporary Navy MMP relocation site at NMAWC would not likely be affected due to the intervening distance and tidal flushing that would further reduce bacterial levels. Therefore, no significant bacterial impact to water quality would occur.

Untreated marine mammal waste, nitrogen levels from the waste, and "red tide" harmful algal blooms are not a problem at the Navy marine mammals' current location. At the proposed NMAWC site, the Navy mammals' enclosures would be more spread out and dispersed than at their current location, so waste concentrations would be expected to be lower at NMAWC. The depth of water adjacent to the proposed location for marine mammal enclosures at NMAWC is somewhat shallower than at the enclosures' current location, but not markedly shallower (SSC Pacific 2012a). Hydrodynamic models for San Diego Bay indicate that water quality, circulation, and tidal flushing are similar at both locations; therefore, waste from the Navy MMP is not a concern at the NMAWC location (SSC Pacific 2012a). Sudden, massive spikes in the level of nutrients entering the bay, such as those following rainfall events, are more commonly associated with harmful algal blooms (SSC Pacific 2012a).

In addition, the Navy MMP takes its responsibility for the marine mammals and their care very seriously. It is accredited by the Association for Assessment and Accreditation of Laboratory Animal Care International, and is a member of the Alliance of Marine Mammal Parks and Aquariums, a nonprofit organization of the world's preeminent marine mammal facilities. The Navy would not plan to locate its marine mammals in an unhealthy living situation. Consistent water quality testing of the NMAWC site has shown that the water quality there is sufficient to ensure the health of the Navy marine mammals while they reside there (SSC Pacific 2012a). In the interest of providing a healthy environment for the marine mammals, the Navy would not create unhealthy water quality conditions that could cause "red tide" harmful algal blooms.

Potable and seawater discharges from cleaning the mammal enclosures (the floating enclosures and the nets suspended in the water below) at the current Navy MMP location are permitted point-source discharges covered under the existing NPDES permit for NBPL. These discharges are sampled regularly according to a sampling monitoring program. NBPL would submit an amendment to the Water Board for the cleaning discharged to be located at NMAWC.

In summary, changes to bacteria and nutrient levels in San Diego Bay near the NMAWC site as a result of the proposed temporary relocation of the Navy MMP would be measurable as compared to background levels, but would be within normal levels and would be dispersed by tidal flushing. Bacterial levels associated with the Navy MMP at the proposed temporary relocation site at NMAWC would not exceed standards established by the California Department of Health Services and the SWRCB to protect water contact recreation in coastal waters from bacterial contamination, at NMAWC or at neighboring beaches and private marinas. When the Navy's marine mammals return to their current location, bacteria and nutrients in the bay waters near the NMAWC site would return to their previous levels. Therefore, proposed temporary relocation of the Navy MMP to NMAWC would not have a significant impact to marine water quality relative to bacteria and nutrient levels.

Proposed Temporary Relocation of Everingham Brothers Bait Company Bait Barges

The bait fish are held in enclosures that have 1-in wide slots on the sides allowing sea water to flow through freely (Everingham Brothers Bait Company 2012). It is important to the health of the bait fish that they always stay in the water they live in normally (fresh sea water with the correct temperature, salinity, oxygen, etc.). Waste water from bathrooms on the barges goes into holding tanks that are pumped out once per week by a contractor (Everingham Brothers Bait Company 2012). The same practices would be followed at the temporary relocation site. As shown on Figure 2-2, both site options under consideration for temporary relocation of the bait barges are in open waters in San Diego Bay, outside the federal navigation channel. Like the fuel pier and the current bait barge location, both proposed temporary bait barge relocation option sites are located within the North Bay – Marine region, where tidal action has the greatest influence on circulation and bay water is exchanged with sea water over a period of two to three days (Port of San Diego 2007). Because the Everingham Brothers Bait Company operations are centered on maintaining the ambient water quality for the health of the bait fish, and do not involve waste water discharges, and due to natural tidal circulation through the North Bay-Marine Region, there would not be a significant impact to marine water quality associated with temporary relocation of the bait barges southeast of Harbor Island.

The San Diego Bay shoreline at Harbor Island (west basin), listed as an impaired water body on the Clean Water Act Section 303(d) list due to copper from an unknown source is about 0.3 mile northwest of one of the potential temporary relocation sites for the Everingham Brothers Bait Company barges (Option 4A) and about 1 mile northwest of the other (Option 6A). The bait barge maintenance process involves the use of vinyl antifouling paint. Copper is often a biocide ingredient in antifouling coatings, including vinyl paint. The bait barges, with their large surface area and continuous maintenance operations, could bring a potential additional input of copper to the vicinity of this water quality-impaired segment. However, the barges would be present only for part of each year during the four-year construction period so any potential input of copper to the impaired waters would be restricted. The intervening distance and tidal flushing would be anticipated reduce copper concentrations in the water actually reaching the impaired segment. Construction BMPs could include discussion with the Everingham Brothers Bait Company about the formulation of the antifouling coatings used in the maintenance

operations to determine the concentration of copper. If copper-containing paints are used, substitution of materials with lower copper concentrations or no copper may be considered if feasible. Post construction (of the fuel pier), the bait barges are expected to return to their existing location so no additional BMPs would be required.

In summary, during demolition, construction, and dredging, protective measures would be implemented to minimize impacts to marine water quality. Protective measures for demolition and construction would include implementation of the construction NPDES Permit, the SWPPP, and the NBPL ICP; and the use of catch devices and sheeting. Protective measures to minimize turbidity would include: retention of the existing sheet pile; cutting piles at the mudline; and use of a clamshell dredge for dredging rather than a hopper or cutter head dredge. All in-water work would comply with the requirements of a Section 401 Water Quality Certification from the Regional Water Quality Control Board (RWQCB) and a Section 404/Section 10 permit from the USACE. Changes to bacteria and nutrient levels in the bay waters in the vicinity of NMAWC associated with proposed temporary relocation of the Navy MMP would be within normal levels, would not exceed standards established by the California Department of Health Services and the SWRCB to protect water contact recreation in coastal waters from bacterial contamination and would be and short-term. The Everingham Brothers Bait Company bait barges would not affect bathymetry or circulation at the temporary relocation site or discharge waste water. The changes to water quality associated with demolition, construction, dredging, and temporary relocation of the Navy MMP and the Everingham Brothers Bait Company bait barges would be localized and short-term. For the reasons summarized in this paragraph and described in detail above in the preceding paragraphs, with implementation of Alternative 1 a significant impact to marine water quality would not occur. The use of dredge sediments for nearshore replenishment would help to restore natural bathymetry; therefore, this component of Alternative 1 would be a beneficial impact.

<u>Surface Water Quality</u>

The ROI for surface water quality is the fuel pier, the current location of the Navy marine mammal enclosures, and NMAWC. Potential surface water quality impacts associated with Alternative 1 include spills and releases of construction-related hazardous and non-hazardous materials, construction materials such as dry and liquid concrete, and turbidity caused by runoff carrying soil and dust from shoreside construction/staging areas.

Pier Demolition and Pier Construction

Potential surface water quality impacts associated with Alternative 1 include spills and releases of hazardous and non-hazardous materials, materials involved with demolition and construction, and conditions that would exist after the fuel pier is replaced.

In accordance with the Navy's Stormwater Construction Permitting Policy, a construction NPDES permit would be obtained that would remain in effect for the length of the project (NAVFAC Southwest 2011a; Navy 2005). The NPDES permit would require preparation and

implementation of a SWPPP that would identify project-specific BMPs to minimize such impacts.

A stormwater management system would be required for the new pier (Navy 2010b). All stormwater runoff would be managed in accordance with current NBPL NPDES Permit requirements (NAVFAC Southwest 2011a). The proposed new pier deck design is such that all rainfall accumulating on the lower deck as well as rainfall from the 85th percentile storm event accumulating on the upper deck of the new pier would be collected on the pier and sent to the FOR receipt tank for treatment (Burns and McDonnell 2012). The upper deck would be equipped with underflow scuppers that would permit a portion of the runoff from large storm events to discharge to the bay. The underflow design would prevent surface sheen and floating fuel from being discharged to the bay and also capture the "first flush" of runoff from a storm to be sent to the FOR Receipt Tank. All runoff from the fuel containment areas and the lower deck would be piped to the FOR system for processing (Burns and McDonnell 2012).

Upon completion of the new fuel pier, the NBPL Storm Water Discharge Management Plan and the fuel pier BMPs would be reviewed, and revised/updated as needed to incorporate changes resulting from the changes to the fuel pier structure and/or operations. The NBPL Storm Water Discharge Management Plan and Basewide BMPs for preventing and minimizing contact of potential pollutants with stormwater would continue to be followed, including: restricting access; regular cleaning and sweeping; controlling spills and reducing waste; avoiding hosing down the site; and regular inspection and maintenance of the storm drain system (NAVFAC Southwest 2009). All BMPs specific to the fuel pier would also be followed. Implementation of the BMPs and compliance with NPDES permit requirements would ensure that no significant water quality impacts would occur as a result of operations at the new fuel pier.

A 12-in diameter storm water outfall is located immediately north of the existing pier abutment, this outfall discharges storm water runoff from the paved area directly west of the existing pier (Burns and McDonnell 2012). The existing discharge point penetrates the vertical wall portion of the existing pier abutment and discharges on to the riprap located along the shoreline north of the existing fuel pier. The existing stormwater outfall would be removed (Burns and McDonnell 2012). A new storm sewer system consisting of four grated area inlets, 12-in reinforced concrete pipe, and a single outfall point would replace the existing system (Burns and McDonnell 2012). The existing outfall would be relocated from the north side of the existing pier to the north side of the new pier (Burns and McDonnell 2012). No changes in impervious areas contributing to the storm sewer system are anticipated. Replacement and re-routing of the existing stormwater outfall would continue to provide drainage for the paved area west of the existing pier, thus, the proposed pier replacement would not have a significant impact to the existing surface water drainage pattern in the area immediately adjacent to the pier.

Temporary Relocation of the Navy MMP

The project construction NPDES permit and SWPPP would apply to this component of the project. The construction SWPPP would specify BMPs to minimize potential impacts to surface water quality during construction and removal of the temporary marine mammal facilities at the NMAWC site.

The existing NBPL NPDES permit addresses the following discharges associated with the Navy MMP in its current location: potable and seawater discharges from cleaning the mammal enclosures (the floating enclosures and the nets suspended in the water below); potable water from rinsing small boat interiors and engines; and seawater discharges from above ground shipboard pool simulators. The same permit conditions would apply to the Navy MMP at the proposed temporary relocation site at NMAWC (SSC Pacific 2012c).

In summary, standard operating procedures and BMPs would be followed to reduce impacts to surface water to a less than significant level. Implementation of the project SWPPP would minimize the potential for contaminants associated with relocating the MMP, demolition, and construction to cause impacts to surface water quality. The new fuel pier would have stormwater management capabilities that would comply with current NPDES Permit requirements. Basewide and site-specific BMPs to prevent impacts to surface water would be followed at the new fuel pier. Therefore, implementation of Alternative 1 would not have a significant impact to surface water quality and beneficial water uses within the bay. Improved stormwater management capabilities for the fuel pier would be a beneficial impact to surface water quality.

3.6.3.3 Alternative 2 Delayed Dredging Alternative

Under Alternative 2, the same project components would be implemented as described under Alternative 1. Under this Alternative, dredging would be done years after the pier replacement effort is completed. Thus under Alternative 2, there would be no potential intermittent overlap of increased turbidity associated with demolition and construction due to dredging activities.

3.6.3.4

Under Alternative 2, during demolition, construction, and dredging, the same protective measures would be implemented to minimize impacts to marine water quality that would be used for Alternative 1 (e.g., implementation of the construction NPDES Permit, the SWPPP, and the NBPL ICP; the use of catch devices and sheeting; retention of the existing sheet pile; cutting piles at the mudline; and use of a clamshell dredge for dredging). All in-water work would comply with the requirements of a Section 401 Water Quality Certification from the RWQCB and a Section 404/Section 10 permit from the USACE. Changes to bacteria and nutrient levels in the bay waters near NMAWC associated with proposed temporary relocation of the Navy MMP would be the same as under Alternative 1. The Everingham Brothers Bait Company bait barges would not affect bathymetry or circulation at the selected temporary relocation site or discharge waste water. As with Alternative 1, demolition, construction, and dredging would

not have significant impacts to bathymetry and circulation. Therefore, implementation of Alternative 2 would not have a significant impact to marine water quality, surface water quality, and beneficial water uses within the bay. As with Alternative 1, removal of creosote-treated wood piles from the old fuel pier, improved stormwater management capabilities for the proposed new fuel pier, and the reuse of dredge sediments for nearshore replenishment are anticipated to be beneficial impacts.

3.6.3.5 Mitigation Measures

Implementation of Alternative 1 or Alternative 2 would not result in significant impacts to water resources; therefore, no mitigation measures are proposed.

3.6.3.6 No-Action Alternative

Under the No-Action Alternative, temporary relocation of the Navy MMP, temporary relocation of the Everingham Brothers Bait Company bait barges, demolition and replacement of the existing fuel pier, dredging of the turning basin and beneficial re-use of dredge sediments for nearshore replenishment would not occur. No changes to existing water resources would occur. Therefore, implementation of the No-Action Alternative would not have a significant impact to water resources. However, the beneficial impacts from the removal of creosote-treated pilings, improved stormwater management capabilities at the fuel pier, and re-use of dredge sediments for nearshore replenishment would not occur under the No-Action Alternative.

3.7 HAZARDOUS MATERIALS AND WASTES

3.7.1 Definition of Resource

The terms *"hazardous materials"* and *"hazardous waste"* are defined by the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act (RCRA [42 19 USC § 6901 et seq]). In general, hazardous materials include substances that, because of their quantity, concentration, or physical, chemical, or infectious characteristics, may present substantial danger to public health or the environment when released into the environment. Hazardous wastes are regulated under RCRA and defined as any solid, liquid, contained gaseous, or semisolid waste, or any combination of wastes that either exhibit one or more of the hazardous characteristics of ignitability, corrosivity, toxicity, or reactivity, or are listed as a hazardous waste under 40 CFR Part 261. Petroleum products include petroleum-based fuels, oils, and their wastes.

Hazardous waste issues may also include the presence of asbestos and lead-based paint (LBP) in structures and exposure to contaminated sites. Asbestos was once widely used in building construction as a fire retardant and noise barrier, but was linked to several diseases. Since the 1970s its use has been restricted by federal regulation under the Clean Air Act (CAA) (e.g., Asbestos National Emission Standards for Hazardous Air Pollutants) rules, and the Toxic Substances Control Act (e.g., Asbestos Ban and Phaseout) asbestos rules. Friable (brittle) asbestos becomes hazardous when fibers become airborne and are inhaled. Lead, which was

used as an additive and pigment in paints for many years before 1978, has been associated with central nervous system disorders, particularly among children and other sensitive populations. Exposure to lead is usually through inhalation during renovation and demolition activities or through ingestion of paint chips or lead-contaminated drinking water. Contaminated sites are locations that have been rendered unsafe due to the presence of hazardous wastes. To facilitate the investigation and cleanup of contaminated sites at military installations, the DoD has developed the Installation Restoration (IR) Program. The IR Program is the process by which contaminated sites and facilities are identified and characterized, and existing contamination is contained, removed, and disposed of to allow for the future beneficial use of the property.

Hazardous materials and wastes are also controlled under the California Code of Regulations (CCR) and these regulations are implemented by the California Department of Toxic Substances Control and the local Certified Unified Program Agency. San Diego County, Department of Environmental Health (DEH) acts as the Certified Unified Program Agent under authorization from the California Environmental Protection Agency to implement state environmental requirements. The U.S. Navy is required to comply with these acts and all DoD requirements, as well as management plans specific to NBPL.

<u>Emergency Planning Community Right-to-Know Act (EPCRA)</u>

The EPCRA (42 USC § 11001 et seq.) includes four major provisions:

1) Emergency planning (Section 301-303)
2) Emergency release notification (Section 304)
3) Hazardous chemical storage reporting requirements (Sections 311-312)
4) Toxic chemical release inventory (Section 313)

Section 311 requires facilities that have Material Safety Data Sheets (MSDS) for chemicals held above certain quantities to submit either copies of their MSDS or a list of MSDS chemicals to the Local Emergency Planning Committee and local fire department. Facilities that need to report under EPCRA Section 311 must also submit an annual inventory report (Tier I or Tier II form) for the same chemicals. This inventory report must be submitted to the State Emergency Response Commission and local fire department by March 1 each year. The information submitted under Sections 311 and 312 are available to the public from Local Emergency Planning Committees and State Emergency Response Commissions. In California, the chemical storage reporting thresholds under the California Health and Safety Code Chapter 6.95 are 55 gallons, 500 pounds, and 200 cubic ft of a compressed gas. Otherwise, the federal threshold limits are 500 pounds for extremely hazardous substances and 10,000 pounds for all other hazardous substances. Any hazardous materials and wastes generated during construction and operation would be subject to installation-wide EPCRA reporting.

3.7.2 Affected Environment

The ROI of potential effects associated with hazardous materials and hazardous wastes for the Proposed Action is NBPL and San Diego Bay. This section describes the presence of hazardous materials and wastes within the proposed project locations.

3.7.2.1 Proposed Temporary Navy Marine Mammal Relocation Site at NMAWC

Small volumes of lubricating oil, gasoline, and various marina boat maintenance materials are currently stored and used at the marina piers at NMAWC. Hazardous wastes at the marinas comprise small volumes of oily rags and marina boat maintenance wastes (NAVFAC Southwest 2011a). These wastes are properly managed in accordance with the Navy Region Southwest (NRSW) Waste Management Plan ([WMP, NRSW 2007] described in Section 3.7.2.4 below) and disposed of via a licensed contractor.

3.7.2.2 Everingham Brothers Bait Company Bait Barges

The bait barges have a total of three diesel storage tanks: one 1,500-gallon tank and two 240 gallon (Everingham Brothers Bait Company 2012). The storage tanks contain fuel for a generator that powers pumps, lights, and other equipment. The barges have rooms that are specially built as containment structures for the tanks and are capable of capturing the tank contents in the event of a leak. The Everingham Brothers' own vessels refill the barge fuel tanks (Everingham Brothers Bait Company 2012). The connections for the fuel transfer hose are inside the delivering vessel and the bait barges' storage tank rooms, to prevent spills during refueling. Personnel from Navy Environmental inspect the barges from time to time. The company is working to reduce the hours of generator operation on the barges by using light-emitting diode lights, a rechargeable diesel-powered battery, and planned installation of a vertical access wind turbine with a power storage battery (Everingham Brothers Bait Company 2012).

Hazardous materials such as fresh oil, waste oil, and paint on the bait barges are handled and stored according to the Navy's requirements, applicable state, and county regulations (Everingham Brothers Bait Company 2012). Evergreen Environmental Services (Evergreen Oil Inc.) removes hazardous waste from the barges (Everingham Brothers Bait Company 2012). All the company's barges and vessels have onboard and follow a policy book for hazardous materials training that was developed by a hazardous materials consultant according to applicable state and county regulations (Everingham Brothers Bait Company 2012). All Everingham Brothers barge and boat personnel are trained according to this policy book. All the barges and skiffs have spill kits on board (Everingham Brothers Bait Company 2012).

Although the majority of the paints and other materials used for repairing the bait receivers are kept on the repair vessel, the barges have a dedicated paint locker room designed and constructed for containment purposes. Wastes from the maintenance operations are properly stored on the barges until they are removed by Evergreen Environmental Services for proper disposal.

3.7.2.3 Proposed Temporary Bait Barge Relocation Sites Options 4A and 6A

As shown on Figure 2-2, both proposed temporary relocation Options (4A and 6A) for the bait barges are in open waters in San Diego Bay, outside the federal navigation channel where no vessels are currently anchored. Aside from fuel in vessels that pass through these two areas, there are no hazardous materials, hazardous wastes, or petroleum products either of proposed temporary relocation sites.

3.7.2.4 NBPL Fuel Pier

Hazardous wastes aboard NBPL are managed according to Chief of Naval Operations Instructions 5090.1C *Environmental and Natural Resources Program Manual* and the WMP for the San Diego Metro Area (NRSW 2007). The guidance in the WMP ensures that Navy commands and contractors manage hazardous waste in accordance with requirements specified in federal, state and local laws and regulations including Title 40, CFR, Title 22, CCR, California Health and Safety Code, and San Diego County Code of Regulatory Ordinances. The WMP contains instructions for hazardous waste minimization, waste characterization, use of proper containers and storage practices, inspection, and disposal via a licensed hazardous waste contractor (NRSW 2007).

The Defense Reutilization and Marketing Office (DRMO) through its contractors manages, stores, ships, and disposes of hazardous materials associated with all DoD installations and operations. DRMO maintains all hazardous materials documentation. DRMO also contracts with licensed firms for proper disposal of these materials at permitted facilities.

No hazardous materials are stored on the fuel pier. Routine maintenance of the metal bollards and pipe risers involves the use of limited quantities of paint that are stored shoreside in the NBPL DFSP hazardous materials locker (NAVFAC Southwest 2010a). Paint is brought out to the pier for use, then returned to the locker when painting is completed (NAVFAC Southwest 2010a).

The fuel pier has several 90-day storage sites on the pier for oiled boom, rags, and absorbent materials (NAVFAC Southwest 2010a). These wastes are properly managed in accordance with the WMP. Hazardous wastes at the fuel pier are covered under County of San Diego DEH Unified Program Facility Permit #HK 57-180134 USN-FISC Pt. Loma Bayside (i.e., DFSP NBPL) and under NBPL's USEPA large quantity hazardous waste generator permit (County of San Diego 2002; NAVFAC Southwest 2010b). The DEH conducts annual inspections of the fuel pier hazardous waste management operations and facilities (County of San Diego 2008; Navy 2010a).

3.7.2.5 Bulk Fuel Pipelines

The pipelines on the existing fuel pier contain a total static volume of approximately 26,040 gallons of fluids comprising fuels, lubricating oil, and contaminated petroleum product (CPP, a mixture of fuel and water) (MNB 2010). The bulk fuel pipelines and fuel transfer operations at the existing fuel pier are regulated by multiple federal and state agencies. Some of these include the following (agency name is in bold, legislative title is in italics):

- **USEPA:** 40 CFR Part 112, *Oil Pollution Prevention and Response; Non-Transportation-Related Facilities*
- **USEPA**: 40 CFR Part 300, *The National Oil and Hazardous Substances Pollution Contingency Plan,* (National Contingency Plan)
- **USEPA**: 40 CFR Part 302, *CERCLA*
- **USEPA**: 40 CFR Part 355, *EPCRA*
- **USEPA**:, 40 CFR Part 264, Subpart D, *RCRA*
- **USEPA**: 40 CFR Part 68, *Chemical Accident Prevention Provisions*
- **USEPA:** Public Law 101-380 (33 USC 2701 et seq.;104 Stat. 484) Oil Pollution Act
- **OSHA**, 29 CFR 1910.38(a), *Employee Emergency Plans and Fire Prevention Plans*, 1910.120, *Hazardous Waste Operations and Emergency Response,* and 1910.165, *Employee Alarm*
- **The Pipeline and Hazardous Material Safety Administration (U.S. Department of Transportation [USDOT]):** Direct Final Rule as Amended, 49 CFR Part 194, *Response Plans for On Shore Oil Pipelines*
- **The Pipeline and Hazardous Material Safety Administration (USDOT):** 49 CFR , Part 195 Transportation of Hazardous Liquids by Pipeline
- **State of California, Office of Oil Spill Prevention and Response** Title 14 CCR Sections 815-820, *Oil Spill Contingency Plans*
- **USCG:** 33 CFR Part 154, *Facilities Transferring Oil or Hazardous Material in Bulk*
- **CSLC** CCR: Title 2, Division 3, Chapter 1 *Marine Terminal Oil Pipelines*
- **CSLC** CCR: Title 24, Part 2, Vol.1, *Chapter 31F MOTEMS*

The fuel pier pipelines were constructed and are maintained in compliance with the applicable federal and state regulations, which specify measures for preventing and containing leaks and spills. Secondary containment structures have been installed where required or appropriate on the fuel pier (NAVFAC 2009). In addition to the 8-in curbing around the pier deck, concrete curbing is installed around the valves and risers and at the loading stations. Spill kits and absorbent materials are located on the pier for response to a spill (NAVFAC 2009). Pipelines, manifolds, valves, loading arms, hoses, containment pits, and other safety equipment such as fire protection or control equipment, lighting, emergency shutdown switches, and the communication systems are inspected weekly and before and after any vessel transfer operation (NAVFAC 2009). The fuel loading arms and supporting piping systems are routinely inspected

along with other equipment on the fuel pier (NAVFAC 2009). The pipelines are pressure-tested in accordance with CSLC requirements (Shaw Environmental Inc. 2007).

The safety and health of all fuel pier personnel, customers, and protection of the environment are of primary importance to the Navy Regional Fuel Officer and Fuel Director. NBPL DFSP has a safety and health program that conforms to the best practices in industry. The program embodies fostering proper attitudes within the workforce and is focused on safety practices, accident prevention, and insuring that mechanical and physical equipment required for personal safety and health are maintained to the highest possible standards. NBPL DFSP subscribes to and emphasizes risk management as the cornerstone of its safety program (Navy 2012a). As such NBPL DFSP utilizes a documented process by which the steps/procedures required to accomplish a work activity are outlined; the actual or potential hazards of each step are identified and measured; and its workforce are charged with eliminating or controlling those hazards (Navy 2012a).

Regarding fuel pier operations, standard operating procedures for Barge Operations, for Lube Oil Operations, for Pipeline Operations, for Ship Operations, for Small Craft Operations, and for Truck Loading Operations are in place and periodically updated (Navy 2012a). NBPL DFSP's preventative maintenance work plans also include safety plans that discuss the principal steps, potential safety and health hazards, and recommended controls. In the event of an accident or spill, NBPL DFSP utilizes a detailed ICP to contain, report, and clean up the environment. The Fuel Department holds daily, weekly and quarterly safety stand downs using the following guiding safety principles (Navy 2012a):

- **General Safety Requirements:** Present an overview of the safety and health program, risk management, hazard analysis, hazard assessment, general safety practices, housekeeping and hygiene rules, and first aid.
- **Emergency Safety Requirements:** Outline emergency response training requirements and safe practices applicable to all emergencies. Describes the type of communications devices available and outlines practices for effective emergency communication.
- **Training:** Detail training programs are required for operating personnel working at NBPL DFSP as well as guidelines for maintaining public awareness regarding the facility.

Operations at the fuel pier meet all USCG requirements in 33 CFR Part 154 (NAVFAC 2009). Fuel transfer equipment meets or exceeds industry and regulatory standards (NAVFAC 2009). Loading arms and transfer hoses are marked and pressure tested as required. The communications equipment is maintained on the pier and between persons-in-charge by two-way radios during any fuel transfer operation (NAVFAC 2009). Fire suppression equipment (extinguishers, hydrants, monitors) and personnel safety equipment (first-aid kit, emergency eye wash/shower, life ring, etc.) is available on the pier. Control systems and alarms are located at each loading station (NAVFAC 2009). The piping is controlled with an automated fuel handling supervisory control and data acquisition system that provides alarms as well as

graphically depicts pressures, flows, and quantities to and from the tanks. During each fueling evolution on the fuel pier, a safety supervisor and an observer known as a "hose watch" monitor product flow and can manually shut down the systems in an emergency (NAVFAC Southwest 2010a).

The CSLC provides regulatory oversight for the fueling operations and is notified of each fueling evolution for a ship capable of storing 90,000 gallons or more fuel (Navy 2010a). Inspectors from CSLC are present at fueling evolutions on the fuel pier 50 times per year on average (Navy 2010a). U.S. Customs inspections occur on average 2-4 times per year.

The volume of CPP off-loaded can vary from around 50,000 gallons to 150,000 gallons depending on the vessel (Navy 2010a). The USCG conducts inspections to insure that NBPL DFSP is in compliance with its USCG Certificate of Adequacy to receive CPP from ships, which documents the type of waste the facility may receive, the waste transfer rate, and the storage capacity of the facility. CPP is pumped from vessels berthed at the fuel pier into a 4,000 gallon aboveground storage tank onshore and then to the NBPL DFSP FOR system where petroleum products are separated from the water (Navy 2011). Oil recovered at the FOR system is recycled via a hazardous waste contractor, and water is discharged to the sanitary sewer system (NAVFAC Southwest 2009).

Because DFSP Point Loma is a bulk fuel storage and transfer facility, Defense Energy Support Center, U.S. Navy policy, and government regulations require that, a contingency plan is in place to respond to oil and hazardous substance spills (NAVFAC 2009). The Integrated Contingency Plan (ICP) for Oil and Hazardous Substance Spill Prevention and Response NBPL serves as the single operational document used for responding to any spill occurring at NBPL (NAVFAC 2009). In the event of a spill or release of oil or hazardous material at the fuel pier, the mitigation procedures discussed in the ICP are followed to contain the release and properly dispose of any spilled materials in compliance with CCR Title 14 (NAVFAC 2009). The ICP includes specific measures such as securing pumps and closing valves, blocking drains, and deploying booms (NAVFAC 2009). Additional booms are deployed as quickly as possible to prevent the spill from moving into the bay or affecting sensitive areas (NAVFAC 2009). Additional military and civilian contractor personnel and equipment are mobilized as needed to expedite cleanup operations, and procedures are reviewed to address the cause of the spill and prevent its recurrence (NAVFAC 2009).

3.7.2.6 IR Program and RCRA Facility Assessment Program Sites

The DoD established the IR Program to identify and clean up areas at military facilities that have been affected by past use of hazardous materials and disposal of hazardous waste (NRSW 2005). Cleanup of the IR Program sites is legislated through CERCLA (commonly known as "Superfund") that primarily addresses contamination resulting from past disposal practices (NRSW 2005). Thirty-nine sites at NBPL-Point Loma Complex are being investigated/cleaned up under the IR and Munitions Response Programs. Cleanup has been completed and regulatory closure has been issued for 19 sites (CH2MHill Kleinfelder 2012). Twenty-seven aboveground and underground storage tank sites have been identified at NBPL. Regulatory

closure has been issued for 23 of the tank sites and cleanup activities are ongoing at four sites (CH2MHill Kleinfelder 2012). RCRA establishes requirements for current hazardous waste handling practices, as well as for investigation and cleanup of existing hazardous waste handling facilities (CH2MHill Kleinfelder 2012). Fifty-four sites were evaluated under the RCRA programs, and investigation/cleanup activities are ongoing at 12 of those sites. Regulatory closure has been issued for 42 RCRA sites (CH2MHill Kleinfelder 2012). The proposed project sites at NMAWC and the fuel pier are not identified as IR or RCRA program sites. Two closed shoreside IR sites (Sites 2 and 5) are within 500 ft of the proposed Navy MMP relocation facilities at NMAWC (CH2MHill Kleinfelder 2012). Two closed shoreside IR sites (Sites 3 and 22) are within 500 ft of the proposed fuel pier replacement site (CH2MHill Kleinfelder 2012).

3.7.2.7 County of San Diego Unauthorized Release Sites and State Water Resources Control Board (SWRCB) Underground Storage Tank Sites

The County of San Diego and the SWRCB oversee investigation and cleanup of sites where releases of petroleum products and/or hazardous wastes from storage tanks have taken place. There are no such sites at the onshore areas immediately adjacent to the existing fuel pier and the location proposed for the replacement pier (County of San Diego 2011; SWRCB 2011a). There are three release sites onshore in the vicinity of the fuel pier where cleanup has been completed. Overfills resulted in the releases of CPP from underground two storage tanks shoreside on the south side of the existing fuel pier (Tanks 115A and 115B) (Navy 2012b). The release was cleaned up and there was no soil contamination (Navy 2011). The two tanks were taken out of service, filled in place with concrete slurry under SWRCB oversight in 1997 and the case is closed (Navy 2012b; RWQCB 2005; SWRCB 2011a). Cleanup is also completed, and the case is closed, for SWRCB Tank Site Building 113 located approximately 75 ft south of the existing fuel pier (SWRCB 2011a). At NMAWC, cleanup is completed, and the case was closed in 2000, for a release that occurred in 1996 at Pier 619 (SRWCB 2011b).

3.7.2.8 California State Water Resources Control Board Sediment Toxic Hotspots

The SWRCB has identified toxic hotspots as locations in enclosed bays, estuaries, or the ocean where pollutants have accumulated in the water or sediment to levels that: (1) may pose a hazard to aquatic life, wildlife, fisheries, or human health; (2) may impact beneficial uses; or (3) exceed SWRCB or RWQCB-adopted water quality or sediment quality objectives (SWRCB 2003). Under the Bay Protection program, all designated hotspots require corrective action, management action, or delisting (SWRCB 2008). The proposed P-151 project locations (comprising the temporary Navy marine mammal relocation site at NMAWC, the fuel pier, the dredge footprint, and bait barge relocation sites (4A and 6A) are neither sediment cleanup sites nor an SWRCB-identified toxic hotspot (SWRCB 2008). Neither of the proposed bait barge relocation sites is identified as a CERCLA or RCRA cleanup site (SWRCB 2012).

3.7.2.9 Public Health and Safety

Explosives Safety Quantity Distances (ESQD) Arcs

ESQD arcs are calculated for all locations where explosives are handled and stored to minimize the risk of serious personal injury, loss of life, and property damage associated with the presence of military explosives (DoD 2004). The safety distance from the explosives storage area (size of the arc) depends on the quantities and types of explosives present at that location (DoD 2004). No habitable development may occur within an ESQD arc (NAVFAC 2001). The piers at NMAWC are not approved for explosives storage and handling so there are no ESQD arcs at or near the proposed Navy MMP temporary relocation site (Naval Base San Diego 2012). There are no ESQD arcs associated with the existing fuel pier or for piers and facilities in the area (NAVFAC Southwest 2010c).

Discarded Military Munitions (DMM)

DMM are unfired military munitions that have been abandoned, discarded, or improperly disposed of and are still capable of functioning (e.g., items found with their cartridges). The Navy is evaluating portions of San Diego Bay under its Munitions Response Program Site 100 – San Diego Bay Primary Ship Channels (also known as UX100, Munitions San Diego Bay Channel) (NAVFAC Southwest 2010d).

3.7.2.10 Solid Waste

The ROI for solid waste is San Diego County. In general terms, solid waste refers to garbage, refuse, sludge, and other discarded solid materials resulting from residential activities, and industrial and commercial operations, including construction and demolition (C & D) debris. The City of San Diego uses innovative engineering, waste reduction, and recycling programs to help extend the working life of the only active, City-run landfill, Miramar Landfill, which was originally scheduled to close as early as 1995 (City of San Diego 2011). Almost 910,000 tons of waste are disposed annually at the Miramar Landfill (City of San Diego 2011). At this rate, the Miramar Landfill will likely be filled to capacity and closed by 2019 (City of San Diego 2011).

To support the City of San Diego in reaching its solid waste diversion goals (i.e., 50 percent of 1990 baseline as required by the California Integrated Waste Management Act Division 30), the U.S. Navy and United States Marine Corps (USMC) agreed to limit the amount of waste sent annually to Miramar Landfill from U.S. Navy and USMC installations in San Diego County to 10.8 percent of the City's annual baseline disposal figure (NRSW 2000). To that end, NRSW has established an extensive recycling program. The NRSW Sustainable Solid Waste Program diverts cans, bottles, plastics, cardboard, and C & D waste from landfilling to the maximum extent possible (Navy Compass 2010).

Solid waste generated at the NMAWC marinas consists of a small volume of domestic trash from marina staff and boat owners (NAVFAC Southwest 2011a). Non-hazardous solid waste associated with the existing fuel pier operations consists of paper and other domestic-type trash from the Control House Building 110. These materials are included with solid waste collected and recycled from NBPL as part of the NRSW Sustainable Solid Waste Program (Navy 2011).

NRSW Instruction 11350.1A (Regional C & D Debris Landfill Diversion) requires that all construction projects submit a solid waste management plan during the project planning phase that must include the types and quantities of waste expected to be generated, actions that would be taken to divert at least 54 per cent (in 2012, increasing by 2 per cent each year until 60 per cent is reached in 2015) of the C & D waste stream from landfilling, a list of the specific waste materials that would be salvaged for resale, reuse, or recycling, and identification and justification for materials that cannot be reused/recycled. While the project is ongoing, the contractor must submit monthly solid waste reports that include the waste tonnages recycled and landfilled (NRSW 2006). The Sustainable Solid Waste program uses a database to track reuse opportunities for recycling materials resulting from construction projects, and to track solid waste diversion for every project. As of 2011, Navy construction projects in the San Diego area are required to divert a minimum of 52 per cent of C & D waste from landfill disposal (NAVFAC Southwest 2011b). In the period from 2009 through 2010, 80 per cent of the C & D waste resulting from NRSW construction projects was diverted from landfill disposal (NRSW 2010).

Solid waste aboard the Everingham Brothers Bait Company bait barges comprises domestic trash, and dry paint cans and wood waste from repairing the bait receivers (Everingham Brothers Bait Company 2012). All solid waste aboard the barges is contained in commercial-size dumpsters (Everingham Brothers Bait Company 2012). When the dumpsters are full, the Everingham Brothers Bait Company vessels offload the dumpsters from the barges and transport them to the company's on-shore property to be taken to Miramar Landfill by a licensed solid waste hauler (Everingham Brothers Bait Company 2012).

3.7.3 Environmental Consequences

3.7.3.1 Approach to Analysis

Federal, DoD, and U.S. Navy regulations govern the storage, disposal, and transportation of hazardous materials, hazardous wastes, and non-hazardous solid wastes. These laws and specifications were established to protect human health and the environment from potential impacts. The significance of impacts associated with hazardous materials and wastes is based on the toxicity of the substance, the quantity of the substance involved, the risk of exposure, and the method of disposal. Impacts are considered significant if the storage, use, transportation, or disposal of these substances increase human health risks or environmental exposure. The ROI for hazardous materials and wastes is NBPL, the City of San Diego, and San Diego Bay.

3.7.3.2 Alternative 1 Pier Replacement and Associated Dredging

<u>Temporary Navy MMP Relocation Site at NMAWC</u>

Under Alternative 1 before construction begins to modify the NMAWC site for temporary use by the Navy MMP, all hazardous materials and wastes associated with marina activities would be removed and properly recycled or disposed per the WMP. Navy MMP activities at the NMAWC site would not involve the use of hazardous materials, or generate hazardous waste (NAVFAC Southwest 2011a). As stated above in Section 3.3.2.6, the piers at NMAWC are not

approved for explosives storage and handling (NBSD 2012). The Navy's Explosives Ordinance Demolition Mobile Unit 1 therefore would not store or use explosives at Pier 619 while temporarily stationed there.

Temporary Relocation of Everingham Brothers Bait Company Bait Barges

Under Alternative 1, the two bait barges would temporarily relocate to either proposed relocation site Options 4A or 6A (Figure 2-2). As stated in Section 3.3.2.1, the barges have diesel storage tanks and hazardous materials/waste storage on board. Everingham Brothers' personnel are trained in proper management procedures and the fuels and hazardous materials/wastes are stored and handled according to applicable state and county regulations (Everingham Brothers Bait Company 2012). Under Alternative 1, Everingham Brothers Bait Company would continue to manage fuel, hazardous materials, and hazardous waste according to applicable state and county regulations while at the temporary relocation site (Everingham Brothers Bait Company 2012). There are no CERCLA or RCRA sites identified at the proposed temporary relocation sites. Therefore, temporary relocation of the bait barges would not have a significant impact with respect to hazardous materials or wastes at either of the proposed temporary relocation sites Option (4A or 6A).

Fuel Pier Demolition and Construction

Hazardous materials associated with proposed demolition and construction activities would include universal wastes, LBP on bollards and striping on the pier deck, coal-tar coating on the steel superstructure of the original pier segment, oily waste water from cleaning pipelines, treated wood waste, fuel and hydraulic fluid contained in heavy equipment, vehicles and vessels performing the overall demolition and construction tasks, and paints to be used on deck infrastructure and deck striping. Potential asbestos-containing material (ACM) could be revealed when demolition exposes previously hidden structural components.

Building Materials Falling Under the Universal Waste Rule (UWR). Building materials falling under the UWR visually identified at the fuel pier include high-intensity mercury vapor lights, mercury vapor light ballasts, and the fuel pipes. Before pier demolition, the building materials falling under the UWR would be properly characterized, removed and properly recycled or disposed of by a licensed contractor.

Coal Tar. Elevated concentrations of PAHs were detected in samples of coal tar coating on portions of the original (i.e., 1908) fuel pier steel superstructure. The Navy would characterize the coating and determine for proper management and disposal for the superstructure according to all applicable federal and state regulations (NRSW 2007).

LBP Removal. LBP removal would be completed with a centrifugal blast machine. During the removal of LBP, work containment would be erected to capture and filter all contaminated air during abrasive blasting and cleanup. Air monitoring would be conducted each day. Each individual inside the containment would wear a personal air monitor and an air monitor would be operated outside and downstream of the work area. Samples would be gathered each day

and tested by a California certified lab to establish the permissible exposure limit over an eight-hour time weighted average.

All removed LBP materials/residue would be captured and properly containerized. LBP paint chips, flakes, or dust would not be permitted to enter San Diego Bay. All waste would be properly stored while waiting for proper disposal per federal and state requirements. After testing is completed, the waste stream would be properly characterized for disposal as hazardous waste, excluded recycled waste, or landfill waste. After all bulk waste has been removed from the containment, all surfaces would be wiped down with a damp rag to remove dust. No compressed air blowing would be allowed, only vacuuming and wiping would be allowed for final cleanup.

ACM Removal. Based on the analytical results of the bulk samples collected during the 2009 survey by Ninyo and Moore, ACMs are not believed to be present at the fuel pier. Because limited-destructive sampling techniques were used in the 2009 Ninyo and Moore survey, it is possible that suspect ACMs may be found during demolition of the fuel pier. In the event that suspect ACMs are encountered, samples of suspect materials would be collected for laboratory analysis, and all activities that may disturb the materials would cease until laboratory analytical results are reviewed. Any work involving the disturbance of materials containing asbestos would be performed using appropriate work practices, and be conducted by, and under the supervision of, properly trained, experienced, and certified personnel.

If determined to be present, asbestos abatement would be performed by properly trained and licensed abatement contractors. All ACM and debris would be removed using wet methods. Asbestos barrier tape would be place around the individual sites of removal. Wearing appropriate personal protective equipment, the contractor personnel would thoroughly wet the area, and then prepare for abatement by setting up containment bags along the perimeter of the ACM area. The ACM would be cut to sections of a manageable size, and the sections would be placed in double-polyethylene-lined, closed container. The San Diego County Air Pollution Control District (SDCAPCD) would be notified in writing of the planned removal of friable ACM per regulations. The latest applicable requirements of federal, state, and local regulations governing removal and disposal of ACM would be complied with.

Treated wood waste. The demolition phase would potentially generate treated wood waste in the form of creosote-treated timber pilings supporting the caissons of the approach and north segments of the pier. Navy representatives have met with Miramar Landfill environmental personnel, provided waste determinations and a policy statement specifying how NRSW will manage various types of treated woods as either non-hazardous special waste or hazardous waste (NRSW 2007). Timber pier piling have been analyzed and classified as non-hazardous and may be transported to a municipal landfill as special waste using the criteria specified in the WMP (NRSW 2007). The Navy would submit the appropriate disposal request, manifest, or other pertinent documentation for proper waste determination to the appropriate municipal landfill authority for review (NRSW 2007).

ESQD. The ROI for ESQDs is NBPL and NMAWC. Alternative 1 would have a significant impact relative to ESQD if the construction of facilities not involving ammunition and explosives were to occur near enough to ammunition and other explosives that the new facilities or workers would have the potential to be exposed to hazards, or that a reasonable doubt exists regarding exposure to hazards (NAVFAC 2001). There are no ESQD arcs associated with the NMAWC temporary Navy marine mammal relocation site, the existing fuel pier, or for piers and facilities in the area (NAVFAC Southwest 2010c). Extending the fuel pier about 200 ft to the east would not interfere with ESQD arcs at other surrounding piers or onshore, or increase explosive hazards for surrounding facilities. No inhabited buildings would be constructed as part of Alternative 1 (Navy 2010b), so there would be no significant impact with respect to ESQD.

However, in the event that DMM are encountered during project activities, an ESQD arc could be established for the location where the DMM was found (NBPL 2011). There could be a potential impact to the construction schedule due to a temporary halt in construction near the discovery until site remediation is completed.

<u>IR Program and RCRA Facility Assessment Sites</u>

No IRP or RCRA facility assessment sites would be disturbed by project activities at the proposed Navy marine mammal temporary relocation site or the fuel pier project site, nor would investigation/cleanup of such sites be affected. Closed IR Site 22 is located near the base of the existing fuel pier. This IR site consists of an abandoned diesel pipeline that was partially removed and partially abandoned in place. The site was issued regulatory closure in 2007. There is no known impact to the proposed fuel pier demolition and construction site (NAVFAC Southwest 2011c). Therefore, with implementation of Alternative 1 there would be no significant impacts relative to IR Program and RCRA sites.

<u>County of San Diego Unauthorized Release Sites and SWRCB Underground Storage Tank Sites</u>

There are no unauthorized release sites at the fuel pier project site or the marine mammal temporary relocation site at NMAWC. Cleanup has been completed, and No Further Action Status assigned, for several sites near the fuel pier (RWQCB 2005; SWRCB 2011a). Cleanup has also been completed, and the case is closed, for a release at Pier 619 (Navy marine mammal temporary relocation site) (SWRCB 2011b). Implementation of Alternative 1 would not have a significant impact with respect to these closed sites. In the event that suspect contaminated soil and/or groundwater is encountered, it would be analyzed and the Navy would consult with regulatory agencies to develop an appropriate course of action regarding further evaluation and potential remediation.

Contractors involved with construction and demolition for all components of Alternative 1 would be subject to all federal, state, and San Diego County requirements for hazardous materials and hazardous waste management, and would be required to follow the requirements of the WMP (NRSW 2007). In addition, demolition and construction contractors would implement BMPs designed to minimize the potential for hazardous material releases during demolition and construction activities. Any hazardous materials and wastes generated

during construction and operational activities would be subject to installation-wide EPCRA 312 and 313 reporting requirements.

The Navy would work with contractors to establish a safety buffer zone between the underwater fuel pipelines to NAS North Island and the demolition/construction work zone and dredge footprint, and would ensure that all contractors' equipment and vessels remain outside the buffer zone during demolition and construction.

Before the fuel pier is demolished, all fuel, lubricating oil, and CPP inside the pipelines on the fuel pier would be pumped out. The fuel and lubricating oil lines would then be disconnected from the fuel supply system. All the lines, including the CPP line, would be flushed with high-pressure water from the fuel pier's existing water supply lines. The cleaning water would be pumped through the CPP pipeline for treatment at the NBPL DFSP FOR system. After the cleaning water was pumped out of the CPP pipeline, the fuel pier segment of the fuel CPP piping system would be cut and capped.

The pipelines on the new fuel pier would be constructed according to applicable federal and state regulations for pipelines and marine bulk fuel transfer facilities. These regulations include specifications for pipeline design, construction, pressure testing, corrosion control, operation and maintenance, and qualifications of operator personnel (49 CFR Subtitle Part 195 Subparts A-H; CCR California Government Codes Section 51010-51019.1). The USCG and CSLC would continue to inspect fuel pier operations while the existing fuel pier remains in use during the first phase of construction, and would inspect the new pipelines when they are complete (NAVFAC Southwest 2011d). Under Alternative 1, the pipelines on the new fuel pier would hold a total of 49,000 gallons, an increase of 22,960 gallons (approximately 88 percent) from the existing pipeline capacity of 26,040 gallons (Burns and McDonnell 2012). However, compliance with applicable regulations and regular inspections from DFSP personnel, USCG, and CSLC would minimize potential risk of releases of fuel or CPP from the new pipelines.

The CPP and ballast water pipelines for the new fuel pier would be designed and tested in accordance with the requirements of CCR Title 22, Chapter 15- *Interim Status Standards for Owners and Operators of Hazardous Waste Transfer, Treatment, Storage, and Disposal Facilities, Article 10 Tank Systems* and the applicable guideline standards in the American Petroleum Institute *Standard 650 Welded Tanks for Oil Storage* (NAVFAC Southwest 2011d). Compliance with these regulations and standards would ensure that the new ballast and CPP pipelines are compatible with the materials they contain, are structurally sound, and are pressure-tested and certified by an independent professional engineer before use (CCR Chapter 15, Article 10, and Section 66265.192). NBPL would also be required to submit to DEH certification from a professional engineer that the new pipelines before the lines could be used (NAVFAC Southwest 2011d). The new CPP and ballast water pipelines would be designed and constructed in compliance with all applicable federal, state, and county regulations, including applicable MOTEMS and USCG requirements (NAVFAC Southwest 2011d). The new fuel pier CPP and ballast water pipelines would be operated in accordance with USCG and SCLC requirements, and inspections by these agencies would continue. As described in Section 2.2.1.4, CPP would be

piped to the onshore DFSP FOR system for processing and ballast water would be piped to the Point Loma bilge oily wastewater treatment system.

Hazardous wastes that would be generated at the new fuel pier would continue to managed according to federal, state and county regulations, and be recycled/disposed of appropriately per the WMP, by licensed contractors through the DRMO. The DEH would continue their regulatory oversight of hazardous waste activities at the new fuel pier. Through the use of the preventive measures described above (proper management of hazardous materials and waste during construction and operation of the new fuel pier; compliance with regulations for pipeline construction and operational safety; implementation of the mitigation procedures described in the ICP in the event of an accidental release) no increase in human health risk or environmental exposure to hazardous materials or hazardous wastes would result from implementation of Alternative 1. Therefore, implementation of Alternative 1 would not have a significant impact with respect to the use, storage, or disposal of hazardous materials or hazardous wastes.

Solid Waste

The ROI for solid waste includes NBPL, NRSW, and regional landfills including Miramar, Otay, and Sycamore Canyon Landfills. Implementation of Alternative 1 would have a significant impact with respect to solid waste if disproportionate volume of available regional landfill capacity were consumed by C & D waste resulting from the project.

As part of the project design, the contractor would be required to perform an Opportunity Assessment to verify the types and quantities of materials on the project that can be reused/recycled, identifiy procedures intended for a recycling, reuse, or salvage program, and prepare a solid waste management plan (NRSW 2006). A minimum of 52 percent of project waste would be required to be diverted from landfill disposal, and all concrete demolition debris would be crushed for reuse on site or hauled to local recycling facilities (NAVFAC Southwest 2011b).

Before construction would begin to prepare the NMAWC site for relocation of the Navy marine mammals, any domestic trash remaining at Building 606 and Piers 607, 548, and 619 would be removed and properly recycled/disposed per the NRSW Sustainable Solid Waste Program. The floating enclosures and walkways from the existing Navy marine mammal location would be transferred to the temporary location, and then transferred back when the construction/demolition component of Alternative 1 is complete. The guide piles would be sold to other marinas for reuse after removal from the NMAWC site. Thus, the temporary marine mammal relocation component of Alternative 1 is not anticipated to generate C & D waste.

There would be no change to the types and volume of solid waste associated with the Everingham Brothers Bait Company bait barges during the temporary relocation periods (Everingham Brothers Bait Company 2012). While at the temporary relocation site, the Everingham Brothers Bait Company would continue to contain all solid waste aboard the barges in dumpsters, and transport the waste on-shore for landfill disposal. Because temporary

relocation of the bait barges would represent no change from existing conditions with respect to solid waste types, volumes, or management, this component of Alternative 1 would not have a significant solid waste impact.

During demolition activities, the contractor would be required to submit monthly diversion summary reports and weight tickets from recyclers to the NAVFAC Construction and Demolition Debris Manager to prove that materials are being diverted according to the project solid waste management plan. The contractor would only be allowed to dispose of the volume of non-recyclable C & D waste as designated in the project solid waste management plan at Miramar Landfill. This would ensure that solid waste associated with the proposed project is reused/recycled to the maximum extent possible, minimizing use of regional landfill capacity for the C & D waste resulting from the proposed project (NRSW 2006).

In summary, through adherence to NRSW recycling and waste minimization requirements, reuse of the construction materials required for the Navy marine mammal temporary relocation component, implementation of Alternative 1 would have not have a significant impact to solid waste and regional landfill capacity.

3.7.3.3 Alternative 2 Delayed Dredging Alternative

Under Alternative 2, the same project components would occur as for Alternative 1. As with Alternative 1, the guide piles from the temporary Navy marine mammal relocation site would be sold for reuse at another marina. While at the selected temporary relocation site, (Option 4A or 6A) the Everingham Brothers Bait Company would continue to manage fuels, hazardous materials, and hazardous waste according to applicable state and county regulations and to contain all solid waste for on-shore landfill disposal. Proposed demolition of the existing fuel pier and construction of the replacement fuel pier would involve the same types and volumes of hazardous and non-hazardous materials and wastes as under Alternative 1. The same protective plans and procedures would be used for Alternative 1 to minimize impacts from hazardous materials, hazardous wastes, DMM, and C & D waste would be used for Alternative 2. Therefore, implementation of Alternative 2 would not have a significant impact with to hazardous materials and wastes and solid waste.

3.7.3.4 Mitigation Measures

Implementation of Alternative 1 or Alternative 2 would not have significant hazardous materials or waste impacts; therefore, no mitigation measures are proposed.

3.7.3.5 No-Action Alternative

Under the No-Action Alternative, temporary relocation of the Navy MMP, temporary relocation of the Everingham Bait Brothers Company bait barges, demolition, and replacement of the existing fuel pier, and associated dredging of the turning basin would not occur. Fueling operations would continue at the existing fuel pier. There would be no change from the existing conditions. Therefore, implementation of the No-Action Alternative would not have a significant impact to hazardous materials and wastes.

3.8 AIRBORNE NOISE

This section provides information on airborne noise, including characterization of existing noise conditions and sensitive receptors in the general vicinity of the proposed project. Underwater noise is discussed in Section 3.2, *Fisheries,* Section 3.3, *Birds,* and Section 3.4, *Marine Mammals.* No site-specific noise data are available for this project, but information is available for the general San Diego Bay area.

3.8.1 Definition of Resource

Noise is defined as unwanted sound that interferes with normal activities or otherwise diminishes the quality of the environment. It may be intermittent or continuous, steady or impulsive, stationary or transient. There is wide diversity in responses to noise that vary not only according to the type of noise and the characteristics of the sound source, but also according to the sensitivity and expectations of the receptor, time of day, and distance between the noise source (e.g., a bulldozer) and the receptor (e.g., a person or animal).

Noise levels are measured in decibels (dB), and represented on a logarithmic scale of about 20 to 120 dB. On this scale, everyday noises range from 30 dB for a quiet room to 100 dB for a loud power lawn mower at close range. At a constant level of 70 dB, noise can be irritating and disruptive to speech; at louder levels, hearing losses can occur. A difference of 3 dB represents a doubling of sound levels in terms of energy. However, because of how we hear, it is necessary to have a 10-dB increase to be perceived as a doubling in sound. Noise measurements are usually on an "A-weighted" scale that filters out very low and very high frequencies to replicate human sensitivity. It is common to add the "A" to identify that the measurement has been made with this filtering process (A-weighted decibel measurement, or dBA).

Because noise levels vary widely during the day, it is customary to record multiple noise levels over a stated period, such as 24 hours, and then calculate the average noise level. Time-averaged noise levels form the basis for land use compatibility guidelines. For instance, the term Day-Night Average Level (Ldn) is used to describe the average noise level during a 24-hour day with a penalty of 10 dBA added to nighttime sound levels (10 P.M. to 7 A.M.). Community Noise Equivalent Levels (CNEL) add a 5 dBA penalty for noise events that occur in the evening (7:00 P.M. to 10:00 P.M.), as well as a 10 dBA penalty for noise events at night (10:00 P.M. to 7:00 A.M.). Shorter measurement durations (typically 1 hour) are described as Energy Equivalent Levels (Leq) indicating the total energy contained by the sound over a given sample period. The Leq for 1 hour is the energy average noise level during the hour; specifically, the average noise based on the energy content (acoustic energy) of the sound. It can be thought of as the level of a continuous noise that has the same energy content as the fluctuating noise level. The Leq for a 24-hour period (Leq24) is the Ldn/CNEL without the penalties.

Airborne sound can be transmitted into the water. However, the amount of acoustic energy directly transmitted from a source is limited due to refraction (sound wave bouncing back) and reflection (sound wave bending away from the original path). Sound transmission in shallow water is also influenced by reflection losses from the bottom and the surface, refraction from

sound speed gradients, reflection, and refraction from shallow bottom layers, and scattering from rough surfaces. Underwater noise is discussed in Section 3.2, *Fisheries,* Section 3.3, *Birds,* and Section 3.4, *Marine Mammals*.

3.8.2 Affected Environment

Land use compatibility with differing noise levels is regulated at the local level, although the federal government has established suggested land use compatibility criteria for different noise zones (Federal Interagency Committee on Urban Noise [FICUN] 1980). Based on the FICUN Land Use Guidelines (1980; Table 2), residential areas and schools are considered compatible where the Ldn is up to 65 dBA; outdoor recreational activities such as fishing and golfing are compatible with noise levels up to 70 dBA; and parks are compatible with noise levels up to 75 dBA (FICUN 1980).

The City of San Diego has an exterior noise level standard of 65 dBA CNEL for noise-sensitive land uses (e.g., residential areas, hospitals, childcare facilities, schools). This standard protects sensitive land uses such as these from high noise levels and guides the City's future planning decisions (City of San Diego 2007). The City of San Diego construction noise ordinance places a restriction of an average sound level (Leq) of 75 dBA or less during the 12-hour period from 7 A.M. to 7 P.M. (City of San Diego 2010). The ordinance also limits construction activity outside of these hours and during certain days (i.e., Sundays and major holidays) where it may create an excessive impact on neighboring sites (City of San Diego 2010).

For listeners with normal hearing and fluency in the language, complete sentence intelligibility can be achieved when the signal-to-noise ratio (i.e., the difference between the speech level and the level of the interfering noise) is in the range of 15 to 18 dBA (Lazarus 1990). The American National Standard Institute (ANSI) recommends at least a 15-dBA signal-to-noise ratio in classrooms, to ensure that children with hearing impairments and language disabilities are able to enjoy high speech intelligibility (ANSI 2002). As such, provided that the average adult male or female voice registers a minimum of 50 dBA in the rear of the classroom, the ANSI standard requires that the continuous background noise level indoors must not exceed a Leq of 35 dBA (assumed to apply for the duration of school hours).

The City of San Diego noise ordinances specify separate noise limits for ambient noise and construction noise levels (City of San Diego 2010). Therefore, in this EA the proposed project construction noise is analyzed independently of ambient noise levels at the project site and the surrounding area.

3.8.2.1 NMAWC

The NMAWC lies outside of the 65-dBA noise contours generated by aircraft activity at San Diego International Airport and NAS North Island (City of San Diego 2007). The primary noise sources at the project site include vessel traffic in the channel, vehicular traffic on North Harbor Drive, and air traffic associated with NAS North Island, the USGC Air Station, and San Diego International Airport.

Sensitive receptors near the Navy MMP include two preschools, a Navy Child Development Center, and a high school. The nearest residential area is Navy family housing located 0.25 mi away on Tattnal Way and the Harbor Island Marina is located across the channel from NMAWC.

3.8.2.2 NBPL Fuel Pier

The proposed project site lies outside the 65-dBA noise contours generated by aircraft activity at San Diego International Airport and NAS North Island (City of San Diego 2007). The primary noise sources at the project site are pumps and other equipment associated with the fuel transfer operations. Nearby ambient sources, include vessel traffic in the channel, vehicular traffic, and air traffic associated with NAS North Island, the USGC Air Station, and San Diego International Airport.

The NBPL waterfront area where the project site is located is an industrial area, where ambient (i.e., background) noise levels are typically higher than in residential areas. Common daytime outdoor ambient sound levels for industrial areas range up to 67 dBA (Engineering Toolbox.com 2010). Although the project site is on Navy property and not subject to municipal requirements, for comparison, the City of San Diego allows ambient noise levels up to 75 dBA in industrial areas (City of San Diego 2007).

Sensitive receptors within NBPL boundaries include the NBPL child development center (CDC), located at Building 377 on Myers Road about 0.7 mi west of the fuel pier, and a cluster of dormitories for NBPL submarine base personnel on Kerrick Road near Ballast Point about 1 mi to the south of the fuel pier.

The nearest sensitive receptor outside the NBPL boundary is the suburban residential neighborhood (La Playa) that borders NBPL to the north. Typical ambient noise levels range from 50 to 65 dBA CNEL in suburban to urban areas, and 65 to 75 dBA CNEL in downtown urban areas (USEPA 1974). Vehicle traffic on the roadways that provide the main access to the Point Loma peninsula (Rosecrans Street and Catalina Boulevard) is the main source of ambient noise in the residential neighborhood (Navy 2007). When there is no major construction activity occurring at NBPL DFSP Point Loma, noise is not intrusive or loud (Navy 2007). Also audible are periodic aircraft from San Diego International Airport, and military aircraft on NAS North Island. Noise from trucks, along with periodic construction in the area, also contributes to the ambient sound levels. Noise from these sources and NBPL DFSP operational activities are typical and not significant (Navy 2007). The City of San Diego exterior and construction noise ordinances apply at the NBPL property boundary, which is approximately 0.5 mi north of the fuel pier.

3.8.3 Environmental Consequences

3.8.3.1 Approach to Analysis

The primary factor considered in determining the significance of noise effects includes the extent or degree to which implementation of Alternative 1 or Alternative 2 would affect baseline noise environments. The primary issue of concern with regard to noise is the potential

for impacts to humans and wildlife. Significant noise impacts would occur if implementation of Alternative 1 or Alternative 2 would directly or indirectly do one or both of the following:

- Increase ambient outdoor CNEL levels at noise-sensitive land uses beyond the 65-dBA CNEL land use compatibility standard for residential, education, and health care land uses.
- Establish noise-sensitive land use (residential, educational, and health care uses) in areas exposed to outdoor ambient noise levels that are higher than the 65-dBA land use compatibility standard.

Both of these criteria represent effects from long-term noise exposure once construction is complete. For this EA, less stringent guidelines are applied to temporary noise sources that are restricted to daytime hours (such as most construction and demolition activities) unless they affect noise-sensitive land uses and result in CNEL levels more than 10 dBA above the respective land use compatibility criteria. Noise levels exceeding the City of San Diego's construction noise limit of 75 dBA Leq between the hours of 7 A.M. and 7 P.M. would be considered significant.

The significance of noise impacts on marine biological resources is considered in Section 3.4 and depends on the sensitivity of the resource and magnitude of impact, considering any applicable thresholds for injury or disturbance. Consultation with the NMFS would ensure that appropriate measures are implemented to reduce impacts below a level of significance.

3.8.3.2 Alternative 1 Pier Replacement and Associated Dredging

Alternative 1 would consist of two overall phases with several components within each phase. Noise generating activities during Phase 1 include the relocation of the Navy MMP to NMAWC, Project Indicator Pile and Temporary Mooring Dolphin, Approach Pier construction, and North Pier construction. Construction of the new south pier and demolition of the existing approach pier comprise Phase 2. Temporary relocation of the bait barges and amendments to the Regulated Navigation Zones, would not involve noise-generating activities, so these two project components are not addressed in detail for noise impacts. Project activities that involve demolition and construction would occur during the daylight hours on weekdays using standard equipment ranging from trucks and cranes to pile drivers, all of which would create noise. To assess potential impacts of this noise, estimated on-site equipment usage was modeled using the Federal Highway Administration's Roadway Construction Noise Model (RCNM) (USDOT 2008) (Appendix G). Since the City of San Diego noise ordinances contain specific stipulations for construction noise, the project-related noise assessment focuses on the output of the RCNM model. The results calculated by the model are conservative. Noise levels in the model originated from data developed by the USEPA, and were refined using an "acoustical usage factor" to estimate the fraction of time each piece of construction equipment would be operating at full power (i.e., its loudest condition) during the project (USDOT 2008).

The RCNM calculates acoustic sound levels at identified receptor points, and reports Lmax and Leq at those points. Under the Proposed Action, noise-generating activities at the NMAWC site

would potentially affect receptors near the NMAWC site and pier construction would affect receptors near the fuel pier. For each portion of the project, noise levels at the sensitive receptors are relative to the noise generated at the center of the construction activities and scheduled timeframe for that particular episode of construction.

NMAWC Site

Temporary Relocation of the Navy MMP

Before the pier replacement activities begin, the Navy MMP would be temporarily relocated to the NMAWC. Pile driving would be the dominant noise producer for the MMP portion of the project. Activities associated with the Navy MMP construction would involve a pile-driver, crane and a workboat and other light construction equipment and pile-driving activities would occur over a very short time span (8 days). Only 50 piles would be required for the proposed temporary Navy MMP facilities at NMAWC under Alternative 1. Although the piles would be small concrete piles and use smaller pile-driving equipment than used for the larger steel piles planned for the fuel pier, the calculation for this analysis used the default pile-driver noise levels in RCNM, resulting in a higher estimated noise level than would likely be produced for driving the concrete piles. The timeframe window for this portion would be between September 2013 and February 2014. Table 3.8-1 shows calculated noise levels at various representative receptors near the proposed temporary Navy MMP relocation site. All of the residential receptors would be below the 75-dBA San Diego weekday construction ordinance limit.

Table 3.8-1. Proposed Navy Temporary MMP Relocation NMAWC Site Airborne Outdoor Construction Noise Levels at Representative Receptor Points

Receptor Point	*Distance* **Miles (km)**	*Outdoor Construction-Related Noise* **(dBA Leq)**
Harbor Island West Marina	0.1 (0.17)	73.2
Fun House Preschool	0.45 (0.73)	60.8
Patrick Wade CDC (Navy family housing area north of Rosecrans Street)	0.42 (0.67)	61.5
Baypoint Preschool	0.40 (0.65)	61.9
High Tech High School	0.5 (0.8)	60.1
Tattnal Way (residential)	0.25 (0.4)	66.0

Note: The City of San Diego Daytime Weekday Construction Ordinance Limit is 75 dBA (Leq)
CDC = Child Development Center.
Source: City of San Diego 2010.

At the Patrick Wade CDC, outdoor noise levels would be 61.4 dBA. Sound attenuation inside a building reduces noise levels by 15 to 25 dBA with windows open and closed, respectively. With windows closed, there would be a 25-dBA reduction in noise levels, so noise levels inside

the preschools, high school, and Patrick Wade CDC would be very close to the indoor classroom criteria level of 35 dBA for effective hearing. These levels likely would be further attenuated because there are a number of two-story buildings between the schools and the proposed temporary Navy MMP relocation site, and all of the schools are located upwind from the MMP location. For these reasons, including that a more conservative noise level was used in the calculations, and that pile driving would be intermittent during the school day (the classroom criteria is for continuous noise levels), these construction noise levels would be considered acceptable. Considering that the noise impacts would be very short term lasting only a few days, the noise impacts associated with construction of the proposed temporary Navy MMP relocation site would not be considered significant.

NBPL Fuel Pier Location

Construction of the proposed replacement fuel pier would involve: the demolition of the existing pier and installation of indicator and dolphin piles; approach pier construction; north pier construction; and south pier construction. Demolition and construction of the fuel pier would involve typical construction equipment including: impact pile driver; vibratory pile driver; tug boats; work boats; hydraulic rams; fork lift; excavators; front end loaders; concrete crushing equipment; delivery trucks; and other miscellaneous equipment.

The impact pile driver is the dominant noise producer of all of the construction equipment that would be used at the NBPL site. Steel wall, concrete, and fiberglass piles would be used in this project. The impact pile driver would be needed for all three types of piles (MNB 2011). The vibratory hammer would drive the steel wall piles to the majority of the required depth, and the embedment would be completed with the impact hammer. The concrete piles would be first jetted, then driven the last few feet with the impact hammer. The fiberglass fender piles would not be embedded as deeply as the other two pile types, so they would be driven for the entire length with the impact hammer (MNB 2012)

The second loudest piece of equipment that would be used for the proposed construction at the NBPL site is the vibratory pile driver; however, it would not operate at the same time as the impact pile driver. The project construction schedule calls for four pile driving episodes: Indicator Pile Driving; Approach Pier Construction; North Pier Construction; and South Pier Construction. Each episode would be separated by 6 ½ months of work with no pile driving (i.e., the least tern foraging season). This would help to minimize acute noise impacts. Demolition work would not involve impact pile driving but would take place at the same time as the earlier portions of the construction. The noise associated with pile driving would be temporary and would only occur during daylight hours (a normal workday is 9.5 hours) (MNB 2011).

Fuel Pier Demolition, Indicator Piles and Temporary Mooring Dolphin Installation

Multiple pieces of construction equipment would be used to demolish the existing pier and install indicator piles and temporary mooring dolphin including cranes, wheel loaders, tugboats, and work boats. By far, the impact pile driver is the loudest piece of equipment planned for the project. At the source, i.e., within 50 ft, of pile driving equipment RCNM uses

an Lmax of 101.3 dBA and the noise level diminishes as the distance from the noise source increases. Two types of piles would be used for indicator piles, 36-in or 48-in diameter steel piles (MNB 2011).

During this portion of the project, the datum for noise calculations was assumed to be in the area of the new pier alignment. The proposed schedule for the pile driving is in March of 2014. Two sensitive receptors landside of the site have been identified: the residential neighborhood of La Playa north of NBPL and the CDC at Building 377 inside NBPL. Both are approximately 0.5 mi away from the proposed project site. These points are areas with land uses that could be sensitive to elevated noise levels.

Potential noise levels from construction activities during the approach pier construction at the two sensitive receptor areas are listed in Table 3.8-2. Model results indicate that noise levels at the La Play neighborhood would be less than the City of San Diego 75 dBA construction noise limit. Consistent with the RCNM methodology used for this assessment, the ambient noise and construction noise are not added as a cumulative level for comparisons to the noise ordinance. At the NBPL CDC, outdoor noise levels would be 61.4 dBA. Sound attenuation inside a building reduces noise levels by 15 to 25 dBA with windows open and closed, respectively. The classroom criteria is 35 dBA recommended indoor noise levels. With windows closed during pile driving operations, the classroom criteria (60.6 dBA - 25 dBA = 35.6 dBA) for effective hearing would be slightly exceeded; however, the limit assumes continual noise throughout the school day but impact pile driving would occur intermittently throughout the school day. Although not quantifiable without actual in situ noise measurements, the relatively new NBPL CDC building itself may provide greater than 25 dBA reduction in noise levels. The design and construction materials of modern buildings often have much better sound attenuation than older structures.

Table 3.8-2. Indicator Piles and Mooring Dolphin Airborne Outdoor Construction Noise Levels at Representative Receptor Points

Receptor Point	*Distance* **Miles (km)**	*Construction-Related Noise* **(dBA Leq)**
La Playa	0.48 (0.78)	61.0
CDC NBPL (Building 377)	0.45 (0.50)	60.6

Demolition activities without pile driving for the North Pier was calculated to be 58.1 dBA measured from the center of the pier to the base boundary at La Playa at 0.47 mi (0.76 km). The CDC is approximately the same distance of 0.47 mi (0.76 km).

Approach Pier Construction

Pile-driving and multiple pieces of other construction equipment would be used to construct the approach pier including cranes, wheel loaders, tug boats, and work boats. The impact pile driver is the loudest piece of equipment planned for the project. At the source, i.e., within 50 ft

of pile driving equipment, RCNM uses an Lmax of 101.3 dBA and the noise level diminishes as the distance from the noise source increases. Two sizes of piles would be used for abutment (24 piles) and structural piles (105 piles): 36-in or 48-in diameter steel piles (MNB 2011). Fiberglass piles (21 piles) would be used for fender piles.

During this portion of the project, the datum for noise calculations was assumed to be in the center of the new approach pier alignment. The proposed schedule for this portion of the project would start after the 2014 least tern foraging season in mid-September and continue until mid-November. Similar to the previously mentioned indicator pile driving component of this project, potential sensitive receptors would be the neighborhood of La Playa and the NBPL CDC (Building 377). Both are approximately a half mile away from the project site, but La Playa is just off-base to the north and the CDC is on-base to the west. These points represent areas with land uses that could be sensitive to elevated noise levels.

Potential noise levels from construction activities during the approach pier construction at the two sensitive receptors are listed in Table 3.8-3. Model results indicate that noise levels at the residential receptor points would be less than the City of San Diego 75 dBA construction noise limit. Consistent with the RCNM methodology used for this assessment, the ambient noise and construction noise are not added as a cumulative level for comparisons to the noise ordinance. At the CDC, outdoor noise levels would be 62.9 dBA. Sound attenuation inside a building reduces noise levels by 15 to 25 dBA with windows open and closed, respectively. The classroom criteria is 35 dBA recommended indoor noise levels. With windows closed during pile driving operations, the classroom criteria (63.2 dBA - 25 dBA = 38.2 dBA) for effective hearing would be slightly exceeded; however, the limit assumes continual noise throughout the school day but impact pile driving would occur intermittently throughout the school day. Although not quantifiable without actual in situ noise measurements, the relatively new NBPL CDC building itself may reduce interior noise levels to below 35 dB. The design and construction materials of modern buildings often have much better sound attenuation than older structures.

Table 3.8-3. Approach Pier Airborne Outdoor Construction Noise Levels at Representative Receptor Points

Receptor Point	*Distance* **Miles (km)**	*Construction-Related Noise* **(dBA Leq)**	
		With Pile Driving	*Without Pile Driving*
La Playa neighborhood	0.47 (0.73)	62.3	57.7
CDC NBPL (Building 377)	0.42 (0.68)	63.2	58.6

North Pier Construction

Pile-driving and multiple pieces of other construction equipment would be used to construct the north pier including cranes, wheel loaders, tug boats, and work boats. By far, the impact pile driver is the loudest piece of equipment planned for the project. Two sizes of steel piles

would be used for structural piles (93 piles) and mooring dolphin piles (16 piles): 36-in or 48-in diameter steel piles (MNB 2011). Concrete primary fender piles (88 piles) and fiberglass secondary fender piles (25 piles) would be used also be driven.

During this portion of the project, the datum for noise calculations was assumed to be in the center of the new approach pier alignment. The proposed schedule for pile driving the steel structural and mooring dolphin piles portion of the project would start after the pile driving of the piles for the approach pier in mid-November 2014 and continue through mid-January 2015. Construction without pile driving would continue through the least tern foraging season and pile driving the concrete and fiberglass fender piles would start in mid-September 2015. Similar to the previously mentioned indicator pile driving component of this project, potential sensitive receptors would be the neighborhood of La Playa and the CDC.

Potential noise levels from construction activities during the approach pier construction at the two sensitive receptors are listed in Table 3.8-4. Model results indicate that noise levels at the residential receptor points would be less than the City of San Diego 75 dBA construction noise limit. Consistent with the RCNM methodology used for this assessment, the ambient noise and construction noise are not added as a cumulative level for comparisons to the noise ordinance. At the CDC, outdoor noise levels would be 62.9 dBA. Sound attenuation inside a building reduces noise levels by 15 to 25 dBA with windows open and closed, respectively. The classroom criteria is 35 dBA recommended indoor noise levels. With windows closed during pile driving operations, the classroom criteria (61.4 dBA - 25 dBA = 36.4 dBA) for effective hearing would be slightly exceeded; however, the limit assumes continual noise throughout the school day but impact pile driving would occur intermittently throughout the school day. Although not quantifiable without actual in situ noise measurements, the relatively new NBPL CDC building itself may provide greater than 25dBA reduction in noise levels. The design and construction materials of modern buildings often have much better sound attenuation than older structures.

Table 3.8-4. North Pier Airborne Outdoor Construction Noise Levels at Representative Receptor Points

Receptor Point	*Distance* **Miles (km)**	*Construction-Related Noise* **(dBA Leq)**	
		With Pile Driving	*Without Pile Driving*
La Playa	0.47 (0.73)	61.7	56.7
CDC NBPL (Building 377)	0.42 (0.68)	61.4	56.4

South Pier Construction/Existing Pier Demolition

South pier berthing and mooring dolphins would be pile driven during this portion of the project. Demolition of the existing pier would be completed during this phase of the project. Once the mooring dolphins are driven, the pile driver would be moved shore-side to drive abutment piles where the existing pier meets the shore. The impact pile driver is the loudest

piece of equipment planned for the project. Two sizes of steel piles would be used for the berthing/mooring dolphin piles (17 piles) and for the abutment piles (13 piles): 36-in or 48-in diameter steel piles (MNB 2011).

During this portion of the project, the datum for noise calculations was assumed to be in the center of the dolphin piles and a second location at the shoreline for the abutment piles. The proposed schedule for pile driving the mooring dolphin piles and abutment piles portion of the project would start in mid-September 2016 and continue until completion around the end of September 2016. Demolition without pile driving would start in June 2016 and continue through November 2016. Similar to the previously mentioned indicator pile driving component of this project, potential sensitive receptors would be the neighborhood of La Playa and the NBPL CDC.

Potential noise levels from construction activities during the mooring dolphin construction at the two sensitive receptors are listed in Table 3.8-5. Model results indicate that noise levels at the residential receptor points would be less than the City of San Diego 75 dBA construction noise limit. Consistent with the RCNM methodology used for this assessment, the ambient noise and construction noise are not added as a cumulative level for comparisons to the noise ordinance. At the CDC, outdoor noise levels would be 62.9 dBA. Sound attenuation inside a building reduces noise levels by 15 to 25 dBA with windows open and closed, respectively. The classroom criteria is 35 dBA recommended indoor noise levels. With windows closed during pile driving operations, the classroom criteria (for dolphin installation: 61.8 dBA - 25 dBA = 36.8 dBA and for Abutment piles: 63.0 dBA – 25 dBA = 38 dBA) for effective hearing would be slightly exceeded; however, the limit assumes continual noise throughout the school day but impact pile driving would intermittently throughout the school day. Although not quantifiable without actual in situ noise measurements, the relatively new NBPL CDC building itself may provide greater than 25dBA reduction in noise levels. The design and construction materials of modern buildings often have much better sound attenuation than older structures.

Table 3.8-5. South Pier Dolphin Installation and Existing Pier Demolition Airborne Outdoor Construction Noise Levels at Representative Receptor Points

Dolphin Installation		
Receptor Point	***Distance* Miles (km)**	***Construction-Related Noise* (dBA Leq)**
La Playa	0.60 (0.97)	59.1
CDC NBPL (Building 377)	0.42 (0.68)	61.8
Abutment Piles		
Receptor Point	***Distance* Miles (km)**	***Construction-Related Noise* (dBA Leq)**
La Playa	0.46 (0.74)	61.4
CDC NBPL (Building 377)	0.38 (0.62)	63.0

Demolition of the existing approach pier and south pier would occur during this phase of the project and the approximate centroid of the pier area was used for the distance datum for these noise calculations. Noise levels for demolition activities at La Playa and the NBPL CDC are shown in Table 3.8-6.

Table 3.8-6. Existing Pier Airborne Outdoor Demolition Noise Levels at Representative Receptor Points

Receptor Point	*Distance* **Miles (km)**	*Construction-Related Noise* **(dBA Leq)**
La Playa	0.52 (0.83)	56.8
CDC NBPL (Building 377)	0.40 (0.64)	59.0

Dredging

Mechanical dredging of the high spot in the turning basin would produce noise from the dredging equipment, tugboats, and barges, and associated human activity. No blasting would take place. The portions of the turning basin that would be dredged are adjacent to the San Diego Harbor Channel. Noise levels associated with dredging the turning basin would therefore be comparable to those that occur during the periodic maintenance dredging of the channel by USACE. Dredging operations would take place on weekdays during daylight hours for approximately three months. Noise levels from dredging would be 87 dBA at 50 ft (15 m) dropping to 61 dBA at 1,000 ft (305 m) and to 55 dBA at 2,000 ft (610 m) from the source (USDOT 2008). At its closest, the proposed dredge footprint is about 0.5 mile away (approximately 2,600 ft) away from shore (refer to Figure 2-1). The outdoor airborne noise levels associated with dredging operations that could be heard ashore in the La Playa neighborhood would be less than the City of San of San Diego construction noise limit of 75 dBA for residential areas. Therefore, there would be no significant noise impact associated with the dredging component of Alternative 1.

Barges transporting the dredged material to a nearshore replenishment site would also be a source of noise associated with the dredging operations. The sediment transport barges would join with existing vessel traffic in the San Diego Harbor Channel and noise levels would be comparable to ambient levels. Any additional noise resulting from the sediment transport barges would be short-term (up to three months), so impacts from transporting the dredge material to a nearshore replenishment site would not be significant.

In summary, noise modeling indicates that the noise associated with the proposed demolition, construction and dredging activities would not exceed City of San Diego construction airborne outdoor noise limits for residential areas (75 dBA-weighted) which apply at the boundaries of NBPL and NMAWC. Modeling also indicates that the indoor airborne noise levels at educational facilities in the areas surrounding the proposed NBPL and NMAWC project components would be slightly greater than the classroom criteria levels for effective hearing with windows closed (35 decibels A-weighted). However, because the pile driving would be

intermittent rather than continual, the noise levels would be considered acceptable. The following BMPs could be used to attenuate noise further levels if a greater reduction in noise levels is desired: noise monitoring for classroom criteria; acoustic blankets around the pile driver; or use of pile cushions could be used to reduce noise levels.

The demolition, construction, and dredging noise generated under Alternative 1 would be generally consistent with the industrial waterfront nature of NBPL and would not permanently alter the overall noise environment. Therefore, with implementation of Alternative 1 there would not be a significant noise impact.

3.8.3.3 Alternative 2 Delayed Dredging Alternative

Under Alternative 2, the same project components and activities would occur as under Alternative 1. The noise impacts associated with demolition, construction, and dredging activities would be the same as those discussed under Alternative 1, i.e., the City of San Diego construction noise ordinance limits would not be exceeded and classroom criteria for effective hearing would be slightly exceeded, but the classroom noise levels would be considered acceptable because the noise would be intermittent throughout the school day. Under Alternative 2, dredging would take place years after construction is completed, so noise from dredging would occur in the absence of other project-related noise. However, the demolition, construction, and dredging noise generated under this Alternative would be generally consistent with the industrial waterfront nature of NBPL and would not permanently alter the overall noise environment. Therefore, implementation of Alternative 2 would not have a significant noise impact.

3.8.3.4 Mitigation Measures

Implementation of Alternative 1 or Alternative 2 would not result in significant airborne noise impacts; therefore, no mitigation measures are proposed.

3.8.3.5 No-Action Alternative

Under the No-Action Alternative, temporary relocation of the Navy MMP, temporary relocation of the Everingham Bait Brothers Company bait barges, demolition, and replacement of the existing fuel pier, and associated dredging of high spots in the turning basin would not occur. Industrial activities currently being conducted in the area would continue, and the area's acoustical environment would remain unchanged. Therefore, implementation of the No-Action Alternative would not have a significant noise impact.

3.9 AIR QUALITY

3.9.1 Definition of Resource

Air quality is defined by ambient air concentrations of specific pollutants that have been determined to be of concern with respect to the health and welfare of the general public by the USEPA. The USEPA has established National Ambient Air Quality Standards (NAAQS) for these pollutants. The seven major pollutants of concern, called "criteria pollutants," are carbon monoxide (CO), sulfur dioxide (SO_2), nitrogen dioxide (NO_2), ozone (O_3), suspended particulate

matter less than or equal to 10 microns in diameter (PM_{10}), fine particulate matter less than or equal to 2.5 microns in diameter ($PM_{2.5}$), and lead (Pb). Primary NAAQS are established to protect public health. Secondary NAAQS may also be established to avoid other adverse impacts to the public welfare such as odors or visibility effects. Areas that violate a federal air quality standard are designated as non-attainment areas.

Ambient air quality refers to the atmospheric concentration of a specific compound (amount of pollutants in a specified volume of air) that occurs at a particular geographic location. The ambient air quality levels measured at a particular location are determined by the interactions of emissions, meteorology, and chemistry. Emission considerations include the types, amounts, and locations of pollutants emitted into the atmosphere. Meteorological considerations include wind and precipitation patterns affecting the distribution, dilution, and removal of pollutant emissions. Chemical reactions can transform pollutant emissions into other chemical substances. Ambient air quality data are generally reported as a mass per unit volume (e.g., micrograms per cubic meter [$\mu g/m^3$] of air) or as a volume fraction (e.g., ppm by volume).

Pollutant emissions typically refer to the amount of pollutants or pollutant precursors introduced into the atmosphere by a source or group of sources. Pollutant emissions contribute to the ambient air concentrations of criteria pollutants, either by directly affecting the pollutant concentrations measured in the ambient air or by interacting in the atmosphere to form criteria pollutants. Primary pollutants, such as CO, SO_2, Pb, and some particulates, are emitted directly into the atmosphere from emission sources. Secondary pollutants, such as O_3, NO_2, and some particulates, are formed through atmospheric chemical reactions that are influenced by meteorology, ultraviolet light, and other atmospheric processes. PM_{10} and $PM_{2.5}$ are generated as primary pollutants by various mechanical processes (for example, abrasion, erosion, mixing, or atomization) or combustion processes. However, fine particulate matter (PM_{10} and $PM_{2.5}$) can also be formed as secondary pollutants through chemical reactions or by gaseous pollutants condensing into fine aerosols. In general, emissions that are considered "precursors" to secondary pollutants in the atmosphere (such as Reactive Organic Gases [ROG] and oxides of nitrogen [NOx], which are considered precursors for O_3), are the pollutants for which emissions are evaluated to control the level of O_3 in the ambient air.

The State of California has identified four additional pollutants for ambient air quality standards: visibility reducing particles, sulfates, hydrogen sulfide, and vinyl chloride. The California Air Resources Board (CARB) has also established the more stringent California Ambient Air Quality Standards (CAAQS). Areas within California in which ambient air concentrations of a pollutant are higher than the state and/or federal standard are considered to be non-attainment for that pollutant. Table 3.9-1 details both the federal and state ambient air quality standards.

Toxic air pollutants, also called hazardous air pollutants (HAPs), are a class of pollutants that do not have ambient air quality standards but are examined on an individual basis when there is a source of these pollutants. The State of California has identified particulate emissions from diesel engines as a toxic air pollutant.

3.9.2 Affected Environment

NBPL is located within San Diego County and is under the jurisdiction of the San Diego Air Pollution Control District (SDAPCD). The SDAPCD is the agency responsible for the administration of federal and state air quality laws, regulations, and policies in the San Diego Air Basin (SDAB), which is contiguous with San Diego County.

On April 15, 2004, the SDAB was designated a basic nonattainment area for the 8-hour NAAQS for O_3, and on July 15, 2005, the 1-hour NAAQS for O_3 was rescinded. The USEPA was challenged on their justification for "basic" nonattainment designations and published proposed for all "basic" nonattainment areas for the 8-hour NAAQS for O_3. The SDAB is currently classified as a moderate nonattainment area for the 8-hour O_3 NAAQS (VOCs and NO_x are precursors to the formation of O_3); however, because the SDAB did not attain the standard in 2009, the USEPA was considering a redesignation of the SDAB as a serious nonattainment area for O_3. It is currently anticipated that the SDAB will remain classified as a moderate nonattainment area. In 1994, the SDAB attained the standard for CO; the air basin is considered a maintenance area for CO and has been subject to a maintenance plan. The SDAB is currently in attainment for the NAAQS for all other criteria pollutants. The SDAB is currently classified as a nonattainment area under the CAAQS for O_3, PM_{10}, and $PM_{2.5}$.

Table 3.9-1. Ambient Air Quality Standards

Pollutant	Averaging Time	NAAQS[1]		CAAQS
		Primary	Secondary	Concentration
Ozone (O_3)	1-Hour	-	Same as Primary Standard	0.09 ppm (180 µg/m3)
	8-Hour	0.075 (147 µg/m3) ppm		0.070 ppm (137 µg/m3)
Carbon Monoxide (CO)	8-Hour	9.0 ppm (10 mg/m3)	None	9.0 ppm (10 mg/m3)
	1-Hour	35 ppm (40 mg/m3)		20 ppm (23 mg/m3)
Nitrogen Dioxide (NO_2)	Annual Average	0.053 ppm (100 µg/m3)	Same as Primary Standard	0.030 ppm (56 µg/m3)
	1-Hour	0.100 ppm (188 µg/m3)		0.18 ppm (338 µg/m3)
Sulfur Dioxide (SO_2)	24-Hour	-	-	0.04 ppm (105 µg/m3)
	3-Hour	-	0.5 ppm (1300 µg/m3)	-
	1-Hour	75 ppb (196 µg/m3)	-	0.25 ppm (655 µg/m3)
Respirable Particulate Matter (PM_{10})	24-Hour	150 µg/m3	Same as Primary Standard	50 µg/m3
	Annual Arithmetic Mean	-		20 µg/m3
Fine Particulate Matter ($PM_{2.5}$)	24-Hour	35 µg/m3	Same as Primary Standard	-
	Annual Arithmetic Mean	15 µg/m3		12 µg/m3
Lead (Pb)	30-Day Average	-	-	1.5 µg/m3
	Calendar Quarter	1.5 µg/m3	Same as Primary Standard	-
_3-Month Rolling Average	Rolling 3-month Average	0.15 µg/m3		
Hydrogen Sulfide (HS)	1-Hour	No Federal Standards		0.03 ppm (42 µg/m3)
Sulfates (SO_4)	24-Hour			25 µg/m3
Visibility Reducing Particles	8-Hour (10 am to 6 pm, Pacific Standard Time)			In sufficient amount to produce an extinction coefficient of 0.23 per kilometer due to particles when the relative humidity is less than 70 percent.
Vinyl chloride[2]	24 Hour			0.01 ppm (26 µg/m3)

Notes: [1] NAAQS (other than O_3, particulate matter, and those based on annual averages or annual arithmetic mean) are not to be exceeded more than once a year. The O_3 standard is attained when the fourth highest 8-hour concentration in a year, averaged over 3 years, is equal to or less than the standard. For PM_{10}, the 24-hour standard is attained when 99 percent of the daily concentrations, averaged over 3 years, are equal to or less than the standard. For $PM_{2.5}$, the 24-hour standard is attained when 98 percent of the daily concentrations, averaged over 3 years, are equal to or less than the standard. For NO_2, to attain the national standard, the 3-year average of the 98th percentile of the 1-hour maximum daily concentration must not exceed 100 ppb.

[2] The CARB has identified lead and vinyl chloride as "toxic air contaminants" with no threshold level of exposure for adverse health effects determined. These actions allow for implementation of control measures at levels below the ambient concentrations specified for these pollutants.

µg/m3 = micrograms per cubic meter; mg/m3 = milligrams per cubic meter.

Source: CARB 2011a.

The SDAPCD operates a network of ambient air monitoring stations throughout San Diego County. The purpose of the monitoring stations is to measure ambient concentrations of the pollutants and determine whether the ambient air quality meets the CAAQS and the NAAQS. The nearest ambient monitoring station to the project site is located in downtown San Diego, California.

3.9.2.1 Region of Influence

Specifically identifying the ROI for air quality requires knowledge of the type of pollutant, emission rates of the pollutant source, proximity to other emission sources, and local and regional meteorology. The ROI for the NBPL Fuel Pier is defined by the SDAB. For inert pollutants (all pollutants other than O_3 and its precursors), the ROI is generally limited to a few miles downwind from the source. However, for a photochemical pollutant such as O_3, the ROI may extend much farther downwind. O_3 is a secondary pollutant that is formed in the atmosphere by photochemical reactions of previously emitted pollutants, or precursors (ROG and NO_x). The maximum effect on O_3 levels from precursors tends to occur several hours after the time of emission during periods of high solar load and may occur many miles from the source. O_3 and O_3 precursors transported from other regions can also combine with local emissions to produce high local O_3 concentrations.

3.9.2.2 Federal Requirements

Under NEPA, air quality impacts must be evaluated and assessed with regard to the significance of their impacts. NEPA is applicable to areas that are within the United States Territory, typically defined as within 12 nautical miles of shore and on land. In addition to NEPA, the CAA, General Conformity, and New Source Review (NSR) are applicable to analyses of impacts to air quality. These federal requirements are discussed in the following sections.

3.9.2.3 Clean Air Act

The USEPA is the agency responsible for enforcing the CAA of 1970 and its 1977 and 1990 amendments. The purpose of the CAA is to establish NAAQS, which classify areas as to their attainment status relative to NAAQS; develop schedules and strategies to meet the NAAQS; and to regulate emissions of criteria pollutants and air toxics to protect public health and welfare. Under the CAA, individual states are allowed to adopt ambient air quality standards and other regulations, provided they are at least as stringent as federal standards. The CAA Amendments established new deadlines for achievement of NAAQS, dependent upon the severity of nonattainment.

The USEPA requires each state to prepare a State Implementation Plan (SIP), which describes how that state will achieve compliance with NAAQS. A SIP is a compilation of goals, strategies, schedules, and enforcement actions that will lead the state into compliance with all federal air quality standards. Each change to a compliance schedule or plan must be incorporated into the SIP. In California, the SIP consists of separate elements for each air basin, depending upon the attainment status of the particular air basin.

The CAA Amendments also require that states develop an operating permit program that would require permits for all major sources of pollutants. The program would be designed to reduce criteria pollutant emissions and control emissions of hazardous air pollutants by establishing control technology guidelines for various classes of emission sources. Under the CAA, state and/or local agencies may be delegated authority to administer the requirements of the CAA, including requirements to obtain permits to operate stationary sources on Navy installations.

3.9.2.4 General Conformity

Under 40 CFR Part 93 and the provisions of Part 51, Subchapter C, Chapter I, Title 40, Appendix W of the CFR, of the CAA as amended, federal agencies are required to demonstrate that federal actions conform with the applicable SIP. In order to ensure that federal activities do not hamper local efforts to control air pollution, Section 176(c) of the CAA, 42 USC 7506(c) prohibits federal agencies, departments, or instrumentalities from engaging in, supporting, providing financial assistance for, licensing, permitting or approving any action which does not conform to an approved SIP or federal implementation plan.

The USEPA general conformity rule applies to federal actions occurring in nonattainment or maintenance areas when the total direct and indirect emissions of nonattainment pollutants (or their precursors) exceed specified thresholds. The emission thresholds that trigger requirements of the conformity rule are called *de minimis* levels. Table 3.9-2 identifies the federal nonattainment pollutants and the relevant *de minimis* emission thresholds (USEPA 2012).

In order to demonstrate conformity with the CAA, a project must clearly demonstrate that it does not cause or contribute to any new violation of any standard in any area; increase the frequency or severity of any existing violation of any standard in any area; or delay timely attainment of any standard, any required interim emission reductions, or other milestones in any area. A conformity applicability analysis is required for each of the nonattainment pollutants or its precursor emissions.

Compliance with the conformity rule can be demonstrated in several ways. Compliance is presumed if the net increase in direct and indirect emissions from a federal action would be less than the relevant *de minimis* level. If net emissions exceed the relevant *de minimis* value a formal conformity determination process must be followed.

3.9.2.5 Greenhouse Gases

Greenhouse gases (GHGs) are gases that trap heat in the atmosphere. These emissions occur from natural processes and human activities. The most significant of the human activities emitting GHGs is the burning of fossil fuels. The accumulation of GHGs in the atmosphere regulates the earth's temperature. Scientific evidence indicates a trend of increasing global temperature over the past century correlating with an increase in GHG emissions from human activities.

The most common GHGs emitted from natural processes and human activities include carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O). Examples of GHGs created and

emitted primarily through human activities include fluorinated gases (hydrofluorocarbons and perfluorocarbons) and sulfur hexafluoride. Each GHG is assigned a global warming potential, which is the ability of a gas or aerosol to trap heat in the atmosphere. The global warming potential scale is standardized to CO_2, which has a value of one. For example, CH_4 has a global warming potential of 21, which means that it has a global warming effect 21 times greater than CO_2 on an equal-mass basis. CO_2 is the dominant gas in terms of quantities of total GHG emissions, although other GHGs have a higher global warming potential than CO_2. Total GHG emissions from a source are often reported as a CO_2 equivalent (CO_{2e}). The CO_{2e} is calculated by multiplying the emissions of each GHG by its global warming potential and adding the results together to produce a single, combined emission rate representing all GHGs.

Federal agencies are addressing emissions of GHGs by mandating GHG reductions in federal laws and EOs, most recently EO 13423 (*Strengthening Federal Environment, Energy, and Transportation Management*) and EO 13514 (*Energy Efficient Standby Power Devices*). Several states have passed GHG related laws as a means to reduce statewide levels of GHG emissions. In particular, the California Global Warming Solutions Act of 2006 (*Assembly Bill 32*) directs the State of California to reduce statewide GHG emissions to 1990 levels by the year 2020.

In an effort to reduce energy consumption, reduce dependence on petroleum, and increase the use of renewable energy resources in accordance with goals set by EO 13423 and the Energy Policy Act of 2005, "the Navy" has implemented a number of renewable energy projects. The types of projects currently in operation within military installations include thermal and photovoltaic solar energy systems, geothermal power plants, and wind energy generators.

The potential effects of GHG emissions are by nature global and cumulative, and it is impractical to attribute climate change to individual projects. Therefore, the impact of GHG emissions associated with this project is discussed in the context of cumulative impacts in Section 4.2.9 of this EA.

3.9.2.6 New Source Review

A NSR is required when a source has the potential to emit any pollutant regulated under the CAA in amounts equal to or exceeding specified major source thresholds (100 or 250 tons per year), predicated on the source's industrial category. A major modification to the source also triggers a NSR. Any new or modified stationary emission source requires construction and operating permits from the SDAPCD. Through the SDAPCD's permitting process, all stationary sources are reviewed and are subject to a NSR process. The NSR process ensures that factors such as the availability of emission offsets and their ability to reduce emissions are addressed and conform to the SIP.

3.9.2.7 Local Requirements

In San Diego County, the SDAPCD is the agency responsible for the administration of federal and state air quality laws, regulations, and policies. Included in the SDAPCD's tasks are monitoring of air pollution, preparation of the SIP for the SDAB, and the promulgation of rules and regulations. The SIP includes strategies and tactics to be used to attain the federal O_3

standard within San Diego County. The SIP elements are taken from the Regional Air Quality Strategy and the SDAPCD plan for attaining the state O_3 standard, which is more stringent than the federal standard. The SDAPCD's rules and regulations include procedures and requirements to control the emission of pollutants and to prevent adverse impacts (SDCAPCD 2012).

These regulations require that facilities constructing, altering, or replacing stationary equipment that may emit air pollutants obtain an Authority to Construct permit. Further, SDAPCD regulations require stationary sources of air pollutants to obtain and maintain Permits to Operate for all stationary sources subject to the requirements of Regulation II (SDCAPCD 2012). The Navy must submit applications to the SDAPCD for their review and approval. The SDAPCD is responsible for the review of applications and for the approval and issuance of these permits. Once a permit is issued, the Navy is responsible for compliance with the conditions specified in the permit, and is responsible for quantification of emissions associated with the permitted unit. The SDAPCD does not have quantitative emissions limits for construction activities, nor for long-term emissions that may result from increased vehicle use or other mobile sources.

3.9.2.8 Current Mitigation Measures

The Navy currently has a comprehensive air quality management program to comply with all federal, state, and local requirements. Mitigation measures that are part of the Navy's air quality management practices are implemented at NBPL. Equipment is maintained and meets applicable emission standards (such as smog certification for on-road vehicles) in accordance with state requirements. The Navy will require equipment such as dredging equipment to obtain the necessary air permits to operate within the SDAB.

3.9.3 Environmental Consequences

This resource section focuses on activities that have the potential to result in an impact to the ambient air quality. Types of emission sources associated with the NBPL Pier 180 replacement that could affect air quality include construction activities. Air quality impacts from proposed construction activities would occur from (1) combustion emissions due to the use of fossil fuel-powered equipment and (2) fugitive dust emissions (PM_{10}) during construction activities including demolition. Due to the nature of the project, earthmoving and grading would be minimal; dredging activities would not generate fugitive dust as the marine sediments that would be dredged are wet.

3.9.3.1 Approach to Analysis

The air quality analysis is based on estimates of emissions from combustion of fossil fuels in heavy construction equipment and vehicles. A list of estimated equipment required for construction activities, including support boats and tugboats, heavy construction equipment, truck trips, and workforce estimates, are provided in Appendix G, along with the emission calculations for all activities. It is assumed that all construction activities would take place during an approximately four-year period starting in August 2013 and ending in January 2017.

Operational emissions would primarily be from mobile sources associated with the use of the pier, including Navy marine vessels and ground vehicles that would service the pier. Because the purpose of the project is to replace the aging, seismically deficient, and obsolete pier with a new pier that would improve safety and fuel receipt and delivery capabilities, the proposed project is designed to serve existing needs and would not result in increases in mobile source emissions. Therefore, this analysis focuses on construction activities required to replace the pier.

Emissions Evaluation Methodology

The methodology for estimating construction emissions involves quantifying the number and type of heavy construction equipment, truck trips, worker trips, and marine vessels that would be used for the NBPL Pier 180 replacement.

Emissions from heavy construction equipment were estimated based on emission factors for specific equipment from the CARB's OFFROAD emission model (CARB 2007), which provides emission factors for offroad equipment. Emissions were estimated by multiplying the number of each type of equipment by the hours per day, days per year, and emission factor in pounds per day. Emissions from the pile driving hammer were calculated based on the DELMAG D12 hammer, assuming the hammer would use 0.95 gallons of diesel fuel per hour (DELMAG 2012).

Emissions from the dredge involved in the construction project were calculated based on the engine specification for the dredge. It was assumed that the main dredge engine would be 2,935 hp, with the auxiliary engine rated at 550 hp and the spud winch at 250 hp. It was assumed the engines would meet Tier 2 emission standards. Emissions were calculated by multiplying the emission factor for the dredge times the amount of time the dredge would be used.

Emissions from ground vehicles (worker vehicles and truck trips) involved in construction of the NBPL Fuel Pier include combustion emissions from delivery vehicles such as trucks, and emissions from the construction workforce traveling to and from the site. Emissions associated with ground vehicles were estimated based on emission factors for specific equipment, or for ground vehicles, from the CARB's Emission Factors (EMFAC) 2011 model (CARB 2011b), which provides emission factors for on-road vehicles. Emissions were estimated by multiplying the number of each type of vehicle times the estimated mileage traveled per day, and the number of days for each phase of construction.

Marine vessels would be involved in the construction of the NBPL Pier during demolition of the existing pier and construction of the new pier. The methodology for estimating marine vessel emissions involves evaluating the type of activity, the number of hours of activity, the type of propulsion engine, and the type of generator used onboard for each type of vessel. Emission factors were obtained from the USEPA (USEPA 2000).

Operational emissions would primarily be from mobile sources associated with the use of the pier, including Navy marine vessels and ground vehicles that would service the pier. Because the purpose of the Proposed Action is to replace the aging, seismically deficient, and obsolete

pier with a new pier that would improve safety and fuel receipt and delivery capabilities, the Proposed Action is designed to serve existing needs and would not result in increases in mobile source emissions. Therefore, this analysis focuses on construction activities required to replace the pier.

Baseline Emissions

The emissions baseline levels provide a basis for evaluating potential emission increases associated with Alternative 1 and Alternative 2. For the purpose of evaluating operational emissions associated with Alternative 1 and Alternative 2, it was assumed that the operation of the Fuel Pier would not be altered with replacement of the pier. Accordingly, there would be no net change in operational emissions.

3.9.3.2 Alternative 1 Pier Replacement and Associated Dredging

As discussed in Chapter 2, construction of the new fuel pier would take place concurrently with demolition of the old pier. The project would be constructed in two main phases. Implementation of Alternative 1 would include the following activities:

Phase 1 – Fuel Pier Construction:

- Project Indicator Pile Program
- Temporary Mooring Dolphin
- North Segment Demolition
- Access Pier Construction
- North Pier Construction
- Mooring Dolphins

Phase 2 – South Pier Construction:

- South Pier Construction
- South Pier and Access Pier Demolition

In addition to construction of the new fuel pier, dredging for the high spot in the turning basin would be conducted under Alternative 1. Dredging could occur any time before, during, or after the construction process. There would be no dredging during the least tern foraging season, April 1 to September 15. For the purpose of calculating emissions associated with dredging, it was assumed that dredging would be concurrent with fuel pier construction, and could occur during the maximum activity years of 2014 and 2015.

Table 3.9-2 presents a summary of the emissions associated with construction activities under Alternative 1. Emission calculations are provided in Appendix H.

Table 3.9-2. Construction Emissions for NBPL Fuel Pier Replacement with Evaluation of Conformity –Alternative 1

Construction Year	Emissions (tons/year)					
	CO[1]	VOCs[2]	NOx[2,3]	SOx[3]	PM_{10}[3]	$PM_{2.5}$[3]
2013	4.73	1.81	13.51	0.01	0.42	0.37
2014	14.14	8.25	33.26	0.05	1.12	0.97
2015	22.84	14.27	44.89	0.07	1.90	1.63
2016	14.24	9.75	35.52	0.05	1.26	1.10
de minimis Threshold/ Major Source Threshold[4]	100	100	100	100	100	100
Exceeds Threshold?	No	No	No	No	No	No

Notes: (1) SDAB is considered a maintenance area for the CO NAAQS.

(2) SDAB is currently classified as a moderate nonattainment area for the 8-hour O_3 NAAQS; VOCs and NOx are precursors to the formation of O_3. However, the USEPA is in the process of redesignating the SDAB as a serious nonattainment area. Should the reclassification occur, the *de minimis* threshold will be 50 tons per year for VOCs and NO_x. Alternative 1 emissions would be below the 50 tons per year threshold as well.

(3) SDAB is in attainment of the NAAQS for NOx, SOx, PM_{10}, and $PM_{2.5}$.

(4) *de minimis* thresholds are developed from the General Conformity Rule for nonattainment and maintenance pollutants; NAAQS attainment pollutants (i.e., SOx, PM_{10}, and $PM_{2.5}$) are evaluated based on SDCAPCD major source thresholds.

Sources: USEPA 2012; SDCAPCD 2012.

As shown in Table 3.9-2, emissions would be below *de minimis* thresholds. Therefore, implementation of Alternative 1 would not have a significant impact to air quality.

General Conformity Applicability Analysis

The estimated construction emissions associated with Alternative 1 would be below the *de minimis* threshold levels for CAA conformity. Therefore, Alternative 1 would conform to the SDAB SIP and would not trigger a conformity determination under Section 176(c) of the CAA. The Navy has prepared a Record of Non-Applicability (RONA) for CAA conformity (Refer to Appendix G).

Hazardous Air Pollutants

As discussed above, the USEPA has listed 188 substances that are regulated under Section 112 of the CAA, and the State of California has identified additional substances that are regulated under state and local air toxics rule. Minor amounts of HAPs are emitted from the combustion of fossil fuels in construction equipment and vehicles. The amounts that would be emitted are small in comparison with the emissions of criteria pollutants; emission factors for most HAPs from combustion sources are roughly three or more orders of magnitude lower than emission factors for criteria pollutants.

Because the majority of activities occur in restricted areas where no sensitive receptors (i.e., residents, schools, hospitals, etc.) are located, no health effects would be anticipated from emissions of HAPs. Therefore, implementation of Alternative 1 would not have a significant impact to air quality.

3.9.3.3 Alternative 2 Delayed Dredging Alternative

As discussed in Chapter 2, implementation of Alternative 2 would involve the same construction activities described under Alternative 1, except that dredging would take place years after construction of the fuel pier and demolition of the existing pier are completed. Under this alternative, emissions associated with dredging would not occur during construction of the pier.

Table 3.9-3 presents a summary of the emissions associated with construction activities under Alternative 2. Emission calculations are provided in Appendix G.

Table 3.9-3. Construction Emissions for NBPL Fuel Pier Replacement with Evaluation of Conformity – Alternative 2

Construction Year	Emissions (tons/year)					
	CO[1]	VOCs[2]	NOx[2,3]	SOx[3]	PM_{10}[3]	$PM_{2.5}$[3]
2013	4.73	1.81	13.51	0.01	0.42	0.37
2014	12.83	7.88	28.34	0.05	0.98	0.84
2015	21.53	13.89	39.97	0.07	1.75	1.50
2016	12.94	9.38	30.60	0.05	1.11	0.97
Dredging	1.31	0.37	4.92	0.00	0.15	0.13
de minimis Threshold/ Major Source Threshold[4]	100	100	100	100	100	100
Exceeds Threshold?	No	No	No	No	No	No

Notes: (1) SDAB is considered a maintenance area for the CO NAAQS.

(2) SDAB is currently classified as a moderate nonattainment area for the 8-hour O_3 NAAQS; VOCs and NOx are precursors to the formation of O_3. However, the USEPA is in the process of redesignating the SDAB as a serious nonattainment area. Should the reclassification occur, the *de minimis* threshold will be 50 tons per year for VOCs and NO_x. Alternative 1 emissions would be below the 50 tons per year threshold as well.

(3) SDAB is in attainment of the NAAQS for NOx, SOx, PM_{10}, and $PM_{2.5}$.

(4) *de minimis* thresholds are developed from the General Conformity Rule for nonattainment and maintenance pollutants; NAAQS attainment pollutants (i.e., SOx, PM_{10}, and $PM_{2.5}$) are evaluated based on SDCAPCD major source thresholds.

Sources: USEPA 2012; SDCAPCD 2012.

As shown in Table 3.9-3, emissions would be below *de minimis* thresholds. Therefore, implementation of Alternative 2 would not have a significant impact to air quality.

3.9.3.4 Proposed Mitigation Measures

Implementation of Alternative 1 or Alternative 2 would not have significant air quality impacts; therefore, no mitigation measures are proposed. However, current mitigation measures, implemented as part of the Navy's air quality management program and practices, would continue to be implemented for operations of the NPBL Fuel Pier.

3.9.3.5 No-Action Alternative

Under the No-Action Alternative, temporary relocation of the Navy MMP, temporary relocation of the Everingham Bait Brothers Company bait barges, demolition, and replacement

of the existing fuel pier, and associated dredging of the turning basin would not occur. As a result, no construction emissions would result from implementation of the No-Action Alternative. With no construction emissions, the No-Action Alternative is exempt from the General Conformity Rule. Therefore, implementation of the No-Action Alternative would not have a significant impact to air quality.

3.10 TRANSPORTATION AND CIRCULATION

3.10.1 Definition of Resource

Transportation and circulation refer to the operational characteristics of a transportation network, including the network's capacity to accommodate the additional demand resulting from a proposed project. Networks may encompass many different types of facilities that serve a variety of transportation modes, such as vehicular traffic, public transit, and non-motorized travel. Because the Proposed Action's primary effect on transportation and circulation would involve vehicular traffic, this analysis focuses on the street network that provides access to and from NBPL.

Roadway operating conditions and the adequacy of existing roadway systems to accommodate vehicle use are described in terms of average daily traffic (ADT) volumes and level of service (LOS) ratings. LOS is a method used to rate the performance of streets, intersections, and other highway facilities. Developed by the Transportation Research Board, and documented in various editions of the Highway Capacity Manual (HCM) (Transportation Resource Board 2010) since 1950, LOS rates performance on a scale of A to F, with LOS A reflecting free flowing conditions and LOS F representing heavily congested conditions. Table 3.10-1 summarizes the general traffic conditions associated with each LOS rating.

Table 3.10-1. Traffic Conditions Associated with LOS Ratings

LOS Rating	*Description of Traffic Conditions*
A	Traffic flows freely, with little or no restrictions to vehicle maneuvers within the traffic stream.
B	Reasonably free-flowing conditions, with slight restrictions to vehicle maneuvers within the traffic stream.
C	Traffic speed approaches free-flowing conditions, but freedom to maneuver within the traffic stream noticeably restricted.
D	Traffic speed begins to be reduced, and freedom to maneuver is seriously limited due to a high concentration of traffic.
E	Unpredictable traffic flow, with virtually no usable gaps in the traffic stream to accommodate vehicle maneuvers.
F	Unstable flow resulting in delays and the formation of queues in locations where traffic demand exceeds roadway capacity.

Source: HCM 2010, Chapters 14 and 11.

Traffic analysis is guided by procedures and standards established by the federal, state, regional or local agency having jurisdiction over the transportation facilities that comprise the ROI. The

Proposed Action and the surrounding street network are located within the City of San Diego; therefore, City of San Diego procedures are incorporated into this analysis.

The City of San Diego Traffic Impact Study Manual (City of San Diego 1998) establishes LOS criteria for roadway segments based on their physical characteristics (e.g., the number of lanes, the presence of a median, adjacent land uses, etc.) and ADT thresholds assigned to each LOS grade (City of San Diego 1998). For example, a four-lane major arterial roadway would have LOS A with an ADT of 15,000 vehicles, and LOS D at 35,000 vehicles per day. The City of San Diego considers LOS D to be the minimum acceptable LOS; LOS E and F are considered unacceptable.

3.10.2 Affected Environment

The ROI for this analysis includes the roadways in the NBPL and NMAWC areas. Roadway access to the Point Loma peninsula and NBPL is limited. There is no immediate freeway access. Two City of San Diego streets, Rosecrans Street and Catalina Boulevard, are the main routes leading to the Point Loma peninsula and NBPL. NBPL has access gates on both Rosecrans Street (Rosecrans Gate) and Catalina Boulevard (McClelland Gate). Due to the volume of traffic on Rosecrans Street, many NBPL workers enter via the McClelland Gate (NAVFAC Southwest 2011).

NMAWC is also accessed by way of city streets. The routes directly leading to NMAWC are North Harbor Drive and Nimitz Boulevard; Rosecrans Street via Nimitz Boulevard is also an option. The NMAWC main gate is on North Harbor Drive, at the intersection with Laning Road (Figure 2-1).

3.10.2.1 Existing Conditions

Rosecrans Street is the major arterial roadway that connects Point Loma to the Mission Valley community, and regional transportation facilities, including Interstate (I) 5, I-8, the Old Town Transit Center, and other land uses. Rosecrans Street is approximately 5 mi long, extending from Taylor Street near highway I-5 southwest down the peninsula past the proposed project area, where it transitions into Fort Rosecrans Boulevard. The morning traffic peak on Rosecrans Street typically occurs between 4:00 and 6:30 A.M. This peak period is substantially earlier than traditional peak commuting periods, which typically begin after 7:00 A.M. (City of San Diego 2010). Afternoon commute volumes begin to peak at 3:00 P.M. and can continue well into the typical evening commute period after 6:00 P.M. The posted 30 to 35 mi per hour speed limits are often exceeded during off-peak hours (City of San Diego 2010).

The capacities of Rosecrans Street are defined as 40,000 vehicles per day for the four lane sections; 45,000 vehicles per day for the five lane sections; and 50,000 vehicles per day for the six lane sections. In addition, the southernmost segment of Rosecrans Street, from Talbot Street to NBPL, is defined as a two-lane major arterial, which has a capacity of 27,000 vehicles per day (City of San Diego 2010). Existing ADT volumes were obtained from the Rosecrans Corridor Mobility Study (City of San Diego 2010), supplemented where appropriate by more updated traffic data obtained from the San Diego Association of Governments (SANDAG) Web site

(SANDAG 2012), and with 24-hour traffic counts conducted in May 2012 (see Appendix H). Table 3.10-2 presents existing LOS within the ROI. As shown in this table, all segments within the ROI are characterized by acceptable LOS D or better conditions.

Table 3.10-2. Level of Service for ROI Roadway Segments, Existing Conditions

Roadway Segment	*Street Classification* [a]	*LOS E Capacity* [b]	*Existing*		
			ADT [c]	*V/C* [d]	*LOS* [e]
Rosecrans Street					
From Nimitz Bl. To N. Harbor Dr.	4 Lane Major Arterial	40,000	33,300	0.83	D
From N. Harbor Dr. to Canon St.	4 Lane Major Arterial	40,000	34,400	0.86	D
From Canon St. to Talbot St. [f]	2 Lane Major Arterial	27,000	15,200	0.56	C
From Talbot St. to Kellogg St. [f]	2 Lane Major Arterial	27,000	10,500	0.39	A
Nimitz Boulevard					
From N. Harbor Dr. to Rosecrans St.	4 Lane Major Arterial	40,000	12,020	0.30	A
Canon Street					
From Rosecrans St. to Locust St.	2 Lane Collector	15,000	12,870	0.86	D
Laning Road					
From N. Harbor Dr. to Decatur Rd.	2 Lane Collector	15,000	6,532	0.44	B
Catalina Boulevard					
From Canon St. to Mills St.	4 Lane Collector	30,000	15,100	0.50	C
From Mills St. to McClelland Rd.	2 Lane Collector	15,000	8,303	0.55	C

Notes:

Bold values segments operating at LOS E or F.

LOS = Level of Service; ADT = Average Daily Traffic volume; V/C = volume divided by capacity; Bl. = Boulevard; N. = North; Dr. = Drive; St. = Street

(a) Street classifications and LOS E Capacities for 2-lane Major Arterials were taken from the Rosecrans Corridor Mobility Study (City of San Diego 2010)

(b) LOS E Capacity obtained from City of San Diego Traffic Impact Study Manual (City of San Diego 1998)

(c) Average Daily Traffic (ADT) volumes obtained from San Diego Association of Governments Average Weekday Traffic Volumes (SANDAG 2012), from the Rosecrans Corridor Mobility Study (City of San Diego 2010), and from 24-hour counts conducted in May 2012 (Appendix I)

(d) ADT divided by LOS E Capacity

(e) City of San Diego Traffic Impact Study Manual, Table 2 (City of San Diego 1998)

(f) LOS E Capacity obtained from Rosecrans Corridor Mobility Study (City of San Diego 2010)

P-401 Traffic Volumes, Impacts and Minimization Measures

The P-401 project is currently under construction at NBPL. The construction period for this project to replace bulk storage tanks and other fuel-related facilities at NBPL commenced in 2009, and will be complete in 2013 (Navy 2007). Therefore, construction traffic from this project is included in the existing volumes presented above in Table 3.10-2.

To determine the traffic implications of the P-401 project, Navy prepared a traffic impact study that was initiated in 2006 and completed the following year (Shaw Environmental & Infrastructure 2007). Based on the results of the P-401 traffic study, the EA for the P-401 project recommended avoidance and minimization measures during the P-401 construction period to reduce potential impacts to traffic. These measures included diverting the existing (non P-401

construction) truck traffic and some of the NBPL employee traffic away from the Rosecrans Gate towards the McClelland Gate, and staging/queuing trucks going to and from the P-401 construction area in portion of the Navy-owned parking lot at North Harbor Drive and Nimitz Boulevard. These measures were anticipated to redistribute traffic and reduce congestion during the P-401 construction period (Navy 2007).

3.10.3 Environmental Consequences

3.10.3.1 Approach to Analysis

For the purpose of this analysis, the proposed project would cause significant impacts to transportation and circulation if they would:

- Exceed City of San Diego significance criteria on segments characterized by LOS E or LOS F conditions.

The following evaluation is based on past traffic analyses and available traffic data. Limited traffic data collection was conducted in instances where no recent traffic data was available (i.e., Laning Road north of North Harbor Drive, and Catalina Boulevard north of McClelland Road).

3.10.3.2 Alternative 1 Pier Replacement and Associated Dredging

<u>NMAWC Site</u>

Complete relocation of the Navy MMP would take place before any demolition or construction begins for the fuel pier replacement, so there would be no potential overlap of construction traffic for the two project components. Nearly all the construction materials involved in the MMP component would arrive via water (pilings would be delivered via barge; floating enclosures and walkways would be towed by small boats), so negligible construction traffic on roadways in the ROI is anticipated. The number of construction workers needed during the eight-day pile installation period is expected to be minimal and not anticipated to result in a significant increase in traffic.

Approximately 140 MMP personnel would be stationed at the NMAWC site along with the animals during temporary relocation period. These workers likely already commute into NBPL via North Harbor Drive, Nimitz Boulevard, and/or Rosecrans Street. Temporarily transferring them to NMAWC would redistribute existing traffic volumes, resulting in a reduction in traffic on Rosecrans Street and other roadways within the ROI. For example, inbound trips approaching from the east via North Harbor Drive would make a left turn at the Laning Road intersection in order to access NMAWC. Diversion of trips traveling along this route would reduce traffic on North Harbor Drive and Rosecrans Street. Traffic approaching from the east on Rosecrans Street would turn left onto Laning Road and continue southward on Laning Road, past North Harbor Drive, into the NMAWC site. Although traffic would be added to a segment of Laning Road, the diversion of trips would reduce traffic volumes further to the west and south, in the vicinity of NBPL.

At the end of the temporary relocation period, the enclosures and walkways would be towed back to their original locations, and the Navy MMP workers would resume their former

commuting pattern. The guide piles would be transported from the NMAWC site by barge, so there would be no demolition truck traffic. As with construction, the time period to remove the guide piles would be short, and a minimal number of workers would be needed.

Fuel Pier Replacement

Under Alternative 1, demolition of the existing fuel pier would begin in 2014. Construction for the P-401 project would be completed in 2013. It is anticipated that the proposed fuel pier replacement effort would require approximately 100 workers per day making one trip each to the site and home, i.e., 200 vehicle trips added daily to Rosecrans Street. It is estimated that overland transport of construction materials and demolition debris would add, on-average, approximately 96 trucks per day, for a daily total of about 296 vehicle trips associated with the P-151 project. Overall, there would be 44 fewer daily trips associated with Alternative 1 demolition/construction than with the P-401 project (i.e., 340 trips per day). In addition, for the duration of the construction/demolition period, approximately 140 Navy MMP personnel (or 280 trips) would be transferred to NMAWC. Accordingly, the net increase in traffic volumes on Rosecrans Street near NBPL would be 16 ADT. By contrast, the construction traffic associated with P-401 is more than 20 times as high.

Because the P-401 project traffic minimization measures are designed to offset impacts from a higher number of trips than those of the fuel pier demolition/construction, and because P-401 construction activities would be complete before the proposed fuel pier project demolition/construction activities begin, the P-401 measures are expected be sufficient to offset any potential temporary impacts from traffic associated with the fuel pier demolition and construction. The following traffic avoidance and minimization measures would therefore be implemented for the fuel pier construction and demolition:

- Non-construction truck traffic and some of the NBPL employees would be diverted away from the Rosecrans Gate towards the McClelland Gate, to relieve congestion on Rosecrans Street and balance traffic more evenly at both gates.
- Trucks going to and from the fuel pier construction area would be staged or queued in a portion of the Navy-owned parking area at the intersection of North Harbor Drive and Nimitz Boulevard, to limit the flow of traffic onto Rosecrans Street.

When the construction period ends in 2017, traffic levels would return to baseline conditions, and the avoidance and minimization measures would be discontinued. There would be no change to the number of workers employed at the new fuel pier (Navy 2012). These workers could be directed to travel to the fuel pier via Catalina Boulevard and the McClelland Gate to remove trips from Rosecrans Street. Operations at the new fuel pier would not result in any additional vehicle traffic to the pier (Navy 2010).

Temporary Relocation of Everingham Brothers Bait Company Bait Barges

The bait barges would be towed from their current location to the selected temporary relocation site (4A or 6A, Figure 2-2). The Navy would coordinate with the U.S. Coast Guard to issue a Notice to Mariners for moving the bait barges to and from the temporary relocation site.

Therefore, temporary relocation of the bait barges would not have a significant impact on marine traffic and circulation.

Demolition and Construction Potential Impacts to Vessel Traffic

Proposed demolition and construction activities would take place inside an existing restricted navigation zone (Security Zone) which is off-limits to civilian vessels (Figure 2-5). Therefore, significant impacts to civilian vessel traffic would not occur.

Sediment Dredging and Disposal

This project component would occur entirely in-water. Dredged material would be transported to the beneficial reuse site via barge. Dredging would take place outside the San Diego Harbor navigation channel, and the dredge, sediment barge(s) and tug(s) would follow all applicable navigation regulations and procedures. Therefore, there would be no significant impacts to vehicular or vessel traffic associated with this component of Alternative 1.

Amendments to Existing Navigation Zones

The Navy has coordinated with the USCG to amend the existing Security Zone to the east of the fuel pier. Appropriate amendments of this designated zone would establish new boundaries for Navy operational areas associated with the proposed new fuel pier that would be approximate 250 ft east of the existing Security Zone boundary. There would be approximately 950 feet of open water between the amended Security Zone Boundary and the San Diego Harbor Federal Navigation Channel, so the impact to civilian vessel traffic would not be significant (Figure 2-7).

Baseline and Baseline Plus Project Traffic Conditions

The Baseline condition represents the estimated future traffic conditions that would exist when project construction begins (i.e., 2013). Baseline ADT volumes were estimated assuming an annual growth rate of two percent per year. This factor is consistent with the approach taken in the P-401 Traffic Impact Study (Shaw Environmental & Infrastructure 2007). It should be noted that this is a conservative approach, as the P-401 traffic report was prepared before the national economic downturn that began in 2008, and assumed future traffic growth based on pre-recession development trends[2]. Table 3.10-3 presents volumes and LOS for ROI street segments under Baseline conditions. As shown in this table, estimated future traffic growth would cause two segments of Rosecrans Street and one segment of Canon Street to deteriorate from LOS D to LOS E.

Table 3.10-4 summarizes the assignment of traffic volumes to the ROI for the following categories of project-related traffic during construction:

1. Construction employees: 100 workers, one inbound and one outbound trip = 200 trips
2. Construction trucks: 48 trucks, one trip inbound and one outbound trip = 96 trips

[2] For example, instead of increasing, the ADT volume on Rosecrans Street from Nimitz Boulevard to North Harbor Drive *decreased* by 8.7 percent from 2008 to 2010 (SANDAG 2012).

3. Relocated Navy MMP personnel: 140 employees, one inbound and one outbound trip = 280 trips (relocated)

The P-401 EA identified a mitigation measure involving the voluntary diversion of 50 NBPL employees from the Rosecrans Gate to the McClelland Gate during construction to minimize congestion on Rosecrans Street. In order to provide a conservative analysis, the Baseline Plus Project traffic condition evaluated in this EA does not incorporate any traffic "credit" for this non-compulsory diversion.

The additional and relocated trips associated with Alternative 1 were assigned in accordance with the P-401 Traffic Impact Study (for construction employees and trucks), and likely travel routes (for relocated trips). As shown in Table 3.10-4, Alternative 1 would result in relatively minor traffic increases on Rosecrans Street (i.e., 16 vehicles per day from North Harbor Drive to Kellogg Street). Relocated Navy MMP personnel trips would result in an increase of 140 daily trips on Laning Road. No project construction-related traffic would be added to Canon Street or Catalina Boulevard.

The construction-related impacts under Alternative 1 are also presented in Table 3.10-3. As shown in this table, Alternative 1 would not have any substantial effect.

In summary, through the use of traffic avoidance and minimization measures during the construction period, implementation of Alternative 1 would not cause significant temporary impacts to traffic and circulation. Implementation of Alternative 1 would not result in changes in accessibility of public roads that would constitute long-term effects to transportation and circulation. Therefore, implementation of Alternative 1 would not have a significant impact to transportation and circulation.

3.10.3.3 Alternative 2 Delayed Dredging Alternative

Under Alternative 2, the same project components would occur as for Alternative 1, except that with Alternative 2, dredging would occur years after the pier replacement effort is complete. Transportation and circulation impacts would be the same as described under Alternative 1. Therefore, implementation of Alternative 2 would not have a significant impact to transportation and circulation.

3.10.3.4 Mitigation Measures

Implementation of Alternative 1 or Alternative 2 would not have significant to transportation and circulation impacts; therefore, no mitigation measures are proposed.

3.10.3.5 No-Action Alternative

Under the No-Action Alternative, temporary relocation of the Navy MMP, temporary relocation of the Everingham Bait Brothers Company bait barges, demolition, and replacement of the existing fuel pier, and associated dredging of the high spot in the turning basin would not occur. Roadway and vessel traffic conditions would remain unchanged. Therefore, implementation of the No-Action Alternative would not have a significant impact to transportation and circulation.

Table 3.10-3. Level of Service for ROI Roadway Segments, Baseline and Baseline Plus Project Conditions (Construction)

Roadway Segment	*Street Classification* [a]	*LOS E Capacity* [b]	*Baseline*			*Baseline Plus Project*			*Effect*	
			ADT [c]	*V/C* [d]	*LOS* [e]	*ADT* [c]	*V/C* [d]	*LOS* [e]	*Δ in V/C* [g]	*Substantial?* [h]
Rosecrans Street										
From Nimitz Bl. To N. Harbor Dr.	4 Lane Major Arterial	40,000	35,338	0.88	**E**	35,318	0.88	**E**	(0.000)	NO
From N. Harbor Dr. to Canon St.	4 Lane Major Arterial	40,000	36,506	0.91	**E**	36,522	0.91	**E**	0.000	NO
From Canon St. to Talbot St. [f]	2 Lane Major Arterial	27,000	16,130	0.60	C	16,146	0.60	C	0.001	NO
From Talbot St. to Kellogg St. [f]	2 Lane Major Arterial	27,000	11,143	0.41	A	11,159	0.41	A	0.001	NO
Nimitz Boulevard										
From N. Harbor Dr. to Rosecrans St.	4 Lane Major Arterial	40,000	13,011	0.33	A	13,107	0.33	A	0.002	NO
Canon Street										
From Rosecrans St. to Locust St.	2 Lane Collector	15,000	13,931	0.93	**E**	13,931	0.93	**E**	-	NO
Laning Road										
From N. Harbor Dr. to Decatur Rd.	2 Lane Collector	15,000	6,663	0.44	B	6,803	0.45	B	0.009	NO
Catalina Boulevard										
From Canon St. to Mills St.	4 Lane Collector	30,000	16,345	0.54	C	16,345	0.54	C	-	NO
From Mills St. to McClelland Rd.	2 Lane Collector	15,000	8,469	0.56	C	8,469	0.56	C	-	NO

Notes:

Bold values indicate roadway segments operating at LOS E or F. **Bold and shaded** values indicate substantial project effect.

(a) Street classifications and LOS E Capacities for 2-lane Major Arterials were taken from the Rosecrans Corridor Mobility Study (City of San Diego 2010)

(b) LOS E Capacity obtained from City of San Diego Traffic Impact Study Manual (City of San Diego 1998)

(c) Baseline volumes factored by two percent per year to reflect future growth

(d) ADT divided by LOS E Capacity

(e) City of San Diego Traffic Impact Study Manual, Table 2 (City of San Diego 1998)

(f) LOS E Capacity obtained from Rosecrans Corridor Mobility Study (City of San Diego 2010)

(g) Baseline Plus Project V/C minus Baseline V/C

(h) City of San Diego Traffic Impact Study Manual, Table 5 (City of San Diego 1998)

Table 3.10-4. Assignment of Project Traffic, Construction

Roadway Segment	*Construction Workers* [a]		*Construction Trucks* [d]		*MMP Personnel Relocation* [e]		*Net Traffic Assignment* [g]
	Distribution [b]	*Assignment* [c]	*Distribution* [b]	*Assignment* [c]	*Distribution* [b]	*Assignment* [f]	
Rosecrans Street							
From Nimitz Bl. To N. Harbor Dr.	82%	164	100%	96	-100%	-280	-20
From N. Harbor Dr. to Canon St.	100%	200	100%	96	-100%	-280	16
From Canon St. to Talbot St. [f]	100%	200	100%	96	-100%	-280	16
From Talbot St. to Kellogg St. [f]	100%	200	100%	96	-100%	-280	16
Nimitz Boulevard							
From N. Harbor Dr. to Rosecrans St.	0%	0	100%	96	0%	0	96
Canon Street							
From Rosecrans St. to Locust St.	0%	0	0%	0	0%	0	0
Laning Road							
From N. Harbor Dr. to Decatur Rd.	0%	0	0%	0	50%	140	140
Catalina Boulevard							
From Canon St. to Mills St.	0%	0	0%	0	0%	0	0
From Mills St. to McClelland Rd.	0%	0	0%	0	0%	0	0

Notes:

Bl. = Boulevard; N. = North; Dr. = Drive; St. = Street

(a) 100 workers, with one trip in and one trip out = 200 daily construction worker trips

(b) Percent of traffic on roadway segment, from P-401 Traffic Impact Study (Shaw Environmental & Infrastructure 2007)

(c) Number of trips for each category times distribution percentage

(d) 48 trucks, with one trip in and one trip out = 96 daily truck trips

(e) Temporary relocation from NBPL to NMAWC. 140 relocated MMP personnel, with one trip in and one trip out = 280 daily MMP personnel relocation trips. 50 percent of diversion trips assumed to divert to Laning Rd. from Rosecrans St. en route to NMAWC.

(f) Relocation would remove MMP personnel trips from Rosecrans Street, and add some traffic to Laning Road

(g) Combined traffic assignment for construction workers, construction trucks, NBPL diversion, and MMP personnel relocation.

3.11 SOCIOECONOMICS AND ENVIRONMENTAL JUSTICE

3.11.1 Definition of Resource

Socioeconomics is a social science discipline that focuses on the attributes of human social and economic interactions within an area. Socioeconomic analyses typically address issues such as population demographics, business activity, employment and income, and environmental justice. Impacts to these fundamental socioeconomic components can also influence other systemic issues such as the availability and affordability of housing, the provision of public services (e.g., emergency services, education, health services, etc.), and the general quality of life in a community.

The primary focus of the socioeconomic analysis in this EA is on the net economic effect on employment, income, and business activity (measured by economic output) in San Diego County, related to the construction of the fuel pier and the relocation of the bait barges. The Proposed Action would involve no change in housing supply and only potentially small changes in population, demand for housing, and public services; therefore, these issues are not addressed.

In 1994, EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, was issued to focus the attention of federal agencies on human health and environmental conditions in minority and low-income communities. In addition, EO 12898 aims to ensure that the environmental effects of federal actions do not fall disproportionately on low-income and minority populations. To support an evaluation of environmental justice issues, this section includes GIS maps identifying the presence of minority and low-income populations in the vicinity of the Proposed Action that could potentially be disproportionately affected.

3.11.2 Affected Environment

The ROI for socioeconomic impacts is defined as San Diego County. Socioeconomic data are provided in this section to establish baseline conditions. Data consist primarily of publicly-available information about San Diego County and, to provide perspective, the State of California and the United States.

3.11.2.1 Existing Conditions

<u>Population Trends</u>

Table 3.11-1 shows population in San Diego County, the State of California, and the United States from 1990 to 2010. In 2010 San Diego County had a population of 3,095,313, making it the second most populous county in California (behind Los Angeles County). Similar to the national and statewide trend, population growth in San Diego County has slowed since 1990, as population growth from 1990 to 2000 exceeded population growth from 2000 to 2010. Over the 20 year period from 1990 to 2010, San Diego County grew at a slower rate than California and the nation overall; however, in the more recent period, 2000 to 2010, population growth in San Diego County did exceed population growth in the nation overall.

Table 3.11-1. Population, 1990-2010

Location	1990	2000	2010	Percent (%) Change 1990 - 2000	Percent (%) Change 2000 - 2010	Percent (%) Change 1990 - 2010
San Diego County	2,498,016	2,813,833	3,095,313	12.6%	10.0%	23.9%
California	29,760,021	33,871,648	37,253,956	13.8%	10.0%	25.2%
USA	248,709,873	281,421,906	308,745,538	13.2%	9.7%	24.1%

Sources: United States Census Bureau (Census) 1990, Census 2000, Census 2010a.

Table 3.11-2 displays population projections, for 2020 and 2030, for San Diego County, the State of California, and the United States. From 2010 to 2020, population in San Diego County is expected to increase by 11.8 percent, exceeding population growth experienced from 2000 to 2010 (see Table 3.11-1). Population growth from 2020 to 2030 is expected to be greater in San Diego County and California than the nation overall (11.3 percent and 11 percent for San Diego and California respectively, compared to 7.3 percent for the nation). For the 20 year period from 2010 to 2030 population in San Diego County is expected to increase by 24.5 percent, slightly less than growth expected in California (25.6 percent) but greater than expected growth in the nation overall (16.1 percent). Projections suggest that by 2030 there will be 3.85 million residents of San Diego County (24.5 percent more than measured in the 2010 Census).

Table 3.11-2. Population, 2010 and Population Projections, 2020-2030

Location	2010	2020	2030	Percent (%) Change 2010 - 2020	Percent (%) Change 2020 - 2030	Percent (%) Change 2010 - 2030
San Diego County	3,095,313	3,461,629	3,853,209	11.8%	11.3%	24.5%
California	37,253,956	42,140,000	46,780,000	13.1%	11.0%	25.6%
USA	308,745,538	334,123,000	358,407,000	8.2%	7.3%	16.1%

Sources: California Department of Transportation 2011; Census 2009, Census 2010a.

Demographics

As shown in Table 3.11-3, in 2010, the population of San Diego County was 68.3 percent White, 14.8 percent Hispanic or Latino, 13.2 percent Asian, 6.3 percent Black or African American, 1.7 percent American Indian or Native Alaskan, and 1 percent Native Hawaiian or Other Pacific Islander. Compared to the population of the State of California, the population of San Diego County was more White, less Hispanic or Latino, and had a similar proportion of Black or African Americans, American Indian or Native Alaskans, and Native Hawaiian or Other Pacific Islanders. In comparison to the population of the Nation overall, San Diego County was less White, more Hispanic or Latino, less Black or African American, more Native Hawaiian or Other Pacific Islander, and had a similar proportion of American Indian or Alaska Natives.

Table 3.11-3. Race, Alone or in Combination[1], 2010

Location	White (percent)	Hispanic or Latino (percent)	Asian (percent)	Black or African American (percent)	American Indian or Alaska Native (percent)	Native Hawaiian or Other Pacific Islander (percent)
San Diego County	68.3%	14.8%	13.2%	6.3%	1.7%	1.0%
California	61.6%	18.4%	14.9%	7.2%	1.9%	0.8%
USA	74.8%	6.7%	5.6%	13.6%	1.7%	0.4%

Note: [1] Respondents were able to identify themselves as one or more races so percentage totals may exceed 100 percent.
Source: Census 2010a.

Table 3.11-4 presents data on educational attainment for San Diego County, the state of California, and the nation overall, as of 2010. Of the population aged 25 or older, 15 percent of San Diego residents had not completed high school, 20 percent had completed high school but not attended college, 31 percent had attended some college or received an Associate degree, and 34 percent had earned a Bachelor's degree or advanced degree. In general, San Diego County had a higher level of educational attainment in comparison to California and the nation overall. As of 2010, a higher percentage of the population of San Diego County had completed some college or received an Associate degree than the populations of California and the nation overall; also, a greater proportion of San Diego County residents had earned a Bachelors or advanced degree. San Diego County had a lower proportion of its population that had either not completed high school or had completed high school but not attended college than California and the nation overall.

Table 3.11-4. Educational Attainment[1], 2010

Education Attainment	San Diego County (percent)	California (percent)	USA (percent)
Did not complete high school	15%	19%	15%
High school or equivalent, no college	20%	21%	29%
Some college or Associate degree	31%	29%	28%
Bachelor's degree or advanced degree	34%	30%	28%

Note: [1] Educational attainment for individuals aged 25 or older.
Source: Census 2010b.

Table 3.11-5 provides household characteristics data for San Diego County, the State of California, and the Nation overall. As of 2010, San Diego County had a household population of 2,918,121 (94 percent of total population) and 1,061,789 total households. The average household size was 2.75 persons per household, fewer than California but greater than the nation overall. San Diego County had a higher median household income and a higher income per household member than California and the nation overall. The number of San Diego County households with incomes below the poverty line totaled 113,963, or 10.7 percent of county households, a rate lower than California and the nation overall.

Table 3.11-5. Household Characteristics

Location	Population in HH's[1]	Total Households	Avg. HH Size	Percent of Family HH's	Median HH Income	Income Per HH Member	HH's Below Poverty Level	Percent HH's Below Poverty Level
San Diego County	2,918,121	1,061,789	2.75	66.3%	$63,069	$22,934	113,963	10.7%
California	35,810,593	12,392,852	2.89	68.6%	$60,883	$21,067	1,493,426	12.1%
USA	295,968,252	114,235,996	2.59	66.8%	$51,914	$20,044	14,865,322	13.0%

Note: [1] By definition, population in households consists of the resident population excluding people living in group quarters (i.e., 9 or more people living together who are unrelated to the householder).
HH = households
Source: Census 2010b.

Employment and Income

Table 3.11-6 provides labor force statistics for San Diego County, the state of California, and the nation overall. In 2010, the labor force of San Diego County was 1,558,186. 1,393,866 individuals were employed and 164,320 were unemployed implying an unemployment rate of 10.5 percent. The unemployment rate in San Diego County in 2010 was lower than California's (12.4 percent) but higher than the nation overall (9.6 percent). From 1990 to 2010, the labor force, the number of employed, and the number of unemployed in San Diego expanded at a greater rate than California and the nation overall; the number of individuals who were employed in San Diego County increased by 20 percent while the number of unemployed nearly tripled (increasing by 191 percent).

Table 3.11-6. Labor Force, Employment, and Unemployment, 1990, 2000, and 2010

Location	Years	Labor Force	Employed	Unemployed	Unemployment Rate[1] (percent)
San Diego County	1990	1,215,650	1,159,268	56,382	4.6%
	2000	1,376,008	1,322,244	53,764	3.9%
	2010	1,558,186	1,393,866	164,320	10.5%
	Percent Change 1990 to 2010	28%	20%	191%	5.9
California	1990	15,168,531	14,294,115	874,416	5.8%
	2000	16,857,578	16,024,341	833,237	4.9%
	2010	18,316,411	16,051,513	2,264,898	12.4%
	Percent Change 1990 to 2010	21%	12%	159%	6.6
USA	1990	125,840,00	118,793,00	7,047,000	5.6%
	2000	142,583,00	136,891,00	5,692,000	4.0%
	2010	153,889,00	139,064,00	14,825,000	9.6%
	Percent Change 1990 to 2010	22%	17%	110%	4.0

Note: [1] Changes in the unemployment rate, from 1990 to 2010, are expressed in terms of percentage points.
Source: BLS 2012a.

Table 3.11-7 shows data on employment by industry in San Diego County for the years 2000 and 2010. In terms of employment, the largest industry in San Diego County in 2010 was the Educational, Health, and Social Services industry, which employed 175,905 people (21.4 percent of industry employment). Other large industries, in terms of employment, in 2010, included the Retail Trade industry (12.7 percent of employment) and the Manufacturing industry (10.4 percent of industry employment). The fastest growing industries in San Diego County, in terms of employment, from 2000 to 2010, include the Construction industry (43 percent increase in employment from 2000 to 2010), the Arts, Entertainment, Recreation, Accommodation, and Food Services industry (37 percent increase), and the Transportation, Warehousing, and Utilities industry (35 percent increase). From 2000 to 2010, overall industry employment in San Diego County increased by 25 percent.

Table 3.11-7. Employment by Industry in San Diego County 2000 and 2010

Industry	2000 Employment	Share of Total 2000 Employment (percent)	2010 Employment	Share of Total 2010 Employment (percent)	Growth Rate 2000 to 2010 (percent)
Agriculture, forestry, fishing, hunting, and mining	5,934	0.9%	6,256	0.8%	5%
Construction	49,517	7.5%	70,951	8.6%	43%
Manufacturing	84,166	12.7%	85,943	10.4%	2%
Wholesale trade	27,174	4.1%	33,179	4.0%	22%
Retail trade	84,460	12.8%	104,614	12.7%	24%
Transportation, warehousing, and utilities	46,776	7.1%	63,024	7.6%	35%
Information	14,961	2.3%	14,762	1.8%	-1%
Finance, insurance, real estate, rental, and leasing	36,860	5.6%	46,496	5.6%	26%
Professional, scientific, management, administrative, and waste management services	50,726	7.7%	68,024	8.3%	34%
Educational, health, and social services	140,063	21.2%	175,905	21.4%	26%
Arts, entertainment, recreation, accommodation, and food services	49,494	7.5%	67,563	8.2%	37%
Other services (except public administration)	34,428	5.2%	40,190	4.9%	17%
Public administration	36,713	5.6%	47,003	5.7%	28%
Total Industry Employment	**661,272**		**823,910**		**25%**

Sources: USCB 2000, 2010b.

Table 3.11-8 provides data on average annual salary for San Diego County, the state of California, and the nation overall for 2001 and 2010. Average annual pay in San Diego County, in 2010, was $50,746. Average annual pay in San Diego County was lower than the California

average ($53,285) but greater than the national average ($46,751). From 2001 to 2010, average annual pay in San Diego County increased at a faster pace than California and the nation overall, increasing 32 percent compared to 29 percent increases for California and the nation overall.

Table 3.11-8. Average Annual Pay[1], 2001-2010

Location	2001	2010	Percent (%) Change
San Diego County	$38,418	$50,746	32%
California	$41,327	$53,285	29%
USA	$36,219	$46,751	29%

Note: [1] Average annual pay for all employees covered by unemployment insurance.
Source: BLS 2012b.

Industries Related to Recreational Fishing

Table 3.11-9 provides information on number of establishments and revenue for industries in San Diego County that receive revenue is association with recreational fishing expenditures.

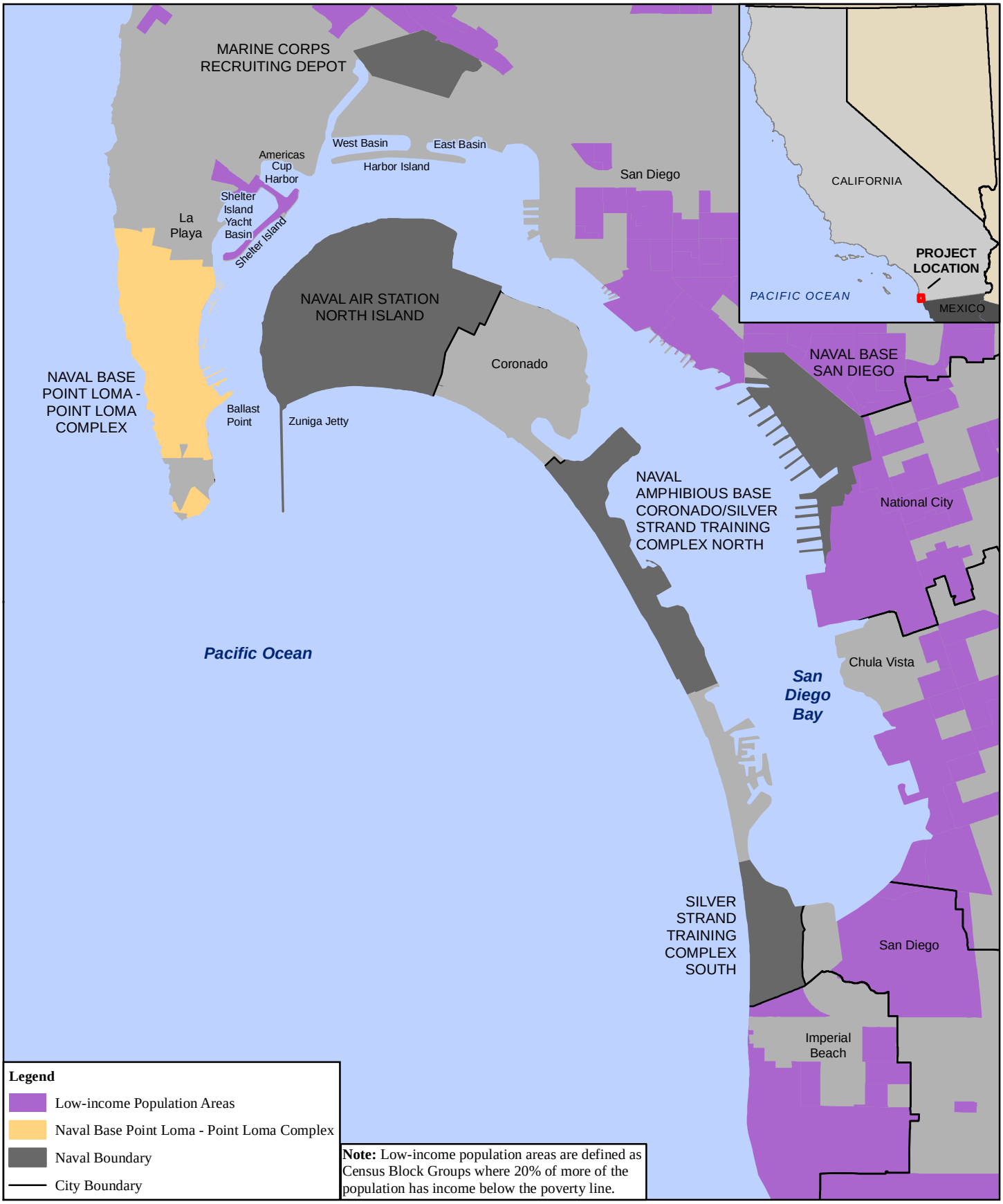
Table 3.11-9. San Diego County[1] Industries Related to Recreational Fishing, 2007

Industry	Establishments	Revenue ($1,000)
Scenic and sightseeing transportation, water[1,2]	50	$70,305
All other miscellaneous amusement and recreation services	36	$15,481
Marinas	32	$51,925
Boat dealers	139	$187,772
Boat repair	40	$38,283
Recreational goods rental	25	$16,146
Sporting goods stores	463	$449,417
Gasoline stations	666	$3,039,365
Accommodation and food services	9,258	$9,551,513
Food and beverage stores	2,254	$6,188,523
Totals	**12,963**	**$19,608,730**

Notes: [1] Data for Scenic and Sightseeing Transportation was not available for San Diego County. Data provided are for the San Diego-Carlsbad-San Marco Metro Area.
[2] Industry includes charter fishing establishments.
Sources: Census 2007a; Census 2007b.

Environmental Justice

Figure 3.11-1 shows environmental justice low-income population areas around San Diego Bay. The nearest low income population is located at Shelter Island. Figure 3.11-2 shows environmental justice minority population areas around San Diego Bay. There are no environmental justice low-income areas within 4 mi of the project location.



Source: Census 2010b

Figure 3.11-1
Environmental Justice Low-Income Population Areas

Source: Census 2010a

Figure 3.11-2
Environmental Justice Minority Population Areas

3.11.3 Environmental Consequences

3.11.3.1 Approach to Analysis

As part of the Proposed Action, the U.S. Navy would engage in a construction project to replace an existing fuel pier. As a result of expected noise from the construction, the bait barges located in San Diego Bay, near the existing fuel pier, would be required to relocate to another location in San Diego Bay. The construction project may bring new economic activity in the local construction sector; however, the relocation of the bait barges may lead to a reduction in economic activity in local industries that are supported by recreational fishing. The socioeconomic analysis measures the economic impact of this scenario, on the economy of San Diego County, by modeling the combined effect of a potential increase in expenditures in the construction sector and a potential reduction in expenditures in industries that are supported by recreational fishing. The Impact Analysis for Planning (IMPLAN) economic software model with 2010 data for San Diego County was used to estimate direct, indirect, and induced impacts.

Site activity associated with the proposed project would be expected to last for four years, 2013 to 2017 (construction work is estimated to be completed in late 2016, however, contractors' demobilization from the job site could run through the first weeks of 2017). Since the bait barges' relocation is contingent upon construction, the relocation would be expected to take place over the same timeframe. While multiple years are considered in the analysis, results of economic modeling are presented in constant 2011 dollars.

The following sections of the Approach to Analysis outline how inputs to the economic model (changes in expenditures related to construction and the bait barges' relocation) were estimated. In the case of the construction portion of the analysis, expected construction expenditures had been previously estimated by NAVFAC Southwest; this estimate was reviewed and then prepared for socioeconomic analysis by removing portions of expenditures that would not be expected to be spent within the economy of San Diego County and portions related to construction cost inflation. The detailed construction estimates were compared to the construction schedule so that analysis could be completed for each year of the project's life.

Inputs for the bait barges' portion of the analysis were developed by incorporating information from multiple sources including project information provided by the U.S. Navy, bait barge specific information provided by the Everingham Brothers Bait Company, publicly available recreational fishing survey data gathered by the CDFG, and recreational fishing expenditures data gathered by NOAA. Changes in expenditures related to the relocation of the bait barges are estimated for one year but since angler effort (annual number of trips) is considered to be stable over time and since the analysis is conducted in constant dollars, the single estimate of expenditures is utilized for each year or the project's life.

<u>Fuel Pier Construction</u>

The construction of the fuel pier would be expected to occur over a 3 ½-year period; it would consist of six major tasks, which are listed in Table 3.11-10. For each major task of construction, Table 3.11-10 provides detail on anticipated direct construction expenditures that would be

expected to take place in the San Diego County, by year, from 2013 to 2016. The single largest task of construction would be the new double deck pier, which would be expected to directly contribute over $23 million to the San Diego County economy over the 3 ½-year time period. The years 2014 and 2016 would be expected to be the most active years for construction; over $13.5 million in direct expenditures within the San Diego County economy would be expected to result from the construction project in each of those years.

Table 3.11-10. Fuel Pier Replacement Direct Construction Expenditures in San Diego County, 2013-2016

Type of Expenditure	2013	2014	2015	2016	Total
New Double Deck Pier	$0	$7,704,526	$7,704,526	$7,704,526	**$23,113,579**
Marine Loading Arm manifolds	$0	$0	$0	$1,685,216	**$1,685,216**
Navigation Dredging and Reclamation	$1,550,400	$1,550,400	$0	$0	**$3,100,800**
Waterfront Utilities	$0	$2,078,664	$2,771,552	$1,385,776	**$6,235,991**
Waterfront Demolition	$0	$2,624,575	$0	$2,624,575	**$5,249,149**
Building Site work	$48,290	$193,159	$193,159	$193,159	**$627,767**
Totals	**$1,598,690,**	**$14,151,324**	**$10,669,237**	**$13,593,252**	**$40,012,502**

Source: NAVFAC Southwest 2011.

Data in Table 3.11-11 detail construction expenditures for material, labor, equipment, and unit costs. The Revised 35 Percent Submittal (NAVFAC 2011), which was used as the source for estimating direct construction expenditures in San Diego County, also include estimates related to escalation costs (cost inflation) and construction contractor markups; however, escalation costs and contractor markups are not included in the socioeconomic analysis. While contractor markups might serve to maintain some employment at local construction firms (administrative and marketing jobs for instance), those jobs would not be entirely attributable to the Proposed Action and so they are excluded from the economic impact analysis altogether.

Table 3.11-11. Fuel Pier Replacement Direct Construction Expenditures in San Diego County, by Type of Expenditure

Type of Expenditure	Materials	Labor	Equipment	Unit Cost	Total
New Double Deck Pier	$14,826,242	$5,379,027	$2,308,310	$600,000	**$23,113,579**
Marine Loading Arm manifolds	$1,452,776	$172,990	$0	$59,450	**$1,685,216**
Navigation Dredging and Reclamation	$0	$0	$0	$3,100,800	**$3,100,800**
Waterfront Utilities	$4,187,652	$1,567,120	$0	$481,219	**$6,235,991**
Waterfront Demolition	$6,525	$4,223,354	$1,019,270	$0	**$5,249,149**
Building Site work	$292,602	$249,558	$11,507	$74,100	**$627,767**
Totals	**$20,765,797**	**$11,592,049**	**$3,339,087**	**$4,315,569**	**$40,012,502**

Source: NAVFAC Southwest 2011.

The direct construction expenditures identified in Tables 3.11-10 and 3.11-11 would contribute to the number of jobs, the amount of income earned by San Diego County residents, and the

overall level economic activity in the county. To determine how much of an impact that would occur, the expenditures were input into the IMPLAN model, which uses direct expenditures to estimate changes in employment, labor income, and economic output.

Bait Barge Relocation

The Everingham Brothers Bait Company bait barges provide a service demanded by the recreational fishing industry. Many party/charter fishing and private/rental fishing trips, heading out from the bay to ocean fishing areas, stop by the bait barges to purchase live bait. At its current location, the Everingham Brothers Bait Company operation is well positioned for this role – from almost every harbor or launch ramp in San Diego Bay, the bait barges are 'on the way' to the ocean. During certain periods of construction, however, the bait barges would be required to relocate further into San Diego Bay, which would place them 'out of the way' for most ocean fishing trips – these fishing trips would, as a result of the Proposed Action, need to travel extra distance and spend valuable time to patronize the bait barges.

As measured in economic impacts, the relocation of the bait barges would add cost to those fishing trips that are reliant upon the bait barges. Additional cost associated with recreational fishing trips could discourage recreational fishing and potentially reduce the number of people who partake in ocean fishing trips in San Diego County. Since there are associated expenditures every time an individual takes a fishing trip (NOAA 2001), a reduction in the number of fishing trips, caused by the relocation of the bait barges, would lead to a reduction in expenditures and constitute a negative economic impact to the San Diego County economy. Any negative impacts would be expected to occur only during the years 2014 through 2016 as relocation would likely not be required in 2013 or 2017. The equation below illustrates how the direct expenditures impact of the bait barges' relocation was determined:

Number of Fishing Trips That Would Not Occur Due to the Bait Barges' Relocation (Reduction in Fishing Trips)

X

Average Expenditures per Fishing Trip

=

Total Reduction in Expenditures Due to the Bait Barges' Relocation

Reduction in Fishing Trips

For purposes of analysis, impacts related to the bait barges' relocation would occur only during periods of time when the bait barges would be relocated. Table 3.11-12 presents the anticipated location of the bait barges during each year of the four-year construction period. There are two potential relocation sites (Options 4A and 6A) identified in Chapter 2; however the two potential sites are near enough to each other that economic impacts would be expected to be the same for either option, thus separate economic impact analyses are not conducted for each potential relocation site.

Table 3.11-12. Anticipated Bait Barges' Location, by Month

Month	Bait Barges' Location
January	Relocation Site
February	Relocation Site
March	Relocation Site
April	Current Location
May	Current Location
June	Current Location
July	Current Location
August	Current Location
September 1-15	Current Location
September 16-30	Relocation Site
October	Relocation Site
November	Relocation Site
December	Relocation Site

Information on usage of the bait barges was provided by Everingham Brothers Bait Company. In 2011, the bait barges sold bait to 3,303 boats carrying 112,350 individuals; the seemingly large number of individuals per boat is a function of party/charter fishing boats, which obtain bait exclusively from the bait barges and can carry as many as 150 individuals (Everingham Brothers Bait Company 2012). The Everingham Brothers Bait Company estimated that 75 percent of their business came from party/charter boats and 25 percent came from private/rental boats. Table 3.11-13 presents information either provided by the Everingham Brothers Bait Company or estimated using data and estimation factors provided by the Everingham Brothers Bait Company.

Table 3.11-13. Information Specific to the Bait Barge, 2011

Number of Boats Served	3,303
Total Bait Barge Customers	112,350
Total Party/Charter Customers	84,262
Total Private/Rental Customers	28,087

Source: Everingham Brothers Bait Company 2012.

Table 3.11-14 provides an estimated breakdown of the number of private/rental and party/charter fishing trips by month. The breakdown was estimated based on sample data from the California Recreational Fishing Survey (CRFS). Since the bait barges would be relocated only during certain times of the year, use of the bait barges, on a monthly basis, was estimated in order to delineate what percentage of trips would be affected by the relocation, over the course of each year. The sample data that was used for estimates in Table 3.11-14 are from 2010 and relate to all ocean fishing trips embarking from San Diego Bay, not just fishing

trips that use the bait barges. However, the analysis assumes that percentages in Table 3.11-14 are representative of bait barges' utilization.

Table 3.11-14. Monthly Breakdown of Individual Fishing Trips

Month	Party/Charter Monthly Percent (%)	Private/Rental Monthly Percent (%)
January	7.1%	6.2%
February	7.5%	2.6%
March	8.2%	9.8%
April	6.7%	9.7%
May	11.4%	6.4%
June	8.5%	14.4%
July	10.3%	11.6%
August	11.1%	9.2%
September	8.2%	16.8%
October	6.4%	4.8%
November	7.8%	5.3%
December	6.9%	3.2%

Source: CDFG 2010.

Table 3.11-15 presents the percentage of party/charter and private/rental fishing trips that are estimated to occur while the bait barges would be relocated (between the middle of September and the end of March). During the portion of the year that the bait barges would be expected to be relocated, 47.9 percent of total annual party/charter fishing trips, and 40.4 percent of private/rental fishing trips are estimated to occur.

Table 3.11-15. Percentage of Individual Fishing Trips Occurring While Bait Barges are Relocated

Party/Charter	Private/Rental
47.9 percent	40.38 percent

Note: Sum of percentages in Table 3.11-14 for the months of January, February, March, October, November, December, and half of September.
Source: CDFG 2010.

The Everingham Brothers Bait Company indicated that they expected a reduction in private/rental business of 10 percent to 15 percent during times that the bait barges would be relocated. While the Everingham Brothers bait barge operation may lose 10 percent to 15 percent of its business in the San Diego Bay, not all of this business would be lost to the San Diego County economy. Some fishing trips that choose not to use the bait barges, because of their relocation, would proceed with their trips using bait from another source; some anglers may switch to artificial lures or they may catch their own live bait. In cases such as these, where fishing trips do not utilize the bait barges but proceed with their fishing trips, there is assumed to be no change in recreational fishing related expenditures.

However, since it is unknown how many private/rental fishing trips would be completely discouraged, the analysis applies the range provided by the Everingham Brothers Bait Company. The analysis assumes that the bait barges, private/rental business would be reduced by 15 percent. More importantly in terms of relevance to estimates of reduced recreational fishing expenditures – the assumption is made that 10 percent of the bait barges' private/rental business would be discouraged from fishing altogether.

Table 3.11-16 outlines the estimate for the number of private/rental fishing trips that would be discouraged altogether, and thus potentially lead to reductions in recreational fishing related expenditures. Annually, it is estimated that there would be a reduction of 1,134 private/rental fishing trips in San Diego County as a result of the relocation of the bait barges.

Table 3.11-16. Estimated Reduction in Private/Rental Fishing Trips, Annual

Private/Rental Bait Barge Customers	28,087
Percentage (%) of Private/Rental Customers while relocated	40.38%
Number Private/Rental Customers while relocated	11,340
Percentage (%) of Private/Rental trips that would be discouraged	10%
Estimated Reduction in Annual Private/Rental Fishing Trips	**1,134**

Sources: Everingham Brothers Bait Company 2012; CDFG 2010.

An estimate for the potential reduction in party/charter business for the bait barges was not provided by the Everingham Brothers Bait Company; the Company expects that all party/charter fishing trips would continue to use the bait barges during times when they are relocated. The Everingham Brothers Bait Company, however, did indicate that some party/charter business may be lost, indirectly, due to potentially lower quality bait (resulting from warmer water temperatures at the relocation site) and an increased potential for charter companies to raise fuel surcharges (as a result of needing to travel further to get live bait). The potential for lower quality bait and an increased fuel surcharge may lead to higher prices for party/charter customers and this may be discouraging to some potential party/charter anglers. Considering these factors, it was assumed that there was potential for a reduction in individuals who would engage in party/charter fishing trips of up to 2 percent, during times when the bait barges are relocated.

Table 3.11-17 shows the estimated reduction in the number of party/charter fishing trips; it is estimated that, annually, 807 people who would have taken a party/charter fishing trip, would not take that trip because of costs indirectly associated with the relocation of the bait barge operation.

Table 3.11-17. Estimated Reduction in Party/Charter Fishing Trips, Annual

Annual Party/Charter Bait Barge Customers	84,262
Percentage (%) Occurring While Bait Barge would be Relocated	47.9%
Percentage (%) reduction in Fishing Trips	2%
Estimated Reduction in Annual Party/Charter Fishing Trips	**807**

Source: Everingham Brothers Bait Company 2012; CDFG 2010.

Average Expenditures per Fishing Trip

In 2000, NOAA conducted a recreational fishing expenditures survey for the Pacific Coast Region and, in 2001, published a report summarizing the results (NOAA 2001). Angler trip expenditures were reported for southern California by fishing mode (private/rental and party charter), and by resident type (state resident or non-resident). Table 3.11-18 provides relevant expenditures data from that report.

Table 3.11-18. Per Trip Expenditures in Southern California by Fishing Mode and Residency, 2000

Fishing Mode	Residents	Non-residents
Party/Charter	$83	$495
Private/Rental	$37	$220

Source: NOAA 2001.

Since the expenditures survey was conducted in 2000, and impacts are presented in 2011 dollars, the expenditures presented in Table 3.11-18 were inflated to 2011 dollars. Table 3.11-19 presents results from the NOAA expenditures survey, inflated to 2011 dollars using the Consumer Price Index, which increased by 30.6 percent from 2000 to 2011.

Table 3.11-19. Per Trip Expenditures in Southern California by Fishing Mode and Residency, 2011

Fishing Mode	Residents	Non-residents
Party/Charter	$107.8	$646.2
Private/Rental	$48.8	$287.7

Sources: NOAA 2001; BLS 2012c.

CRFS sample data, from 2010, attributable to ocean fishing trips embarking from San Diego Bay, was used to establish residency, by fishing mode (party/charter or private/rental). Residency data from the NOAA survey could not be applied in this analysis as it classified residents as residents of the state of California, as opposed to residents of San Diego County, which is the region subject to analysis. CRFS data identified the county of residence of surveyed anglers, so the percentages of anglers who are residents of San Diego County were estimated using that source. Table 3.11-20 presents estimated residency status, by fishing mode (party/charter or private/rental), based on CRFS sample data from 2010.

Table 3.11-20. Per Trip Expenditures in Southern California by Fishing Mode and Residency, 2010

Fishing Mode	Percentage (%) San Diego County Residents	Percentage (%) Non-residents
Party/Charter	71.6%	28.4%
Private/Rental	91.6%	8.4%

Source: CDFG 2010.

Annual Reduction in Fishing Trip Expenditures Due to the Bait Barge Relocation

Table 3.11-21 details the estimated annual reduction in private/rental fishing trip expenditures that would be expected in San Diego County, as a result of the relocation of the bait barge operation, in 2011 dollars. An estimated total reduction in expenditures of $77,876 per year would be expected as a result of the relocation of the bait barges, $50,408 per year would be as a result of reduced expenditures by residents of San Diego County, and $27,468 per year would be expected as a result of reduced expenditures by non-residents.

Table 3.11-21. Estimated Annual Reduction in Private/Rental Fishing Trip Expenditures Due to Potential Bait Barge Relocation, in 2011 Dollars

Annual Reduction in Private/Rental Fishing Trips	1,134
Percentage (%) of Reduction from San Diego County Residents	91.6%
Reduction in Trips - San Diego County Residents	1,038
Per Trip Expenditures - San Diego County Residents	$48.5
Reduced Expenditures - San Diego County Residents	$50,408
Percentage (%) of Reduction from Non-residents	8.4%
Reduction in Trips - Non-residents	95
Per Trip Expenditures - Non-residents	$287.7
Reduced Expenditures - Non-residents	$27,468
Total Reduction in Expenditures - Private/Rental	**$77,876**

Sources: Everingham Brothers Bait Company 2012; CDFG 2010; NOAA 2001; BLS 2012c.

Table 3.11-22 details the estimated annual reduction in party/charter fishing trip expenditures that would be expected in San Diego County, as a result of the relocation of the bait barge operation, in 2011 dollars. An estimated total of $210,357 per year in reduced expenditures would be expected as a result of the relocation of the bait barges, $62,389 per year would be as a result of reduced expenditures by residents of San Diego County, and $147,968 per year would be expected as a result of reduced expenditures by non-residents.

Table 3.11-22. Estimated Annual Reduction in Party/Charter Fishing Trip Expenditures Due to Potential Bait Barge Relocation, in 2011 Dollars

Annual Reduction in Private/Rental Fishing Trips	807
Percentage (%) of Reduction from San Diego County Residents	71.6%
Reduction in Trips - San Diego County Residents	579
Per Trip Expenditures - San Diego County Residents	$107.8
Reduced Expenditures - San Diego County Residents	$62,389
Percentage (%) of Reduction from Non-residents	28.4%
Reduction in Trips - Non-residents	229
Per Trip Expenditures - Non-residents	$646.2
Reduced Expenditures - Non-residents	$147,968
Total Reduction in Expenditures - Private/Rental	**$210,357**

Sources: Everingham Brothers Bait Company 2012; CDFG 2010; NOAA 2001; BLS 2012c.

Table 3.11-23 displays total estimated annual expenditure reductions that would be expected as the result of the relocation of the bait barges. Annually, a total reduction in recreational fishing related expenditures of $288,233 would be expected as a result of the relocation of the bait barges; most of the reduction in expenditures would extend, indirectly, from a reduction in party/charter fishing trips ($210,357), and the remainder ($77,876) would extend from a reduction in private/rental trip expenditures.

Table 3.11-23. Total Estimated Annual Reduction in Recreational Fishing Trip Expenditures Due to Potential Bait Barge Relocation

Reduced Expenditures - Private/Rental Fishing Trips	$77,876
Reduced Expenditures - Party/Charter Fishing Trips	$210,357
Annual Reduction in Expenditures	**$288,233**

Sources: Everingham Brothers Bait Company 2012; CDFG 2010; NOAA 2001; BLS 2012c.

The total reduction in fishing trip expenditures that would be expected as a result of the potential relocation of the bait barges were weighted by industry according to how they were delineated in the NOAA expenditures survey. Industry weights and total value of reduced expenditures are presented in Table 3.11-24.

Table 3.11-24. Annual Reduction in Recreational Fishing Expenditures by Industry, 2011 Dollars

Expenditure Category	Percentage (%) Weight	Reduced Expenditures
Private Transportation	14%	($41,563)
Grocery Stores	10%	($28,977)
Restaurants	5%	($13,636)
Lodging	4%	($11,008)
Public Transportation	12%	($33,432)
Boat Fuel	9%	($25,374)
Party/Charter Fees	37%	($105,693)
Access/Boat Launching	2%	($5,134)
Equipment Rental	3%	($9,132)
Bait & Ice	5%	($14,286)
Total	**100%**	**($288,233)**

Source: NOAA 2001 (percentage weights).

Summary of Input Data

Table 3.11-25 identifies annual expenditures, as they were input into the IMPLAN model, related to construction expenditures and reduced recreational fishing related expenditures. Construction expenditures were input into the IMPLAN sector "construction of other new nonresidential structures" and reduced recreational fishing related expenditures were input into various industries corresponding to the industries and weights identified in Table 3.11-24.

Table 3.11-25. Direct Expenditures Input into IMPLAN Model, Constant 2011 Dollars

Annual Expenditures	2013	2014	2015	2016
Construction Expenditures	$1,598,690	$14,151,324	$10,669,237	$13,593,252
Reduction in Recreational Fishing Related Expenditures	$0	($288,233)	($288,233)	($288,233)

There is the potential that some marine mammals may be drawn to areas around the bait barges near the relocation site. If this does occur, there would be the potential that these marine mammals would occupy privately owned areas that, previous to the relocation, had lesser or no marine mammal presence. If marine mammals do increase occupancy of privately owned areas, private owners may find this to be a nuisance. In the event of a nuisance, caused by marine mammals, it would be within the property owner's rights and it would be their responsibility to deter the marine mammals from causing them nuisance.

There are a variety of methods that can be legally applied to deter nuisance caused by the presence of marine mammals. Broadly, these methods include: Barriers and Exclusion Devices (such as fencing), Visual Repellents (such as flashing lights), Noise Makers (such as horns and whistles), and Physical Contact (such as water from hoses and projectiles from sling shots).

Engaging in any of these methods of deterrence imposes a cost on the owner – whether it would be the cost of purchasing and installing fencing or simply the cost of time it takes to blow a whistle in the direction of a marine mammal.

Since marine mammals could be attracted to the bait barges, any new or additional presence of the marine mammals on private property would likely be associated with the relocation of the bait barges and thus the cost of deterrence would be attributable to the proposed action. If there are additional costs associated with deterrence of marine mammal nuisance on private property, brought about by the proposed action, it would be considered an indirect impact of the proposed action. However, since these costs would be very small relative to the regional economy, the impact would be less than significant.

3.11.3.2 Alternative 1 Pier Replacement and Associated Dredging

Table 3.11-26 shows the estimated number of direct, indirect, induced, and total jobs, in San Diego County, that would result from Alternative 1. Over the four-year project period from 2013 to 2017, the impact on jobs would be expected to be, on net, positive. Increased economic activity generated by the fuel pier construction would overshadow decreased economic activity that would result from the relocation of the bait barges. During the most active years of construction, 2014 and 2016, increases of over 145 jobs would be generated within the San Diego County economy. During the least active year of construction, 2013, an estimated 18 jobs would be generated by Alternative 1. Figure 3.11-3 illustrates potential changes in jobs over the course of the proposed construction period. Overall, more jobs would be created than are lost, resulting in beneficial impacts. Therefore, there would be no significant impact to jobs from implementation of Alternative 1.

Table 3.11-26. Jobs[1] Impact, 2013-2016

Jobs Impact	2013	2014	2015	2016
Direct Effect	9	77	57	74
Indirect Effect	3	28	21	27
Induced Effect	5	46	34	44
Total Effect	**18**	**151**	**113**	**145**

Note: [1] Jobs are not Full Time Equivalent; some part-time jobs may be included in results.

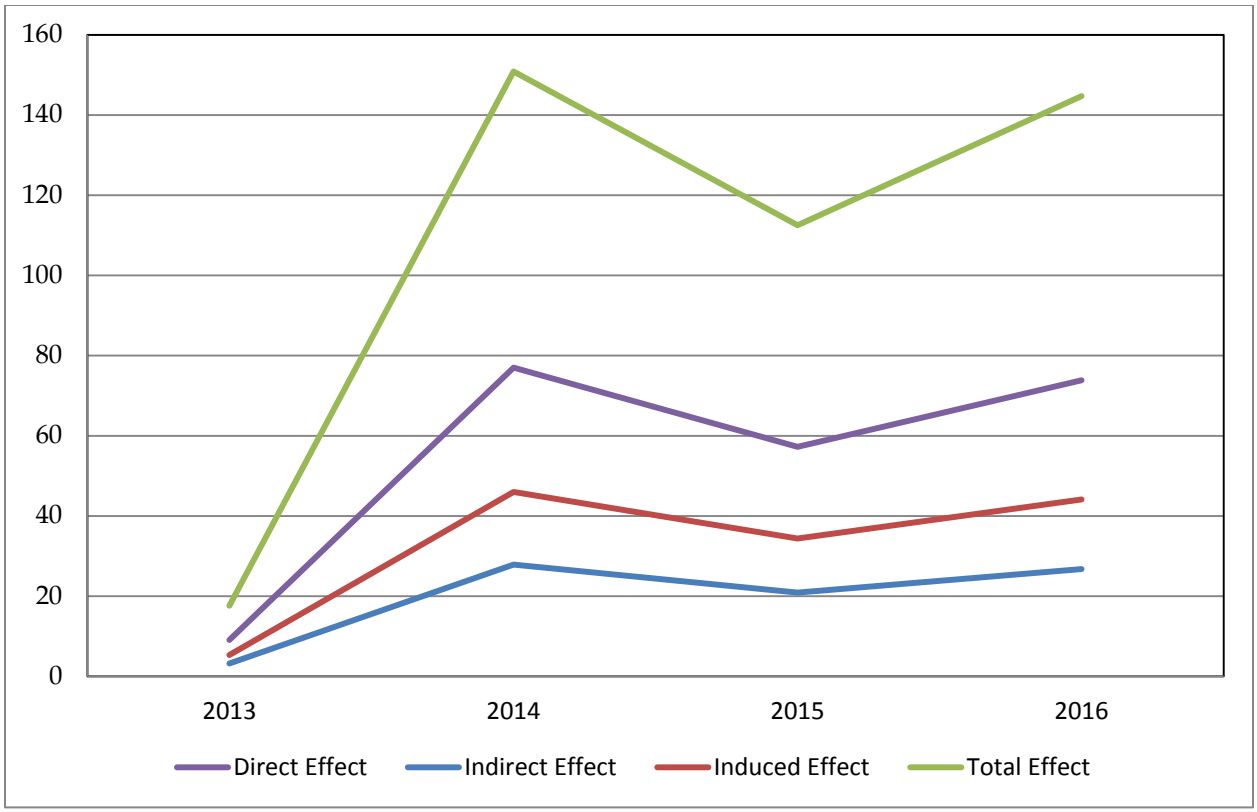


Figure 3.11-3. Jobs Impact, 2013-2016

Table 3.11-27 shows the estimated direct, indirect, induced, and total labor income, in San Diego County, that would result from Alternative 1. Over the four-year project period from 2013 to 2017, the impact on labor income would be expected to be, on net, positive. Increased economic activity generated by the fuel pier construction would overshadow decreased economic activity that would result from the relocation of the bait barges. During the most active years of construction, 2014 and 2016, an increase of about $9 million in labor income would be generated within the San Diego County economy. During the least active year of construction, 2013, $1 million in labor income would be generated by Alternative 1. Figure 3.11-4 illustrates potential changes in labor income over the course of the proposed construction period. Overall, labor income impacts from Alternative 1 would be beneficial, but less than significant.

Table 3.11-27. Labor Income Impact, 2013-2016, Constant 2011 Dollars

Labor Income Impact	2013	2014	2015	2016
Direct Effect	$646,550	$5,575,866	$4,167,624	$5,350,167
Indirect Effect	$198,427	$1,726,669	$1,294,478	$1,657,402
Induced Effect	$237,930	$2,056,256	$1,538,022	$1,973,199
Total Effect	**$1,082,907**	**$9,358,790**	**$7,000,124**	**$8,980,768**

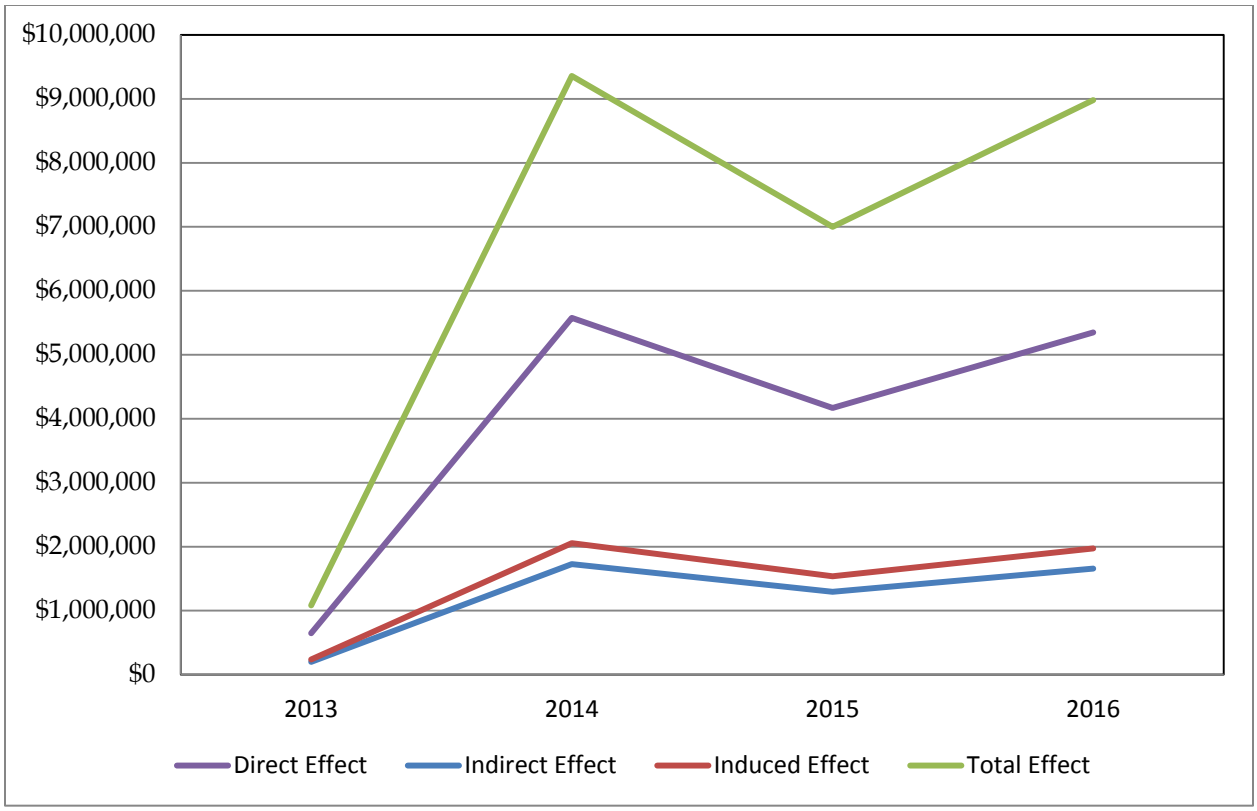


Figure 3.11-4. Labor Income Impact, 2013-2016

Table 3.11-28 shows the estimated direct, indirect, induced, and total economic output, in San Diego County, that would result from Alternative 1. Over the four-year project period from 2013 to 2017, the impact on economic output would be expected to be, on net, positive. Increased economic activity generated by the fuel pier construction would overshadow decreased economic activity that would result from the relocation of the bait barges. During the most active years of construction, 2014 and 2016, an increase of over $23 million in economic output would be generated within the San Diego County economy. During the least active years of construction, 2013 and 2017 (years when construction activity would be building-up and winding-down, respectively), about $3 million in economic output would be generated with implementation of Alternative 1. Figure 3.11-5 illustrates potential changes in economic output over the course of the proposed construction period. Overall, labor income impacts would be beneficial. Therefore, there would be no significant impact to labor income from implementation of Alternative 1.

Table 3.11-28. Economic Output Impact, 2013-2016, Constant 2011 Dollars

Economic Output Impact	2013	2014	2015	2016
Direct Effect	$1,598,690	$13,863,089	$10,381,002	$13,305,017
Indirect Effect	$485,936	$4,227,772	$3,169,360	$4,058,141
Induced Effect	$705,278	$6,095,189	$4,559,032	$5,848,990

Total Effect	$2,798,904	$24,186,050	$18,109,394	$23,212,148

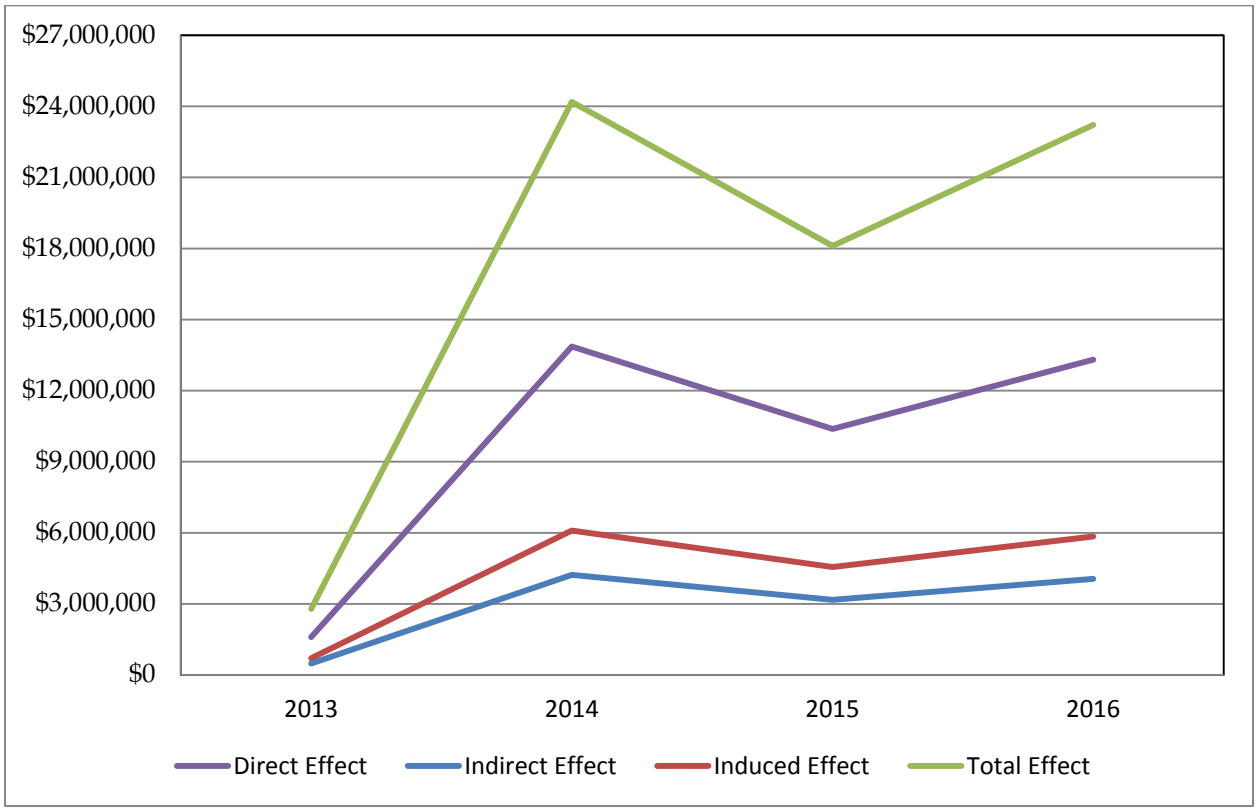


Figure 3.11-5. Labor Income Impact, 2013-2016

Overall, Alternative 1 would have a beneficial impact on the San Diego County economy; however, some industries might be negatively impacted. Charter fishing companies, for instance, may lose some business during the course of the project. This impact would be less than significant relative to the industries' overall size. In addition, the impact would be indirect, potentially stemming from increased gasoline costs and a choice by the industry as to whether it would increase gasoline surcharges (which would be a choice not entirely dependent on the location of the bait barge operation, but on broader economic conditions).

Individuals interviewed in the process of conducting this socioeconomic analysis discussed their concerns that the charter fishing industry was performing below its potential; that it was suffering from image problems and had failed to counteract those image problems by effectively promoting itself. Interviewees noted that the charter fishing is a healthy, environmentally sustainable, recreation activity. If the charter fishing industry improves its marketing profile and overall popular presence, any potential impacts from the bait barges' relocation could be more than offset. Therefore, implementation of Alternative 1 would not have a significant impact to socioeconomics.

Environmental Justice

No residential areas would be affected by Alternative 1 so no environmental justice impacts would be expected. There was some potential for the low-income population residing at Shelter Island to be impacted by construction noise, but analysis shows that construction noise would not be audible from that distance. There would be no disproportionately high environmental or health impacts on low-income or minority populations Therefore, implementation of Alternative 1 would not have a significant impact with respect to environmental justice.

3.11.3.3 Alternative 2 Delayed Dredging Alternative

Socioeconomic and environmental justice impacts would be the same under Alternative 2 as described under Alternative 1. Therefore, implementation of Alternative 2 would not have a significant impact with respect to socioeconomics and environmental justice.

3.11.3.4 Mitigation Measures

Implementation of Alternative 1 or Alternative 2 would not have significant socioeconomics and environmental justice impacts; therefore, no mitigation measures are proposed.

3.11.3.5 No-Action Alternative

Under the No-Action Alternative, temporary relocation of the Navy MMP, temporary relocation of the Everingham Bait Brothers Company bait barges, demolition and replacement of the existing fuel pier, and associated dredging of the high spot in the turning basin would not occur. Socioeconomic and environmental justice conditions would remain unchanged. Therefore, implementation of the No-Action Alternative would not have a significant impact with respect to socioeconomics and environmental justice.

CHAPTER 4
OTHER CONSIDERATIONS REQUIRED BY NEPA

Federal regulations implementing NEPA (42 USC 4321 et seq.) and Navy Procedures for Implementing NEPA (32 Code of California Regulations [CFR] 775), as described in Chief of Naval Operations Instruction 5090.1C, require that the cumulative impacts of a Proposed Action be assessed. Council on Environmental Quality regulations implementing the procedural provisions of NEPA define cumulative impacts as:

> The impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions (40 CFR 1507).

To analyze cumulative impacts, a cumulative impacts region must be identified for which impacts of the Proposed Action and other past, proposed, and reasonably foreseeable actions would be cumulatively recorded or experienced. Consequently, the region where cumulative impacts may occur includes Naval Base Point Loma (NBPL) and the surrounding area. The cumulative projects described in Section 4.1 focus on other military projects and a civilian project adjacent to NBPL planned within San Diego Bay. The analysis presented in Section 4.2 considers additional impacts arising from the impacts of implementing Alternative 1 or Alternative 2 combined with the impacts of other known past, present, and reasonably foreseeable future actions within this region.

4.1 PAST, PRESENT, AND REASONABLY FORESEEABLE PROJECTS

4.1.1 Past Projects

4.1.1.1 Upgrades to Magnetic Silencing Facility for Advanced Degaussing Systems MILCON P-135 (NBPL)

MILCON Project P-135 upgraded the Magnetic Silencing Facility at Naval Base Point Loma so that it could support newer class Pacific Fleet surface ships. Upgrades occurred at pre-existing piers and associated underwater grids, vessel mooring system, Anti-terrorism/Force Protection floating barriers, and power supply systems (which required the installation of a new on-shore electrical cable distribution system and on-shore building demolition, repair, and construction). As part of the project, the Navy's explosive ordnance disposal marine mammals and their floating enclosures were moved to be co-located with the Space and Naval Warfare Systems Center (SSC) Pacific marine mammals at Pier F122. A new access pier was constructed at Pier F122 for the co-located Navy marine mammal facilities. A Finding of No Significant Impact (FONSI) was signed for this project. Project activities were completed in 2010.

4.1.1.2 Pier 5002 Sub Fender Installation MILCON P-118 (NBPL)

MILCON Project P-118 modified Submarine Pier 5002, south of the P-135 project area, at Naval Base Point Loma. It allowed mooring of submarines next to the maintenance building. The principal modification was removal of deteriorating timber piles and replacement with

composite piles with an expected life of 50 years. Supplemental foam-filled fenders were interspersed between the submarine fenders to accommodate surface ships. There was no increase in the pier footprint and no dredging was done. New power supply booms routing shore power to moored submarines and extra communications lines were installed. A Categorical Exclusion (CATEX) was signed for the project. The project occurred in 2008.

4.1.1.3 Improved Navy Lighterage System Pier (Naval Amphibious Base Coronado, Naval Base Coronado)

The Improved Navy Lighterage System project involved construction of waterfront command and control facilities for amphibious operations and training at NAB Coronado. The project consisted of an Improved Navy Lighterage System lift/launch pier facility, including new pier construction and upgrades to pre-existing Piers 16, 18, and 19; road upgrades; increased storage yard space in conjunction with adequate maintenance and operational storage facilities; and quaywall repairs. A FONSI was signed for the project. Construction was completed in 2008.

4.1.1.4 Quaywall Repair (Special Project RM11-05) NAS North Island, Naval Base Coronado

Special Project RM11-05 involved both in-water and land based construction to repair the deteriorated portions of the quaywall along Berths "L" through "P" at NAS North Island. The quaywall became distressed as a result of scouring at the base, which compromised its structural integrity. Repairs were needed to prevent structural failure of the quaywall and to provide for its continued functionality in support of the Navy's operational and support mission. Project components included: (1) dredging and disposal of 49,000 cy of bay sediment; (2) placement of rock armoring layers on the base of the sheet piling along the entire length of the quaywall (3,200 ft); (3) demolition and replacement of a portion (150 linear ft) of the damaged quaywall cap; (4) replacement of 150 linear ft of damaged steam line; (5) filling voids behind the quaywall; and (6) installation of new fendering at the location of the quaywall repairs. A FONSI was signed for the project. Construction was completed in 2008.

4.1.1.5 San Diego Association of Governments (SANDAG) Regional Beach Sand Project II

The project restored beaches in the San Diego region, because water supply and flood control projects reduce the natural flow of water and sand to the coast (SANDAG 2012). The project replenished 1.4 million cubic yards of clean beach-quality sand at up to 11 receiver sites in the San Diego region, including Imperial Beach (SANDAG 2012). Sand was dredged from up to three offshore borrow sites and placed on shore. An EIR was certified for this project in May 2011. Work took place from August through October 2012 (SANDAG 2012). Equipment set-up for this project included assembling and anchoring 3,000 ft sections of 30-in diameter dredge pipe in the waters south of Harbor Island for approximately one week in August 2012. Work at Imperial Beach included dredging sand offshore from a borrow site offshore, transporting the dredge sediment to a pump-out location located approximately 6,000 ft from shore, and pumping the sand to the onshore placement site via an underwater pipeline. This work was completed as of mid-October 2012.

4.1.2 Present Projects

4.1.2.1 Fiddler's Cove Marina Repairs and Improvements Project (NAB Coronado, Naval Base Coronado)

The purpose of the Fiddler's Cove Marina Repairs and Improvements Project is to provide a functional multi-use, year-round recreational facility in San Diego County to support the military's regional recreational needs. The project is restoring serviceability of deteriorated marina facilities at the existing Fiddler's Cove Marina, NAB Coronado, Naval Base Coronado. This project includes restoration of deteriorated marina facilities including slips and docks at Fiddler's Cove, replacement of the floating wave attenuation system, erosion control and shoreline stabilization, and enhancement/expansion of existing recreational functions of the marina. A FONSI was signed for the project. The Fiddler's Cove Marina Repairs and Improvements Project is under construction.

4.1.2.2 P405 NBSD Bachelors Quarters - Homeport Ashore

This project would construct a 162,040 sf bachelor enlisted quarters to house 772 E1-E4 personnel. Additionally, a seven level parking structure of 284,167 sf will be constructed. The project location is dry side NBSD (next to the bowling alley). Construction will be completed by early 2012. A CATEX has been completed for the project.

4.1.2.3 P-750 NASNI Rotary Hangar

The project will provide a helicopter maintenance facility and an aircraft parking apron to bed-down three helicopter squadrons being assigned to NASNI. The project will consist of a multi-story, steel framed, three-bay maintenance hangar at the current site of Building 802. The hangar will have a concrete foundation, concrete first and second floors, interior partitions, steel roof deck, masonry walls, and a pile foundation. The project includes electrical and mechanical utilities, power check pad, engine wash pad, compressed air, secure communications connections, aircraft parking apron, and roadway. Built-in equipment would include an elevator, back-up generators, and a closed loop wash rack system. Special construction features would include sound attenuation for administration and shop space and an aqueous film-forming foam fire protection system. The project will also upgrade electrical power for the new MH-60S/R helicopters by installing a 1,500 kilovolt-ampere transformer and secondary switchboard and construct a 12 kilovolt duct bank with conductors, manholes, and switch. A 5-ton crane will be provided from other appropriations. The project will conform to anti-terrorism/force protection standards and follow sustainable development criteria for design, development, and construction of the project. P-750's NEPA is included in the MH60 Homebasing EA, which was completed in 2011. Construction is expected to begin in 2012.

4.1.2.4 Assessment and Identification of Mine Susceptibility Array Correction at SSTC-S

This project consists of the placement of a stone-filled concrete caisson structure around the existing eight piles of the Assessment and Identification of Mine Susceptibility Array at SSTC-S. The existing facility is one mile offshore in 50 ft of water. The concrete caisson would "stiffen" the structure, limiting its wave force deflection, and improving its performance. The project

will include the creation of fish habitat through the placement of A-jacks structures. A CATEX was signed for this project in December 2010.

4.1.2.5 Replace Fuel Storage Tanks and Facilities at NBPL (MILCON P-401)

This project consists of modernizing the existing DFSP Point Loma fuel storage and distribution facility. All existing bulk fuel storage tanks, both above and underground (and their associated pipelines and pumping facilities) are being demolished or closed in place. Eight new multi-product, aboveground bulk fuel storage tanks are being constructed to provide a total fuel storage capacity of 42 million gallons. New pumping facilities and transfer pipelines are also being constructed, as well as new access roads within DFSP Point Loma and new sedimentation basins for stormwater management. The construction plan is divided into two phases: construction activities, followed by the in-place closure of underground storage tanks. While construction is ongoing, fueling operations will continue from underground storage tanks that will be decommissioned when the new tanks are functional. No significant impacts to any resource area were identified in the EA prepared for this project. Work on the P-401 project began in March 2009 and is expected to be completed in 2013.

4.1.2.6 Scripps Institution of Oceanography (SIO)/ University of California San Diego (UCSD) Pier Fender Pile Replacement Project

This project would replace 12 concrete and wood fender piles at the existing Scripps Institution of Ocean Oceanography (SIO) University of California San Diego (UCSD) Nimitz Marine Facility Research Vessel Berthing Pier and associated wharf on NBPL and UCSD lands adjacent to the north of NBPL (Figure 2-5). The 12 fender piles identified for replacement have failed or are missing completely, thus the work is considered urgently needed, i.e., ahead of the replacement of the entire pier and wharf facility as described below in Section 4.1.3.1. At seven designated locations on the pier (Navy lands) and five locations on the wharf (UCSD lands) broken piles or visible pile stubs would be removed or cut at the mudline. The fender piles would be replaced in-kind with 14-inch square concrete fender piles installed using jetting and an impact hammer. The proposed fender pile replacement would not expand the existing pier footprint or change its use. The total construction time is expected to be less than two weeks, and would be completed before December 2012. UCSD-SIO would coordinate all pile-driving activities with SSC Pacific such that the Navy's marine mammals could be observed during construction. If any unexpected adverse effects are observed, actions such as moving disturbed individuals may occur.

4.1.3 Reasonably Foreseeable Projects

4.1.3.1 Scripps Institution of Oceanography UCSD Marine Facility Research Vessel Berthing Pier Replacement

This project would replace the existing SIO (UCSD) Nimitz Marine Facility Research Vessel Berthing Pier and associated wharf on NBPL and UCSD lands adjacent to the north of NBPL (Figure 2-5). The existing pier and wharf that were originally constructed in 1965, replaced and expanded in 1973, would be demolished. A new, modern replacement pier and wharf of the same size and configuration would be constructed with upgrades including: cold-iron berthing

for ships in port; improved lighting for nighttime operations; fiber optic lines for telecommunications and data transfer; and modern systems for potable water, management of oily water, waste oil, sanitary sewage, and storm water. The Scripps Pier project would install a total of 137 24-inch diameter concrete piles over the course of an 18-month construction period. In-water work for this proposed project would also be scheduled to coincide with the temporary relocation of the Navy's marine mammal program that is planned for the proposed P-151 fuel pier replacement project. Dredging would not be required for the Scripps Pier project but design would allow for future dredging and expansion. The slope under the Scripps Pier wharf and landward would be stabilized with cement deep soil mixing. All concrete and steel debris would be recycled; treated wood waste wood be disposed at an appropriately permitted facility. An EA for the project is in process.

4.1.3.2 Harbor Island West Marina Dock System Rebuild

Harbor Island West Marina is a privately owned facility located across San Diego Bay to the east of NMAWC that accommodates recreational vessels ranging from 25 to over 55 ft long. This project would rebuild the existing docks at Harbor Island Marina and is anticipated take approximately 3 to 4 years to complete. The estimated project start date is approximately October 2013, so that in-water construction may take place outside the least tern foraging season. The project would like occur in phases that would occur over 18 months. As of the time frame of this EA, project environmental and permitting work was not initiated. Harbor Island West Marina is in contact with the Unified Port of San Diego (San Diego Port Authority), which will be the CEQA lead agency, to determine what CEQA and permitting requirements apply. An engineering firm is under contract to develop the early design and cost estimate. The numbers and sizes of structural piles that would be required at Harbor Island West Marina are unknown within the timeframe of this EA. However, it is anticipated that jetting would be used to install the new piles, which could potentially be of concern to the Navy marine mammal program.

4.1.3.3 Pier 8 Replacement MILCON P-440 (Naval Base San Diego)

MILCON P-440 would demolish the inadequate existing Pier 8 at NBSD and construct a replacement general purpose berthing pier. The new, single deck pier would fulfill berthing needs for modern ships in the U.S. Pacific Fleet. Pier design would include pre-stressed concrete piles supporting a concrete deck and support a future upgrade of shore-to-ship power to meet power intensive ship requirements. A stormwater collection system with an oil/water separator would be included. No dredging would be required because Pier 8 is already a deep draft pier. The EA for this project is on hold. The construction date is unknown.

4.1.3.4 Pier 12 Replacement and Dredging Naval Base San Diego MILCON P-327

This project would involve demolition of an inadequate existing pier (Pier 12), at Naval Base San Diego, dredging in berthing and approach areas for the new pier, dredged material disposal at an approved ocean disposal site and permitted landfill, construction of a new general purpose berthing pier and associated pier utilities, including upgrades to the electrical utilities at adjacent Pier 13, and construction of fish enhancement structures (artificial habitat for

fish) using concrete debris from pier demolition. An EA has been completed for this project and a FONSI was signed. Demolition and dredging for this project began in summer 2012.

4.1.3.5 NAS North Island Rotary Aircraft D-Level Maintenance Facility MILCON P-880

This project would construct a depot-level rotary aircraft maintenance facility at NASNI. A new high-bay facility is required to support the current depot-level H-60 helicopter maintenance, repair, and overhaul program workload and to accommodate scheduled workload increases due to the arrival of three additional H-60 squadrons. The facility would house maintenance shops, administration offices, parts storage spaces, break room/lunch room, restrooms, showers, and locker rooms. The building space would consist of aircraft rework shop space (high bay), plant services for aircraft overhaul (administration and production control), and maintenance aircraft storage space. The project would also demolish 10 existing facilities. Sustainable design principles would be included in the design and construction of the projects in accordance with EO 13123 and other laws and EOs. Facilities would meet LEED green building certification ratings and comply with the Energy Policy Act of 2005. Low Impact Development would be included in the design and construction of this project. Construction is expected occur in 2012, and environmental review is ongoing.

4.1.3.6 USACE San Diego Harbor Maintenance Dredging Project

This project includes the removal of up to 336,000 cubic yards (cy) of beach compatible material from the Federal Channel within San Diego Harbor, and reuse of dredged material for nearshore replenishment at Naval Base Coronado. The project is required to maintain Federally-authorized channel configurations, and to restore and ensure safe navigation within the harbor. The EA (USACE 2009) prepared for this project concluded that there would be no significant impact to any resource area, and a FONSI was signed on 5 March 2009. Maintenance dredging is scheduled to occur from summer of 2012 through April 2013.

4.1.3.7 Littoral Combat Ships (LCS) Homeporting EA

The Navy proposes to homeport 12 LCS on the West Coast of the United States. The homeporting would occur in phases over a 5-year period between 2013 and 2017. The project also includes stationing LCS crews and their dependents; infrastructure upgrades required to support the storage and maintenance of aircraft systems (i.e., MQ-8B Firescouts) associated with the LCS; ground transport of Firescouts, MH-60 squadrons and their associated equipment, and mission packages to and from the LCS homeport; and new land-based training requirements for the LCS. In the Quadrennial Defense Review Report dated February 2006, the need for the LCS to provide power projection capabilities in littoral waters is discussed. The Quadrennial Defense Review Report dated February 2010 includes the need to ensure that global basing posture is best aligned to address current and future issues. In accordance with these directives and other national defense priorities, the Navy developed its Strategic Laydown Plan, which requires 12 LCS to be homeported on the West Coast of the United States. An EA was prepared for the project and the FONSI was signed on May 17, 2012.

4.1.3.8 Naval Base Coronado (NBC) Coastal Campus Strategic Plan Environmental Impact Statement (EIS)

The Navy is preparing an Environmental Impact Statement (EIS) to evaluate the potential environmental effects of developing a coastal campus on Naval Base Coronado (NBC) to support the current and future operational readiness of personnel within the Naval Special Warfare Command (NSWC). The proposed campus would include a mix facilities that would support Naval Special Warfare Functions. Specific proposed actions within the Coastal Campus proposal are: (1) evaluation of current land use and available facilities; (2) augmentation by design and construction of new facilities to support logistics, equipment use and maintenance training, classroom and tactical skills instruction, storage, and administration; and, (3) design and build of related site improvements that may include upgraded utilities, fencing, roads, and parking. The proposal generally includes approximately 25 projects to be constructed over a roughly ten-year period. A Notice of Intent (to prepare an EIS) was published in the Federal Register on 28 June 2012. A Record of Decision is anticipated for signature in 2014.

4.1.3.9 Silver Strand Training Complex EIS (NBC)

The Silver Strand Training Complex (SSTC) project would increase the amounts and types of training, and implement range sustainability measures on SSTC and the southern beaches of North Island to enhance training capabilities. The project would integrate training and environmental management on SSTC to limit or avoid conflicts between training activities and sensitive environmental resources, while providing unique and essential local training opportunities. There are five main components of the project: 1) the continuation of current training and test and evaluation activities; 2) an increase in training tempo and additions to types of training; 3) the carrying out of existing, routine training at additional locations; 4) the introduction of new platforms and equipment; and 5) increased access and availability to existing beach and inland training areas. Through implementation of the components listed above, the project would support mission-oriented requirements for SSTC through an increase in diverse and realistic training and improved accessibility to training areas. The Final EIS was released in January of 2011. A Record of Decision was signed for this project on August 21, 2012.

4.2 CUMULATIVE IMPACTS

This section addresses the additive effects of Alternative 1 or Alternative 2 evaluated in this EA in combination with the relevant actions described in Section 4.1 above.

4.2.1 Habitats and Communities

With implementation of Alternative 1 or Alterative 2, the effects on habitats and communities would largely consist of temporary underwater noise and sediment disturbance to open water and benthic communities during construction and demolition. The Scripps Pier replacement project would overlap in time with the Proposed Action and would add incrementally by a small amount to areas of marine water column and benthic habitat affected by the Proposed

Action (sound is discussed in Section 4.2.2), but the combined impacts would still be small in the context of the bay, temporary, and not significant in a cumulative sense.

Net long-term changes associated with the replacement of the existing pier by a slightly smaller pier and the deepening of the turning basin would be minor in the context of bay habitats, and not significant. Any permanent effects on eelgrass beds would be mitigated by use of the Navy's eelgrass mitigation bank, which has proven to effectively replace eelgrass functions and values that are impacted by Navy projects. Therefore, neither Alternative 1, nor Alternative 2, in conjunction with other projects listed in Section 4.1 would result in significant cumulative impacts to habitats and communities.

4.2.2 Fish

With implementation of Alternative 1 or Alternative 2, the effects on fisheries, including EFH, would largely consist of temporary underwater noise and sediment disturbance during construction and demolition. Mortality to fish is unlikely because potential ZOIs for fish injury are confined to the immediate area around the pile being driven, and fish would most likely move away during the ramp-up procedure. Otherwise, the dispersal of fish away from especially loud underwater sound, or other behavioral reactions may occur, but these effects would be localized and not significant. The Scripps Pier replacement project would overlap in time with the Proposed Action and would add incrementally by a small amount to the cumulative disturbance of marine water column and benthic habitats used by fish.

The potential combined effects of pile driving noise from the Proposed Action and the Scripps Pier replacement project were modeled by Dr. Peter Dahl of the University of Washington using methods essentially similar to those used to model transmission loss for the Proposed Action (Appendix E.4), but with the sound levels from the two projects additive. The modeled scenario was a simultaneous pile strike and is shown in Figure 4.2-1. Because the sound level for the Scripps Pier replacement pile driver is much less than that of the impact pile driver for the steel piles needed for the replacement fuel pier, the Scripps Pier replacement project would not add significantly to the sound caused by the Proposed Action. The area where the two projects could have an additive effect in terms of disturbance is limited to the vicinity of the Scripps pier, where the received sound levels from the two projects could be approximately equal, adding to the disturbance of fish in that area. The combined impacts would still be small in the context of the bay, temporary, and not significant in a cumulative sense.

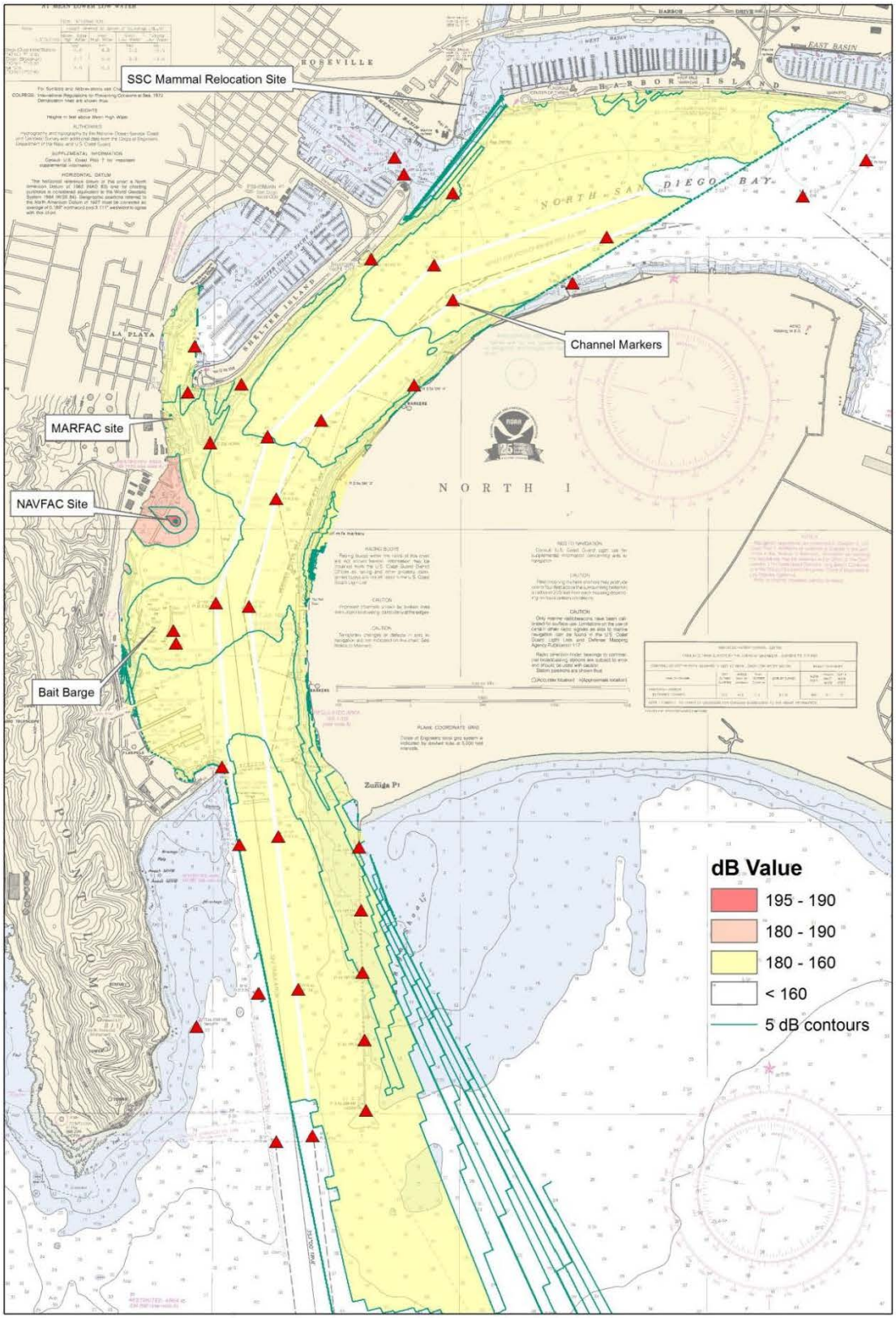


Figure 4.2-1 Combined Underwater Construction Sound Contours for the Proposed Naval Base Point Loma Fuel Pier Replacement (195 dB)

and the Scripps Marine Facility (MARFAC) Replacement Pier (175 dB)

4.2.3 Birds

With implementation of Alternative 1 or Alternative 2, the effects on bird would consist of direct as well as indirect effects of temporary noise and sediment disturbance during construction and demolition, as well as minor permanent changes in structural habitats which birds perch on and which may affect the distribution of forage fish. Birds are likely to avoid the immediate areas of construction and demolition due to loud, airborne noise, and fish would likely disperse away from these areas in response to underwater noise, but these effects are relatively small and localized in the context of the bay; similar structural and aquatic habitats are present throughout the northern and central parts of the bay. It is very unlikely that diving birds would remain underwater and in close proximity to pile driving for a sufficient time to incur injury. Pier replacement would result in a net reduction in covered bay surface and underwater structural habitat, with a corresponding increase in open water, but these changes are also minor in the context of the bay. Effects on eelgrass habitat would be minimized and mitigated as described above. Overall, localized effects on foraging and resting habitats would occur, but no effects on migratory bird populations are anticipated as a result of the Proposed Action.

The Scripps Pier replacement project would overlap in time with the Proposed Action and would add incrementally by a small amount to areas affected by airborne and underwater sound, and turbidity, but any combined impacts would still be small in the context of the bay and migratory bird populations. Therefore, neither Alternative 1, nor Alternative 2, in conjunction with other projects listed in Section 4.1 would result in significant cumulative impacts to birds.

4.2.4 Marine Mammals

As shown in Figure 4.2-2, the combined underwater acoustic effect of the Scripps Pier replacement project and the Proposed Action is very small, and the potential for additive disturbance to marine mammals would be limited to the immediate vicinity of the Scripps pier. Given that marine mammals are likely to avoid the Scripps pier location during that project's pile driving, no significant cumulative impact would be anticipated.

Other Navy as well as non-Navy projects in the San Diego Bay region have the potential to affect individual marine mammals, but MMPA compliance by all projects assures that effects on stocks of marine mammals remain negligible under the MMPA. Consultation on many projects and the sharing of research and monitoring results between the Navy and NMFS also contributes to a better understanding of the potential effects of anthropogenic sound and other stressors on individuals as well as populations. Therefore, neither Alternative 1, nor Alternative 2, in conjunction with other projects listed in Section 4.1 would result in significant cumulative impacts to marine mammals.

4.2.5 Threatened and Endangered Species

Federally listed threatened and endangered species that may occur in the areas affected by the Proposed Action include the California least tern and green sea turtle. Consistent with the Navy-USFWS MOU (Appendix .1), seasonal restrictions on in-water activities that could generate noise and turbidity would be implemented to avoid potential direct and indirect effects on least tern foraging habitat. The Scripps Pier replacement project would implement a similar seasonal restriction on pile driving. Navy monitoring would ensure that in the unlikely event that green sea turtles transit through a potential ZOI for acoustic effects, the activity would be stopped until the animal has departed. Hence for both species, the Navy has reached a conclusion of "may affect, not likely to adversely affect." For both of these species, ongoing programmatic consultations between the Navy and USFWS and NMFS ensure that Navy activities avoid and minimize potential effects. Therefore, neither Alternative 1, nor Alternative 2, in conjunction with other projects listed in Section 4.1 would result in significant cumulative impacts to threatened and endangered species.

4.2.6 Water Resources

With implementation of Alternative 1 or 2 impacts on water quality would be localized and short-term. During demolition, construction, and dredging, protective measures would be implemented to minimize impacts to marine water quality (implementation of the construction NPDES Permit, the SWPPP, and the NBPL ICP; the use of catch devices and sheeting; retention of the existing sheet pile; cutting piles at the mudline; and use of a clamshell dredge for dredging. All in-water work would comply with the requirements of a Section 401 Water Quality Certification from the Regional Water Quality Control Board (RWQCB) a Section 404/Section 10 permit from the USACE. changes to bacteria and nutrient levels in San Diego Bay in the vicinity of the NMAWC site as a result of the proposed temporary relocation of the Navy MMP would be measurable as compared to background levels, but would be within normal levels would be dispersed by tidal flushing, and would return to background levels when the Navy MMP is moved back to its current location. The Everingham Brothers Bait Company bait barges would not affect bathymetry or circulation at the selected temporary relocation site or discharge waste water. Demolition, construction, and dredging would not have significant impacts to bathymetry and circulation. Removal of creosote-treated wood piles from the old fuel pier, improved stormwater management capabilities for the proposed new fuel pier, and the reuse of dredge sediments for nearshore replenishment are anticipated to be beneficial impacts.

As stated above is Section 4.1.3.1, timing for the Scripps Institution of Oceanography Pier Replacement project is expected to coincide with the NBPL P-151 Fuel Pier Replacement Project in 2013. The Scripps Pier project would be required to implement measures to minimize impacts to relative to water resources. Other reasonably foreseeable projects would not occur concurrently with the NBPL P-151 Fuel Pier Replacement Project so potential impacts from those projects would be moderated over space and time. Therefore, when added to the impacts from other reasonably foreseeable projects, either Alternative 1 or Alternative 2 would not result in a significant cumulative impact to water resources.

4.2.7 Hazardous Materials and Wastes

With implementation of Alternative 1 or Alternative 2 hazardous materials and wastes and solid wastes would be properly managed according to applicable federal and state regulations. Hazardous materials and wastes at the proposed Navy marine mammal program (MMP) temporary relocation site at the Naval Mine and Anti-Submarine Warfare Command (NMAWC) would be removed and properly recycled or disposed before the site is modified for use by the MMP. Hazardous materials/wastes would not be used or stored at the proposed temporary NMAWC site while occupied by the MMP. Under Alternative 1, or Alternative 2, during the time the barges are at the temporary relocation site the Everingham Brothers Bait Company would continue to manage fuel, hazardous materials, and hazardous wastes according to applicable state and county regulations (Everingham Brothers Bait Company 2012). Hazardous materials currently present at the fuel pier consist of bulk quantities of fuel, lubricating oil, and contaminated petroleum products contained in pipelines that are designed and operated in compliance with federal and state regulations, and undergo frequent inspections by the U.S. Coast Guard and the California State Lands Commission. The fuel pier follows Basewide best management practices for minimizing and containing potential leaks and spills from the pipelines and has a contingency plan and procedures in place for responding to spills. Hazardous waste resulting from fuel pier demolition would include building materials falling under the Universal Waste Rule, creosote-treated wood components and paint that may contain lead or other metals. All hazardous wastes would be properly characterized and disposed at appropriate facilities with sufficient receiving capacity. There are no existing Installation Restoration, Resource Conservation and Recovery sites or County of San Diego Unauthorized Release Sites on or in the vicinity of the project area that would be affected by implementation of either alternative. The new fuel pier would be built and operated in compliance with all federal and state requirements for pipeline and bulk fuel safety.

The Everingham Brothers Bait Company Temporary properly manages and disposed of solid wastes aboard its two San Diego Bay bait barges. Temporary relocation of the barges under Alternative 1 or Alternative 2 would not change solid waste types, volumes, or management practices aboard the barges. Solid waste generated from demolition and construction associated with implementation of Alternative 1 or Alternative 2 would be evaluated for resale, recycling, and diversion in accordance with the NRSW Integrated Solid Waste Management Program to minimize the volume of waste sent to a landfill. For the reasons listed above, implementation of Alternative 1 or 2 would not have a significant impact with respect to solid waste.

As stated above in Section 4.1.3.1, timing for the Scripps Institution of Oceanography Pier Replacement project is expected to coincide with the NBPL P-151 Fuel Pier Replacement Project in 2013. The Scripps Pier project would be required to implement measures to minimize impacts to relative to hazardous materials/ wastes and solid wastes. Other reasonably foreseeable projects are not anticipated to take place concurrently with the Proposed Action, so potential impacts from those projects would be moderated over space and time. Therefore, when added to the impacts from other reasonably foreseeable projects, implementation of

either Alternative 1 or Alternative 2 would not result in a significant cumulative impact to hazardous materials, hazardous wastes and solid waste.

4.2.8 Airborne Noise

With implementation of Alternative 1 or Alternative 2airborne noise levels would be below established limits (NBPL fuel pier) or very short-term and intermittent (NMAWC Navy MMP temporary relocation site) and construction noise would cease upon completion of demolition/construction activities. Alternative 1 or Alternative 2 and most of the reasonably foreseeable projects would not likely occur at the same time and location; except the proposed Scripps Pier construction. The Scripps Institution of Oceanography Pier Replacement project would be located approximately 400 ft from residential areas in the La Playa neighborhood north of NBPL. Assuming similar construction activities as Alternative 1, estimated noise levels for the Scripps Pier project are shown in Table 4.2-1. Noise levels in La Playa would be strongly dominated by the noise generated at the Scripps Pier with 78.2 dBA when combined with Alternative 1, but would be 78.1 dBA if only the Scripps Pier noise is considered. On the other hand, noise levels at the NBPL Child Development Center (CDC [day care facility]) would be 64.6 dBA cumulatively but would be 63.2 dBA when Alternative 1 is considered by itself. Either case exceeds the classroom criteria, but the noise levels would not be continuous and it is likely that modern construction design and materials used in the CDC building would provide a sufficient sound buffer so that indoor noise levels would not exceed the classroom criteria. Some or all of the BMPS described in Section 3.8.3.4 (noise monitoring for classroom criteria, acoustic blankets around the pile driver or use of pile cushions) could be implemented if additional noise attenuation is desired. It is possible that the USACE San Diego Harbor Maintenance Dredging Project and Alternative 1 or Alternative 2 could happen at the same time as Alternative 1 or Alternative 2. However, Alternative 1, Alternative 2, or the USACE San Diego Harbor Maintenance Dredging Project would not have a significant impact with respect to noise. Noise levels from the Scripps project alone would exceed the San Diego construction noise ordinance limit of 75 dBA at La Playa, but the cumulative contribution from Alternative 1 or Alternative 2 would be negligible. Therefore, implementation of Alternative 1 or Alternative 2, in conjunction with other projects listed in Section 4.1 would not result in significant cumulative noise impacts.

Table 4.2-1. Cumulative Noise Levels at La Playa and NBPL CDC

Receptor Point	*Distance from Alternative 1[1] Miles(km)*	*Distance from Scripps Pier Miles*	*Construction-Related Noise (dBA Leq)*		
			Alternative 1 only[1]	**Scripps Pier only**	**Combined noise levels**
La Playa	0.47 (0.73)	0.07(0.12)	62.3	78.1[2]	78.2[2]
CDC NBPL (Building 377)	0.42 (0.68)	0.68 (1.1)	63.2[3]	59.0	64.6[3]

Notes [1]Approach pier construction used for cumulative impacts since it is the highest noise levels relative to La Playa.
[2] Exceeds City of San Diego construction noise ordinance limit criteria of 75 dBA.
[3] Exceeds recommended classroom criteria of 60 dBA Leq outdoor noise levels for an interior noise level of 35 dBA with windows closed. Refer to best management practices in Section 3.8.3.4 for noise monitoring for classroom criteria and additional noise reduction measures if results indicate further reductions are necessary.

4.2.9 Transportation and Circulation

With implementation of Alternative 1 or Alternative 2, traffic avoidance and minimization measures would be used to reduce use of congested roadways during the temporary construction period. The number of additional workers employed at the new fuel pier would be minimal, so there would not be a significant permanent change in daily commute traffic volumes or patterns. As discussed above, proposed construction activities for the proposed Scripps Pier replacement project are expected to occur at the same time as those of Alternative 1 or 2. According to data furnished by the Scripps Institution of Oceanography University of San Diego through their engineering consultant (Anchor QEA 2012), approximately 30 workers and 12 trucks are anticipated to access the site on a daily basis during construction. Workers for the Scripps project would access that worksite using Rosecrans Street. Assuming one inbound and one outbound trip for each worker and truck, the Scripps Pier replacement project would add 84 daily vehicle trips to Rosecrans Street.

As indicated in Section 3.10 Traffic and Circulation in Table 3.10-3, due to diversion of existing employee trips during construction, Alternative 1 or 2 would result in a net increase of 16 trips per day on Rosecrans Street. As shown in Section 3.10 in Table 3.10-2, segments of Rosecrans Street are characterized by LOS E conditions, but Alternative 1 or 2 would not have a significant impact on this segment. When taken together with construction trips from the Scripps Pier site, the cumulative traffic increase on Rosecrans Street would be 100 daily trips. The cumulative change in the volume to capacity (V/C) ratio on this segment with these additional trips is 0.25 percent (i.e., 100 daily trips divided by the LOS E Capacity of 40,000). The City of San Diego's significance criteria is a 2.0 percent increase on segments characterized by LOS E or F.

The Navy would issue a Notice to Mariners when in-water components of this project are occurring. As shown in Figure 2-5, all of the in-water construction zone for the proposed fuel pier replacement project would be within an existing navigation restricted area (Security Zone) that is off-limits to civilian vessels. Most of the Scripps Pier in-water construction zone is in Navy waters, and it would lie within the Security Zone as well. There would be about 600 ft of open water between the part of the Scripps Pier construction zone that is outside the Security Zone and the southern tip of Shelter Island, leaving sufficient space for civilian vessels. Therefore, implementation of either Alternative 1 or Alternative 2, in conjunction with other projects listed in Section 4.1 would not result in significant cumulative impacts to transportation circulation, and marine traffic.

4.2.10 Air Quality

4.2.10.1 Criteria Pollutants

<u>Alternative 1</u>

The Region of Influence in this air quality cumulative effects analysis includes the San Diego Air Basin. With implementation of Alternative 1 or Alternative 2, the minor impacts to air quality that could contribute to potential cumulative impacts would be from the short term air emissions from trucks and vehicles used during the construction of the project. Operational air

emissions from Alternative 1 would not change from existing conditions and would not result in long term increases in air emissions. Cumulative projects would also be required to conform to Clean Air Act (CAA) conformity requirements and the San Diego Air Basin State Implementation Plan and would not produce significant amounts of air emissions.

Nominal cumulative impacts would result from Alternative 1, in conjunction with impacts from other potentially cumulative projects (listed in Section 4.1). For all projects, construction and operation activities would produce air emissions that would be well below applicable CAA conformity significance thresholds.

The one project that could have combined cumulative air impacts is the Scripps Pier construction project, which would occur at the same time as Alternative 1 and involve similar activities. Table 4.2-2 presents a summary of the cumulative emissions from Alternative 1 and the Scripps Pier Replacement construction project.

Table 4.2-2. Cumulative Construction Emissions for NBPL Fuel Pier Replacement – Alternative 1 and Scripps Pier Replacement Project

Construction Year	Emissions (tons/year)					
	CO[1]	**VOCs[2]**	**NOx[2,3]**	**SOx[3]**	**PM_{10}[3]**	**$PM_{2.5}$[3]**
2013 – NBPL Fuel Pier	4.73	1.81	13.51	0.01	0.42	0.37
Total 2013	**4.73**	**1.81**	**13.51**	**0.01**	**0.42**	**0.37**
2014 – NBPL Fuel Pier	14.14	8.25	33.26	0.05	1.12	0.97
2014 – Scripps Pier	8.39	2.78	23.74	0.03	0.83	0.74
Total 2014	**22.53**	**11.03**	**57**	**0.08**	**1.95**	**1.71**
2015 – NBPL Fuel Pier	22.84	14.27	44.89	0.07	1.90	1.63
2015 – Scripps Pier	6.54	1.88	18.95	0.02	0.64	0.59
Total 2015	**29.38**	**16.15**	**63.84**	**0.09**	**2.54**	**2.22**
2016 – NBPL Fuel Pier	14.24	9.75	35.52	0.05	1.26	1.10
2016 – Scripps Pier	1.80	0.66	2.68	0.00	0.13	0.11
Total 2016	**16.04**	**10.41**	**38.2**	**0.05**	**1.39**	**1.21**
de minimis Threshold/ Major Source Threshold[4]	100	100	100	100	100	100
Exceeds Threshold?	No	No	No	No	No	No

Notes: (1) SDAB is considered a maintenance area for the CO NAAQS.

(2) SDAB is currently classified as a moderate nonattainment area for the 8-hour O_3 NAAQS; VOCs and NOx are precursors to the formation of O_3. However, the USEPA is in the process of redesignating the SDAB as a serious nonattainment area. Should the reclassification occur, the *de minimis* threshold will be 50 tons per year for VOCs and NO_x. Alternative 1 emissions would be below the 50 tons per year threshold as well.

(3) SDAB is in attainment of the NAAQS for NOx, SOx, PM_{10}, and $PM_{2.5}$.

(4) *de minimis* thresholds are developed from the General Conformity Rule for nonattainment and maintenance pollutants; NAAQS attainment pollutants (i.e., SOx, PM_{10}, and $PM_{2.5}$) are evaluated based on SDAPCD major source thresholds.

The combined air emissions of Alternative 1 and cumulative projects would not contribute to an exceedance of an ambient air quality standard. As a result, proposed construction and operational activities would produce less than cumulatively considerable air quality impacts. Therefore, Alternative 1, in conjunction with the potentially cumulative projects listed in Section 4.1 would not result in significant cumulative impacts to air quality.

Alternative 2

The air quality impacts from Alternative 2 would essentially be the same as described under Alternative 1. Therefore, implementation of Alternative 2 would not result in significant cumulative impacts to air quality.

4.2.10.2 Greenhouse Gas Cumulative Effects Analysis

The potential effects of Greenhouse gasses (GHGs) emissions are by nature global and cumulative and it is impractical to attribute climate change to individual activities. Therefore, an appreciable impact on global climate change would only occur when GHG emissions associated with Alternative 1 or Alternative 2 are combined cumulatively with GHG emissions from other man-made activities on a global scale.

Alternative 1

Table 4.2-3 summarizes the annual GHG emissions that would occur with implementation of Alternative 1.

Table 4.2-3. Estimated Annual GHG Emissions – Alternative 1

Construction Year	Metric tons per year			
	CO_2	CH_4	N_2O	CO_2e[1]
2013	1,462	0.33	10.22	4,637
2014	4,720	1.28	6.20	6,669
2015	6,498	1.42	7.35	8,806
2016	5,178	1.58	6.20	7,133

Note: [1]$CO_2e = CO_2 + (21 * CH_4) + (310 * N_2O)$

As an indication of the nominal relative magnitude of these emissions, total annual CO_{2e} emissions in the United States were approximately 7.05 billion metric tons (USEPA 2008). Total CO_{2e} emissions in California in 2008 were approximately 474 million metric tons (CARB 2012).

Potentially cumulative projects in the vicinity of Alternative 1 (listed in Section 4.1) could also release a nominal amount of GHGs from construction and operation activities when compared to the total annual CO_{2e} emissions in the United States. In addition, in response to DoD directives such as EO 13221 *Energy Efficient Standby Power Devices* and EO 13423 *Strengthening Federal Environment, Energy, and Transportation Management*, the Navy has taken a number of steps to reduce GHG emissions from their activities. These actions include developing energy efficient technologies and weapons systems, improving military and civilian vehicles fuel efficiency, utilizing alternative fuel vehicles and electric vehicles, improving energy efficiency at Navy facilities, and installing solar and other renewable energy sources at Navy facilities.

Therefore, when GHG impacts from Alternative 1 are added to the GHG impacts from the cumulative projects, there would not be significant GHG cumulative impacts to global climate change from implementation of Alternative 1.

Alternative 2

The GHG effects from implementation of Alternative 2 would be similar to those effects from Alternative 1. Therefore, there would not be significant GHG cumulative impacts to global climate change from implementation of Alternative 2.

4.2.11 Socioeconomics and Environmental Justice

Impacts to socioeconomics and environmental justice from Alternative 1 or Alternative 2 would be beneficial overall. There would be indirect, temporary, adverse impacts to the charter fishing industry, which would be less than significant. It is likely that none of the reasonably foreseeable projects described in Section 4.1 would reduce beneficial impacts or exacerbate adverse impacts. Therefore, implementation of either Alternative 1 or Alternative 2 in conjunction with other projects listed in Section 4.1 would not result in significant cumulative impacts to socioeconomics and environmental justice.

4.3 CUMULATIVE IMPACTS CONCLUSION

Cumulative impacts to the environmental resource areas evaluated herein from Alternative 1, or Alternative 2, in conjunction with other past, present, and reasonably foreseeable actions, would not be significant.

4.4 POSSIBLE CONFLICTS BETWEEN THE ACTION AND THE OBJECTIVES OF FEDERAL, REGIONAL, STATE, AND LOCAL PLANS, POLICIES, AND CONTROLS

Implementation of Alternative 1 or Alternative 2 would be consistent with federal, regional, state and local plans, policies, and controls to the extent required by federal law and regulation. No potential conflicts have been identified. Table 4.4-1 provides a summary of environmental compliance with implementation of Alternative 1 or Alternative 2.

Table 4.4-1. Status of Compliance with Relevant Land Use Plans, Policies, and Controls

Plans, Policies, and Controls	*Responsible Agency*	*Status of Compliance*
NEPA (42 USC § 4321 *et seq.*) Department of the Navy Procedures for Implementing NEPA (32 CFR 775)	U.S. Navy	This EA has been prepared in accordance with the CEQ Regulations implementing NEPA and U.S. Navy NEPA procedures.
Coastal Zone Management Act (16 CFR § 1451 *et seq.*)	U.S. Navy	The Coastal Zone Management Act (CZMA) of 1972 (16 USC Section 1451) encourages coastal states to be proactive in managing coastal zone uses and resources. CZMA established a voluntary coastal planning program and participating states submit a Coastal Management Plan to the National Oceanic and Atmospheric Administration for approval. Under the CZMA, federal agency actions within or outside the coastal zone that affect any land or water use or natural resource of the coastal zone shall be carried out in a manner that is consistent to the maximum extent practicable with the enforceable policies of the approved state management programs. Each state defines its coastal zone in accordance with the CZMA. Excluded from any coastal zone are lands the use of which by law is subject solely to the discretion of the federal government or which is held in trust by the Federal government (16 USC 1453). Accordingly, although Naval Base Point Loma land is federal government property and therefore, excluded from the coastal zone, the Navy nonetheless conducted an effects analysis as part of its determination of the action's effects for purposes of federal consistency review under the CZMA. This was done to factually determine whether the action (even if conducted entirely within a federal enclave) would affect any coastal use or resource. A Coastal Consistency Negative Determination (CCND) has been prepared and is presented in Appendix A.
CWA (§§ 401-402 and 404, 33 USC § 1251 *et seq.*)	USEPA, U.S. Army Corps of Engineers (USACE)	Alternative 1 or Alternative 2 would not involve the release of chemicals requiring an NPDES permit. A construction NPDES permit would be obtained that would remain in effect for the length of the project The project would involve in-water demolition, dredging, and construction activities for which a CWA Section 404/ Rivers and Harbors Act Section 10 permit from the USACE would be obtained, along with the related Section 401 Water Quality Certification from the RWQCB.
CAA, as amended (42 USC § 7401 *et seq.*)	USEPA	Per CAA regulations, Alternative 1 or Alternative 2 would not compromise air quality attainment status or conflict with attainment status and maintenance goals established in the SCAQMD SIP. A formal CAA conformity determination is not required. Alternative 1 Alternative 2 would be in compliance with the CAA and would comply with all applicable SDCAPCD Rules and Regulations.
Emergency Planning and Community Right-to-Know Act (EPCRA) of 1986, 42 USC §§ 11001-11050.	U.S. Navy	The Navy would inform Local Emergency Planning Committees of Alternative 1 or Alternative 2 as required to assist them in developing plans to prepare for and respond to chemical emergencies.
EO 11990, *Protection of Wetlands* (42 Federal Register 26961)	U.S. Navy	Alternative 1 or Alternative 2 would not impact wetlands (none are present in the proposed project areas at NBPL and NMAWC) and would be in compliance with EO 11990.
ESA (16 USC § 1531)	NMFS/USFWS	Alternative 1 or Alternative 2 are not likely to adversely affect any federally listed endangered or threatened species or critical habitat and

Table 4.4-1. Status of Compliance with Relevant Land Use Plans, Policies, and Controls

Plans, Policies, and Controls	*Responsible Agency*	*Status of Compliance*
		formal consultation with USFWS is not required. The Navy would consult informally with NMFS (green sea turtle) and USFWS (California least tern) (refer to Appendix F.2); therefore, Alternative 1 or Alternative 2 would be in compliance with the ESA.
Marine Mammal Protection Act of 1972 (16 USC § 1361-1407)	NMFS	Non-injury, Level B behavioral takes of marine mammals are likely to occur as a result of pier demolition and construction. With implementation of monitoring and ramp-up procedures as proposed, no Level A (permanent hearing loss) takes would occur, and Level B takes due to temporary hearing loss are unlikely to occur for Alternative 1 or Alternative 2. The Navy would obtain an Incidental Harassment Authorization from NMFS for the anticipated marine mammal takes before commencing in-water demolition/construction activities. Therefore, Alternative 1 or Alternative 2 would be in compliance with the MMPA.
EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations* (59 Federal Register 7629)	U.S. Navy	There would be no disproportionately high and adverse human health or environmental effects on minority populations and low-income populations. Alternative 1 or Alternative 2 would be in compliance with EO 12898.
EO 13045, *Protection of Children from Environmental Health Risks and Safety Risks* (62 Federal Register 19885)	U.S. Navy	Under Alternative 1 or Alternative 2, the proposed project activities during demolition of the existing fuel pier and construction and operation of the proposed new fuel pier would take place within military facilities that are off-limits to the general public, and where children are not present. The shoreside construction zones would be fenced and warning signs would be posted to prevent unauthorized access. In-water construction zones would be marked with buoys and signs to restrict entry by civilian vessels. The proposed demolition of the existing fuel pier, and construction and operation of the new fuel pier would be performed in compliance with all applicable federal and state requirements for hazardous material and hazardous waste management, bulk fuel storage and transfer, and workplace safety. These measures would minimize environmental health and safety risks to the public overall, including children. For these reasons, Alternative 1 or Alternative 2 would not disproportionately expose children to environmental health risks or safety risks and would be in compliance with EO 13045.
EO 13089, *Coral Reef Protection* (63 Federal Register 32701)	U.S. Navy	Alternative 1 or Alternative 2 would not affect any coral reef ecosystem and would be in compliance with EO 13089.
Magnuson-Stevens Fishery Conservation and Management Act 16 U.S.C § 1801, et. Seq. as amended by the Sustainable Fisheries Act of (Public Law 104-267)	NMFS	Alternative 1 or Alternative 2 would have minimal adverse effects on EFH for federally managed fish species within the Coastal Pelagic Species and West Coast Groundfish FMPs. These effects would be temporary and limited in scope, and eelgrass habitat shaded by the proposed fuel pier, and as impacted by the SSC Marine Mammal Program relocation, would be offset through use of the eelgrass mitigation bank. Both Alternative 1 and Alternative 2 contain measures to avoid and minimize any remaining potential adverse effects to EFH. In conjunction with the NEPA process, the Navy would consult informally with NMFS to determine whether additional measures may be warranted (refer to Appendix F.1); therefore, Alternative 1 or Alternative 2 would be in compliance with the Magnuson-Stevens Fishery Conservation and Management Act.
EO 13186, *Responsibilities of Federal Agencies to Protect*	U.S. Navy	Alternative 1 or Alternative 2 are not likely to have a measurable negative effect on migratory bird populations and would be in

Table 4.4-1. Status of Compliance with Relevant Land Use Plans, Policies, and Controls

Plans, Policies, and Controls	*Responsible Agency*	*Status of Compliance*
Migratory Birds (66 Federal Register 3853)		compliance with EO 13186.
NHPA (Section 106, 16 USC 470 *et seq.*)	Advisory Council in Historic Preservation, California State Historic Preservation Office	Alternative 1 or Alternative 2 would be designed to avoid effects on NRHP or eligible properties. Alternative 1 or Alternative 2 would not affect any *known* archaeological sites or other *known* cultural resources at NBPL, as none are found within the Area of Potential Effect (APE) at, as defined under the Navy Region Southwest (NRSW) Metro San Diego Programmatic Agreement (PA). The DFSP Fuel Pier (Pier 180, built in 1908 and 1942) has previously been determined by consensus and consultation to be ineligible for the National Register of Historic Places. The construction laydown area at NBPL would be staged outside the 100-meter APE buffer of identified historic properties in the nearby Fort Rosecrans Historic District. A 1997 investigation inventoried and evaluated all of NMAWC and concluded that NMAWC contains no built properties or archaeological resources eligible for listing in the National Register of Historic Places. However, while there are no identified built or archaeological historic properties within the APE at NBPL, there is a buried archaeological *potential* under the quay wall fill shoreside of the existing fuel pier. The project would implement on-site monitoring by qualified archaeologists to identify any such features or deposits encountered during site preparation excavations on the quay wall portion of the project area. Through these procedures, Alternative 1 or Alternative 2 would be in compliance with the NHPA.
Sikes Act Improvement Act (16 USC § 670a *et seq.*)	U.S. Navy	Alternative 1 or Alternative 2 would be in compliance with the Sikes Act Improvement Act.

4.5 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

Resources that are irreversibly or irretrievably committed to a project are those that are used on a long-term or permanent basis. This includes the use of non-renewable resources such as metal and fuel, and other natural or cultural resources. These resources are irretrievable in that they would be used for this project when they could have been used for other purposes. Human labor is also considered an irretrievable resource. Another impact that falls under this category is the unavoidable destruction of natural resources that could limit the range of potential uses of that particular environment.

Although proposed demolition and construction activities would result in the consumption of fuel, concrete and steel, Alternative 1 or Alternative 2 would not result in a significant irreversible or irretrievable commitment of resources at NBPL or NMAWC.

4.6 RELATIONSHIP BETWEEN SHORT-TERM ENVIRONMENTAL IMPACTS AND LONG-TERM PRODUCTIVITY

NEPA requires an analysis of the relationship between a project's short-term impacts on the environment and the effects that these impacts may have on the maintenance and enhancement of the long-term productivity of the affected environment. Impacts that narrow the range of beneficial uses of the environment are of particular concern. This refers to the possibility that choosing a single development option reduces future flexibility in pursuing other options, or that giving over a parcel of land or other resource to a certain use often eliminates the possibility of other uses being performed at that site.

Alternative 1 or Alternative 2 would, reversibly, dedicate parcels of land, equipment, and other resources to a particular use during a limited period of time. These resources would not be available for other productive uses throughout the duration of the project. However, these impacts are considered negligible, as the facilities and geographic areas associated with Alternative 1 or Alternative 2 are designated for and have historically accommodated the types of uses proposed. Therefore, Alternative 1 or Alternative 2 would not result in any impacts that would reduce environmental productivity or permanently narrow the range of beneficial uses of the environment.

4.7 GROWTH INDUCEMENT

CEQA Guidelines (§15126.2(d)) require that an environmental review document evaluate the growth inducing impacts of a proposed project:

"Discuss the way in which a proposed project could foster economic or population growth, or the construction of additional housing, either directly or indirectly, in the surrounding environment. Included in this are projects that would remove obstacles to population growth (a major expansion of a wastewater treatment plant might, for example, allow for more construction in service areas). Increases in the population may tax existing community service facilities, requiring construction of new facilities that could cause significant environmental effects. Also discuss the characteristic of some projects that may encourage and facilitate other activities that could significantly affect the environment, either individually or cumulatively. It must not be assumed that growth in any area is necessarily beneficial, detrimental, or of little significance to the environment."

A project can bring about the potential for direct and/or indirect growth inducement. A project can lead to direct growth inducement if it involves the development of new housing units. A project can create the potential for indirect growth inducement if it would create sizable new permanent employment opportunities or if it would involve a substantial construction effort with sizable short-term employment opportunities that would indirectly stimulate the need for additional housing and services to support a large temporary population. A project would also have an indirect growth inducement effect if it would remove obstacles to additional growth and development, such as removing a constraint on a required public service, for instance additional public infrastructure such as new roads or increased utilities capacity.

The Point Loma Fuel Pier Replacement project would be a temporary construction project to replace existing infrastructure that is not intended for use by the general public; it would not be expected to induce growth either directly or indirectly. The project would not induce any direct growth because it would not involve the construction of new housing units. There would be no indirect growth because the project would provide no permanent new employment opportunities, and the temporary demand for construction employment could be filled by the existing construction labor supply of San Diego County. Also, since the project replaces existing infrastructure and enables the continuation of activities that currently take place, the project would not encourage, facilitate, or remove constraints on new activities that would lead to new growth.

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CHAPTER 5
AGENCIES AND PERSONS CONTACTED

Agencies

California Coastal Commission, Mark Delaplaine

National Marine Fisheries Service (NMFS), Bob Hoffman, Monica DeAngelis

San Diego Port Tenants Association Sharon Bernie-Cloward, President

U.S. Army Corps of Engineers (USACE) Robert Revo Smith, Jr. Environmental Engineer/Civil Engineer Regulatory Project Manager Carlsbad Field Office

U.S. Coast Guard (USCG) CDR Jeremy C. Smith, Assistant Sector Response Chief/Air Operations Officer Sector San Diego

U.S. Environmental Protection Agency (USEPA), Jorine Campopiano, Environmental Scientist, Wetlands Region 9 Southern California Field Office, Los Angeles

USEPA, Allan Ota, Oceanographer/Regional Ocean Dumping Program Coordinator, Dredging and Sediment Management Team (WTR-8) Region 9

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Key Naval Facilities Engineering Command Southwest (NAVFAC Southwest) and Naval Base Point Loma (NBPL) Team Members

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Mitchell A. Perdue, Senior Biologist and Deputy Dive Safety Coordinator, NAVFAC Southwest Coastal IPT

Alberto Sanchez, NAVFAC Southwest, Senior Civil Engineer, Construction Project Manager

Jeff Seib, Burns and McDonnell Engineering Company (Burns and McDonnell), PE Project Manager Fueling Group

Lisa Seneca, NAVFAC Southwest, National Environmental Policy Act (NEPA) Project Manager and Senior NEPA Planner

David Sproul, NAVFAC Southwest, Cultural Resources Historian

Alan Vancil, Regional Environmental Program Manager, NAVSUP Fleet Logistics Center San Diego

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CHAPTER 7
PREPARERS

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Appendix A

Agency Correspondence
[To Be Provided in the next DEA Submittal]

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Appendix B

Public Involvement

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Naval Base Point Loma Fuel Pier Replacement and Dredging Environmental Assessment (EA) Scoping Summary Report June 2012

The U.S. Navy (Navy) conducted notification and outreach activities in support of the scoping phase for the Naval Base Point Loma Fuel Pier Replacement and Dredging Environmental Assessment (EA). The intent of public outreach for this phase of the project was to provide an opportunity for the public and agencies to both learn about and comment on the Proposed Action and potential resource areas to be studied in the EA. Efforts to notify the public, media, government agencies and elected officials of the scoping period and open house public meeting were conducted in accordance with the Navy's Public Involvement Plan for the Naval Base Point Loma Fuel Pier Replacement and Dredging EA.

This summary report includes detailed information about public involvement and outreach activities conducted by the Navy for the scoping phase of the EA.

Summary of Activities

A. Early Engagement and Stakeholder Briefings

As part of the outreach program, the Navy notified and engaged key stakeholders prior to the official notification published in the U-T San Diego. The Navy conducted initial phone calls and meetings with the Everingham Bros. Bait Co., a business that would potentially be affected by the Proposed Action. Questions were answered in advance of the scoping meeting, and the company was able to coordinate directly with the Navy.

B. Notification Activities

The following notifications were made to inform people of the scoping meeting and public comment period:

Newspaper Advertisement

A display advertisement (Exhibit A) was placed in the *U-T San Diego*. The newspaper advertisement ran on Saturday, April 28, 2012, in conjunction with the beginning of the 30-day public scoping comment period.

LOCATION	NEWSPAPER	DATE OF ADVERTISEMENT
San Diego, Calif.	*U-T San Diego (daily)*	April 28, 2012

Postcard Mailer
A postcard mailer (Exhibit B) announcing the public scoping meeting, Proposed Action, comment information and project information was sent to 306 individuals and organizations on Thursday, April 26, 2012.

Press Release
A press release (Exhibit C) was distributed by the Naval Base Point Loma Public Affairs Office to media outlets on Monday, April 23, 2012. It announced the public scoping meeting, Proposed Action, comment information and project information.

Stakeholder Letter
A stakeholder letter (Exhibit D) was distributed to 66 key stakeholders, including federal, state and local elected officials and regulatory agencies, as well as a few private companies and fishing groups/marinas.

C. Risk Communication and Media Training and Scoping Meeting Dry Run
The Navy held a risk communication and media training session and conducted a dry run on May 2, 2012, at Naval Base Point Loma to prepare the project scoping team for how to handle inquiries from stakeholders and media, and to prepare for public interface at the scoping meeting. Topics included: risk communication principles; how to handle difficult questions and possible hostile individuals; a review of key messages and frequently asked questions and answers; the Proposed Action and alternatives; and an overview of the scoping meeting format and poster stations.

D. Scoping Meeting
The Navy held one scoping meeting, which consisted of an open house information session and poster displays. The scoping meeting was held on May 3, 2012, from 5 to 8 p.m., at the Loma Portal Elementary School Auditorium in San Diego, Calif. Notification efforts are in Section A of this summary report.

Media availability was held at 4:30 p.m. prior to the scoping meeting to allow the media to ask questions of Navy representatives prior to the arrival of members of the public. Although this timeframe was specifically set up to allow the media to interview subject matter experts (SMEs), media representatives could arrive at any time between 4:30 and 8 p.m. No media representatives attended the meeting.

The public scoping meeting was held in an informal open house format where members of the public could arrive at any time during the three-hour event. Staff at the welcome station greeted guests and encouraged meeting attendees to sign in and be added to the project mailing list. A packet containing four project fact sheets and a comment form was distributed to attendees, along with verbal direction on the general flow of the poster stations.

Poster stations (see Figure 1) were set up around the room offering visual displays, fact sheets and comment forms. Subject matter experts staffed each poster station to answer questions and provide project information.

A comment station with tables, chairs, pens, comment forms and a digital voice recorder for oral comments was also provided to facilitate the public completing and submitting written or oral comments at the meeting. Members of the public were encouraged to fill out comment forms to ensure their comments were submitted during the scoping comment period. Comment forms were also available at each poster station. Individuals could submit completed forms at the meeting or mail them to the address provided on the comment form and on fact sheets. Meeting attendees were also informed that they could submit comments via the project website.

The following outreach materials were developed for use during the public scoping meeting:

Fact Sheets

Four double-sided, color fact sheets (Exhibit E) were developed and included the following topics: Proposed Action and Alternatives, Construction and Logistics, Environmental Resources and the National Environmental Policy Act. The fact sheets were distributed to scoping meeting attendees and posted for the public on the project website.

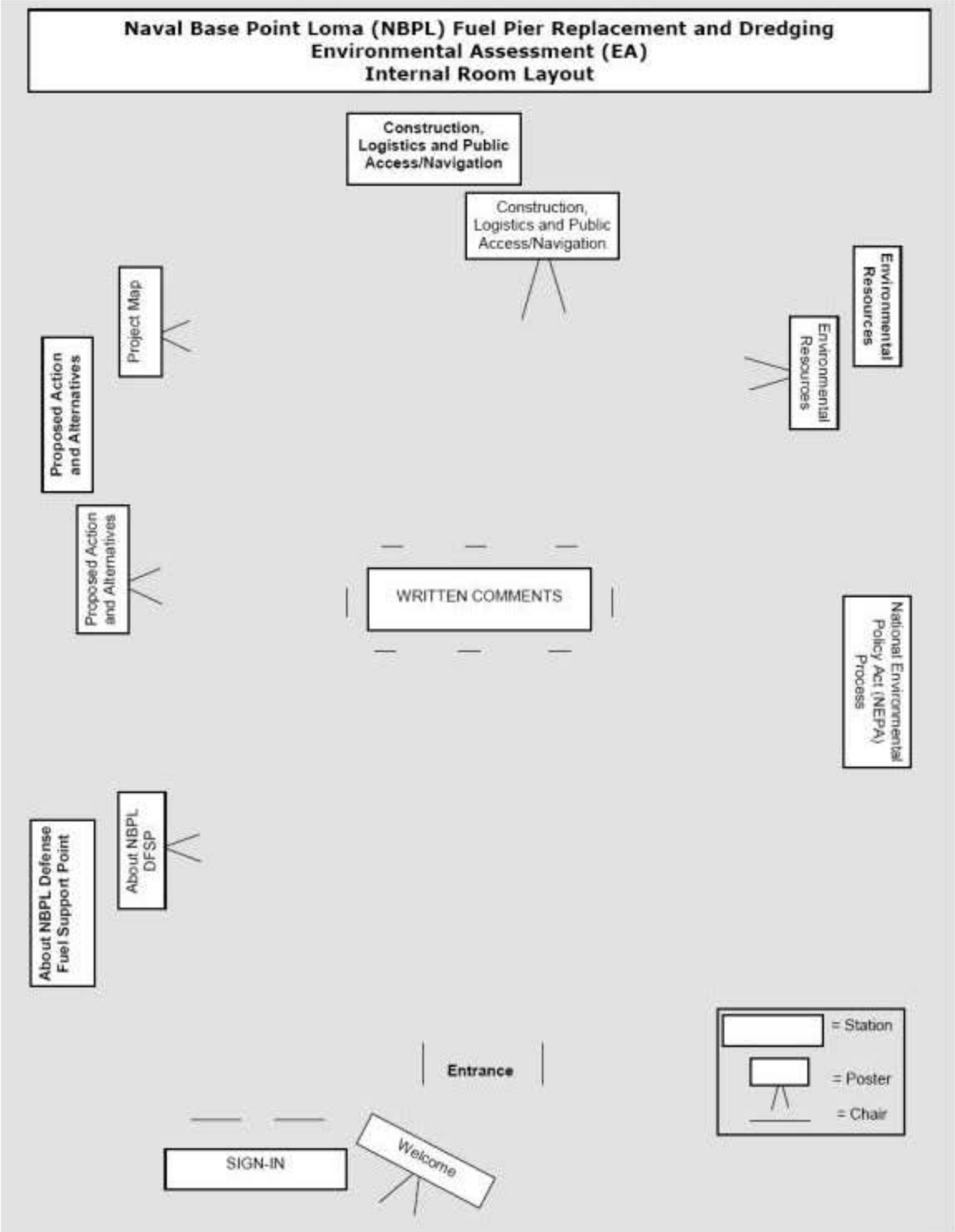
Posters

Six color posters (Exhibit F) were developed and included the following topics: Welcome, Study Area Map, About Naval Base Point Loma, Proposed Action and Alternatives, Construction and Logistics and Environmental Resources. The posters were on display during the scoping meeting and posted for the public on the project website.

Handouts

Two handouts (Exhibit G) were developed for the scoping meeting, including a poster station overview and comment form. The poster station overview familiarized attendees with the meeting format. The comment form allowed attendees to submit written comments at the meeting.

Figure 1: Scoping Meeting Room Layout – Internal Use



Attendance

Meeting attendees were encouraged to sign in at the welcome table. The information below reflects the number of meeting attendees who attended the scoping meeting.

- Twenty (20) people attended the Point Loma public scoping meeting including a staff member from Representative Susan Davis' office and several employees from the Everingham Bros. Bait Co.

Findings

This section is intended to illustrate the main issues heard from the public during the scoping meeting; it is not meant to capture all aspects of the comments or to serve as a legal record.

The project team answered questions and provided information to the public during the scoping meeting. Some of the general concerns and questions expressed by the public about this project during the public information meeting include (not prioritized):

NEPA Process

- Questions about current and future notification efforts
- Concern about low scoping meeting attendance
- Positive reactions to the open house format
- Positive reactions to informational materials

Socioeconomic and Community Impacts

- Concern about work hours for maintenance activities
- Concern about access for sailors, fishermen and recreational boaters

Construction and Logistics

- Questions about the depth and amount of dredging
- Concerns about relocation of bait barge from bait barge company, fisherman and tourism company
- Concern from marina operator about the constraints the project may have on planned repairs for the marina
- Concern about Navy Marine Mammal Program relocation

E. Media Coverage

There were television announcements on KGTV-ABC Channel 10 and KMFB-CBS Channel 8 and a radio announcement on KOGO 95.7FM about the scoping meeting on Thursday, May 3.

F. Scoping Comment Period

The 45-day comment period was from April 28, 2012, to June 11, 2012. Below is a summary (Figure 2) of the written comments received during this period. The summary is not meant to capture all aspects of the comments or to serve as a legal record.

Figure 2. Summary of Public Comments Received

Comment #	Organization	Commenter Name	Summary of Comment	*Marine Biological Resources*	*Water Quality*	*Hazardous Materials and Waste*	*Air Quality*	*Socioeconomics and Env Justice*	*Transportation and Circulation*	*Public Health and Safety*	*Construction*	*Purpose and Need/Cost*	*NEPA Process/Public Involvement*	*Noise*	*Visual and Aesthetics*	*Recreation*	*Other*
Federal Agency																	
No comments received.																	
Comment #	**Organization**	**Commenter Name**	**Summary of Comment**	*Marine Biological Resources*	*Water Quality*	*Hazardous Materials and Waste*	*Air Quality*	*Socioeconomics and Env Justice*	*Transportation and Circulation*	*Public Health and Safety*	*Construction*	*Purpose and Need/Cost*	*NEPA Process/Public Involvement*	*Noise*	*Visual and Aesthetics*	*Recreation*	*Other*
State Agency																	
No comments received.																	
Comment #	**Organization**	**Commenter Name**	**Summary of Comment**	*Marine Biological Resources*	*Water Quality*	*Hazardous Materials and Waste*	*Air Quality*	*Socioeconomics and Env Justice*	*Transportation and Circulation*	*Public Health and Safety*	*Construction*	*Purpose and Need/Cost*	*NEPA Process/Public Involvement*	*Noise*	*Visual and Aesthetics*	*Recreation*	*Other*
Local Agency																	
No comments received.																	
Comment #	**Organization**	**Commenter Name**	**Summary of Comment**	*Marine Biological Resources*	*Water Quality*	*Hazardous Materials and Waste*	*Air Quality*	*Socioeconomics and Env Justice*	*Transportation and Circulation*	*Public Health and Safety*	*Construction*	*Purpose and Need/Cost*	*NEPA Process/Public Involvement*	*Noise*	*Visual and Aesthetics*	*Recreation*	*Other*
Federal Elected Official																	
No comments received.																	
Comment #	**Organization**	**Commenter Name**	**Summary of Comment**	*Marine Biological Resources*	*Water Quality*	*Hazardous Materials and Waste*	*Air Quality*	*Socioeconomics and Env Justice*	*Transportation and Circulation*	*Public Health and Safety*	*Construction*	*Purpose and Need/Cost*	*NEPA Process/Public Involvement*	*Noise*	*Visual and Aesthetics*	*Recreation*	*Other*
State Elected Official																	
No comments received.																	
Comment #	**Organization**	**Commenter Name**	**Summary of Comment**	*Marine Biological Resources*	*Water Quality*	*Hazardous Materials and Waste*	*Air Quality*	*Socioeconomics and Env Justice*	*Transportation and Circulation*	*Public Health and Safety*	*Construction*	*Purpose and Need/Cost*	*NEPA Process/Public Involvement*	*Noise*	*Visual and Aesthetics*	*Recreation*	*Other*
Local Elected Official																	
No comments received.																	

Comment #	Organization	Commenter Name	Summary of Comment	*Marine Biological Resources*	*Water Quality*	*Hazardous Materials and Waste*	*Air Quality*	*Socioeconomics and Env Justice*	*Transportation and Circulation*	*Public Health and Safety*	*Construction*	*Purpose and Need/Cost*	*NEPA Process/Public Involvement*	*Noise*	*Visual and Aesthetics*	*Recreation*	*Other*
Nongovernmental Organization																	
1	San Diego Audubon Society	James Peugh	• Concern about natural shoreline destruction and impact on species • Concern about potential loss of foraging value for waterfowl in the proposed area • Concerns about oil and toxic chemical spills as well as prevention of such and mitigation if a spill was to occur	X	X	X											
2	San Diego Coastkeeper	Jill Witkowski	• Concern about lead and asbestos containment • Concern about management of hazardous and non-hazardous waste from demolition and construction • Concern about impact on sewer system • Concern about impact of fuel or sewer spill • Concern about impact of demolition on marine life • Concern about impact on water quality • Concern about impact on sailing and navigation • Concern about waste from Marine Mammal Program relocation • Concern about compliance with Ocean Plan and Basin Plan water quality standards • Concern about compliance with federal legislation • Concern about comment period dates	X	X	X			X	X	X		X				
3	San Diegans for Open Government	Ian Towbridge	• Opposed to bait barge relocation sites														X

Comment #	Organization	Commenter Name	Summary of Comment	*Marine Biological Resources*	*Water Quality*	*Hazardous Materials and Waste*	*Air Quality*	*Socioeconomics and Env Justice*	*Transportation and Circulation*	*Public Health and Safety*	*Construction*	*Purpose and Need/Cost*	*NEPA Process/Public Involvement*	*Noise*	*Visual and Aesthetics*	*Recreation*	*Other*
Community Group																	
4	Restoration Advisory Board	Jim Gilhooly	• Concern about findings on previous fuel pier inspections • Concern about sediment contamination and disposal related to proposed dredging • Concern about budget • Concern about effects on Point Loma traffic • Suggestion that dimensions of new fuel pier should be governed by the number and size of vessels, high and low tides and flood levels • Suggestion that berthing area should be dredged to allow deeper vessels to berth close to shore • Concern about cathodic protection for steel structures because salt water environments are highly corrosive		X	X			X		X	X					
5	Challenged America	David Hopkins	• Concern about decreased sailing area and safety of navigation related to the proposed bait barge relocation						X	X						X	
6	Naval Base Point Loma Community Liaison Group	Nick Caldwell	• Concern about impact of proposed bait barge relocation Alternatives 4 and 4A on sailboat racing, navigation and safety						X	X						X	X
Comment #	**Organization**	**Commenter Name**	**Summary of Comment**	*Marine Biological Resources*	*Water Quality*	*Hazardous Materials and Waste*	*Air Quality*	*Socioeconomics and Env Justice*	*Transportation and Circulation*	*Public Health and Safety*	*Construction*	*Purpose and Need/Cost*	*NEPA Process/Public Involvement*	*Noise*	*Visual and Aesthetics*	*Recreation*	*Other*
Fishing Group/Marina/Yachting Group																	
7	The Rod and Reel Club at The Coronado Yacht Club	Paul Dodson	• Concern about loss of bait receivers														X

8	Ullman Sails San Diego	Chuck Skewes	• Concern about length of proposed pier and its affects on navigating the bay • Concern about decreased safety zone around fueling ships • Concern about height of proposed pier and wind shadow creating unsafe conditions • Concern about location of bait barge and its affects on sailboat racing						X	X						X	
9	Harbor Island/West Marina	Eric Leslie	• Concern about proposed relocation of Marine Mammal Program affect on West Marina's plans for pile driving								X						
10	Cortez Racing Association	Joe Saad	•Concern about navigation, accessibility and aesthetics related to the proposed bait barge relocation						X						X	X	
11	Silvergate Yacht Club	Brad Brown	• Concern about impact of proposed bait barge relocation on over 30 races and 2,000 sailors • Concern that alternatives were not analyzed thoroughly enough • Question about consideration of alternative flight and mooring operations					X	X				X			X	
12	Cortez Racing Association	Colleen Cooke	• Concern about impact of proposed bait barge relocation on recreational use of the bay and sailboat races													X	
13	Southwestern Yacht Club	Chris O'Brien	• Concern about impact on proposed bait barge relocation on sailboat races													X	
14	Recreational Boaters of California	Cleve Hardaker	• Concern about impact of proposed bait barge relocation on boater recreation and safety							X							
15	Southwestern Yacht Club	Geoff Longenecker	• Concern about impact of proposed bait barge relocation on safety and aesthetics							X					X		
16	San Diego Yacht Club	Kyle Clark	• Concern about impact of proposed bait barge relocation on safety and sailboat races							X						X	
17	San Diego Yacht Club	Jeff Johnson	• Concern about impact of proposed bait barge relocation on safety and boat traffic						X	X							

18	Cortez Racing Association	Susan Graff	• Concern about impact of proposed bait barge relocation on sailboat races and local businesses					X								X	
19	Southwestern Yacht Club, Anglers	Lynn Hull	• Concern about impact of bait barge relocation on costs to boaters, traffic and safety					X	X	X							
20	Southwestern Yacht Club	Roy Benstead	• Concern about impact of proposed bait barge relocation on beauty of the bay • Suggestion to move bait barges to the east side of Zuniga Jetty												X		X
21	San Diego Yacht Club	John Driscoll	• Concern about height of structure impacting sailing in the area • Suggestion to expand fueling operations across the bay to avoid moving the bait barges and contain potential spills			X			X		X					X	X
22	Cortez Racing Association	Lee Pearce	• Concern about impacts of proposed bait barge relocation on sailboat race course • Glad to know bait barge relocation would be temporary • Thank you for opportunity to submit comments						X				X			X	
23	Navy Broadway Complex Coalition	Don Wood	• Request for information regarding an Environmental Impact Statement and the scoping process										X				
Comment #	**Organization**	**Commenter Name**	**Summary of Comment**	*Marine Biological Resources*	*Water Quality*	*Hazardous Materials and Waste*	*Air Quality*	*Socioeconomics and Env Justice*	*Transportation and Circulation*	*Public Health and Safety*	*Construction*	*Purpose and Need/Cost*	*NEPA Process/Public Involvement*	*Noise*	*Visual and Aesthetics*	*Recreation*	*Other*
Individual																	
24		Howard Weiss	• Concern about marine mammal urine potentially causing a red tide • Concern about Navy's lack of outreach to boating community	X	X	X							X				
25		Yvonne Soria	• Request for more information on proposed bait barge relocation • Request for contact information										X				X
26		Carl Hancock	• Concern about aesthetics of the proposed bait barge relocation												X		
27		Robert Randall	• Concern about impacts of proposed bait barge relocation on racing courses, businesses and hotels and enjoyment of local sailors					X	X							X	X

28		Robert Peek	• Concern about proposed bait barge relocation														X
29		Stephen Carter	• Concern about proposed bait barge relocation attracting more people to the bay • Suggestion for Navy to look into other locations for bait barge relocation						X								X
30		Garry Schaeffer	• Concern about impacts of proposed bait barge relocation on aesthetics, boat traffic, navigation hazards and unwanted sea lion population	X					X	X					X		
31		Ryan Lorence	• Concern about impact of proposed bait barge relocation on sailboat racing and boating community													X	
32		Elese Coit	• Concern about impact of proposed bait barge relocation on recreation and boating use													X	
33		Dennis Case	• Suggestion for alternatives to bait barge relocation • Concern about impact of proposed bait barge relocation on natural beauty, recreational use of the bay and navigation • Concern about free anchorage for bait barge company • Suggestion to develop a committee of interested parties to find a solution						X				X		X		X
34		Anne Neiger	• Concern about impact of proposed bait barge relocation on races and recreational uses													X	
35		Shala Lawrence	• Concern about impact of proposed bait barge relocation on races and recreational uses • Concern about impact of proposed bait barge relocation on revenue to the city and private businesses					X							X	X	

36		Michael Fontaine	• Concern about impact of proposed bait barge relocation on fuel consumption and cost to boaters, aesthetics, congestion and navigational hazards • Concern about impacts of warmer water on bait fatality and yield • Suggestion to use Zuniga Jetty as bait barge location					X	X	X					X		
37		Linda Romero	• Concern about impact of proposed bait barge relocation on beauty of the bay and tourism					X							X		
38		Laura Goodwin	• Concern that bait barges will be relocated to the starting line of sailboat racing course • Concern about impacts of proposed bait barge relocation on hotels, restaurants and tourism					X	X							X	X
39		William Posner	• Concern about impact of proposed bait barge relocation on racing areas						X							X	
40		Carole More	• Concern about impact from bait barge odor on recreation and tourism					X								X	
41		Ryan Dillon	• Concern about impact of proposed bait barge relocation on racing areas and local organizations and businesses					X								X	
42		Joshua Lippitt	• Concern about odor and noise impacts by proposed bait barge relocation on sailing community											X	X		
43		LTCOL Mike Hatch	• Concern about impact of proposed bait barge relocation on sailboat races and smell and increase in bird droppings in park areas • Suggestion to move bait barges across channel												X	X	X
44		Dan Aeling	• Concern about impact of proposed bait barge relocation on tourism, recreation and aesthetics					X							X	X	
45		John Voigt	• Concern about impact of proposed bait barge relocation on boating, sailboat racing and aesthetics					X							X	X	
46		Brent Boyn	• Concern about impact of fuel pier extension on navigation • Suggestion to run fuel lines under the bay and utilize existing facilities at North Island						X	X							

47		George Karris	• Concern about aesthetic impact of proposed bait barge relocation on tourism and navigation impact on boaters					X	X						X		
48		Dennis Jackson	• Concern about impact of proposed bait barge relocation on odor and aesthetics • Concern about impact of seal population on boaters • Suggestion to move bait barges to less heavily trafficked navigation routes	X					X						X		
49		Alex Bravo	• Concern about impact of proposed bait barge relocation on pollution, congestion, safety, noise, odor, water quality, water circulation, bait quality, aesthetics and the sport fishing industry	X	X			X	X	X				X	X		
50		Brad Alberts	• Concern about impact of proposed bait barge relocation on safety, navigation and local business					X	X	X						X	X
51		Tad Walicki	• Concern about bait barge odor and visual impacts on tourism					X							X		
52		Corey Isaacson	• Concern about impact of proposed bait barge relocation on aesthetics and racing												X	X	
53		Steve & Lucy Howell	• Concern about impact of proposed bait barge relocation on recreational boating, racing and tourism					X								X	
54		Mike Kirk	• Concern about impact of proposed bait barge relocation on tourism and recreational boating					X								X	
55		Cindy Breider	• Concern about impact of proposed bait barge relocation on aesthetics												X		
56		John James	• Supports Alternative 6														X
57		Drew Niedringhaus	• Concern about impact of proposed bait barge relocation on sailboat racing • Supports Alternative 6													X	X
58		Darroch Cahen	• Concern about impact on proposed bait barge relocation on aesthetics												X		
59		Ed Machado	• Request that the bait barges not be relocated to Harbor Island or San Diego Maritime Museum locations														X
60		Dave Vieregg	• Concern about impact of proposed bait barge relocation on tourism and aesthetics due to smell and debris					X							X		

61		Tim Steele	• Concern about impact of proposed bait barge relocation on sailboat races and aesthetics												X	X	
62		Paul Doster	• Concern that proposed bait barge relocation will cause accumulation of seals, pelicans and seagulls, will create contamination due to stagnant water, will cause noise and odor and will hurt local business	X	X			X						X	X		
63		Rick Day	• Concern about impact of proposed bait barge relocation on safety, navigation, sailboat racing and local businesses					X	X	X						X	
64		Chuck Faith	• Concern about impact of proposed bait barge relocation on pollution, safety due to increased wake action, noise and smell of seal population	X	X					X				X	X		
65		Patrick Morrisey	• Concern about impact of proposed bait barge relocation on boat races													X	
66		George Roland	• Concern about impact of proposed bait barge relocation on boat races													X	
67		Eric Jackson	• Concern about impact of proposed bait barge relocation on boat traffic and racing						X							X	
68		Randy Ames	• Request that another location for the bait barges be used														X
69		Tracy Nackel	• Concern about impacts of proposed bait barge relocation on safety, sailboat races, local businesses and aesthetics					X		X					X	X	
70		Susan Rogers	• Concern about impact on proposed bait barge relocation on aesthetics, recreation and sailboat races and tourism					X							X	X	
71		Daniel Golembiewski	• Request that bait barges not be moved to Harbor Island location														X
72		Pipewheezr	• Concern about smell and aesthetics of bait barges and noise from accompanying seal population											X	X		
73		Stevens Worcester	• Concern about impact of proposed bait barge relocation on aesthetics, safety and marine mammals that congregate on the barges	X						X					X		
74		R. Casey Schnoor	• Concern about impact of proposed bait barge relocation on aesthetics, safety, navigation and local businesses • Concern about smell of bait barges					X	X	X				X	X		

			and accompanying seals														
75		Richard Hartman	• Concern about impact of proposed bait barge relocation on safety and aesthetics							X					X		
76		Marcus Hale	• Supports anchorage 216 and would like to see the current location of the bait barges used again in the future • Bait barges are important to community					X									X
77		Mike Collins	• Concern about impact of proposed bait barge on aesthetics and safety							X					X		
78		Doug Innis	• Concern about impact of proposed bait barge relocation on commercial and recreational fishing community, tourism and all boaters					X								X	
79		Walter Shaffer	• Concern about the seals accompanying the bait barges will be subject to greater risk of injury	X													
80		Dennis Case	• Concern that bait barge company is getting free anchorage • Concern that ship and boat wakes could pose risk to the bait barge and employees							X							X
81		Dennis Conner	• Suggestion to move bait barges east of Harbor Island														X
82		Walter Schaffer	• Concern about impact of proposed bait barge relocation on safety due to more congestion and larger wakes						X	X							
83		Keith Ericson	• Concern about impact of proposed bait barge relocation on aesthetics and sailboat racing												X	X	
84		David Cattle	• Concern about impact of proposed bait barge relocation on aesthetics and sailboat racing												X	X	
85		Mark Clements	• Concern about impact of proposed bait barge relocation on safety							X							
86		Tim McQueen	• Concern about loss of revenue due to proposed bait barge relocation					X									
87		Robert Madruga	• Concern about impact of proposed bait barge relocation on recreation, aesthetics, air quality/smell and safety to small crafts				X			X					X	X	

88		Steve Wright	• Concern about impact of proposed bait barge relocation on aesthetics, navigation and safety near Harbor Island • Suggestion to move the bait barges south of Ballast Point						X	X					X		
89		Ann Jones	• Requests that the bait barges not be moved to the Harbor Island location														X
90		Suzie Concors	• Concern about aesthetic and financial impact of proposed bait barge relocation on Maritime Museum, Harbor Island and the tourism industry					X							X		X
91		Fred McGee	• Concern about impact of proposed bait barge relocation on bait quality	X				X									X
92		David Cloyd	• Concern about impact of proposed bait barge relocation on aesthetics and sailboat racing												X	X	
93		Scott Graham	• Concern about impact of proposed bait barge relocation on boater safety							X							
94		Daylen Teren	• Concern about impact of aesthetics of proposed bait barge relocation on local business and tourism • Concern about impact of proposed bait barge relocation on sailboat racing					X							X	X	
95		Lee Sharp	• Concern about the proposed bait barge relocation on the safety, navigation and tourism					X	X	X							
96		Mike Pearlman	• Concern about increased claims of boat damage if bait barges are relocated to a higher wake area • Concern about the stance of the San Diego Regional Water Quality Control Board • Request to see an environmental quality report		X			X					X				
97		Tony Ward	• Concern about impact on proposed bait barge relocation on safety and aesthetics							X					X		
98		Fred Nagel	• Concern about impact proposed bait barge relocation will have on navigation, safety, aesthetics, business and sailboat races					X	X	X					X	X	

99		Ron Coalson	• Suggestion to move bait barges to where the New Zealand America's Cup Syndicate is located														X
100		Joanne O'Neil	• Opposed to relocating bait barges in San Diego Bay														X
101		Dianna Jones	• Concern about impact of proposed bait barge relocation on safety and sailboat races							X						X	
102		John Deforest	• Concern about impact of proposed bait barge relocation on aesthetics • Suggestion to move bait barges to northwest entrance of America's Cup harbor												X		X
103		Lynne Eddy	• Concern about impact of proposed bait barge relocation on aesthetics and sailboat racing												X	X	
104		Michael Seneca	• Concern about impact of the proposed bait barge relocation on the quality of bait • Request for information about further opportunity for public involvement • Request for information regarding mandates set by San Diego Regional Water Quality Control Board to clean up bay pollutants • Request for information regarding impact of proposed bait barge relocation on the seal community • Request for information why contractor cannot work around current location of bait barges	X	X			X					X			X	X
105		Lyle Lundberg	• Concern about impact of proposed bait barge relocation on sailboat racing													X	
106		Kenneth Van Fleet	• Concern about impact of proposed bait barge relocation on tourism • Concern about seal and sea lion population that would follow the proposed bait barge relocation	X				X									
107		Susan Haymaker	• Concern about impact of proposed bait barge relocation on aesthetics of the bay												X		
108		Karen Goldberg	• Question about other locations under consideration for the proposed bait barge relocation														X

109		Pat Stadel	• Concern about impacts of proposed bait barge relocation on congestion of boat traffic in the bay						X								
110		Carolyn Whiting	• Concern about impacts of proposed bait barge relocation on the aesthetics												X		
111		Robb Lane	• Request for information regarding the environmental impact of the proposed bait barge relocation										X				
112		Kevin Sage	• Suggestion of the jetty by the harbor police office outside of Shelter Island as an alternate location for the bait barges														X
113		Sandy Vissman	• Thank you for an informational open house and helpful staff										X				
Comment #	**Organization**	**Commenter Name**	**Summary of Comment**	*Marine Biological Resources*	*Water Quality*	*Hazardous Materials and Waste*	*Air Quality*	*Socioeconomics and Env Justice*	*Transportation and Circulation*	*Public Health and Safety*	*Construction*	*Purpose and Need/Cost*	*NEPA Process/Public Involvement*	*Noise*	*Visual and Aesthetics*	*Recreation*	*Other*
Private Business																	
114	Smart Marine Services	Nico Landauer	• Concern about impacts of proposed bait barge relocation on racing and beauty of the bay • Suggestion that bait barge should be made smaller due to less demand for bait												X	X	X
115	Communication Wiring Specialists, Inc.	Dick Templin	• Concern about impact of proposed bait barge relocation on boat traffic						X								
116	Willis Allen Real Estate	Vicki Droz	• Concern about impact of proposed bait barge relocation on beauty of the bay, tourism, water quality and water circulation		X				X	X					X	X	X
117	Quality Claims Management Corp.	Ronald Reitz	• Opposed to bait barge relocation in San Diego Bay														X
118	Landmark Development Services, Inc.	Mark Freed	• Concern about impact of proposed bait barge location on racing													X	
119	Arsea Marine Inc.	Robert E. Capita	• Concern about impact of proposed bait barge relocation to Alternative 4, Alternative 4A and Alternative 6 on aesthetics and safety							X					X		X

120	San Diego Sunroad Boat Show	Kat Ohlmann	• Concern about impact of proposed bait barge relocation on aesthetics													X		
121	Seabreeze Books and Charts	Ann Kinner	• Concern about impact of proposed bait barge relocation on aesthetics, including smells and sounds of seals and gulls, increased boat traffic, safety and water quality • Concern about odors and debris from the construction barges working on the pier		X				X	X	X			X	X		

Exhibit A: Newspaper Display Advertisement

Environmental Assessment for Naval Base Point Loma Fuel Pier Replacement and Dredging

The U.S. Navy is in the early stages of preparing an Environmental Assessment to evaluate the potential environmental impacts associated with demolition and construction of a fuel pier at Naval Base Point Loma.

The Navy welcomes your input!

Attend the open house information session to learn about the project and speak to Navy team members. Comments will be accepted at the meeting and can also be submitted online or mailed to the address below.

To submit comments online, visit:
www.piersystem.com/go/doc/4275/1355631/

To mail written comments, send to:

P-151 NEPA Project Manager
Naval Facilities Engineering Command
Southwest, Attn: (OPUE2.LS)
2730 McKean St., Bldg. 291
San Diego, CA 92136-5198

Comments must be postmarked or received online by May 28, 2012, to be included in the record.

OPEN HOUSE INFORMATION SESSION

Thursday, May 3, 2012
5 to 8 p.m.

There will not be a formal presentation. Arrive at any time during the session.

Loma Portal Elementary School (Auditorium)
3341 Browning St.
San Diego, CA 92106

FOR PROJECT INFORMATION VISIT
www.piersystem.com/go/doc/4275/1355631/.

PROPOSED ACTION: Demolish the existing fuel pier and construct a new fuel pier at Naval Base Point Loma to meet California State Lands Commission Marine Oil Terminal standards.

The Navy will evaluate the potential environmental impacts of:

• Phased demolition and removal of the existing fuel pier • Construction of a double-deck fuel pier utilizing steel pilings • Dredging of the existing basin and beneficial sediment reuse • Temporary relocation of the Navy's Marine Mammal Program to Naval Mine and Anti-Submarine Warfare Command, and • Amendment of navigation zones to accommodate the proposed fuel pier.

The Everingham Bros. Bait Co. would move their barges to a location to be determined.

Exhibit B: Postcard Mailer

ENVIRONMENTAL ASSESSMENT FOR

Naval Base Point Loma

Fuel Pier Replacement and Dredging

U.S. NAVY INVITES YOU TO AN OPEN HOUSE INFORMATION SESSION

The U.S. Navy is in the early stages of preparing an Environmental Assessment to evaluate the potential environmental impacts associated with demolition and construction of a fuel pier at Naval Base Point Loma.

The Navy welcomes your input for the development of the environmental analysis. Attend the open house information session to learn about the project and speak to Navy team members. Comments will be accepted at the meeting and can also be submitted online or mailed to the address below by May 28, 2012.

Visit www.piersystem.com/go/doc/4275/1355631/ for project information and to submit comments online.

MAIL WRITTEN COMMENTS TO:

P-151 NEPA Project Manager
Naval Facilities Engineering Command Southwest
Attn: (OPUE2.LS)
2730 McKean St., Bldg. 291
San Diego, CA 92136-5198

All comments must be postmarked or received online by May 28, 2012, to be included in the official record.

OPEN HOUSE INFORMATION SESSION

Arrive at any time during the session. There will not be a formal presentation.

Thursday, May 3, 2012
5 to 8 p.m.
Loma Portal Elementary School (Auditorium)
3341 Browning St.
San Diego, CA 92106

Visit www.piersystem.com/go/doc/4275/1355631/ for project information.

THE NAVY PROPOSES TO DEMOLISH THE EXISTING FUEL PIER AND CONSTRUCT A NEW FUEL PIER AT NAVAL BASE POINT LOMA TO MEET CALIFORNIA STATE LANDS COMMISSION MARINE OIL TERMINAL STANDARDS.

The Navy will evaluate the potential environmental impacts of the following activities:

- Phased demolition and removal of the existing fuel pier
- Construction of a double-deck fuel pier utilizing steel pilings
- Amendment of navigation zones to accommodate the new fuel pier
- Dredging of the existing basin and beneficial sediment reuse
- Temporary relocation of the Navy's Marine Mammal Program to Naval Mine and Anti-Submarine Warfare Command

The Everingham Bros. Bait Co. would move their bait barges to a location to be determined.

Visit www.piersystem.com/go/doc/4275/1355631/ to learn more about the project.

P-151 NEPA Project Manager
Naval Facilities Engineering Command Southwest
Attn: (OPUE2.LS)
2730 McKean St., Bldg. 291
San Diego, CA 92136-5198

NAVAL BASE POINT LOMA
Public Affairs Office

PRESS RELEASE

https://www.cnic.navy.mil/pointloma

Tel: (619) 553-7175
POC: Public Affairs Officer

140 Sylvester Road
San Diego, CA 92106

FOR IMMEDIATE RELEASE **Date: Apr. 23, 2012**

Development of Environmental Assessment for NBPL Fuel Pier Replacement

The U.S. Navy is preparing an Environmental Assessment for proposed replacement of the existing fuel pier at Naval Base Point Loma. Public scoping comments are requested for 30 days, April 28 to May 28, 2012.

The U.S. Navy is in the early stages of preparing this Environmental Assessment to evaluate the potential environmental consequences of the pier replacement project that would include: 1) the phased demolition and removal of the existing fuel pier located at Naval Base Point Loma Defense Fuel Support Point, San Diego; 2) the construction of a new steel pile supported double-deck fuel pier with a 700-foot-long approach and a 605-foot-long by 50-foot-wide main deck; 3) an amendment to existing regulated navigation zones in San Diego Bay to the east and south of the proposed fuel pier; 4) the dredging of portions of an existing turning basin to continue accommodating ship operations; 5) the temporary relocation of the Navy's Marine Mammal Program to facilities that would be modified at the Naval Mine and Anti-Submarine Warfare Command; and 6) the temporary relocation of the bait barges by the Everingham Bros. Bait Co. to a location to be determined.

Public Scoping Comment and Informational Open House
The Navy is requesting and welcomes public scoping comments on this project to aide in the development of a draft Environmental Assessment. Additional project information will be available for public review at the following website on April 28: http://www.piersystem.com/go/doc/4275/1355631/.

An informational open house meeting will be held on:

Thursday, May 3, from 5 to 8 p.m.
Loma Portal Elementary School auditorium
3341 Browning St., San Diego, CA 92106

Comments may also be submitted online at:
http://www.piersystem.com/go/doc/4275/1355631/ or mailed to:

P-151 NEPA Project Manager
Naval Facilities Engineering Command Southwest
Attn: (OPUE2.LS)
2730 McKean Street, Bldg 291
San Diego, CA 92136-5198

Comments must be postmarked or submitted online no later than May 28 to ensure they become part of the official record. All comments will be addressed in the Environmental Assessment.

-30-

Exhibit D: Stakeholder Letter

DEPARTMENT OF THE NAVY
COMMANDING OFFICER
NAVAL BASE POINT LOMA
140 SYLVESTER ROAD
SAN DIEGO, CALIFORNIA 92106-3521

IN REPLY REFER TO:
5726
Ser 00/239
April 25, 2012

Name
Title
Company
Address
City, State Zip

Dear Sir or Madam:

SUBJECT: ENVIRONMENTAL ASSESSMENT (EA) FOR NAVAL BASE POINT LOMA FUEL PIER REPLACEMENT AND DREDGING

The United States (U.S.) Navy is in the early stages of preparing an Environmental Assessment (EA) to analyze the potential environmental impacts of replacing a fuel pier located at Naval Base Point Loma in San Diego, California. A new, enhanced fuel pier would meet current California State Lands Commission seismic standards and projected ship fueling needs for the Department of Defense. Portions of the existing fuel pier are more than 100 years old, and it does not meet current regulations.

The fuel pier replacement EA presents an environmental analysis of the following pier replacement activities: 1) the phased demolition and removal of the existing fuel pier at Naval Base Point Loma, 2) the construction of a new double-deck fuel pier utilizing steel pilings, 3) an amendment to the existing regulated navigation zone in San Diego Bay to the east of the proposed fuel pier (specifically, U.S. Coast Guard Security Zone), 4) the dredging of portions of an existing turning basin to continue accommodating ship operations (dredge sediments would be used for beneficial near-shore replenishment), and 5) the temporary relocation of the Navy's Marine Mammal Program to facilities that would be modified at the Naval Mine and Anti-Submarine Warfare Command. In addition, the Everingham Bros. Bait Co. bait barges near the existing fuel pier would relocate prior to pier pile-driving activities. Everingham Bros. Bait Co. would move their bait barges to a location to be determined.

The EA will be prepared to analyze the potential environmental effects of the pier demolition, construction and related activities, as required under the National Environmental Policy Act of 1969 (NEPA).

Environmental issues to be addressed in the EA include the following resource areas: marine biological resources, water quality, hazardous materials and wastes, noise, air quality, socioeconomics and environmental justice, and transportation and

circulation. Your input in identifying specific issues and concerns that should be assessed, in these areas and any additional areas, is important to the NEPA process.

A 30-day public scoping comment period will be open from April 28, 2012, through May 28, 2012. The Navy is holding an open house information session in San Diego to support an early and open public involvement process for determining the scope of issues to be addressed in the EA. There will be no presentation or formal oral comment session during the open house. Instead, written comments will be accepted during the open house and throughout the 30-day public comment period. Input received from the public will be used to help identify environmental issues to be analyzed within the EA. Navy representatives will be available at the open house to provide information about the project and answer questions.

The open house information session will be held on Thursday, May 3, 2012, from 5 to 8 p.m. at the following location:

Location: Loma Portal Elementary School (Auditorium)
3341 Browning St.
San Diego, CA 92106

The Navy requests and welcomes your comments. Comments may also be submitted online at www.piersystem.com/go/doc/4275/1355631/, or via postal mail to:

P-151 NEPA Project Manager
Naval Facilities Engineering Command, Southwest
Attention: (OPUE2.LS)
2730 McKean St., Bldg 291
San Diego, CA 92136-5198

Comments must be postmarked or received online by **May 28, 2012**, to ensure they become part of the official record. All timely comments will be addressed in the EA.

For more information, please visit the project website at www.piersystem.com/go/doc/4275/1355631/ or contact the Naval Base Point Loma Public Affairs Office at 619-553-7175.

Sincerely,

S. F. ADAMS
Captain, U.S. Navy
Commanding Officer

Enclosure: 1. Naval Base Point Loma Fuel Pier Replacement Project Area Map

2

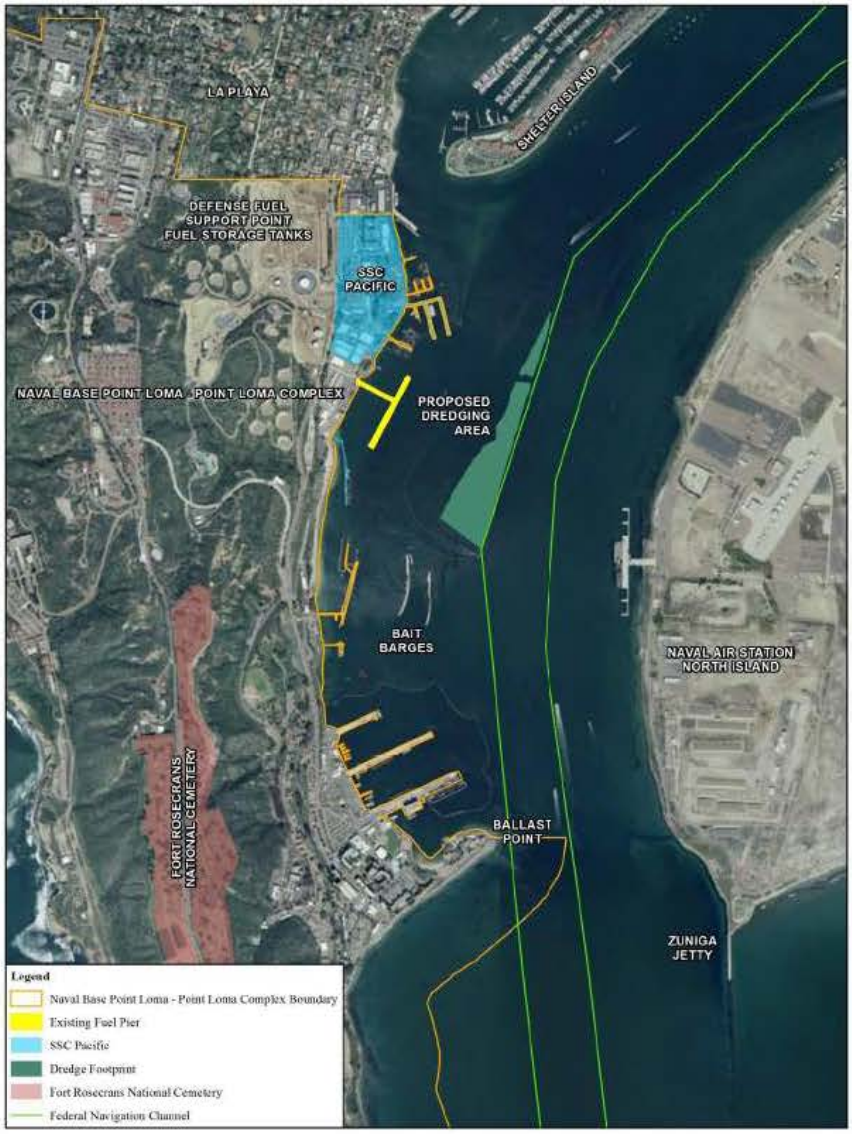

LA PLAYA
SHELTER ISLAND
DEFENSE FUEL SUPPORT POINT FUEL STORAGE TANKS
SSC PACIFIC
NAVAL BASE POINT LOMA - POINT LOMA COMPLEX
PROPOSED DREDGING AREA
BAIT BARGES
NAVAL AIR STATION NORTH ISLAND
FORT ROSECRANS NATIONAL CEMETERY
BALLAST POINT
ZUNIGA JETTY
Legend
Naval Base Point Loma - Point Loma Complex Boundary
Existing Fuel Pier
SSC Pacific
Dredge Footprint
Fort Rosecrans National Cemetery
Federal Navigation Channel

Exhibit E: Fact Sheets

ENVIRONMENTAL ASSESSMENT FOR

Naval Base Point Loma

Fuel Pier Replacement and Dredging

PROPOSED ACTION AND ALTERNATIVES

The U.S. Navy is in the early stages of preparing an Environmental Assessment to analyze the potential environmental impacts of replacing a fuel pier located at Naval Base Point Loma in San Diego, Calif. A new, enhanced fuel pier would meet current California State Lands Commission Marine Oil Terminal standards. The Navy's Proposed Action is to:

- Demolish the existing fuel pier at Naval Base Point Loma
- Construct a new double-deck fuel pier utilizing steel pilings, to support current and projected fueling needs of the Department of Defense
- Perform dredging activities to deepen an existing turning basin to accommodate vessels

The existing fuel pier is more than 100 years old and no longer meets current California State Lands Commission Marine Oil Terminal standards. Functionally, the existing fuel pier lacks adequate deep-water berthing capability and thus cannot safely accommodate all of the existing and future classes of Navy vessels. The Department of Defense needs adequate and safe ship fueling facilities now and in the future to accomplish its mission.

The Navy's Proposed Action to replace the fuel pier would create the infrastructure necessary to support increased berthing capability by providing a facility with additional berthing length, versatility in accommodating a wide variety of ships, and additional deep-draft berthing capabilities. The Proposed Action would also greatly reduce the time and money associated with re-positioning ships while in port for refueling, maintenance and training. A new fuel pier would provide a safe, secure and environmentally compliant facility with a service life that is expected to exceed 75 years.

The Navy's existing fuel pier at Naval Base Point Loma is more than 100 years old and no longer meets current California State Lands Commission Marine Oil Terminal standards. A new fuel pier would provide a safe, secure and environmentally compliant facility with a service life that is expected to exceed 75 years.

The existing fuel pier, called Pier 180, was built in 1908 with the south segment added in 1942. It is T-shaped, consisting of three sections with a concrete deck. On average, 43 ships per month are refueled at the pier.

PROJECT ALTERNATIVES

At this time, the Navy has identified three alternatives, including the Pier Replacement and Associated Dredging Alternative, Delayed Dredging Alternative, and the No-Action Alternative, to analyze in the Environmental Assessment. A decision on implementing the Proposed Action will not be made until the National Environmental Policy Act (NEPA) process is completed. The current alternatives are described below.

PIER REPLACEMENT AND ASSOCIATED DREDGING ALTERNATIVE

Under the Navy's Pier Replacement and Associated Dredging Alternative, demolition of the existing fuel pier and construction of a new fuel pier would occur in two phases to maintain the fueling capabilities and operations of the existing fuel pier while the new fuel pier is being constructed. Fueling operations would not be interrupted. The estimated construction period would be three and a half years to minimize underwater demolition and construction activities from April 1 through September 15 when least terns are foraging in the project area.

For protective measures and to accommodate the demolition and construction, the Navy's Marine Mammal Program would temporarily be relocated to the Naval Mine and Anti-Submarine Warfare Command. After the completion of the new fuel pier, the Marine Mammal Program would be moved back to its original locations adjacent to the fuel pier.

Prior to pile-driving activities, the Everingham Bros. Bait Co. would move their bait barges to a location to be determined. The bait barges are currently anchored in Navy waters south of the existing fuel pier and would move to a site outside the underwater pile-driving noise footprint.

An amendment to existing regulated navigation zones in San Diego Bay to the east and south of the proposed fuel pier would occur to accommodate the new fuel pier. Specifically, the U.S. Coast Guard Security Zone would be modified.

Under the Pier Replacement and Associated Dredging Alternative, dredging in the existing turning basin to accommodate deep-draft berthing capability could be done before, during or shortly after the fuel pier replacement effort. Dredge sediments would be beneficially reused for nearshore replenishment.

DELAYED DREDGING ALTERNATIVE

Implementation of the Delayed Dredging Alternative would be the same as described under the Pier Replacement and Associated Dredging Alternative, except that dredging would occur years after completion of the fuel pier replacement.

NO-ACTION ALTERNATIVE

Under the No-Action Alternative, the Navy would not implement the demolition of the existing fuel pier, construction of the new fuel pier facility or dredging activities. Structural, seismic and operational deficiencies of the existing fuel pier would continue to degrade and would remain inconsistent with current standards. Extensive repairs would still be needed.

The No-Action Alternative is not considered to be a reasonable alternative because it does not meet the purpose of and need for the Proposed Action. However, for purposes of environmental analysis, it provides a measure of the baseline (current) conditions against which potential adverse impacts of the Proposed Action can be compared as required under NEPA.

For more information about this project, including how to submit comments on the Proposed Action and alternatives, visit www.piersystem.com/go/doc/4275/1355631/, or contact the Naval Base Point Loma Public Affairs Office at (619) 553-7175.

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APRIL 2012

ENVIRONMENTAL ASSESSMENT FOR

Naval Base Point Loma

Fuel Pier Replacement and Dredging

CONSTRUCTION AND LOGISTICS

INTRODUCTION

The U.S. Navy is in the early stages of preparing an Environmental Assessment to analyze the potential environmental impacts of replacing a fuel pier located at Naval Base Point Loma in San Diego, Calif. A new, enhanced fuel pier would meet current California State Lands Commission Marine Oil Terminal standards.

PROPOSED DEMOLITION AND REMOVAL OF THE EXISTING FUEL PIER

Demolition and construction would occur in two phases to maintain the fueling capabilities of the existing fuel pier while the new fuel pier is being constructed. The demolition would take place on a segment by segment basis to allow for continuous fueling operations. Demolition includes removal of the associated fuel systems, including piping and pipe supports, as well as removal of utility infrastructure, including water and sewer pipelines, lighting systems and wiring. Before demolition would begin, abatement of lead paint and asbestos containing material would be completed. In addition, water and sewer pipes and electrical and mechanical utilities connected to the fuel pier would be properly terminated before demolition.

TEMPORARY RELOCATION OF THE U.S. NAVY'S MARINE MAMMAL PROGRAM

Before demolition of the fuel pier would begin, the Navy's Marine Mammal Program would be temporarily relocated to facilities that would be modified at the Naval Mine and Anti-Submarine Warfare Command (NMAWC), which is approximately 3 kilometers away in San Diego Bay. Marine mammal enclosures that are used to house dolphins and sea lions would be towed from the existing marine mammal facilities, and after completion of the new fuel pier, would be moved back to the original locations. It is anticipated that approximately 90 days would be required to move all of the enclosures and marine mammals to NMAWC.

THE DEMOLITION PROCESS

Typical pier demolition begins from water to land and from top down. Construction of the new fuel pier would take place concurrently with demolition of the existing fuel pier. The north segment of the existing fuel pier would be demolished first while the existing approach (segment that connects to shore) and south segment would remain operational. The estimated construction period would be three and a half years to minimize underwater demolition and construction activities from April 1 through September 15 when least terns are foraging in the project area. During demolition, floating booms would be used to provide a complete barrier to floating debris. Any floating debris would be gathered in work boats and would be recycled or disposed of as appropriate.

The proposed double-deck fuel pier would have steel pilings, a 700-foot-long approach, and a 605-foot-long by 50-foot-wide main deck.

TYPES OF DEMOLITION DEBRIS

There are four types of debris that could result from the demolition of the fuel pier: concrete, wood, steel and plastic. Materials would be reused or recycled as appropriate, and materials that cannot be reused or recycled would be transported to a permitted landfill.

CONSTRUCTION OF NEW FUEL PIER

PHASE I: DEMOLITION OF NORTH SEGMENT, AND CONSTRUCTION OF APPROACH PIER AND NORTH PIER

A temporary mooring dolphin would be constructed to allow vessels to berth and load and unload fuel while the north segment of the existing fuel pier is under demolition. The same pile-driving equipment and barges used to construct the temporary mooring dolphin would later be used to construct the new fuel pier. The construction of the approach pier, which is the segment connected to shore, would require two barges with mounted cranes and two without. The approach pier and north pier would be constructed concurrently. Two additional barges and equipment would be required for the north pier construction.

PHASE II: CONSTRUCTION OF SOUTH PIER, AND DEMOLITION OF EXISTING SOUTH PIER AND APPROACH PIER

The south berthing dolphin and mooring dolphin construction would begin after the approach pier, north pier and mooring dolphins from Phase I are operational. The existing south pier and approach would be demolished after the new south pier is operational.

DREDGING

Dredging in the existing turning basin, to accommodate deep-draft berthing capabilities, could occur any time before, during or after the fuel pier construction process. An approximate maximum volume of 80,000 cubic yards of sediment are expected to be dredged. The dredged sediment would be deposited for beneficial replenishment.

REGULATED NAVIGATION ZONES AND MAINTAINING ACCESS TO NAVIGABLE WATERS

The proposed construction and dredging activities would take place adjacent to the San Diego Harbor navigation channel, with the new fuel pier construction zone being approximately 1,200 feet from the navigation channel. Most of the vessels involved with the project would transit the channel intermittently, with the exception of the sediment transport barges. Sailing or public use of the navigation channel is not expected to be affected because the primary sailing area is outside the construction zone.

The new fuel pier would extend 200 feet further east than the existing fuel pier. The Navy would coordinate with the U.S. Coast Guard to amend the Security Zone. The new fuel pier would also extend beyond Navy waters into waters that are under the jurisdiction of the California State Lands Commission. Following completion of the National Environmental Policy Act process, the Navy would provide written notification to the State Lands Commission of the extension of Navy facilities into state waters.

Sailing or public use of the navigation channel is not expected to be affected because the primary sailing area is outside the construction zone.

For more information about this project, including how to submit comments on the Proposed Action and alternatives, visit www.piersystem.com/go/doc/4275/1355631/, or contact the Naval Base Point Loma Public Affairs Office at (619) 553-7175.

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ENVIRONMENTAL ASSESSMENT FOR

Naval Base Point Loma

Fuel Pier Replacement and Dredging

ENVIRONMENTAL RESOURCES

INTRODUCTION

The U.S. Navy is in the early stages of preparing an Environmental Assessment (EA) to analyze the potential environmental impacts of replacing a fuel pier located at Naval Base Point Loma in San Diego, Calif. A new fuel pier would meet current California State Lands Commission Marine Oil Terminal standards.

The Navy understands the importance of evaluating the potential environmental impacts of the fuel pier replacement and would take necessary measures to ensure protection of the environment before taking action. The EA will address the following resource areas:

- Marine biological resources
- Water quality
- Hazardous materials and wastes
- Noise
- Air quality
- Socioeconomics and environmental justice
- Transportation and circulation

To contain construction debris within the project site, the Navy would implement stringent best management practices, including the use of debris nets under and around the demolition site.

AREAS OF POTENTIAL INTEREST

The EA will include assessments of the potential impacts on the community and natural resources, as described in the resource areas above. This fact sheet provides a brief summary of the potential impacts on resource areas that are anticipated to be of most concern to members of the public. A full analysis of potential impacts will be completed in the EA.

MARINE BIOLOGICAL RESOURCES

The Navy would conduct demolition and construction activity in an environmentally sound manner to protect fish, sea turtles and marine mammals that may pass near the construction area. Monitoring plans and other avoidance measures would be proactively built into the project so as to avoid risks to green sea turtles. The Navy is also working closely with the National Marine Fisheries Service and other agencies to craft a construction plan that minimizes potential for impacts on marine mammals. The EA will further evaluate potential impacts on marine biological resources, including essential fish habitat and eelgrass beds.

California Least Tern

To minimize impacts on the California least tern, a small endangered seabird that feeds in shallow estuaries or lagoons, underwater demolition and construction activities would not occur from April 1 to September 15 when least terns are foraging in the project area.

The Everingham Bros. Bait Co. bait barges near the existing fuel pier would relocate prior to construction activities. Everingham Bros. Bait Co. would move the bait barges to a location to be determined.

WATER QUALITY

The project involves permanent removal of existing creosote treated wooden timbers. Removal of these wooden timbers would provide a net permanent benefit to area water quality. Effects from the Proposed Action on water quality, including demolition and construction activities, would be analyzed as part of the EA.

NOISE

Preliminary analysis of ambient noise indicates that noise generated by construction activity would comply with City of San Diego construction noise ordinances. Preliminary analysis of in-water noise indicates that underwater noise from construction activity would range from 120 decibels (db) to 180db. As such, there may be impacts on wild marine mammals during construction. The Navy is working with the National Marine Fisheries Service to address these potential noise impacts. The EA will further evaluate potential impacts from noise on the surrounding community and environment.

DREDGING AND BENEFICIAL REUSE OF SEDIMENTS

The proposed fuel pier footprint is intentionally aligned close to the existing fuel pier footprint to minimize disturbance of eelgrass beds. The footprint of the proposed new fuel pier is actually smaller than the existing fuel pier due to the use of mooring dolphins, which also minimizes bay shading from the new pier. The new fuel pier is aligned to extend farther into the bay so as to minimize the amount of required dredging.

High spots in an existing turning basin about 1,000 feet west of the existing fuel pier would be dredged to accommodate deep-draft berthing capability as part of the fuel pier replacement project. Dredging would take place outside the federal navigation channel. Dredged sediment would be deposited for beneficial nearshore replenishment. Sediment samples from the dredge area were analyzed in November 2010 and determined by the U.S. Environmental Protection Agency and U.S. Army Corps of Engineers to be suitable for unconfined aquatic disposal. Additional analysis of proposed dredging and beneficial reuse of sediments will be conducted as part of the EA.

For more information about this project, including how to submit comments on the Proposed Action and alternatives, visit www.piersystem.com/go/doc/4275/1355631/, or contact the Naval Base Point Loma Public Affairs Office at (619) 553-7175.

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ENVIRONMENTAL ASSESSMENT FOR

Naval Base Point Loma

Fuel Pier Replacement and Dredging

THE NATIONAL ENVIRONMENTAL POLICY ACT PROCESS AND COMMUNITY INVOLVEMENT

The National Environmental Policy Act of 1969 (NEPA) requires U.S. federal agencies to consider the potential environmental impacts of their actions before making a decision. In compliance with NEPA, the U.S. Navy is preparing an Environmental Assessment (EA) to analyze the potential environmental impacts that may result from the Navy's proposal to replace the fuel pier at Naval Base Point Loma in San Diego, Calif.

NEPA PROCESS

The purpose of an EA is to determine whether a proposed action or its alternatives would have potentially significant impacts on the human or natural environment. In preparing the EA, the Navy will develop, describe and study a reasonable range of alternatives in support of the Proposed Action.

The Navy will use the findings of the analysis to determine the next steps in the NEPA process. If the findings indicate environmental impacts would be significant, the Navy would prepare an Environmental Impact Statement (EIS) and conduct additional analyses. If the findings indicate environmental impacts would not be significant, the Navy would prepare a Finding of No Significant Impact (FONSI). The FONSI would describe how the Navy determined the Proposed Action would have no significant impacts. The Navy would then proceed with the Proposed Action.

Proposed Action:
Demolish the existing fuel pier and construct a new fuel pier at Naval Base Point Loma to meet seismic standards and future needs.

Steps in the Environmental Assessment Process

Depending on the results of the environmental analysis, the Navy will:

- Document that the Proposed Action would not have a significant impact, or
- Identify potentially significant impacts to be further assessed in an EIS

NATIONAL ENVIRONMENTAL POLICY ACT PROCESS

NEPA PROCESS AND COMMUNITY INVOLVEMENT

Resource Areas for Analysis

NEPA regulations and implementation guidance specify that an EA should focus on resource areas that may potentially be impacted. The public is encouraged to provide input on these and other resource areas for consideration in the EA:

- Marine Biological Resources
- Air Quality
- Noise
- Transportation and Circulation
- Socioeconomics and Environmental Justice
- Hazardous Materials and Wastes
- Water Quality

COMMUNITY INVOLVEMENT

The NEPA process provides opportunities for public input. During development of the EA, the public participates in the process by helping to identify environmental issues and potential alternatives, and by evaluating the analysis of the Proposed Action and alternatives. The public's input helps to ensure all relevant issues are addressed. All public comments are considered, and the Navy would not proceed with the Proposed Action until the NEPA process is complete.

The first opportunity for public comment is during the scoping period, prior to the development of the Draft EA. During this phase, from **April 28, 2012, to May 28, 2012**, the public will have 30 days to submit comments.

HOW TO SUBMIT COMMENTS

The Navy encourages the public to provide input for the development of the EA. Comments may be submitted online or via postal mail. Written comments for the scoping phase will be accepted from **April 28, 2012, to May 28, 2012**. The public will have another opportunity to provide input when the Draft EA is available.

Visit www.piersystem.com/go/doc/4275/1355631/ to submit comments online, or mail comments to:

P-151 NEPA Project Manager
Naval Facilities Engineering Command Southwest
Attn: (OPUE2.LS)
2730 McKean St., Bldg. 291
San Diego, CA 92136-5198

All comments must be postmarked or received online by **May 28, 2012**, to be considered in the Draft EA.

NEXT STEPS

When the Draft EA is made available for public release, the public will be notified and will have the opportunity to provide comments. Interested parties can request to be added to the project mailing list by contacting the Naval Base Point Loma Public Affairs Office. The Draft EA will be available for download on the project website, and a hard copy of the Draft EA will be available at the Point Loma/Hervey Public Library. There will be a 30-day public review period, and a public meeting will be held to provide information about the Draft EA and its findings, as well as provide the public with an opportunity to submit comments.

FOR MORE INFORMATION

For more information about the EA, visit www.piersystem.com/go/doc/4275/1355631/ or attend the open house information session.

Open House Information Session
Thursday, May 3, 2012
5 to 8 p.m.
Loma Portal Elementary School, Auditorium
3341 Browning St.
San Diego, CA 92106

Scoping

Scoping is an early and open process for developing the scope of issues to be addressed in an environmental analysis and for identifying significant issues related to a proposed action. During the scoping phase, the public will help define environmental resources to be analyzed in the EA by participating in an open house information session and submitting comments for consideration during the comment period.

For more information about this project, including how to submit comments on the Proposed Action and alternatives, visit www.piersystem.com/go/doc/4275/1355631/, or contact the Naval Base Point Loma Public Affairs Office at (619) 553-7175.

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Exhibit F: Posters

ENVIRONMENTAL ASSESSMENT FOR

Naval Base Point Loma

Fuel Pier Replacement and Dredging

NAVAL BASE POINT LOMA AND THE DEFENSE FUEL SUPPORT POINT

NAVAL BASE POINT LOMA

In 1852, the southern portion of Point Loma was set aside for military purposes and assigned to the U.S. Army. In 1901, 225 acres were transferred to the U.S. Navy for a coaling station. The USS New York, in 1924, was the last ship fueled with coal.

MAJOR TENANT COMMANDS AT NAVAL BASE POINT LOMA

- Commander Third Fleet
- Naval Mine and Anti-Submarine Warfare Training Command
- Fleet Intelligence Training Center Pacific
- Tactical Training Group Pacific
- Space and Naval Warfare Systems Command
- Space and Naval Warfare Systems Center Pacific
- Commander Sealift Logistics Command Pacific
- Navy Substance Abuse Rehabilitation Department
- USS ARCO (floating dry-dock)
- Submarine Squadron Eleven
- Seven submarines
- Submarine Training Center Pacific Detachment
- Naval Supply Systems Command Fleet Logistics Center San Diego

The multimillion dollar military construction investments will ensure that Defense Fuel Support Point, Point Loma can continue to maintain its strategic importance to the fleet.

DEFENSE FUEL SUPPORT POINT, POINT LOMA

- Busiest Navy operated fuel terminal on the West Coast
- Provides petroleum fuels, oil and lubricants and support to the Department of Defense
- Includes a fuel storage and transfer facility, administrative and support facilities, fuel storage tanks, pump houses and pipelines, with capacity for 1 million barrels of petroleum-based products
- Construction has been underway since 2009 for a new state-of-the-art fuel storage facility

FUEL PIER - PIER 180	
History	Built in 1908 with the south segment added in 1942
Description	T-shaped fuel pier, consisting of three sections with a concrete deck and 71,180-square-foot pier area
Function	Loading and off-loading fuels and lubricants
Current Ship Loading	On average, 43 ships per month are refueled at the pier

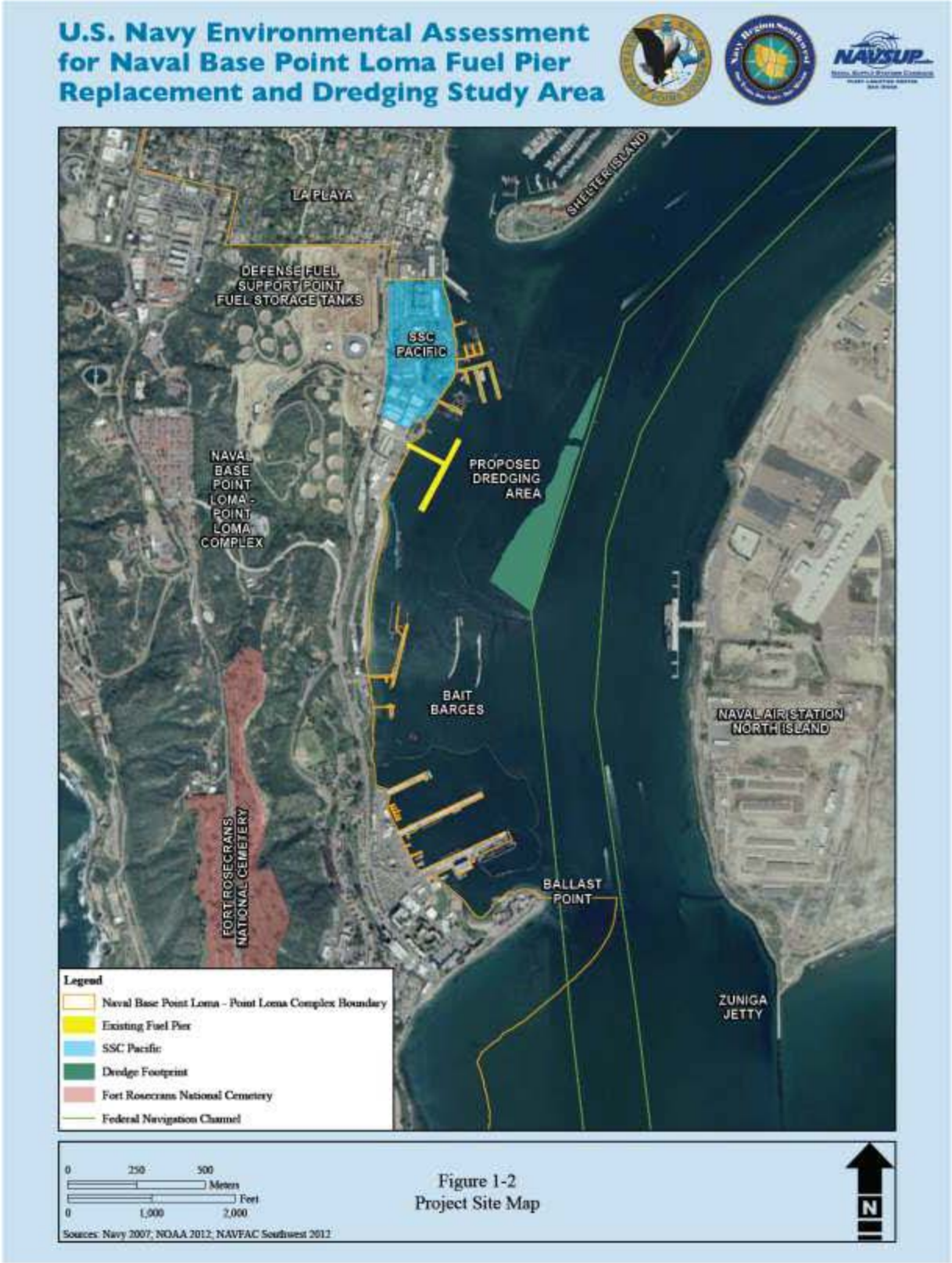
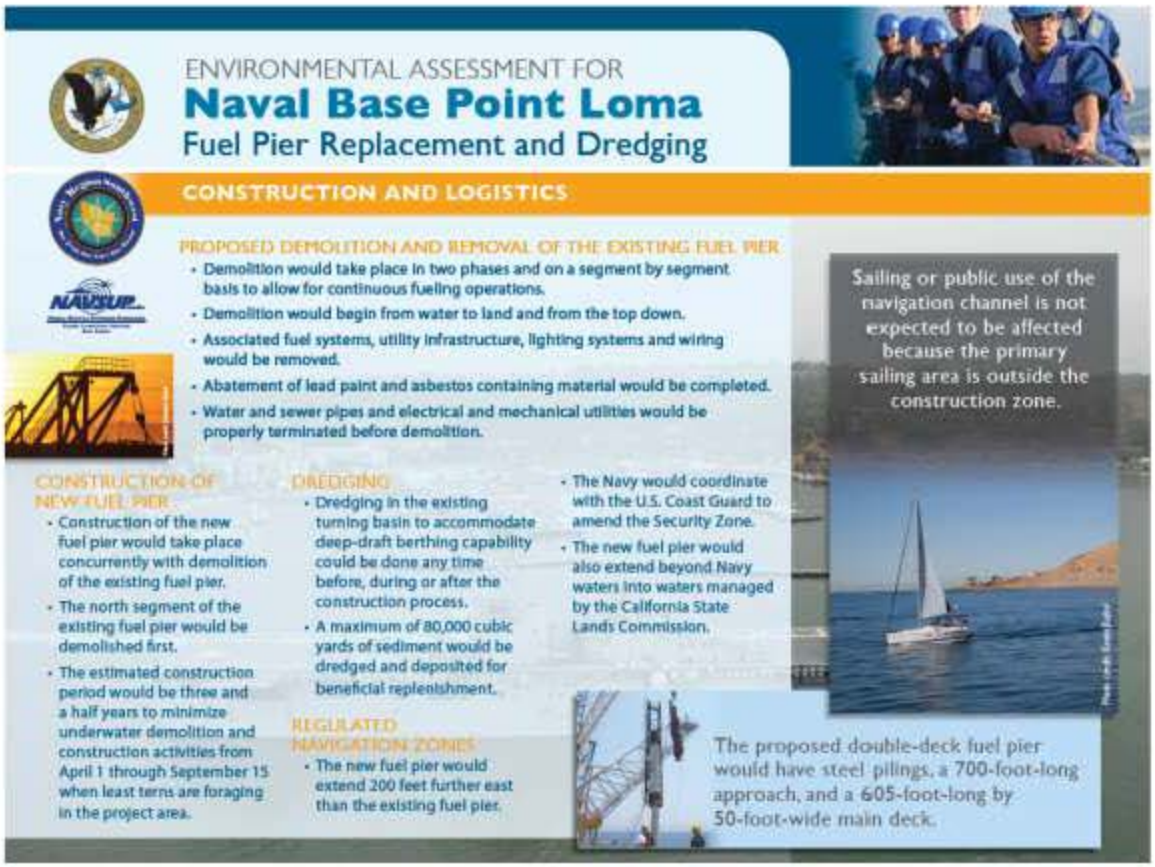


Figure 1-2
Project Site Map


ENVIRONMENTAL ASSESSMENT FOR
Naval Base Point Loma
Fuel Pier Replacement and Dredging
CONSTRUCTION AND LOGISTICS
PROPOSED DEMOLITION AND REMOVAL OF THE EXISTING FUEL PIER
• Demolition would take place in two phases and on a segment by segment basis to allow for continuous fueling operations.
• Demolition would begin from water to land and from the top down.
• Associated fuel systems, utility infrastructure, lighting systems and wiring would be removed.
• Abatement of lead paint and asbestos containing material would be completed.
• Water and sewer pipes and electrical and mechanical utilities would be properly terminated before demolition.
Sailing or public use of the navigation channel is not expected to be affected because the primary sailing area is outside the construction zone.
CONSTRUCTION OF NEW FUEL PIER
• Construction of the new fuel pier would take place concurrently with demolition of the existing fuel pier.
• The north segment of the existing fuel pier would be demolished first.
• The estimated construction period would be three and a half years to minimize underwater demolition and construction activities from April 1 through September 15 when least terns are foraging in the project area.
DREDGING
• Dredging in the existing turning basin to accommodate deep-draft berthing capability could be done any time before, during or after the construction process.
• A maximum of 80,000 cubic yards of sediment would be dredged and deposited for beneficial replenishment.
REGULATED NAVIGATION ZONES
• The new fuel pier would extend 200 feet further east than the existing fuel pier.
• The Navy would coordinate with the U.S. Coast Guard to amend the Security Zone.
• The new fuel pier would also extend beyond Navy waters into waters managed by the California State Lands Commission.
The proposed double-deck fuel pier would have steel pilings, a 700-foot-long approach, and a 605-foot-long by 50-foot-wide main deck.

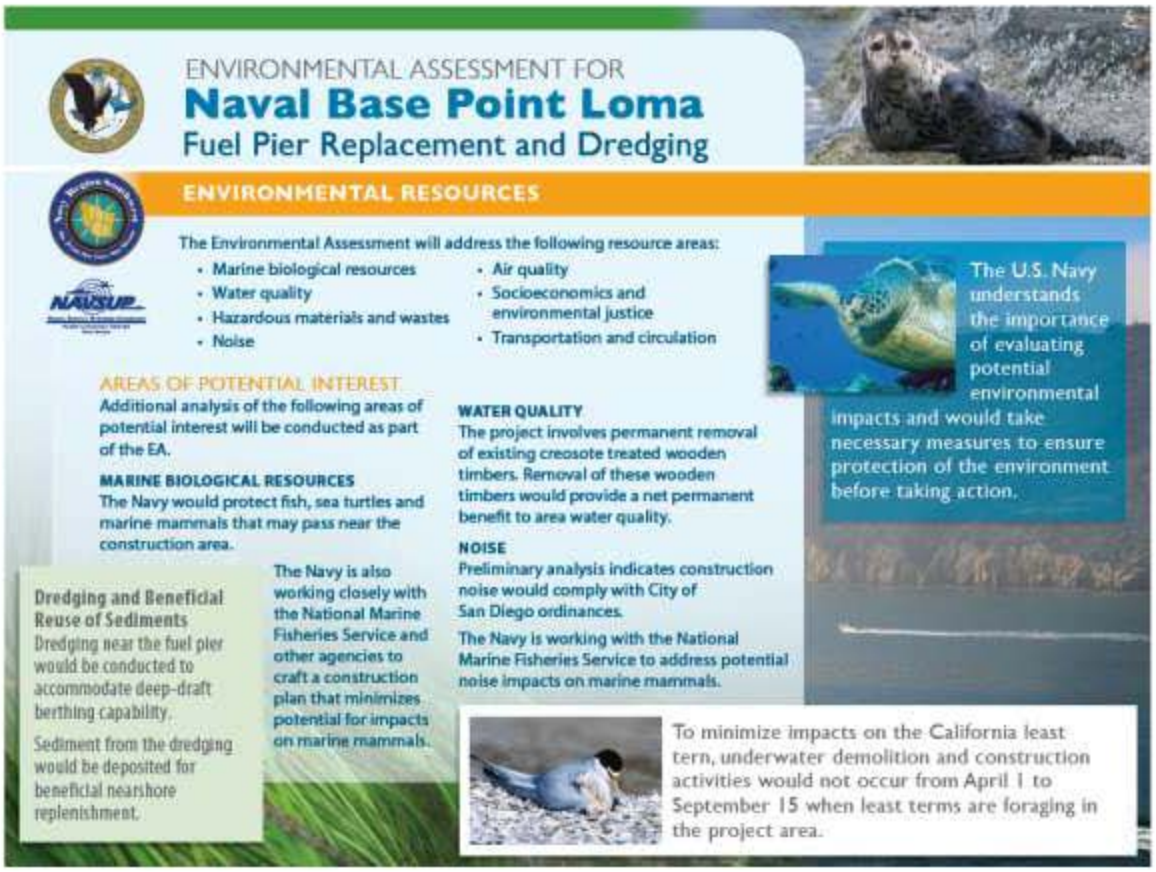

ENVIRONMENTAL ASSESSMENT FOR
Naval Base Point Loma
Fuel Pier Replacement and Dredging
ENVIRONMENTAL RESOURCES
The Environmental Assessment will address the following resource areas:
• Marine biological resources
• Water quality
• Hazardous materials and wastes
• Noise
• Air quality
• Socioeconomics and environmental justice
• Transportation and circulation
The U.S. Navy understands the importance of evaluating potential environmental impacts and would take necessary measures to ensure protection of the environment before taking action.
AREAS OF POTENTIAL INTEREST
Additional analysis of the following areas of potential interest will be conducted as part of the EA.
MARINE BIOLOGICAL RESOURCES
The Navy would protect fish, sea turtles and marine mammals that may pass near the construction area.
WATER QUALITY
The project involves permanent removal of existing creosote treated wooden timbers. Removal of these wooden timbers would provide a net permanent benefit to area water quality.
NOISE
Preliminary analysis indicates construction noise would comply with City of San Diego ordinances.
The Navy is working with the National Marine Fisheries Service to address potential noise impacts on marine mammals.
Dredging and Beneficial Reuse of Sediments
Dredging near the fuel pier would be conducted to accommodate deep-draft berthing capability.
Sediment from the dredging would be deposited for beneficial nearshore replenishment.
The Navy is also working closely with the National Marine Fisheries Service and other agencies to craft a construction plan that minimizes potential for impacts on marine mammals.
To minimize impacts on the California least tern, underwater demolition and construction activities would not occur from April 1 to September 15 when least terns are foraging in the project area.

Exhibit F: Handouts

U.S. Navy, Naval Base Point Loma Fuel Pier Replacement and Dredging Environmental Assessment (EA)

Open House Information Session Comment Form

Date: _____

Thank you for your comments on the Naval Base Point Loma Fuel Pier Replacement and Dredging EA. Comments must be postmarked or received by **May 28, 2012**, and may be submitted at this open house session or via mail to the address below. Comments may also be submitted online at

http://www.piersystem.com/go/doc/4275/1355631/

Please Print

_____
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_____
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_____

1. Name:_____
2. Organization/Affiliation (if applicable): _____
3. Address:_____

   _____
4. Do you wish to withhold your name and address from public review or from disclosure under the Freedom of Information Act (FOIA)? [ ] NO [ ] YES

Please give this form to one of the U.S. Navy representatives, place in the comment box or mail to:

P-151 Project Manager
Naval Facilities Engineering Command Southwest
Attn: (OPUE2.LS)
2730 McKean St., Building 291
San Diego, CA 92136-5198

Appendix C

Unified Facilities Criteria (UFC)

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APPENDIX C: APPLICABLE UNIFIED FACILITIES CRITERIA

New Fuel Pier Facility design would be in accordance with the following applicable Unified Facilities Criteria (UFC):

- UFC 2-000-05N (P-80) Facility Planning Criteria for DoN and Marine Corps Shore Installations
- UFC 3-300-10N Structural Engineering
- UFC 3-460-01 Petroleum Fuel Facilities
- UFC 3-600-01 Fire Protection Engineering for Facilities
- UFC 4-010-01 DoD Minimum Antiterrorism Standards for Buildings
- UFC 4-150-02 Dockside Utilities for Ship Service
- UFC 4-150-06 Military Harbors and Coastal Facilities
- UFC 4-151-10 General Criteria for Waterfront Structures
- UFC 4-152-01 Design: Piers and Wharves
- UFC 4-159-03 Design: Moorings

Appendix D

Sampling and Analysis Report for Naval Base Point Loma Fuel Pier Replacement and Dredging (MILCON Project P-151)

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SAMPLING AND ANALYSIS REPORT
for
NAVAL BASE POINT LOMA
FUEL PIER REPLACEMENT AND DREDGING

(Navy MILCON Project P-151)

Prepared by:
TEC Inc.
1819 Cliff Drive, Suite F
Santa Barbara, CA 93109

Prepared for:
U.S. Navy
Naval Facilities Engineering Command, Southwest
Coastal IPT
Naval Base San Diego
2730 McKean Street, Building 291
San Diego, California 92136

March 2011

0 50 100 Meters

0 250 500 Feet

Figure ES-1
Sample Locations - Pier 180
Naval Base Point Loma

N

EXECUTIVE SUMMARY

The Navy has undertaken physical, chemical, and biological testing of sediment within a proposed dredged footprint associated with the proposed Fuel Pier (Pier 180) replacement project located at Naval Base Point Loma (NBPL) in San Diego, California. The intent of this sediment testing is to determine suitability of the proposed dredged material for disposal in the approved regional ocean disposal site LA-5. Sediment collection and testing was done pursuant to the approved P-151 Sampling and Analysis Plan (November 2010).

The following summarizes the results of analytical tests performed on sediment samples collected within a proposed dredging area and ocean disposal reference site.

Field Sediment Collection

- Field sampling activities were conducted from November 10 through November 13, 2010:
    - Ocean Disposal Site (LA-5) reference site sample collected.
    - 10 sites in proposed turning basin (TB) dredge area collected (Figure ES-1).
- Sediment samples were received by the laboratories (CalScience Environmental Laboratories and Nautilus Environmental LLC) on November 15, 2010.
- The control sediment for bioassay toxicity testing was collected by the contracted laboratory on November 18, 2010.

Composites

- Sediments from sample stations TB-1 to TB-5 were combined into Composite Sample #1 representing approximately 40 percent of proposed dredge material.
- Sediments from sample station TB-6 to TB-10 were combined into Composite Sample #2 representing approximately 60 percent of proposed dredge material.

Grain Size

- Field observation and laboratory analysis of the collected sediment from the two composite samples from within the proposed dredging footprint indicates that the dredge material would be comprised largely of sand and shell hash.
- Results of the physical tests show sediment from both composite samples consist of more than 86 percent sand, 10 percent silt and 2 percent clay, with trace amounts (less than 1 percent) of gravel.

Bulk Chemistry

- The following bulk chemistry tests were conducted by the contracted laboratory: trace metals, mercury, polycyclic aromatic hydrocarbons (PAHs), phenols, phthalates, organochlorine pesticides, polychlorinated biphenyl (PCB) congeners, organotins, total recoverable petroleum hydrocarbons (TRPH), total solids, total sulfide, dissolved sulfide, ammonia and total organic carbon.
- A total of 128 constituents were analyzed and more than 100 constituents were not detected above the laboratory reporting limits in sediments from each composite sample.
- A majority of the chemicals that were detected in all three samples (including the LA-5 reference sample) were metals and phthalates.

- No organotins, PAHs, phenols and PCBs were detected above the laboratory reporting limits.
- No pesticides were detected in samples from Area 1 composite or Area 2 composite.
- Three pesticides were detected in sediment from the reference site, two of which (4,4'-DDE and DDTs) were detected at concentrations greater than the Effects Range Low (ERL) levels (NOAA National Sediment Quality Guidelines)
- No constituents were detected greater than any of the ERLs or Effects Range Median (ERM) concentrations in the Project Sediment Samples.
- For toxicity characteristic leaching procedure (TCLP), barium and zinc were detected in sediment from both project composite samples at concentrations less than 1 milligram per liter. Additionally, trace amounts of arsenic were detected just above the laboratory reporting limit in sediment from Area 2 composite.
- No TCLP metals were detected greater than any of the respective Resource Conservation and Recovery Act (RCRA) standards for hazardous waste. TCLP testing is not required for ocean disposal. Characterization with respect to hazardous waste disposal criteria would be useful should upland disposal be considered.

<u>Bioassay</u>

- Solid phase testing showed greater than 90 percent survival in all exposures to amphipod shrimp (*Eohaustorius*) and worms (*Neanthes*).
- Suspended particulate phase testing showed greater than 90 percent survival in the lab control and all levels of exposure to fish (*Menidia*) and shrimp (*Mysidopsis*). For the bivalve larval development test, observed effects were of low magnitude: for both composite samples, the percent normal survival rate of the 100 percent exposure sample yielded a value within 20 percent of the laboratory control. Furthermore, none of the results were less than the median effect level and the limiting permissible concentration (LPC) criterion is therefore substantially met for ocean disposal.
- Bioaccumulation phase testing has yielded sufficient organism survival and tissue recovery for chemical analysis.

<u>Chemistry Tests of Bioaccumulation Tissues</u>

- Tests results of tissues from clams and worms for metals indicate low bioavailability of several metals. Bioavailability of metals detected by the laboratory in project samples is not believed to be ecologically significant.
- Most organic contaminants were not detected with the exception of phthalate compounds that were detected in both the project composites and reference-sediment exposed tissues.

<u>Overall</u>

The project sediment from the proposed dredging consists mostly of sand. Test results indicate low concentrations or the absence of contaminants in the sediments. All test results appear to support a regulatory conclusion that the project sediment is suitable for ocean disposal. However, the regulatory determination needs to be made by the US Army Corps of Engineers (USACE) and US Environmental Protection Agency (USEPA).

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LIST OF ACRONYMS AND ABBREVIATIONS

°C	Degrees Celsius
±	Plus or Minus
BP	Bioaccumulation Phase
CFR	Code of Federal Regulations
CY	Cubic Yards
DFSP	Defense Fuel Support Point
DGPS	Differential Global Positioning System
ERL	Effects Range Low
ERM	Effects Range Median
FISC	Fleet and Industrial Supply Center
ft	Foot/Feet
LPC	Limiting Permissible Concentrations
mL	Milliliters
MLLW	Mean Lower Low Water
MOTEMS	Marine Oil Terminal Engineering and Maintenance Standards
N	North
Navy	Naval Facilities Engineering Command, Southwest Division
NBPL	Naval Base Point Loma
NOAA	National Oceanic and Atmospheric Administration
ODMDS	Ocean Dredged Material Disposal Site
oz.	Ounce
PAH	Polycyclic Aromatic Hydrocarbons
PCB	Polychlorinated Biphenyl
PVC	Polyvinyl Chloride
QA/QC	Quality Assurance/Quality Control
RCRA	Resource Conservation and Recovery Act
SAP	Sampling and Analysis Plan
SP	Solid Phase
SQG	Sediment Quality Guidelines

SSP	Suspended Solid Phase
TB	Turning Basin
TCLP	Toxicity Characteristic Leaching Procedure
TEC	TEC Inc.
TEG	TEG Oceanographic Services
TRPH	Total Recoverable Petroleum Hydrocarbons
USACE	US Army Corps of Engineers
USCG	US Coast Guard
USEPA	US Environmental Protection Agency
W	west

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1.0 INTRODUCTION

This document serves as the Sampling and Analysis Report for a dredged material characterization study associated with the proposed Fuel Pier (Pier 180) replacement project located at Naval Base Point Loma (NBPL) in San Diego, California (Appendix A, Figures 1 and 2).

NBPL Pier 180 is an active fuel pier that has been in operation for many decades and currently serves approximately 40 ship fueling operations per month. Naval Facilities Engineering Command, Southwest (Navy) is proposing to demolish the existing Pier 180 and replace it with a modern structurally sound marine fuel pier. This proposed project would replace the approximately 100 year old and seismically deficient Pier 180 at NBPL and would provide a new pier that will meet current California State Lands Commission - Marine Oil Terminal Engineering and Maintenance Standards (MOTEMS). An environmentally safe and improved fuel receipt and delivery capability at the Defense Fuel Support Point (DFSP), Fleet and Industrial Supply Center (FISC), San Diego would be provided. This proposed project would replace the existing deficient Fuel Pier with a new concrete pile supported T-shaped fueling pier, located in deeper water outboard of the existing structure.

Sediment samples were collected within a proposed dredge footprint in the outer turning basin for the fuel pier, as well as in a designated reference sample site located near the US Environmental Protection Agency (USEPA) - approved LA-5 Ocean Dredged Material Disposal Site (ODMDS). The collected sediment samples were subject to physical, chemical and biological testing to determine suitability for ocean disposal of the proposed dredged material. Field sample collection and laboratory testing were conducted in accordance with the Sampling and Analysis Plan (SAP) for this project (NAVFAC Southwest, 2010), that was approved in November 2010 by the United States Army Corps of Engineers (USACE) and the USEPA. Field and laboratory activities were also consistent with USACE dredge material engineering and regulatory practice along with guidance provided by the USEPA's "Evaluation of Dredged Materials Proposed for Ocean Disposal" (commonly known as the "Green Book Testing Manual").

This Sampling and Analysis Report documents the sediment sample collection procedures and analytical test results that were done to evaluate proposed dredged materials from the outer portion of the turning basin for Pier 180 for suitability for ocean disposal. Tests were conducted according to the regulations contained in Title 40 Code of Federal Regulations (CFR) Parts 220-228.

2.0 PURPOSE OF THE SAMPLING

The Fuel Pier NBPL is critical to the mission of the Navy and is the only active Navy fueling facility in the vicinity. More than 42 million gallons of fuel are stored at DFSP Point Loma and more than 11 million gallons of fuel is issued and received every month to more than 42 ships including the Military Sealift Command, Expeditionary Warfare Training Groups, three carrier

strike groups, National Oceanographic and Atmospheric Administration (NOAA), Homeland Security (USCG), foreign and small craft.

The proposed pier replacement project would provide a new Double Deck Fuel Pier, 1,100 feet (ft) long and 50 ft wide. The proposed pier replacement would extend the outboard berthing length to 1500 ft by the addition of two 30 ft square mooring dolphins on each end of the pier. The total area, including the 700 ft long Access Pier, would be 91,150 square ft (Appendix A, Figure 3). No dredging would be needed alongside the replacement pier, as sufficient water depths currently exist.

The proposed new pier layout would include a minimum 1,200 ft wide turning basin between the outboard (eastern) side of the pier and the navigation channel, to provide safety for the berthing operations of the large vessels being serviced at the facility (Figure 4). The design depth for the turning basin would be 41 ft below mean lower low water (MLLW) (38 ft vessel draft plus 3 ft under keel) with an additional 2 ft for overdredge allowance. The majority of the existing bathymetry of the turning basin is deep enough to accommodate safe vessel operation. However, there is a wedge-shaped high spot along the western edge of the navigation channel where bottom depths rise from -40 to -36 ft MLLW. This wedge-shaped area would need to be excavated to bring it to a minimum of -41 ft MLLW (plus 2 ft overdredge allowance). The proposed dredge footprint would be limited to the location adjacent, to the west, of the navigation channel, as illustrated and shown in green in Figure 4. The estimated volume of proposed dredging is presented in the table below.

Proposed Dredging Volume (Cubic Yards [CY])			
SITE	DESIGN DEPTH (-41 ft MLLW)	OVERDREDGE (2 ft)	TOTAL
Turning Basin	53,000 CY	34,000 CY	87,000 CY

Physical, chemical and biological tests were conducted on two composite sediment core samples collected within the dredge footprint, and one reference sample from near the proposed ODMDS site. The intent of the sediment physical and chemical tests is to characterize and describe the type of dredged material that will be excavated from the proposed dredging area. Bioassay testing assesses the impact of contaminants in the dredged material on appropriate sensitive organisms to determine if there is potential for the dredged material to have an unacceptable impact.

The ocean disposal of dredged materials at the LA-5 ODMDS is regulated under Section 103 of the Marine Protection, Research and Sanctuaries Act, and disposal operations must comply with permitting and dredging regulations published in 33 CFR Parts 320-330 and 335-338.

3.0 DESCRIPTION OF THE SAMPLING AREA

The proposed dredge footprint is located in the outer portion of the turning basin for NBPL Pier 180. The extent of the footprint is illustrated in Figure ES-1 and Appendix A, Figure 4. The dredging footprint is comprised of areas in the outer portion of the turning basin with water depths of less than -41 ft MLLW.

Sediment samples were collected from 10 representative sites within the proposed dredging footprint in the turning basin. The intent was to place sampling stations in 10 sites equidistant from one another from one end of the footprint to the other. Sites in the equidistance locations were placed in a zigzag fashion to obtain sediment cores from the west, central and east sides of the footprint. This resulted in sediment collection from representative locations within the proposed dredging envelope.

4.0 PAST RELEVANT SEDIMENT CHARACTERIZATIONS

Sediment within the proposed dredge footprint consists of bay/beach deposits and the Pleistocene age Bay Point Formation. Bay deposits generally consist of loose, fine sands with silt and silty sands. Bay/beach deposits are underlain by terrace deposits of the Bay Point Formation. The Bay Point Formation generally consists of medium dense and dense, poorly graded and clays sands with some layers of sandy clay (Woodward-Clyde, 1995).

In addition, the USACE undertook recent sediment sampling and testing before proposed maintenance dredging of the San Diego Harbor Navigation Channel. Vibracore samples were taken in the federal navigation channel in the vicinity of the proposed dredging portion of the turning basin for Pier 180. The grain size and chemical analyses of samples revealed sediment that was mostly sand with low concentrations of any contaminants. This sediment was deemed suitable for beach nourishment (USACE, 2009).

5.0 FIELD ACTIVITIES

Field activities were conducted from November 10 through November 13, 2010. TEC Inc. (TEC) was project manager for sediment sample collection effort. The following subcontractors carried out the field collection activities:

- AMEC Earth & Environmental, Inc. – field work coordination.
- Seaventures – boat (*Early Bird II)* and boat crew.
- TEG Oceanographic Services (TEG) - operated vibracore equipment for sediment collection.

5.1 TEST SEDIMENT COLLECTION

Sample sediments were collected from the 10 sites (Figure ES-1 and Appendix A, Figure 4) and the sediment was pooled into two (TB sites 1-5 and TB sites 6-10) composite samples for physical, chemical and biological testing for ocean disposal suitability determination. A reference sediment sample was also collected from the designated reference site (Appendix A, Figure 5) for the same physical, chemical, and biological tests as the two composite samples from within the proposed dredging footprint.

Extra sediment was collected from the 10 dredging footprint sites and archived for backup testing if needed. The cores were visually inspected and split into a top and bottom strata per physical characteristics or per depth when no physical differences were observed. Subsamples were taken from both strata for archiving and then homogenized separately, as top and bottom samples for later testing for physical, chemical and bioaccumulation analyses, if needed.

A differential global positioning system (DGPS) was used to navigate to the target sampling locations. The target navigational accuracy was plus or minus three meters. The *Early Bird II* deployed a three-point anchor to maintain its position. Once secured, the position was recorded in the field log and the water depth was measured with a weighed fiberglass tape. The water depth was corrected for the MLLW (using the NOAA tide tables).

TEG personnel deployed the vibracore used for sediment sample collection. The vibracore uses a 4-inch diameter aluminum tube connected to a stainless steel cutter. The aluminum encased vibrating unit uses 240-volt, three-phase, and 26-amp electricity to drive two counter rotating concentric vibrators. The vibracore and tube were lowered by a hydraulic winch and vibrated until penetration to project depth was achieved. Core penetration depth was calculated with a tape measure attached to the vibracore head. After the vibracore was turned off, the sediment core was returned to the boat's deck for processing.

Once onboard, core samples were carefully extruded into clean, polyethylene-lined trays, photographed, and inspected for unique strata, color, odor, etc. The processing involved extruding each sample from the plastic-enclosed core tube into a polyvinylchloride (PVC) tray. The extruded cores were subsampled after being logged and photographed. All of the core logs and sediment sample photographs are included in Appendix C. Subsampled sediments were deposited into stainless steel mixing pots and thoroughly homogenized with a mixer attached to an electrically-powered hand-held drill. This process was repeated at each of the 10 collection sites.

No solvents were used on deck of the vessel. Decontamination used only biodegradable soap rather than hazardous substances. Between coring stations, sampling equipment and the work area on board the collection vessel was cleaned. The decontamination process for equipment coming into direct contact with sediment samples included thorough cleaning with site seawater, scrubbing with Alconox (or similar) detergent, and rinsing with site seawater. Similarly, between cores, the deck of the collection vessel was cleaned using site seawater. Site seawater was obtained from approximately 1 ft beneath the bay surface using an onboard pump which supplies water to the deck at approximately household pressure.

5.2 TEST SEDIMENT COMPOSITING

Sediment samples collected at the 10 sample locations within the proposed dredging footprint were pooled into two composite samples. Sediments from sample stations TB-1 to TB-5 were combined into Composite Sample #1 (referred to as Area 1). Sediments from sample stations TB-6 to TB-10 were combined into Composite Sample #2 (referred to as Area 2). It is estimated that of the total volume of proposed dredging, that approximate 40 percent is represented by Composite Sample #1 and 60 percent by Composite Sample #2.

On the survey vessel, each of the 10 individual core samples, (plus additional cores necessary to make up sufficient testing volume – required additional testing volume was accomplished by moving vertically not by moving to adjacent locations at the same depth) were homogenized separately in a clean, non-contaminating stainless steel mixing vessel, and then subsampled for archiving purpose. The sediment from the five individual cores within each composite group were then combined, homogenized, and subsampled for physical, chemical and biological analyses as well as for archiving purposed. Samples for physical and chemical analyses were forwarded to Calscience in labeled 16 ounce (oz.) glass jars and plastic bags, respectively. Samples were transported in accordance with chain-of-custody procedures and were received by the laboratory on November 15, 2010 (Appendix D).

For the toxicity and bioaccumulation testing, the two test site composite samples and sediment collected from the reference site were delivered to Nautilus Environmental laboratory in food-grade plastic bags in iced coolers or buckets. The samples were held in a 4 degrees Celsius (˚C) cold room until toxicity tests were initiated.

The integrity of each sample was maintained throughout the study. Proper record-keeping and chain-of-custody procedures were implemented to allow samples to be traced from collection to their final disposition. After collection of sediment, documentation on various logs and forms were completed to adequately identify and catalog station and sample information. Archived samples will be retained by the laboratories for a period of one year from collection (or until suitability determination has been made). Completed chain-of-custody forms are located in Appendix D and core log documentation is located in Appendix C.

5.3 REFERENCE SEDIMENT COLLECTION

Reference sediment was collected at a designated site (lat 32˚46.00′N, long 117˚22.75′W) that has been used for numerous dredged material bioassays and has a sediment quality that is acceptable to USEPA and USACE (Appendix A, Figure 5).

5.4 CONTROL SEDIMENT COLLECTION

Control sediments were used for both the solid phase (SP) and bioaccumulation phase (BP) biological tests. The control or "home" sediments were collected at the same location and at the same time as the test organisms. Control sediment exposures are used to determine the health of the test organisms during the laboratory exposure period. These tests must meet specific control criteria (greater than 90 percent survival in the SP tests and greater than 70 percent in the BP tests) for the tests to be considered valid. Survival at these levels attests to the suitability of the organisms for testing purposes. Home control sediments were collected from Tomales Bay in northern California and fine-grained control sediments were collected from Sail Bay in San Diego on November 18, 2010. Control sediment was collected by the test organism supplier using the methods used to collect test organisms. Then, the sediment was sent to the Nautilus Environmental laboratory along with each batch of test organisms. Control sediment was stored at 4˚C until test initiation.

5.5 FIELD OBSERVATIONS

At many sample locations, the sediment was composed of fine to medium grain sand with an underlying layer of coarse sand mixed with shell hash (see Photos in Appendix B). Additionally, the photo on page 7 illustrates a core sample of sandy sediment taken at station TB-10. Sands have a tendency to dampen the frequency of the vibracore's vibration, while the shell hash has a tendency to clog the vibracore's catcher/cutter head causing a plug in the core cutter. As a result, multiple attempts were made at the sediment sample locations that experienced poor core recoveries. At some locations, the collection boat had to be slightly re-positioned so that sufficient core recoveries could be achieved.

Table 1 provides the actual locations within the proposed dredging footprint of the sample stations, the water depth and the penetration length of the sample cores.

Table 1. Sample Collection Locations and Core Depths

Station ID	*Sample Type*	*Collection Coordinates*		*Sample Collection Type*	*Sample Collection*			
		Latitude North WGS84 (dd° mm ss.sss′)	*Longitude West WGS84 (ddd° mm ss.sss′)*		*Mudline[1] (ft MLLW)*	*Dredge Depth (ft MLLW)*	*Penetration Depth (ft)*	
							Target	*Actual*
Turning Basin								
TB1	Core	32° 42′9.300″	117° 13′52.560″	Vibracore	-38.3	-43	4.7	4.7
TB2	Core	32° 42′8.460″	117° 13′51.840″	Vibracore	-40.0	-43	3.0	3.0
TB3	Core	32° 42′6.300″	117° 13′53.580″	Vibracore	-37.4	-43	5.6	5.6
TB4	Core	32° 42′3.540″	117° 13′54.720″	Vibracore	-36.6	-43	6.4	6.0
TB5	Core	32° 42′0.480″	117° 13′55.680″	Vibracore	-38.8	-43	4.2	4.7
TB6	Core	32° 41′56.340″	117° 13′57.720″	Vibracore	-39.5	-43	3.5	4.0
TB7	Core	32° 41′53.220″	117° 14′1.200″	Vibracore	-39.1	-43	3.9	4.0
TB8	Core	32° 41′51.360″	117° 13′58.860″	Vibracore	-36.4	-43	6.6	6.6
TB9	Core	32° 41′49.320″	117° 14′3.420″	Vibracore	-37.0	-43	6.0	6.0
TB10	Core	32° 41′46.320″	117° 14′0.900″	Vibracore	-35.0	-43	8.0	8.0
Reference								
REF	Grab	32° 46′ 00″	117° 22′45.0″	Pipe Dredge	Approx. -600	NA	Surface	

Legend:
NA – not applicable
Ref – reference

Vibracore penetration accuracy is ±0.5 ft. Target penetration to project design depth was corrected for the tidal elevation at each coring location. The penetration depth was determined using a measuring tape attached to the vibracore head. The distance from where the tape is attached to the vibracore head was added to the length from this point to the core cutter. Following the collection of each core, the length of the sediment in the tube was determined to assess the amount of compaction that occurred during collection. In the case of TB4, refusal was met at 6 ft, 0.4 ft short of the target penetration depth (see Table 1).

Above: Photo from TB-10 station showing a core sample consisting largely of sand.

6.0 ANALYTICAL RESULTS

The results of the analytical tests presented below are required for ocean disposal consideration as per "Evaluation of Dredged Material Proposed for Ocean Disposal (Testing Manual), 1991 (also known as the "Green Book").

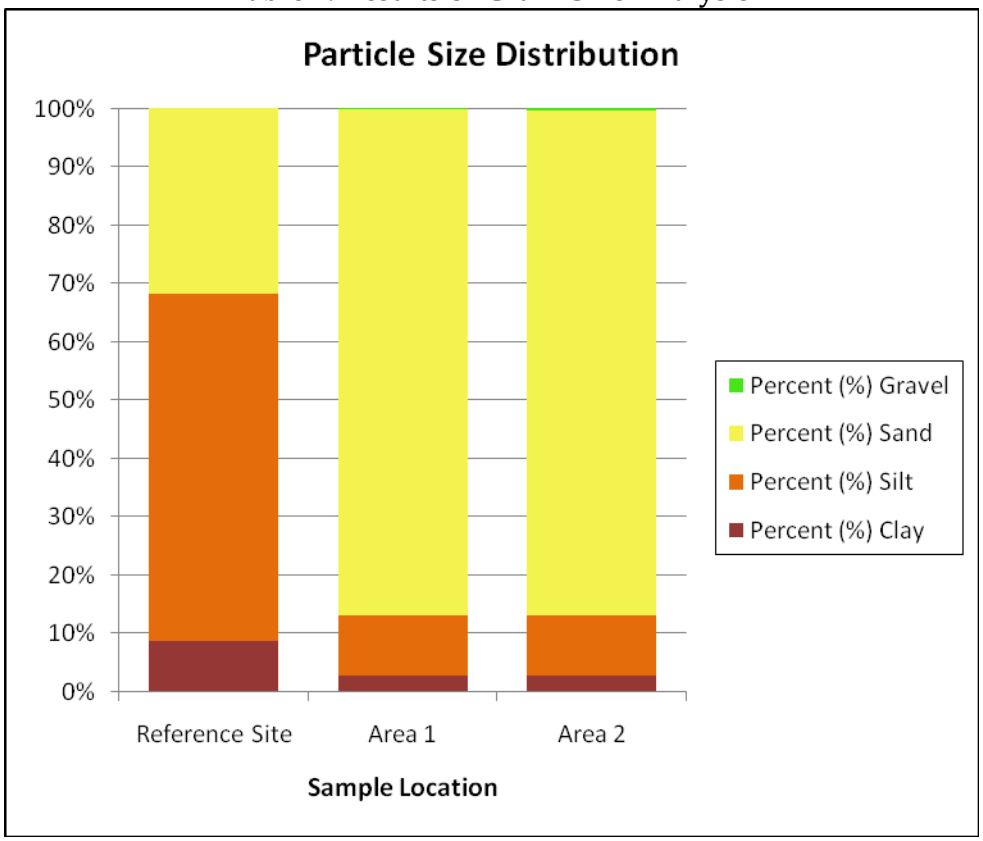
Testing protocols contained in this USEPA reference manual suggests a tiered approach for analysis of dredge sediment quality. Tier I relies on historical evidence. Tier II involves sediment sampling and physical and chemical analysis of the sediment. Tier III includes biological assessments of the sediment for suitability for ocean disposal. The objective of this sediment sampling and testing program was to complete Tiers I, II and III of the USEPA referenced protocol. Complete laboratory analytical reports for physical and chemical tests, including Quality Assurance/Quality Control (QA/QC) statistics, are provided in Appendix E.

Upon receipt from the laboratory that performed the analysis, all data were forwarded to Laboratory Data Consultants, Inc. for third party validation.

6.1 RESULTS OF PHYSICAL TESTS

Physical analyses were performed on the two composite samples and the reference sample. The analyses were performed at Core Laboratories in Bakersfield, California (under subcontract to Calscience) following the sieve and hydrometer method (ASTM 1967). Percent gravel, sand, silt and clay were reported to 0.1 percent, along with the corresponding millimeter and phi sizes, and a cumulative grain-size distribution diagram. The results of the grain size analysis are illustrated in Table 2.

Table 2. Results of Grain Size Analysis



The general size classes of gravel, sand, silt and clay are the most useful in describing the size distribution of particles in dredged material samples. Grain size analysis is used to describe the distribution of particle sizes in samples of sediment. Based on the results of the grain size analysis, sediments from the samples collected within the proposed dredge footprint (i.e., Area 1 and Area 2) have similar particle size distributions. Sediment samples collected from Area 1 and Area 2 consist of more than 86 percent sand, 10 percent silt and 2 percent clay, with trace amounts (less than 1 percent) of gravel. Sediment from the reference sample location consists of 31.76 percent sand, 59.47 percent silt and 8.77 percent clay.

6.2 RESULTS OF CHEMICAL TESTS

Bulk chemistry tests are a primary method of characterizing sediment quality for proposed dredged material. Chemical analysis of the sediment provides information about constituents present in the dredged material that, if biologically available, could cause toxicity and/or be bioaccumulated. This information is valuable for exposure assessment and for selecting constituents to measure in tissue samples for Tier III analysis.

Calscience Environmental Laboratories (Calscience), a California accredited laboratory, conducted all analytical chemical analyses on sediment. The sediment samples submitted to Calscience were analyzed according to USEPA- and USACE-approved methods. Total solids/water content was also analyzed and reported to 0.1 percent solids. Results of the bulk chemistry tests are summarized in Table 3.

NOAA sediment quality guidelines (SQGs) were developed as part of the National Status and Trends Program to be used as informal, interpretive tools to estimate the possible toxicological significance of chemical concentrations in sediments. The guidelines are commonly used to rank and prioritize sites and chemicals of concern. NOAA SQGs are reported as two values: the Effects Range Low (ERL) and the Effects Range Median (ERM). The ERL values represent the concentration below which adverse effects rarely occur and the ERM value represents the concentration above which adverse effects frequently occur.

As shown in Table 3, analyses were conducted on 128 constituents. In each of the three samples (two samples from the proposed dredge footprint and one sample from the reference site) more than 100 of the analyzed constituents were not detected above the reporting limits in sediment from each sample. For the Area 1 composite sample, 107 of the 128 analyzed constituents were not detected above the laboratory reporting limits. For the Area 2 composite sample, 105 constituents were not detected and for the reference site sample, 101 constituents were not detected above the laboratory reporting limits. For all samples, no constituents were detected in the following chemical categories: organotins, polycyclic aromatic hydrocarbons (PAHs), phenols and polychlorinated biphenyls (PCBs). No pesticides were detected above the reporting limits in the sediment samples from Area 1 and Area 2. In the sample from the reference site, 4,4'-DDE and DDTs were detected above the reporting limits and above the designated ERLs. In general, most chemical detections for all sample areas were concentrated in the following chemical categories: conventionals, metals and phthalates. In addition, total sulfide was detected above the laboratory reporting limits in all three samples analyzed, but dissolved sulfide was not.

Sediment for the two composite samples from within the proposed dredge footprint did not exhibit detected chemical concentrations greater than any of the ERLs or ERMs. In sample sediment from the reference site, no constituents were detected above any of the ERMs. Other than the two pesticide constituents (i.e., 4,4'-DDE and DDTs) detected in the sediment sample from the reference site, no other constituents were detected at concentrations greater than any of the ERLs.

Sediment from the sample composites was also subjected to Toxicity Characteristic Leaching Procedure (TCLP) testing. TCLP results are summarized in Table 4. Of the 12 TCLP metals that

were analyzed, only trace levels of barium and zinc were detected above the laboratory reporting limits in sediment from sample composites. Arsenic was also detected in trace amounts, but only in the sediment from Area 2. Results of TCLP tests are typically used to determine whether a substance meets the criteria for hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). None of the TCLP metals were detected above the RCRA concentrations for hazardous waste. These tests are not related to ocean disposal requirements but would be useful should upland disposal of the proposed dredging project be considered.

Table 3. Summary of Sediment Chemistry Analysis

Sample ID *Sample Components* *Sample Date*		*Area 1* *TB-1 - TB-5* *11/13/10*	*Area 2* *TB-6 - TB-10* *11/12/10*	*Reference* *LA-5* *11/10/10*	*ERL*	*ERM*
	Units	*Result*	*Result*	*Result*		
Conventionals						
Ammonia	mg/kg	1.4	3.1	2.3	NA	NA
Carbon, Total Organic	%	0.2	0.71	3.4	NA	NA
Moisture	%	28.4	18.2	39.7	NA	NA
Total Solids	%	71.6	81.8	60.3	NA	NA
TRPH	mg/kg	38	34	40	NA	NA
Metals						
Arsenic	mg/kg	1.94	2.67	2.48	8.2	70
Cadmium	mg/kg	ND	ND	0.293	1.2	9.6
Chromium	mg/kg	8.91	6.56	22.3	81	370
Copper	mg/kg	7.51	5.27	10.8	34	270
Lead	mg/kg	3.57	2.66	7.06	46.7	218
Mercury	mg/kg	0.0613	0.0498	0.0559	0.15	0.71
Nickel	mg/kg	2.63	3.94	11.9	20.9	51.6
Selenium	mg/kg	ND	0.133	0.542	NA	NA
Silver	mg/kg	ND	ND	ND	1	3.7
Zinc	mg/kg	33.5	16.2	40.9	150	410
Sulfides						
Dissolved Sulfide	mg/kg	ND	ND	ND	NA	NA
Total Sulfide	mg/kg	18	0.98	2.2	NA	NA
Organotins						
Dibutyltin	ug/kg	ND	ND	ND	NA	NA
Monobutyltin	ug/kg	ND	ND	ND	NA	NA
Tetrabutyltin	ug/kg	ND	ND	ND	NA	NA
Tributyltin	ug/kg	ND	ND	ND	NA	NA
PAHs						
1-Methylnapthalene	ug/kg	ND	ND	ND	NA	NA
2,4,5-Trichlorophenol	ug/kg	ND	ND	ND	NA	NA
2,4,6-Trichlorophenol	ug/kg	ND	ND	ND	NA	NA
2,4-Dichlorophenol	ug/kg	ND	ND	ND	NA	NA
2,4-Dimethylphenol	ug/kg	ND	ND	ND	NA	NA
2,4-Dinitrophenol	ug/kg	ND	ND	ND	NA	NA
2-Chlorophenol	ug/kg	ND	ND	ND	NA	NA
2-Methylnapthalene	ug/kg	ND	ND	ND	70	670
Acenaphthene	ug/kg	ND	ND	ND	16	500

Sample ID ***Sample Components*** ***Sample Date***		***Area 1*** ***TB-1 - TB-5*** ***11/13/10***	***Area 2*** ***TB-6 - TB-10*** ***11/12/10***	***Reference*** ***LA-5*** ***11/10/10***	***ERL***	***ERM***
	Units	***Result***	***Result***	***Result***		
Acenaphthylene	ug/kg	ND	ND	ND	44	640
Anthracene	ug/kg	ND	ND	ND	85.3	1100
Benzo(a)anthracene	ug/kg	ND	ND	ND	261	1600
Benzo(a)pyrene	ug/kg	ND	ND	ND	430	1600
Benzo (b) Fluoranthene	ug/kg	ND	ND	ND	NA	NA
Benzo (g,h,i) Perylene	ug/kg	ND	ND	ND	NA	NA
Benzo (k) Fluoranthene	ug/kg	ND	ND	ND	NA	NA
Chrysene	ug/kg	ND	ND	ND	384	2800
Dibenz (a,h) Anthracene	ug/kg	ND	ND	ND	63.4	260
Fluoranthene	ug/kg	ND	ND	ND	600	5100
Fluorene	ug/kg	ND	ND	ND	19	540
Indeno (1,2,3-c,d) Pyrene	ug/kg	ND	ND	ND	NA	NA
Naphthalene	ug/kg	ND	ND	ND	160	2100
N-Nitrosodimethylamine	ug/kg	ND	ND	ND	NA	NA
Pentachlorophenol	ug/kg	ND	ND	ND	NA	NA
Phenanthrene	ug/kg	ND	ND	ND	240	1500
Phenols	ug/kg	ND	ND	ND	NA	NA
Pyrene	ug/kg	ND	ND	ND	665	2600
PAHs	ug/kg	ND	ND	ND	4022	44792
Phthalates						
Bis(2-Ethylhexyl) Phthalate	ug/kg	51	50	110	NA	NA
Butylbenzyl Phthalate	ug/kg	150	120	180	NA	NA
Diethyl Phthalate	ug/kg	200	190	300	NA	NA
Dimethyl Phthalate	ug/kg	ND	13	20	NA	NA
Di-n-butyl Phthalate	ug/kg	23	16	25	NA	NA
Di-n-octyl Phthalate	ug/kg	ND	ND	ND	NA	NA
Phenols						
2-Methylphenol	ug/kg	ND	ND	ND	NA	NA
2-Nitrophenol	ug/kg	ND	ND	ND	NA	NA
3,4-Methylphenol	ug/kg	ND	ND	ND	NA	NA
4,6-Dinitro-2-Methylphenol	ug/kg	ND	ND	ND	NA	NA
4-Chloro-3-Methylphenol	ug/kg	ND	ND	ND	NA	NA
PCBs						
Congener 8	ug/kg	ND	ND	ND	NA	NA
Congener 18	ug/kg	ND	ND	ND	NA	NA
Congener 28	ug/kg	ND	ND	ND	NA	NA

Sample ID Sample Components Sample Date		Area 1 TB-1 - TB-5 11/13/10	Area 2 TB-6 - TB-10 11/12/10	Reference LA-5 11/10/10	ERL	ERM
	Units	Result	Result	Result		
Congener 44	ug/kg	ND	ND	ND	NA	NA
Congener 49	ug/kg	ND	ND	ND	NA	NA
Congener 52	ug/kg	ND	ND	ND	NA	NA
Congener 66	ug/kg	ND	ND	ND	NA	NA
Congener 70	ug/kg	ND	ND	ND	NA	NA
Congener 74	ug/kg	ND	ND	ND	NA	NA
Congener 77	ug/kg	ND	ND	ND	NA	NA
Congener 81	ug/kg	ND	ND	ND	NA	NA
Congener 87	ug/kg	ND	ND	ND	NA	NA
Congener 101	ug/kg	ND	ND	ND	NA	NA
Congener 105	ug/kg	ND	ND	ND	NA	NA
Congener 114	ug/kg	ND	ND	ND	NA	NA
Congener 118	ug/kg	ND	ND	ND	NA	NA
Congener 119	ug/kg	ND	ND	ND	NA	NA
Congener 123	ug/kg	ND	ND	ND	NA	NA
Congener 126	ug/kg	ND	ND	ND	NA	NA
Congener 128	ug/kg	ND	ND	ND	NA	NA
Congener 138	ug/kg	ND	ND	ND	NA	NA
Congener 151	ug/kg	ND	ND	ND	NA	NA
Congener 153	ug/kg	ND	ND	ND	NA	NA
Congener 156	ug/kg	ND	ND	ND	NA	NA
Congener 157	ug/kg	ND	ND	ND	NA	NA
Congener 158	ug/kg	ND	ND	ND	NA	NA
Congener 167	ug/kg	ND	ND	ND	NA	NA
Congener 168	ug/kg	ND	ND	ND	NA	NA
Congener 169	ug/kg	ND	ND	ND	NA	NA
Congener 170	ug/kg	ND	ND	ND	NA	NA
Congener 180	ug/kg	ND	ND	ND	NA	NA
Congener 183	ug/kg	ND	ND	ND	NA	NA
Congener 184	ug/kg	ND	ND	ND	NA	NA
Congener 187	ug/kg	ND	ND	ND	NA	NA
Congener 189	ug/kg	ND	ND	ND	NA	NA
Congener 195	ug/kg	ND	ND	ND	NA	NA
Congener 201	ug/kg	ND	ND	ND	NA	NA
Congener 206	ug/kg	ND	ND	ND	NA	NA
Congener 209	ug/kg	ND	ND	ND	NA	NA

Sample ID ***Sample Components*** ***Sample Date***		***Area 1*** ***TB-1 - TB-5*** ***11/13/10***	***Area 2*** ***TB-6 - TB-10*** ***11/12/10***	***Reference*** ***LA-5*** ***11/10/10***	***ERL***	***ERM***
	Units	***Result***	***Result***	***Result***		
Total PCB Congeners	ug/kg	ND	ND	ND	22.7	180
Pesticides						
2,4'-DDD	ug/kg	ND	ND	ND	NA	NA
2,4'-DDE	ug/kg	ND	ND	ND	NA	NA
2,4'-DDT	ug/kg	ND	ND	ND	NA	NA
4,4'-DDD	ug/kg	ND	ND	ND	NA	NA
4,4'-DDE	ug/kg	ND	ND	5	2.2	27
4,4-DDT	ug/kg	ND	ND	4	NA	NA
DDTs	ug/kg	ND	ND	9	1.58	46.1
Aldrin	ug/kg	ND	ND	ND	NA	NA
Alpha-BHC	ug/kg	ND	ND	ND	NA	NA
Beta-BHC	ug/kg	ND	ND	ND	NA	NA
Chlordane	ug/kg	ND	ND	ND	NA	NA
Delta-BHC	ug/kg	ND	ND	ND	NA	NA
Dieldrin	ug/kg	ND	ND	ND	NA	NA
Endosulfan I	ug/kg	ND	ND	ND	NA	NA
Endosulfan II	ug/kg	ND	ND	ND	NA	NA
Endosulfan Sulfate	ug/kg	ND	ND	ND	NA	NA
Endrin	ug/kg	ND	ND	ND	NA	NA
Endrin Aldehyde	ug/kg	ND	ND	ND	NA	NA
Endrin Ketone	ug/kg	ND	ND	ND	NA	NA
Gamma-BHC	ug/kg	ND	ND	ND	NA	NA
Heptachlor	ug/kg	ND	ND	ND	NA	NA
Heptachlor Epoxide	ug/kg	ND	ND	ND	NA	NA
Methoxychlor	ug/kg	ND	ND	ND	NA	NA
Toxaphene	ug/kg	ND	ND	ND	NA	NA

Legend:
ERL – Effects Range-Low
ERM – Effects Range-Median
NA – not applicable
ND – indicates that the analyte was not detected above the reporting limit
mg/kg – milligrams per kilogram
ug/kg – micrograms per kilogram
% – percent
5 – result exceeded the ERL

Table 4. Summary of TCLP Results

Sample ID		***Area 1***	***Area 2***	***RCRA***
Sample Components		***TB1 - TB5***	***TB6 - TB10***	
Sample Date		***11/13/10***	***11/12/10***	
TCLP Metals	***Units***	***Result***	***Result***	
Arsenic	mg/L	ND	0.175	5
Barium	mg/L	0.563	0.425	100
Cadmium	mg/L	ND	ND	1
Chromium	mg/L	ND	ND	5
Copper	mg/L	ND	ND	NA
Lead	mg/L	ND	ND	5
Mercury	mg/L	ND	ND	0.2
Nickel	mg/L	ND	ND	NA
Selenium	mg/L	ND	ND	1
Silver	mg/L	ND	ND	5
Zinc	mg/L	0.889	0.908	NA

Legend:
NA – not applicable
RCRA – Resource Conservation and Recovery Act Standards for TCLP
ND – indicates the analyte was not detected above the reporting limit
mg/L – milligrams per liter

6.3 RESULTS OF BIOASSAY TESTS

Bioassay testing assesses the impact of contaminants in the dredged material on appropriate sensitive organisms to determine if there is potential for the dredged material to have an unacceptable impact. Bioassays use lethality as the endpoint because lethality is easily interpreted and quantified. The bioassays are acute tests using organisms that are representative of the water-column and benthic environments at the disposal site. Bioaccumulation also has to be considered to fully evaluate potential benthic impact. The results of bioaccumulation tests are used to predict the potential for uptake of dredged-material contaminants by organisms.

Bioassay and bioaccumulation testing was conducted by Nautilus Environmental Laboratory, LLC, San Diego, California (Nautilus). The complete report by Nautilus *Pier 180 Sediment Characterization Study, Naval Base San Diego Toxicity & Bioaccumulation Report March 2011* is presented as Appendix F to this report. Portions of the Nautilus report are excerpted/ summarized below.

6.3.1 SOLID PHASE TOXICITY TESTS

Ten-day amphipod and polychaete tests were conducted according to USEPA/USACE 1998 and ASTM 1990 protocols. The five replicate solid phase (SP) test chambers contained a 2-centimeter layer of control, reference, or test sediment, along with 950 milliliters (mL) of clean

seawater. Test chambers were permitted to equilibrate for 24 hours before adding test organisms. Test chambers were aerated for the duration of the test period.

Twenty amphipods were distributed randomly to each chamber. The polychaete test was conducted with five individuals per replicate container. Test and reference sediment toxicity tests were run in concurrence with control toxicant tests to ensure the test organisms were in adequate health. Water quality parameters were measured prior to test initiation, then daily during the 10-day test period.

SP toxicity test results are summarized in Table 5. Sediment exposures to amphipods (*Eohaustorius estuarius*) and polychaete (*Neanthes arenaceodentata*) from Area 1 and Area 2 composite samples exhibited high mean survival rates (96 and 92 percent, respectively). Mean survival of *Eohaustorius* ranged from 91 percent to 97 percent in the three controls, exceeding the USEPA criteria of 90 percent. Mean survival of *Neanthes* was slightly less than the USEPA criteria in Lab Control 1 at 88 percent. However, the other two controls exceeded the criteria at 92 percent and 96 percent. Based on the lab data, the absence of toxicological effects correlates well with the amphipod results (Nautilus, 2011). High mean survival rates for *Eohaustorius* and *Neanthes* were also observed in the LA-5 reference sediment.

Table 5. Summary of Solid-Phase Toxicity Test Results

Sediment Treatment	***Eohaustorius estuarius* Mean Survival (percent)**	***Neanthes arenaceodentata* Mean Survival (percent)**
Lab Control 1	91	88
Lab Control 2	97	92
Sail Bay Control	94	96
LA-5 Reference	92	100
Area 1 Comp	96	96
Area 2 Comp	92	92
Source: Nautilus, 2011		

6.3.2 SUSPENDED PARTICULATE PHASE TOXICITY TESTS

The test solution used in the suspended solid phase (SSP) toxicity tests was prepared by mixing seawater and test sediment to yield a volumetric water:sediment ratio of 4:1. Mechanical mixing, using a stainless steel impeller, was applied to vigorously agitate the mixture for 30 minutes. A one-hour settling time followed (or longer if insufficient settling has occurred), after which the supernatant was drained from the top of the mixing chamber. The supernatant was the 100 percent SSP liquid. The 100 percent liquid was then mixed with clean seawater (from Scripps Institution of Oceanography) to prepare the 50, 10 and 1 percent exposure concentrations. Clean seawater was also used as the control.

Control and test liquids were distributed to individual test chambers, and water quality parameters were measured. Water quality was monitored daily for the duration of the test period to ensure that acceptable test conditions were met. Tests were initiated by adding 10

mysid shrimp and 10 silversides to separate test chambers. Bivalve larvae test vials were initially stocked with approximately 20 fertilized embryos per mL. Silversides and bivalve larvae were not fed during the test period; however, mysid shrimp must be fed once daily to prevent cannibalism. The test duration was 96 hours for the mysid shrimp and silverside, and 48 hours for the bivalve larvae.

Results of the SPP toxicity tests are summarized in Table 6. In the mysid shrimp [*Americamysis bahia (Mysidopsis bahia*)] and silverside (*Menidia beryllina*) tests no toxicity was observed and mean percent survival was at or exceeding 98 percent in all 100 percent exposures. In laboratory controls, *Mysidopsis* and *Menidia* exhibited mean survival rates of 94 to 100 percent and 96 percent, respectively.

Suspended particulate-phase elutriates obtained from test sediments were not toxic to mysid shrimp or inland silverside minnow at any concentration tested. Toxicity was observed in the bivalve larvae test in the 100 percent concentrations from both sites and in the 50 percent elutriate of Area 2 composite sediment exposure. However, toxicity was of insufficient magnitude to calculate a median lethal concentration (Nautilus, 2011). Per Green Book guidance, LPC compliance was undertaken using the USACE's Short-Term Fate model (STFATE) (Version 5.01, windows version, USACE 2007). The STFATE model output results indicated that water column LPC requirements were met (Nautilus, 2011).

Table 6. Summary of Suspended Particulate-Phase Toxicity Test Results

Treatment	***Elutriate Concentration (Percent)***	***M. galloprovincialis (Mean Percent Normal Alive)***	***A. bahia (Mean Percent Survival)***	***M. beryllina (Mean Percent Survival)***
Laboratory Control	0	77 – 82	94 - 100	96
Area 1 Comp	1	79	94	96
	10	73	88	94
	50	78	94	94
	100	***66***	100	98
Area 2 Comp	1	74	100	96
	10	76	94	98
	50	***66***	92	98
	100	***61***	98	98

Note: Bold values indicate significant differences when compared to control.
Source: Nautilus, 2011

6.3.3 BIOACCUMULATION TEST

Bioaccumulation testing used the polychaete worm (*Nereis virens*) and the bent-nose clam (*Macoma nasuta*) with a 28-day test period under flow-through conditions. Testing was initiated using reference and test sediments in the same manner as described for other 10-day testing, except that tests were carried out in 10-gallon glass aquaria designed to accommodate the 10

polychaetes and 35 mollusks per replicate necessary to yield the biomass required to achieve the specified detection limits. The chambers were maintained under flow-through conditions, and daily water quality measurements were taken on each chamber.

Mean percent survival of the clams and worms (summarized in Table 7) were within acceptable parameters (i.e. percent survival to supply enough tissue for follow-on tests) for the test method. The bent-nose clams (*Macoma nasuta*) exhibited 98 percent survival in the Area 1 composite, 95 percent in the Area 2 composite and the LA-5 reference sample, and 97 percent survival in the laboratory control. Polychaete worms (*Nereis virens*) showed a 98 percent survival rate in the Area 1 composite, 88 percent in the Area 2 composite, 94 percent survival in the LA-5 reference, and 98 percent in the laboratory control sediment. The same suite of chemical analyses used to test sediments was applied to the bioaccumulation tissue samples.

Table 7. Mean Percent Survival in Bioaccumulation Tests

Treatment	***Macoma nasuta***	***Nereis virens***
Laboratory Control	97	98
LA 5 Reference	98	94
Area 1 Comp	98	98
Area 2 Comp	95	88
Source: Nautilus, 2011		

Tissue from Nautilus Laboratory was shipped to Physis Environmental Laboratory for analysis. The analysis included all of the same chemical parameters tested for in the sediment analysis as per the SAP. The full suite of test results of tissue of clams and worms is included in a CD appended to this report. These tissue chemistry results are summarized as follows.

<u>Laboratory Analysis of Metals Bioaccumulation Data</u>
Mean metals concentrations in test sediment exposed tissues were compared with respective reference sediment exposed tissues for both clam and worm tissues; data is summarized in Tables 8 and 9. For clam tissues, exposed to Area 1 composite sediments, several metals were found at concentrations greater than those in tissues exposed to reference sediments, but only lead, mercury, and zinc were found to be elevated at levels which were statistically significant, and none were found at levels more than 34 percent higher than those in reference tissues. Tissue burdens were also examined in terms of the ratio of metals in tissues compared with those in sediments (on a dry-weight basis), and were not found to be present in ratios greater than 2.9 (for zinc) (Note: comparable ratio for reference tissues was 2.0). Lead and mercury concentration ratios did not exceed 1.0, and thus, while bioavailable, appeared not to biomagnify. It appears that zinc was the only metal to biomagnify, albeit at a similar rate to that of zinc in reference sediment and to tissue concentrations only slightly greater than that of comparable reference sediment exposed tissues (only 15 percent greater, Table 8). Tissues of clams exposed to Area 2 composite sediments did not exhibit any metals which were statistically elevated over those of reference sediment exposed tissues. (Nautilus, 2011)

For worm tissues exposed to test sediments, patterns differed from those of clam tissues. Copper was the only metal to be statistically elevated in worm tissues, and was elevated for

both Area 1 composite and Area 2 composite exposures. The magnitude of the bioaccumulation was similar (respectively 19 and 27 percent higher values in Area 1 composite and Area 2 composite sediment exposed tissues). Bioconcentration of copper was also similar between the test sites (approximately 1.7 times, Table 9). (Nautilus, 2011)

Table 8. Summary of Clam Tissue Metal Concentrations

Parameter	*Reference*	*Area 1 Comp*				*Area 2 Comp*			
	Mean ± SD	*Mean ± SD*	*Magnitude of Exceedance vs. Reference*	*Statistically Elevated? (p-value)*	*Bioconcen-tration Factor (Tissue: Sediments)*	*Mean ± SD*	*Magnitude of Exceedance vs. Reference*	*Statistically Elevated? (p-value)*	*Bioconcen-tration Factor (Tissue: Sediments)*
Arsenic (As)	2.48 ± 0.16	2.42 ± 0.30	-			2.15 ± 0.11	-		
Cadmium (Cd)	0.050 ± 0.015	0.046 ± 0.005	-			0.037 ± 0.008	-		
Chromium (Cr)	0.37 ± 0.04	0.55 ± 0.55	1.49	No		0.24 ± 0.07	-		
Copper (Cu)	2.33 ± 0.17	2.91 ± 0.90	1.26	No		2.28 ± 0.48	-		
Lead (Pb)	0.27 ± 0.02	0.37 ± 0.06	1.34	Yes (0.005)	0.7	0.26 ± 0.04	-		
Mercury (Hg)	0.006 ± 0.001	0.008 ± 0.002	1.29	Yes (0.034)	1.0	0.007 ± 0.001	1.12	No	NA
Nickel (Ni)	0.46 ± 0.04	0.35 ± 0.05	-			0.30 ± 0.04	-		
Selenium (Se)	0.24 ± 0.02	0.23 ± 0.03	-			0.21 ± 0.01	-		
Silver (Ag)	0.07 ± 0.01	0.07 ± 0.03	1.02	No		0.05± 0.01	-		
Zinc (Zn)	11.0 ± 1.3	12.7 ± 1.2	1.15	Yes (0.032)	2.9[1]	10.1 ± 1.2	-		

All data presented in milligrams per kilogram wet weight, with the exception of the Bioconcentration Factors (see text), which are presented on a dry weight/dry weight basis.
[1] Bioconcentration Factor for Reference Tissue Zinc loading = 2.1.
SD – standard deviation of the mean
Statistical differences were assessed using a one-tailed *t*-test, (α =0.05, n=5)

Table 9. Summary of Worm Tissue Metal Concentrations

Parameter	*Reference*	*Area 1 Comp*				*Area 2 Comp*			
	Mean ± SD	*Mean ± SD*	*Magnitude of Exceedance vs. Reference*	*Statistically Elevated? (p-value)*	*Bioconcen-tration Factor (Tissue: Sediments)*	*Mean ± SD*	*Magnitude of Exceedance vs. Reference*	*Statistically Elevated? (p-value)*	*Bioconcen-tration Factor (Tissue: Sediments)*
Arsenic (As)	2.28 ± 0.12	2.39 ± 0.27	1.05	No		2.40 ± 0.12	1.05	No	
Cadmium (Cd)	0.048 ± 0.004	0.040 ± 0.006	-			0.039 ± 0.003	-		
Chromium (Cr)	0.12 ± 0.13	0.09 ± 0.06	-			0.14 ± 0.04	1.22	No	
Copper (Cu)	0.93 ± 0.14	1.10 ± 0.13	1.19	Yes (0.039)	1.6	1.18 ± 0.11	1.27	Yes (0.006)	1.7
Lead (Pb)	0.25 ± 0.03	0.27 ± 0.09	1.05	No		0.21 ± 0.05	-		
Mercury (Hg)	0.007 ± 0.002	0.006 ± 0.001	-			0.005 ± 0.001	-		
Nickel (Ni)	0.13 ± 0.06	0.11 ± 0.01	-			0.14 ± 0.01	1.07	No	
Selenium (Se)	0.17 ± 0.02	0.17 ± 0.02	1.00	No		0.17 ± 0.01	1.04	No	
Silver (Ag)	0.033 ± 0.008	ND<0.0 5	-			ND<0.05	-		
Zinc (Zn)	27.2 ± 15.1	15.7 ± 8.0	0.58	No		24.9 ± 24.1	-		

All data presented in milligrams per kilogram wet weight, with the exception of the Bioconcentration Factors (see text), which are presented on a dry weight/dry weight basis.
SD – standard deviation of the mean
Statistical differences were assessed using a one-tailed *t*-test, (α =0.05, n=5)

Laboratory Analysis of Organics Bioaccumulation Data

Organic contaminants were largely absent from the tissues tested with the exception of phthalate compounds. Phthalates were observed in all tissue replicates, and were observed to be statistically higher in clam tissues from both Area 1 composite and Area 2 composite exposure treatments when compared to the reference sediment exposed tissues (Table 10). Phthalates were also elevated in worm tissues exposed to test sediments, but not at levels statistically distinguishable from reference-sediment exposed tissues.

Table 10. Summary of Tissue Organic Concentrations

Analyte Class	***Reference Mean ± SD***	***Area 1 Comp Mean ± SD***	***Area 2 Comp Mean ± SD***
Clam Tissues			
Pesticides	ND	ND	ND
PCBs	ND	ND	ND
Phenols	ND	ND	ND
Phthalates	902 ± 253	***2071 ± 368***	***2632 ± 1412***
PAHs	ND	ND	ND
Organotins	ND	ND	ND
Worm Tissues			
Pesticides	ND	ND	ND
PCBs	ND	ND	ND
Phenols	ND	ND	ND
Phthalates	208 ± 190	230 ± 114	343 ± 108
PAHs	ND	ND	ND
Organotins	ND	ND	ND

All units: micrograms per wet kilogram.
SD – standard deviation of the mean
Statistical differences were assessed using a one-tailed *t*-test, (α =0.05, n=5)
Bold Italicized values are statistically elevated compared to the mean Reference concentration.
Pesticides include the sum of Aldrin, 2,4- and 4,4- isomers of DDD, DDE, and DDT; α-, ß-, δ- and γ-BHC; chlordane (includes α - and γ - chlordane); dieldrin; endosulfan I and II; endosulfan sulfate; endrin, endrin aldehyde and ketone; heptachlor and heptachlor epoxide; methoxychlor; cis- and trans-nonachlor; and toxaphene.
PAHs includet the sum of both Low Molecular Weight PAHs (acenaphthylene; acenaphthene; anthracence; fluorene; 1- and 2-methylnaphthalene; naphthalene; and phenanthrene) and High Molecular Weight PAHs (fluoranthene; pyrene, benzo(a)anthracene; chrysene, benzo(b)fluoranthene; benzo(k)fluoranthene; benzo(a)pyrene; indeno(1,2,3-c,d)pyrene; dibenz(a,h)anthracene; and benzo(g,h,i)perylene).
Phthalates include the sum of bis(2-ethylhexyl) phthalate; butyl benzyl phthalate; di-n-butyl phthalate; di-n-octylphthalate; diethyl phthalate; and dimethyl phthalate.
Phenols include the sum of 2,4-dimethylphenol; 2,4,6-trichlorophenol; 2- and 2,4-dichlorophenol, 2- and 4-nitrophenol, 3/4-methylphenol; 4,6-dinitro-2-methylphenol; 2,4-dinitrophenol; and pentachlorophenol.
Organotins includes the sum of mono-, di-, tri- and tetra-butyltin.

As noted in the detailed tables included in Appendix F, the phthalate compound bis (2-ethylhexyl) phthalate was present in concentrations over an order of magnitude higher than any other phthalate compound in clam tissue samples from Areas 1 and 2 and concentrations of this compound in all Area 1 and 2 were higher than in the reference area. The mean bis (2-

ethylhexyl) phthalate concentration in the clam tissue samples were 1,964 and 2,569 ug/kg for Areas 1 and 2 and 696 ug/kg for the reference area. However, these results differ from those for phthalate concentrations in sediment where the mean sediment concentrations in Areas 1 and 2 for all phthalate compounds were lower than those detected in the reference sediments (See Table 3).

7.0 SUMMARY OF FINDINGS

The following summarizes the results of the sediment sampling and testing for the characterization of dredged material associated with the proposed Pier 180 replacement project.

Grain Size

- Field observation and laboratory analysis of the collected sediment from the two composite samples from within the proposed dredging footprint indicates that the dredge material would be comprised largely of sand and shell hash.
- Results of the physical tests show sediment from both composite samples consist of more than 86 percent sand, 10 percent silt and 2 percent clay, with trace amounts (less than 1 percent) of gravel.

Bulk Chemistry

- The following bulk chemistry tests were conducted by the contracted laboratory: trace metals, mercury, PAHs, phenols, phthalates, organochlorine pesticides, PCB congeners, organotins, TRPH, total solids, total sulfide, dissolved sulfide, ammonia and total organic carbon.
- A total of 128 constituents were analyzed and more than 100 constituents were not detected above the laboratory reporting limits in sediments from each composite sample.
- A majority of the chemicals that were detected in all three samples (including the LA-5 reference sample) were metals and phthalates.
- No organotins, PAHs, phenols and PCBs were detected above the laboratory reporting limits.
- No pesticides were detected in samples from Area 1 composite or Area 2 composite.
- Three pesticides were detected in sediment from the reference site, two of which (4,4'-DDE and DDTs) were detected at concentrations greater than the ERL levels (NOAA National Sediment Quality Guidelines)
- No other constituents were detected greater than any of the ERLs or ERM concentrations in the project sediment samples.
- For TCLP, barium and zinc were detected in sediment from the two samples at concentrations less than 1 milligram per liter. Additionally, trace amounts of arsenic were detected just above the laboratory reporting limit in sediment from Area 2 composite.
- No TCLP metals were detected greater than any of the respective RCRA standards for hazardous waste. TCLP testing is not required for ocean disposal. Characterization with respect to hazardous waste disposal criteria would be useful should upland disposal be considered.

Bioassay

- Solid phase testing showed greater than 90 percent survival in all exposures to amphipod shrimp (*Eohaustorius*) and worms (*Neanthes*).
- Suspended particulate phase testing showed greater than 90 percent survival in the lab control and all levels of exposure to fish (*Menidia*) and shrimp (*Mysidopsis*). For the bivalve larval development test, observed effects were of low magnitude: for both composite samples, the percent normal survival rate of the 100 percent exposure sample yielded a value within 20 percent of the laboratory control. Furthermore, none of the results were less than the median effect level and the limiting permissible concentration (LPC) criterion is therefore substantially met for ocean disposal.
- Bioaccumulation phase testing has yielded sufficient organism survival and tissue recovery for chemical analysis.

Chemistry Tests of Bioaccumulation Tissues

- Several metals were detected in the bioaccumulation results for the two project composite samples as well as in the reference sample. All of these detection levels were low and the project composite sample results were approximately the same as those found in the reference sample.
- Most organic contaminants were not detected with the exception of phthalate compounds that were detected in both the project composites and reference-sediment exposed tissues.

Overall

The project sediment from the proposed dredging area consists mostly of sand. Test results indicate low concentrations or the absence of contaminants in the sediments. All test results appear to suggest a regulatory conclusion that the project sediment is suitable for ocean disposal. However, the regulatory determination needs to be made by the USACE and USEPA.

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APPENDIX A
FIGURES

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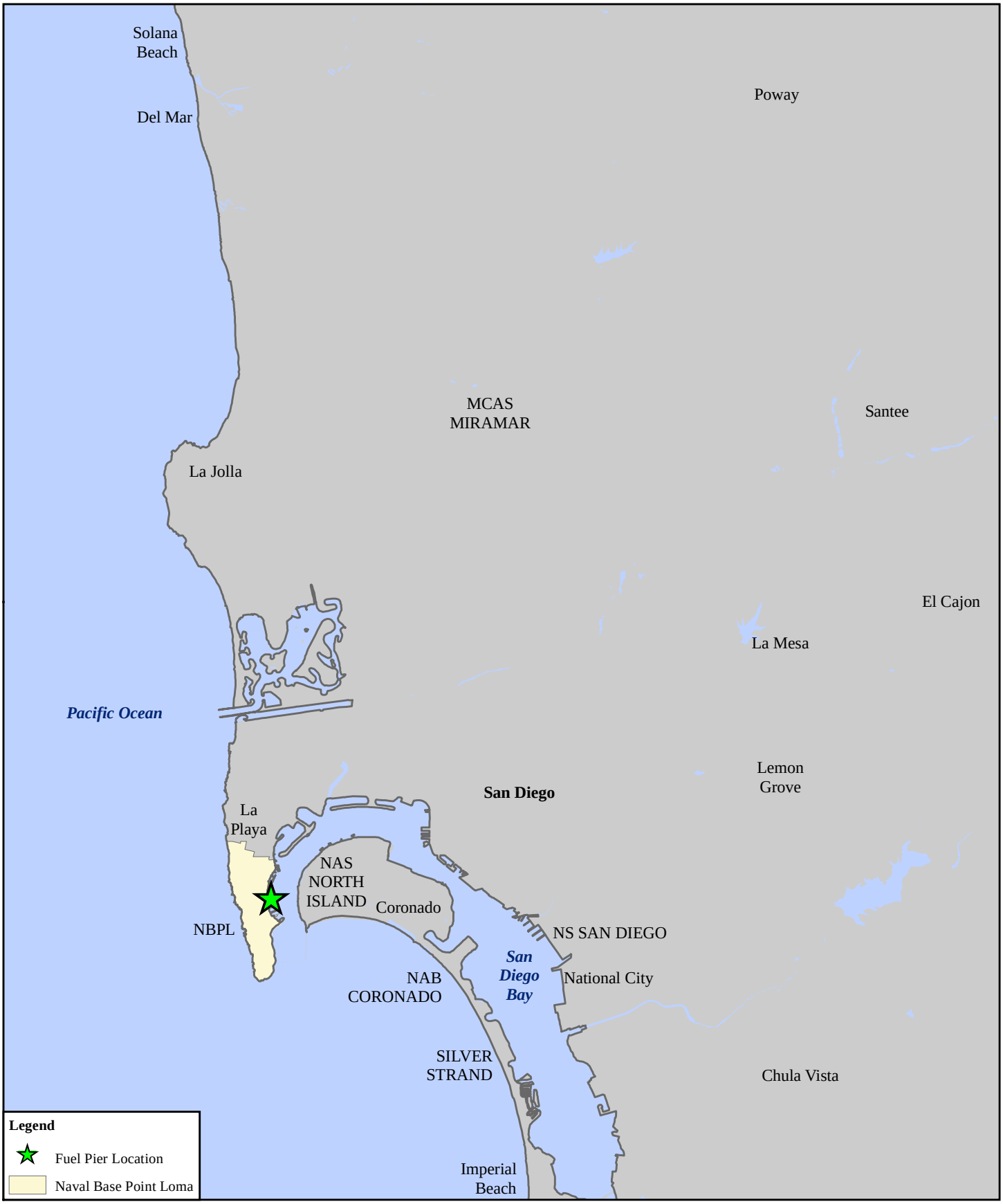

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Figure 1
Regional Location - Pier 180 Replacement
Naval Base Point Loma

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Figure 2
Vicinity Map
Naval Base Point Loma

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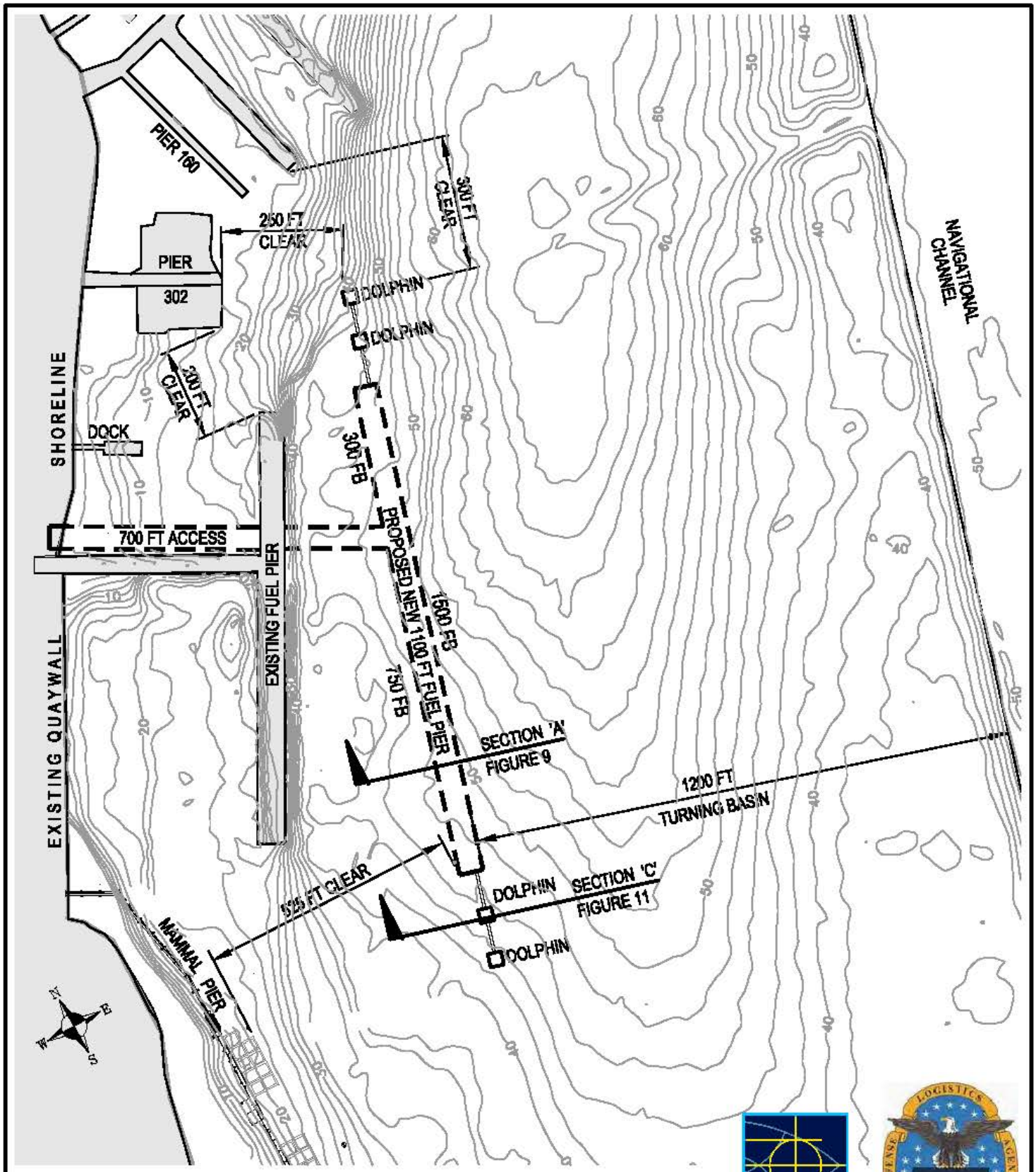

ALTERNATIVE 3 - 1100 FT LONG x 50 FT WIDE PIER

2,550 FB 95,150 SF

GRAPHIC SCALE		NAVAL SUPPLY SYSTEMS COMMAND FLEET INDUSTRIAL SUPPLY CENTER SAN DIEGO, CA	
0 150 300 600 FT 1"=300'	Source: NAVFAC Southwest 2010	NAVAL BASE POINT LOMA, CA ALTERNATIVE 3 - 1100 FT x 50 FT DOUBLE DECK FUEL PIER	FIG. NO. 3

0 50 100 Meters

0 250 500 Feet

Figure 4
Sample Locations - Pier 180
Naval Base Point Loma

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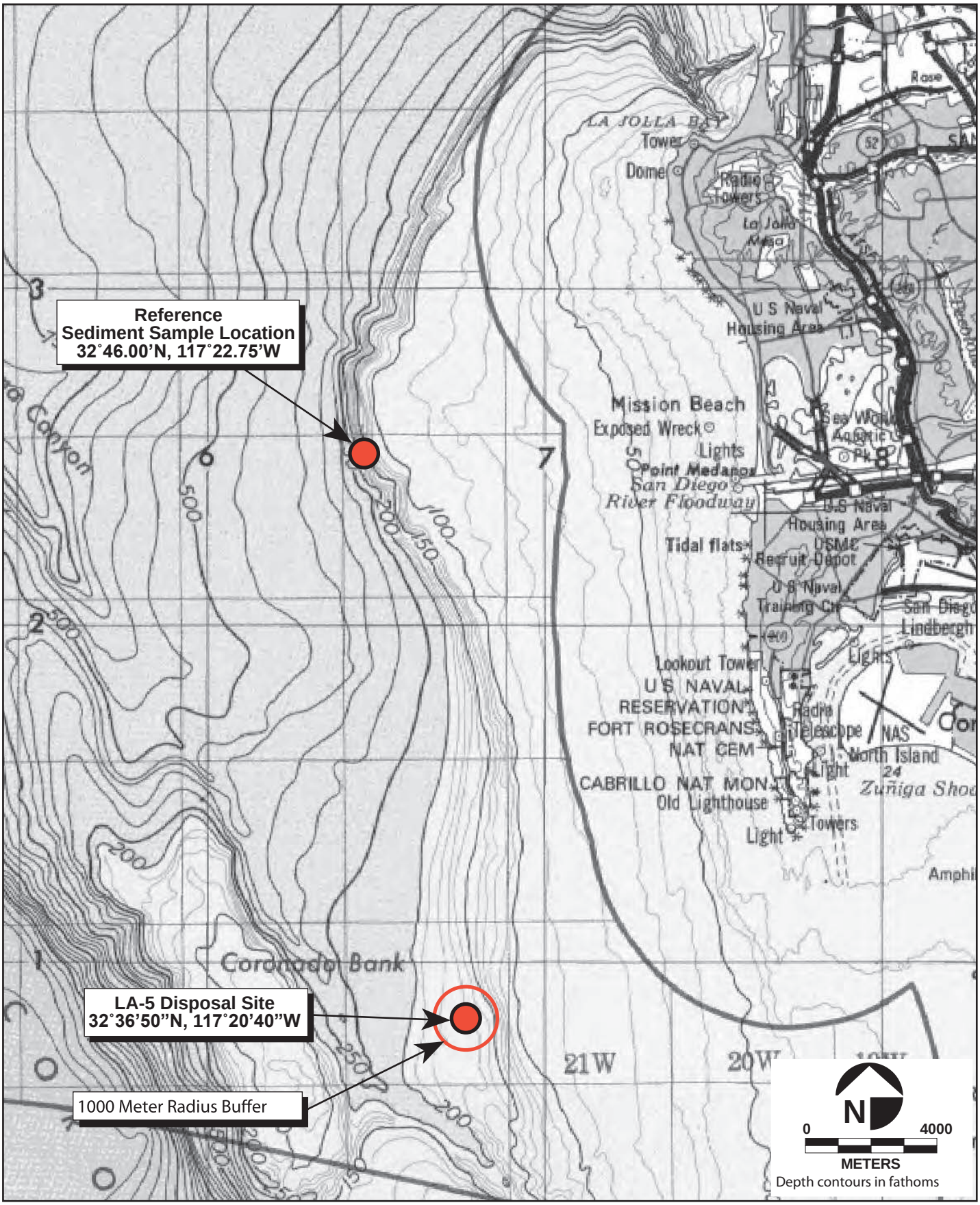

Figure 5
LA-5 Ocean Disposal Site and Reference Sediment Location
Naval Base Point Loma

Source: NAVFAC Southwest 2009

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Appendix E

Marine Biological Resources

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Appendix E.1

Essential Fish Habitat Assessment for NBPL Fuel Pier Replacement and Dredging (MILCON P-151)

Draft Working Document FOUO

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DRAFT ESSENTIAL FISH HABITAT ASSESSMENT FOR THE NAVY'S FUEL PIER REPLACEMENT PROJECT AT NAVAL BASE POINT LOMA

Prepared by:

Naval Facilities Engineering Command

For:

Naval Base Point Loma

September 2012

ACRONYMS AND ABBREVIATIONS

°ac	acre/acres
C	degree Celsius
°F	degree Fahrenheit
µPa	micro pascal
ac	acre
CFR	Code of Federal Regulations
CPS	Coastal Pelagic Species
CSLC	California State Lands Commission
dB	decibel
DFM	diesel fuel marine
DFSP	Defense Fuel Support Point
DMM	discarded military munitions
EFH	Essential Fish Habitat
FMP	Fishery Management Plan
ft	feet/foot
HAPC	Habitat Area of Particular Concern
in	inch
INRMP	Integrated Natural Resources Management Plan
km	kilometer
lf	linear feet
m	meter
mg O^2/l	milligrams oxygen per liter
MHHW	Mean High Higher Water
mi	mile
MLLW	Mean Low Lower Water
MOTEMS	Marine Oil Terminal Engineering and Maintenance Standards
MSFCMA	Magnuson-Stevens Fishery Conservation and Management Act
MWR	Morale, Welfare and Recreation
NAS	Naval Air Station
NAVFACSW	Naval Facilities Engineering Command Southwest
NBPL	Naval Base Point Loma
NEPA	National Environmental Policy Act
NMAWC	Naval Mine Antisubmarine Warfare
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
ODMDS	ocean dredged material disposal site
PAH	polycyclic aromatic hydrocarbons
PCB	polychlorinated biphenyl
PFMC	Pacific Fishery Management Council
POSD	Port of San Diego
ppt	parts per trillion
PSU	practical salinity unit
rms	root mean square
RWQCB	Regional Water Quality Control Board
SELcum	accumulated sound exposure level
SPAWAR	Space and Naval Warfare Systems Command
SPLpeak	peak sound pressure level
sq	square
sf	square feet
USACE	U.S. Army Corps of Engineers
USC	United States Code
USCG	U.S. Coast Guard
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
ZOI	zone of influence

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1 INTRODUCTION

As required by the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA), the purpose of this document is to present the findings of the Essential Fish Habitat (EFH) Assessment conducted for the United States Department of the Navy's proposed demolition and replacement of Naval Base Point Loma Pier 180 and dredging of the turning basin. The objective of this EFH Assessment is to evaluate how the actions proposed may affect EFH designated by the Pacific Fishery Management Council (PFMC) and implemented by the National Marine Fisheries Service (NMFS) within its area of influence.

The coastal waters of southern California, including San Diego Bay where the project is located, are designated as EFH for two Fishery Management Plans (FMPs): Pacific Coast Groundfish (PFMC 2011) and Coastal Pelagic Species (PFMC 1998a). For any Federal action that may adversely affect EFH, Federal agencies must provide NMFS with a written assessment of the effects of that action on EFH. An adverse effect to EFH is "any impact that reduces the quality and/or quantity of EFH" (see 50 Code of Federal Regulations [CFR] § 600.910 (a) for further clarification). The level of detail required in the assessment is commensurate with the magnitude of potential adverse effects, so an action that may only result in minor effects would only require a brief assessment. Mandatory contents of the assessment are outlined in 50 CFR 600.920.e.3. Because this project may adversely affect EFH, the U.S. Navy is required to consult with NMFS.

This assessment of EFH is being provided in conformance with the 1996 amendments to the Magnuson-Stevens Act as well as the Navy Policy Regarding Essential Fish Habitat Assessments and Consultations (Navy 2011). Species that are managed by the West Coast Groundfish and Coastal Pelagic Species FMPs and are likely to occur in the project site are considered in this assessment.

This EFH Assessment will include a description of the Proposed Action, an overview of the EFH designated within the activity area, an analysis of the direct and cumulative effects on EFH for the managed fish species and their food resources, the Navy's views regarding the effects of the proposed activity, and proposed mitigation measures selected to minimize any potential adverse effects resulting from the proposed activity.

The Naval Base Point Loma Fuel Pier Replacement and Dredging (P-151/DESC1306) Environmental Assessment contains additional detail regarding the project's proposed activities, the affected environment, and the potential environmental effects that would result from project implementation. The San Diego Bay Integrated Natural Resources Management Plan (INRMP) (Naval Facilities Engineering Command Southwest [NAVFACSW] and Port of San Diego [POSD] 2011) also contains comprehensive descriptions of the marine environment including climate; marine geology; physical, chemical, and biological oceanography; marine habitats; and protected species in the project site.

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2 PROPOSED ACTION

2.1 Introduction

Naval Base Point Loma (NBPL), California, is located on the peninsula of Point Loma near the mouth and along the northern edge of San Diego Bay (Figure 2-1). NBPL provides berthing and support services to United States (U.S.) Navy submarines and other fleet assets. The entirety of NBPL is restricted from general public access, although the adjacent waters of San Diego Bay are heavily used by the public as well as the Navy. The Proposed Action (Figure 2-2) would involve demolition of the aging and seismically deficient fuel pier (Pier 180) at NBPL; construction of a new enhanced fuel pier with optimum capability to support current and projected fueling needs of the Navy and Department of Homeland Security (DHS); performance of associated dredging, and the beneficial reuse of dredged sediments; the temporary relocation of the Navy's Marine Mammal Program to avoid potential effects of construction noise on the Navy's trained marine mammals; and the relocation of commercial bait barges to reduce potential construction noise effects on California sea lions (which are attracted to the bait barges) and on the bait fish, which are an important resource for the local fishing community. Project demolition, construction, and dredging would occur simultaneously, and would commence in 2013 and be completed in 2017. Sections 2.2 and 2.3 describe the proposed activities to be conducted in detail and impacts on federally managed fisheries and EFH.

2.2 Proposed Action

The Proposed Action has two alternatives that differ only with respect to when dredging would occur. Both alternatives would have the same impacts on EFH and hence they are not separated in this assessment.

2.2.1 Background

The existing fuel pier (Figure 2-3) serves as a fuel depot for loading and unloading tankers, U.S. Navy underway replenishment vessels that refuel ships at sea ("oilers") fueling Navy, DHS, Department of Defense (DoD), and foreign Navy vessels, as well as transferring fuel to the local replenishment vessels and other small craft operating in San Diego Bay. The fuel pier at NBPL Defense Fuel Support Point (DFSP) is critical to the mission of the Navy and is the largest active Navy fueling facility in the vicinity. More than 42 million gallons of fuel are stored at NBPL DFSP and more than 11 million gallons of fuel are issued and received every month to an average of 43 ships including the Military Sealift Command, Expeditionary Warfare Training Groups, three carrier strike groups, National Oceanic & Atmospheric Administration (NOAA), DHS, foreign and small craft. The approach (portion that connects to shore) and north segments are over 100 years old (constructed in 1908 as La Playa Coaling Wharf). The south segment was constructed in 1942. The average design service life of this kind of structure in a marine environment is typically considered to be about 50 years (Navy 2010a). The pier, as such, is significantly past its design service life. Further, the pier does not meet current California State Lands Commission (CSLC) - Marine Oil Terminal Engineering and Maintenance Standards (MOTEMS) Level 1 (operational) and Level 2 (survival) seismic criteria (Navy 2010a, b). Because of the structural deficiencies, significant damage in a moderate earthquake is considered to be likely, with potential failure of the pile foundations occurring in a major seismic event.

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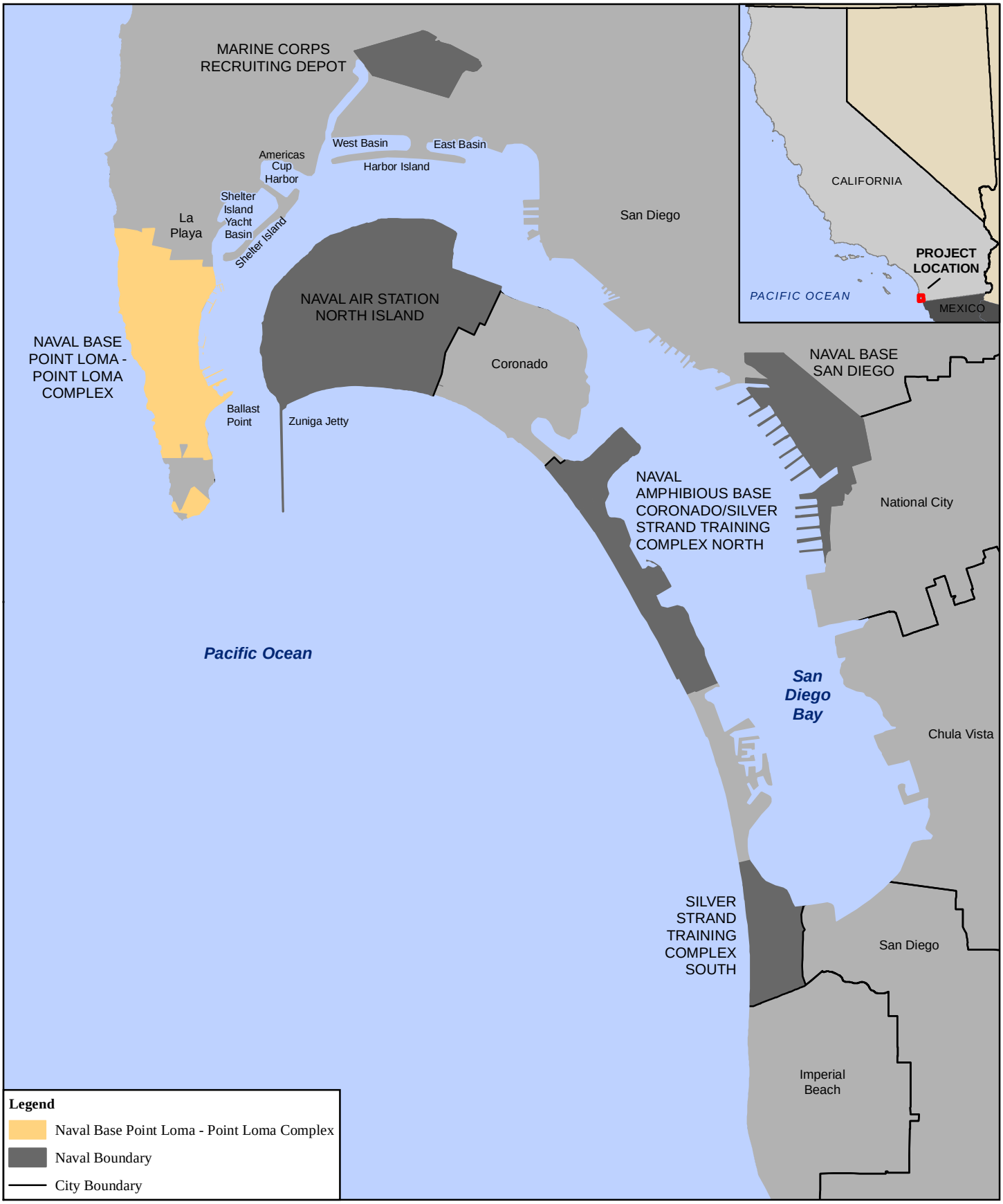

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Figure 2-1
Regional Location - Pier 180 Replacement
Naval Base Point Loma - Point Loma Complex

Source: Navy, NAVFAC Southwest, and Port of San Diego 2010

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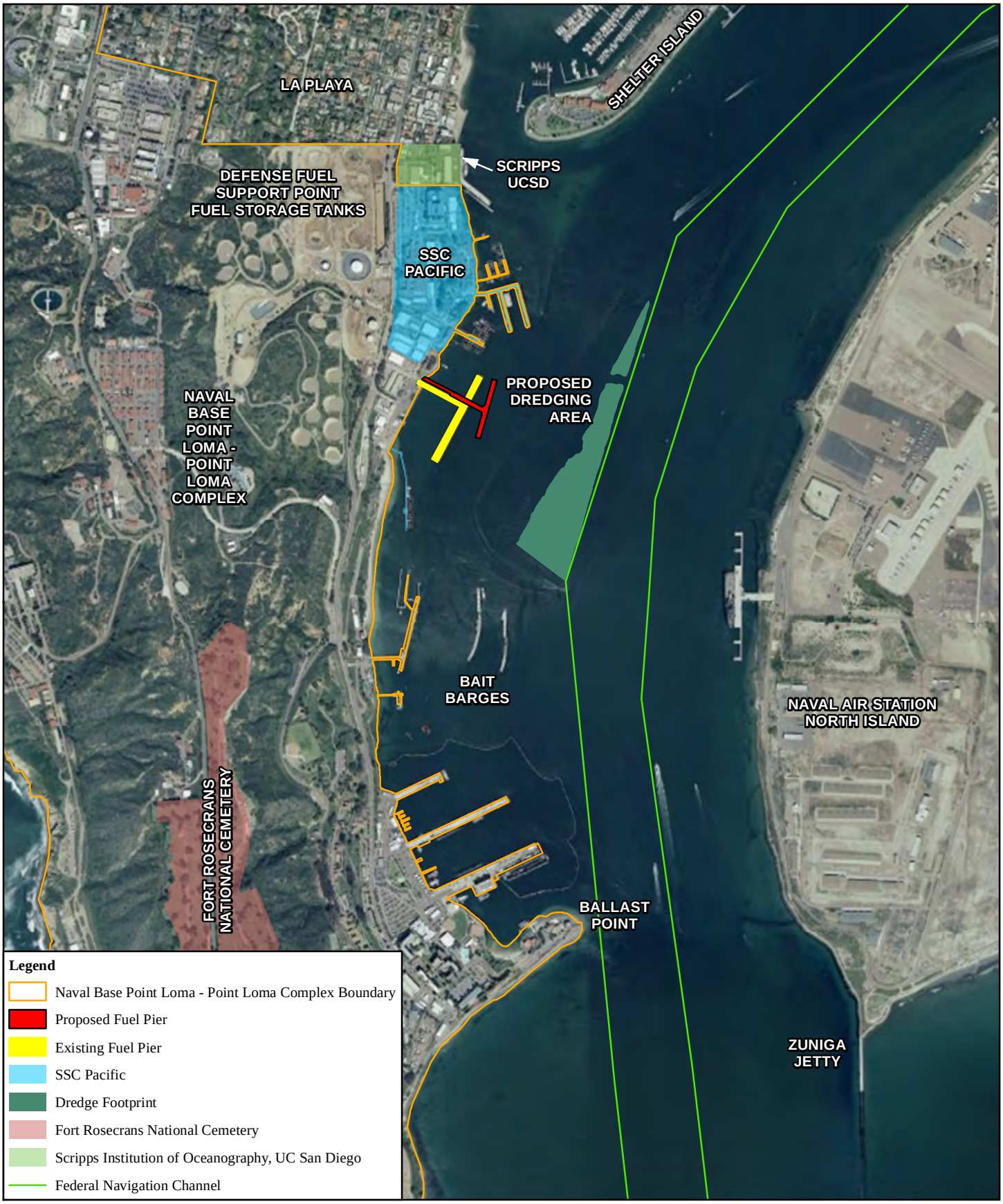


0 250 500 Meters

0 1,000 2,000 Feet

Sources: Navy 2007; NOAA 2012; NAVFAC Southwest 2011a

Figure 2-2
Project Site Map

N

a) Aerial View of Existing Fuel Pier 180

b) View of Existing Fuel Pier 180 to the northeast

Figure 2-3 Views of Existing Fuel Pier 180

The State of California enforces special requirements for marine oil terminals, particularly with regard to seismic criteria. The Navy has agreed to comply with the California MOTEMS requirements for the fuel pier. However, the existing fuel pier is not consistent with the MOTEMS seismic criteria. The poor condition of the existing fuel pier has also been noted in the Navy Region Southwest (NRSW), Port Operations Shore Infrastructure Plan, dated April 2009 (Navy 2010a). Per the Defense Readiness Reporting System an overall rating of "F4" has been assigned to the existing fuel pier facility. This translates into: "Facility has deficiencies that prohibit or severely restrict use of its designated functions." The Port Operations Shore Infrastructure Plan has listed P-151 "Replace Pier 180" as a planned project affecting Port Operations for NRSW. Additionally, the existing fuel pier is situated in waters where the natural bottom depth is between 30 to 40 feet (ft) thus requiring maintenance dredging because San Diego Bay has an open hydrologic circulation system that causes infill around piers and infrastructure. Dredging occurred most recently in 1999 to keep the pier accessible for larger vessels.

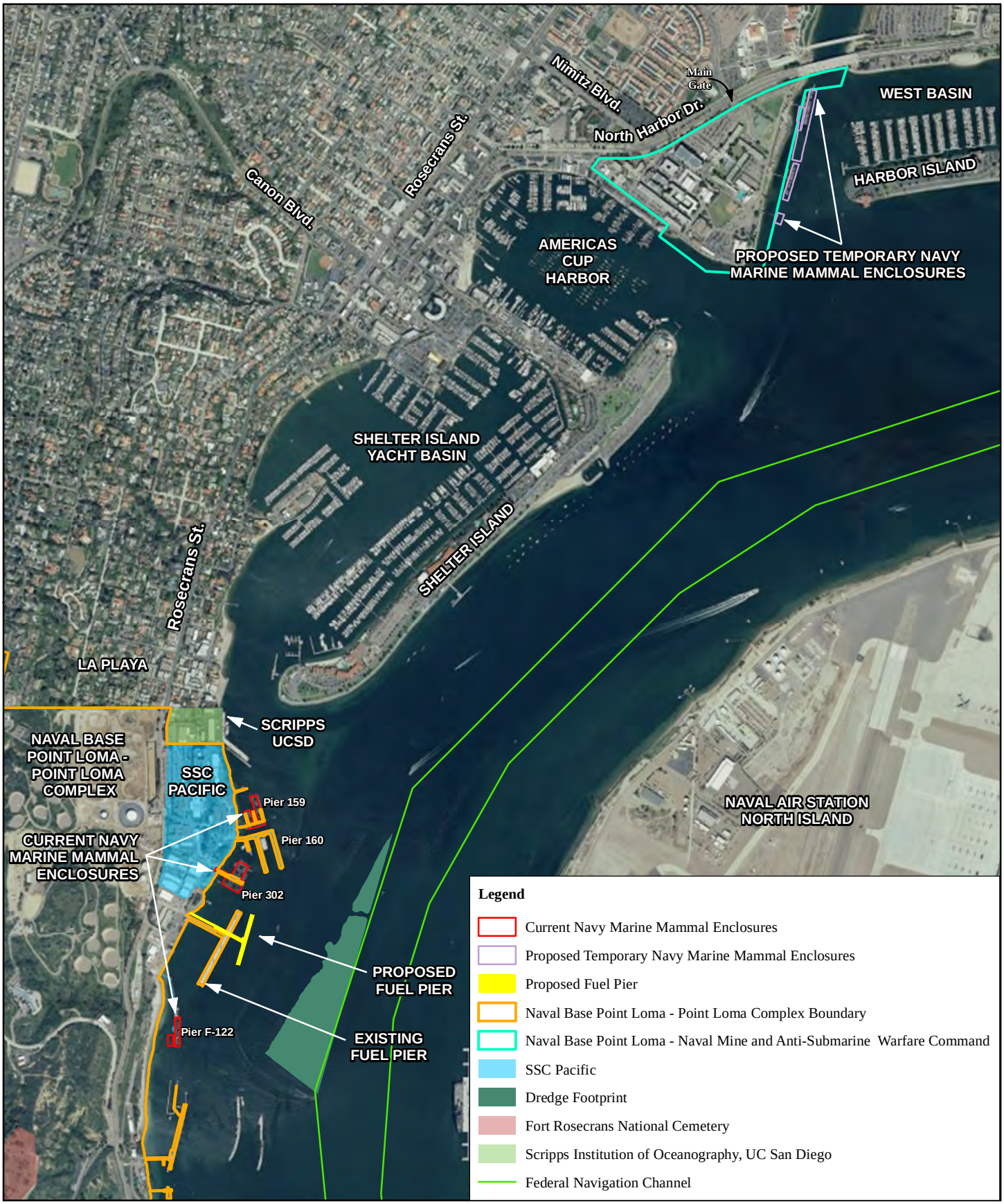
To support the fueling needs of the Navy and DHS, the NBPL DFSP must be able to provide adequate services, i.e., receive and issue fuel, to multiple ships at a time. To meet this requirement, ships and barges are received on both the inboard and outboard sides of the existing pier. The inboard south side of the pier is primarily used for fuel issues to small cutters, mine sweepers, and barges. The inboard north side is used for fueling small craft. The outboard side of the pier is currently used to issue and receive fuel from large ships, i.e., tankers, oilers, transport ships, dock landing ships, ocean going barges, and various other Navy and DHS vessels. When included with scheduling requirements, the demand of the existing pier has exceeded the facility capacity. In addition, the existing fuel pier has reached a maximum capacity for the deeper outer berth, resulting in the need to turn vessels away due to lack of available docking and mooring space.

It is anticipated that future classes of ships would generally be more multi-purpose, require more frequent fueling, and further increase the fuel capacity loading requirement for the new replacement fuel pier (Navy 2010a). The existing fuel pier lacks deep water berthing capability and is therefore limited in the range of vessels that can be accommodated (Navy 2010a).

2.3 Description of Pile Installation and Other Construction Activities

In addition to demolition and construction, which are described in more detail below, the Proposed Action would include the following key elements.

- ***Temporary Relocation of the Marine Mammal Program.*** Before the pier replacement activities begin, the Navy Marine Mammal Program, which is administered by Space and Naval Warfare Systems Command (SPAWAR) Systems Center (SSC), would be moved to the Naval Mine and Anti-submarine Warfare Command (NMAWC), (Figure 2-4). SSC's working mammals are being relocated so that they will not be affected by noise and vibrations associated with demolition/construction-related activities. The only suitable location available is at the Naval Mine and Antisubmarine Warfare Center (NMAWC), approximately 3 kilometers (km) away. In addition, NMAWC is acoustically shadowed from the piling noise. Per 10 U.S. Code (USC) 645 Section 7524, the Navy's authorization to hold marine mammals applies without regard to the provisions of the MMPA.



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0 0.2 0.4 Miles

Source: NAVFAC Southwest 2011a

Figure 2-4
Navy Marine Mammal Program Current and Proposed Temporary Relocation Sites

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Construction of the temporary facility would include driving 50 18-in square concrete piles; this component of the action is analyzed herein for potential effects on wild marine mammals. After completion of the new fuel pier the Marine Mammal Program would move back to its original location adjacent to the fuel pier, and the temporary facilities at NMAWC would be removed.

- ***Temporary Relocation of Everingham Brothers Bait Company Bait Barges.*** The Everingham Brothers Bait Company bait barges currently anchored in Navy waters approximately 600 meters (m) south of the existing fuel pier would be moved to a location to be determined along the southwest side of Harbor Island, approximately 5 kilometers (km) from the project site (Figure 2-5). The two barges attract large numbers of sea lions, and their relocation would reduce the number of sea lions that would be exposed to noise levels constituting harassment under the MMPA. Barge relocation would also avoid construction underwater noise disturbance to the bait fish, which might otherwise affect their viability. The bait barges would be moved prior to the initiation of in-water construction. There would be no in-water demolition and construction during the least tern foraging season (April 1 to September 15). It is anticipated that it would be possible for the Everingham Brothers Bait Company to move the two bait barges back to their current position south of the fuel pier on approximately April 1 and return to the selected temporary relocation site by September 15 while project activities are ongoing. The current plan is for the Everingham Brothers Bait Company to return the barges to their existing site after the proposed new pier is constructed.
- ***Regulated Navigation Zones***. The existing U.S. Coast Guard (USCG) Security Zone would be amended as needed to provide adequate security standoff distance to the east for the proposed new fuel pier alignment. A temporary Security Zone would be established to a distance of 100 ft offshore from the proposed temporary Navy marine mammal relocation site at NMAWC for the period that the Navy marine mammals are present.
- ***Dredging and Sediment Disposal***. Dredging and sediment disposal are needed to deepen a high spot in an existing turning basin, so that the basin can safely accommodate current and future deep draft berthing capabilities. An estimated 80,000 cubic yards of sediment would be dredged. The proposed dredge footprint would be approximately 463,000 square feet/10.6 acres.. Laboratory testing of the sediments confirmed the lack of contamination and they were approved for ocean disposal by the U.S. Environmental Protection Agency (USEPA) and USACE. However, the sediments also have sufficient content of sand for beneficial reuse in nearshore replenishment. Accordingly, the sediments would be transported by barge and deposited in the nearshore zone of the sediment beneficial reuse receiver site south of the Imperial Beach Pier (Figure 2-6).
- ***Notice to Mariners.*** To ensure safety of all vessels using the San Diego Bay and nearshore waters, the Navy would coordinate with the USCG to issue a Notice to Mariners when in-water components of this project are occurring, including temporary relocation of the Navy marine mammal enclosures and the bait barges, dredging, and sediment disposal at the receiver site at Imperial Beach.
- ***Construction Monitoring.*** Sound propagation data will be collected through hydroacoustic monitoring during pile installation and removal. The presence of marine mammals will also be monitored during pile installation and removal. The results from acoustic and marine mammal monitoring will be used to validate or refine estimates of acoustic effects as part of the Navy's compliance with the MMPA.

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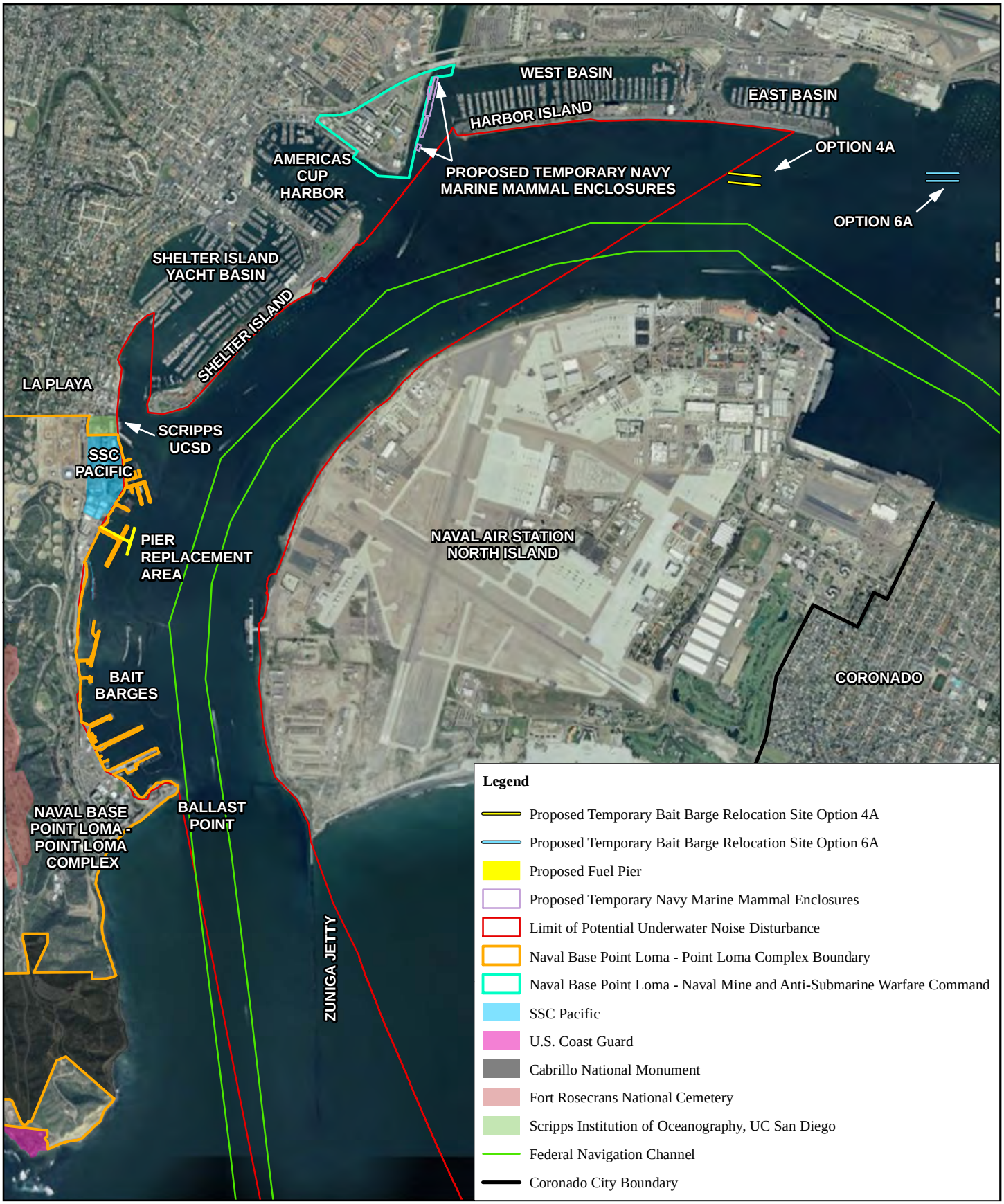

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0 0.2 0.4 Miles

Figure 2-5
Proposed Temporary Relocation Sites for Bait Barges

Source: NAVFAC Southwest 2011a; Navy 2007

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0 100 200 Meters

0 200 400 Feet

Source: NAVFAC Southwest 2012

Figure 2-6
Imperial Beach Sediment
Beneficial Reuse Receiver Site

N

2.3.1 Phased Demolition and Removal of the Existing Fuel Pier

Demolition and construction would occur in two phases to maintain the fueling capabilities of the existing fuel pier while the new pier is being constructed. Each of the utilities, systems and pier features would be demolished as described in this section, but on a segment-by-pier segment basis to allow for continuous fueling operations during demolition and construction. Table 2-1 below summarizes the work that would be done in each phase (refer also to Figure 2-7), and the durations of each phase. The total duration of demolition/construction is estimated to be approximately four years.

Table 2-1. Construction Phase Summary

PHASE ONE (approximately three years)	
1	Initial mobilization of equipment to the site, set up temporary office space.
2	Temporary relocation of Navy marine mammals to NMAWC.
3	Relocation of Everingham Brothers Bait Company bait barges
4	Indicator Pile Program- Drive approximately 12 piles (several of them will be 'driven' twice: once to the tip elevation and again after 48 hours to check the 'set-up' strength).
5	Construct temporary mooring dolphin south of existing fuel pier.
6	Demolish north segment of the existing fuel pier.
7	Construct abutments at landside end of approach segment for the new fuel pier.
8	Construct portions of landside utilities and relocations.
9	Construct the new pier: ramped approach pier (lower and upper deck) two northern mooring dolphins, and double deck fueling pier.
10	Connect/construct fueling lines to new pier and begin fueling at the new fuel pier.
PHASE TWO (approximately one year)	
1	Construct southern berthing dolphin and mooring dolphin.
2	Demolish remainder of existing fueling pier (approach and south segments).
3	Complete abutment construction.
4	Remove temporary mooring dolphin.
5	Complete grading, paving, and landside utility work.
6	Demobilize equipment from site, remove temporary offices

More detail is provided below only on those aspects of the project that involve in-water activity or otherwise might have the potential to result in impacts on federally managed fisheries or EFH. Other aspects of the project are considered in more detail in the Navy's Environmental Assessment. It should be noted that the NBPL DFSP bulk fuel storage tanks, pipelines, and supporting infrastructure are currently being replaced under the military construction project P-401 (Navy 2010a).

In addition to fueling vessels, NBPL DFSP supplies JP-5 (jet fuel) to Naval Air Station (NAS) North Island across San Diego Bay to the east via two underwater pipelines (Naval Facilities Engineering Command [NAVFAC] 2009). The NAS North Island pipelines are not included in the fuel pier replacement project, (Navy 2010a). However the NAS North Island pipelines are in the fuel pier replacement project area, both onshore and offshore. The Navy would work with contractors to establish a safety buffer zone between the pipelines and the demolition and construction work zone footprint and would ensure that all contractors' equipment and vessels remain outside the buffer zone during demolition and construction.

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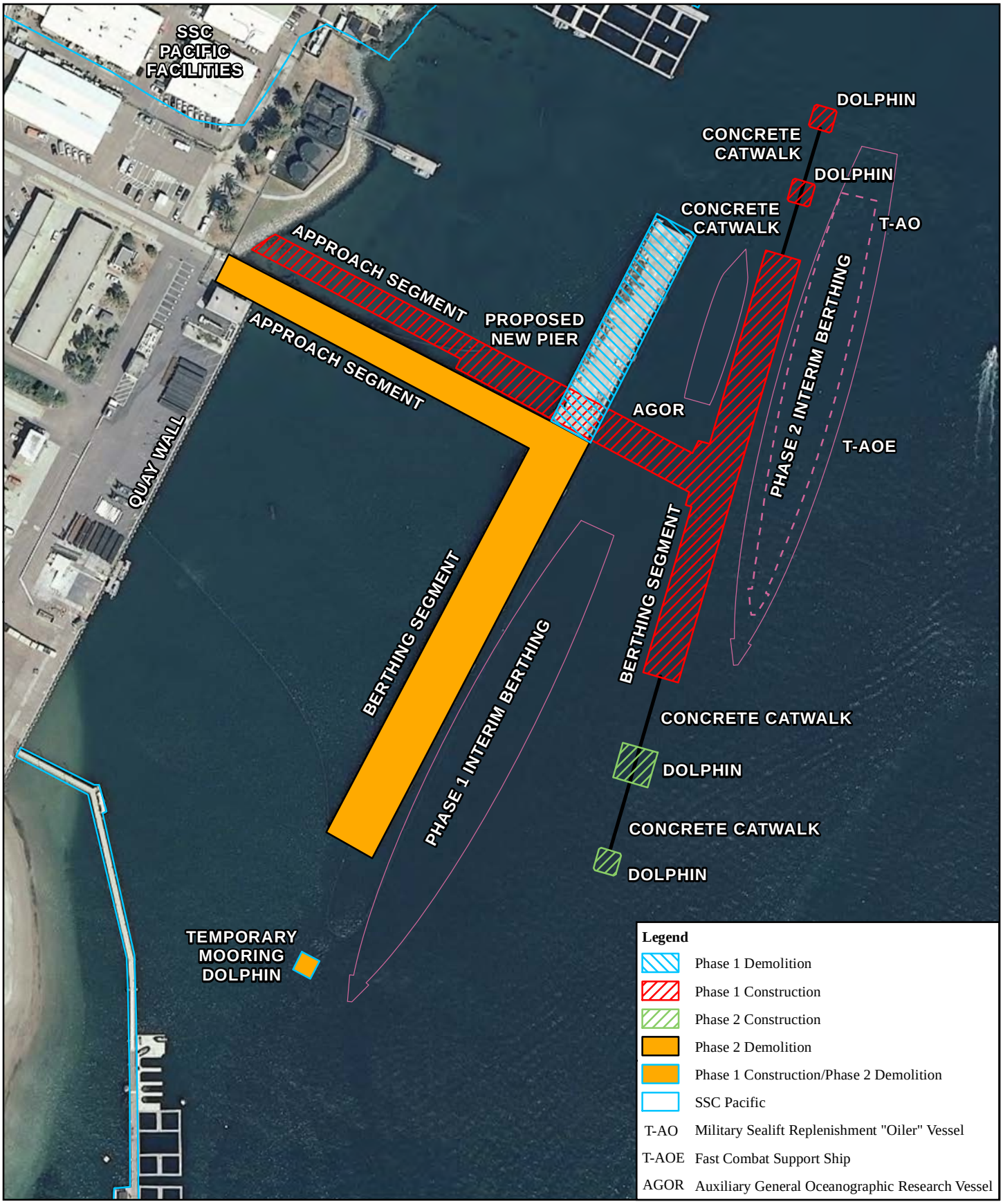

0 25 50 Meters
0 100 200 Feet

Source: MNB 2012b

Figure 2-7
Demolition and Construction Phasing Plan

N

The majority of the fuel pier replacement work would be conducted over water and would include removal of the pier, pilings, plastic camels and fenders. All utility infrastructure would be removed, including water and sewer pipelines, lighting systems, and wiring. The fueling systems, including piping and pipe supports would also be removed. Facility information for the existing fuel pier is included in Table 2-2.

Table 2-2. Existing Fuel Pier (Pier 180) Information

Existing Pier 180	***Pier Specifications***
Installation	Naval Base Point Loma (NBPL), San Diego, California
Activity	Defense Fuel Supply Point (DFSP)
Facility Name	Fuel Pier (Pier 180)
Pier Area	71,180 square feet (sf)
Description	T-shaped fuel pier, consisting of 3 sections with concrete deck
Approach Segment	Built in 1908, Size: 34 feet (ft) x 500 ft, timber support piles, steel caissons and superstructure, plastic fender piles
North Segment	Built in 1908, Size: 50 ft x 349 ft, timber support piles, steel caissons and superstructure, plastic fender piles
South Segment	Built in 1942, Size: 60 ft x 598 ft, concrete support piles and superstructure, plastic fender piles
Function	Loading and off-loading of fuels and contaminated petroleum products
Current Ship Loading	Average: 43 ships/month
Condition of Facility	Facility is aging, is in poor condition, and is seismically deficient
Major Structural Repairs	Repairs to four undermined caissons on the Approach Pier in 1957 and two additional undermined caissons in 1987. The 1987 repairs included the installation of a submerged steel sheet pile bulkhead to prevent further undermining of the caissons.

Source: Navy 2010a.

Demolition Process

Hazardous Material Abatement. Hazardous lead paint removal and asbestos containing material abatement would be completed by licensed contractors before demolition.

Mechanical and Electrical Utilities. Shoreside, all water and sewer laterals connected to the fuel pier would be cut and capped at the mains to prevent the formation of dead-end pipes in the water and sewer systems. Underground utilities would be located before performing any drilling or excavation work at the site. All electrical and mechanical utilities would be properly terminated before demolition. Demolition of utilities under the pier would either occur with a hydraulic crane from the pier topside, or a barge mounted crane. Salvageable piping and electrical materials would be loaded in dumpsters and transported to a local recycling facility. This work would occur concurrently with the hazardous material abatement.

Fueling System and Pipelines. All liquids, solids, or sludges would be evacuated from the fuel and contaminated petroleum product systems, and the systems and pipelines would be cleaned. The same procedure would be applied to the potable water and sewer lines that supply Building 140 on the fuel pier. All pipelines would then be properly terminated at the shoreline and dismantled topside. Salvageable metal would be would be loaded in dumpsters and transported to a local recycling facility. This work would occur concurrently with the hazardous material abatement.

*Cleat and Bollard Bases***.** This work would be performed with a mini excavator with a concrete breaker. All bollards and cleats would be hauled away for recycling. This operation would occur concurrently with the removal of the pier deck.

Plastic Fendering System. This work would be performed from a barge-mounted crane. Salvageable materials from this demolition process would be loaded onto flatbed trucks and hauled away for recycling. All other materials removed from the fendering system would be sized and hauled away to an approved disposal facility. This work would occur concurrently with the hazardous material abatement.

Concrete Deck and Pier Pilings. Typical pier demolition takes place bayward to landward and from the top down. Table 2-3 below lists the types and numbers of piles to be removed. First, the fender piles and exterior appurtenances (such as utilities and the fuel piping systems) would be demolished above and below the pier deck. Then, the deck would be demolished using concrete saws and a barge-mounted excavator equipped with a hydraulic breaker. Next, structural and fender piles would be demolished.

Table 2-3. Existing Fuel Pier (Pier 180) Piles and Caissons

Pile Type or Structure	***Number***
16-inch concrete structural piles	518
14- and 24-inch concrete fender piles	105
13-inch plastic fender piles	34
16-inch steel pipe filled with concrete	24
12-inch timber piles	739
66-inch diameter concrete-filled steel caissons – approach	26
84-inch diameter concrete-filled steel caissons – north section	25
Total	**1,471**

Typically piles would be cut off at the mudline; however, the full length of the piles would be pulled at the area where the new approach segment would be constructed. An attempt would first be made to dry-pull the piles with a barge-mounted crane. A vibratory hammer or a pneumatic chipper may be used to loosen the piles. Jetting (the application of a focused stream of water under high pressure) would be another option to loosen piles that could not be removed through the previous procedures. The removal of the caissons (six ft diameter steel with 13 wood piles each [25 caissons and 325 12-in diameter wood piles total] and concrete topping) would take place outside the least tern nesting season. The caisson elements could be removed with a barge-mounted derrick crane. The crane can be used to grasp and lift large components such as caissons and piles with attachments such as wire slings or clamshell buckets (i.e., dredge buckets). When a wooden pile cannot be completely pulled out, the pile may be cut at the mudline using crane-attached hydraulic jaws and/or a diver-operated underwater chainsaw.

Once extracted, the piles would be loaded on to a support barge where they would be floated over to the quaywall. Once on shore, the debris would be crushed onsite or hauled to a concrete recycling facility. 100% of the concrete material would be recycled.

Figure 2-8 shows the location of the contractors' laydown area for materials, equipment, and concrete recycling. The contractor may also stage some equipment and materials on barges. During demolition, floating slick bar booms would be used to provide a complete barrier to floating debris. Any floating debris would be gathered in work boats and would be disposed of or recycled as appropriate.

To minimized impacts to eelgrass and minimize sediment disturbance, steel sheet pile bulkheads along the south side of the approach segment and the outboard side of the north segment would not be removed. The bulkheads protrude about 10 ft above the mudline, and preserve a remnant soil mound that lies beneath the approach pier and main pier structure (Terra Costa Consulting Group 2010). This remnant soil mound was created by dredging the bay floor adjacent to the pier (Terra Costa Consulting Group 2010). Original engineering plans for the sheet pile bulkhead indicate that it was covered in rock rip-rip (Terra Costa Consulting Group 2010).

Discarded Military Munitions (DMM)

The project area may contain discarded military munitions (DMM). The Navy would coordinate with the demolition and construction contractors to minimize health and safety risks posed by DMM.

Demolition Debris

Four major types of debris would result from the demolition of the fuel pier: concrete; wood; steel; and plastic. The Proposed Action would be in accordance with the DoD Low-Impact Development Initiative requiring all demolition projects that take place after 2011 to recycle and divert materials from local landfills to the maximum extent practicable. Materials would be reused or recycled as appropriate. 100% of the concrete material would be recycled. Materials that cannot be reused or recycled would be transported to a permitted landfill. No special permits would be required for disposal of non-hazardous solid waste. Debris would not be allowed to fall into the San Diego Bay.

- Concrete debris would comprise the largest volume of demolition material, approximately 4,280 cubic yards (Navy 2010c). Concrete debris not crushed for onsite reuse would be hauled to an offsite concrete recycling facility and processed for reuse as bulk construction material such as roadway fill.
- Wood debris, comprising approximately 739 creosote-treated timber support piles would be disposed at Miramar landfill in accordance with the NRSW special waste management policy (NRSW 2007)
- Approximately 680 tons of steel debris and 4 tons of wiring (e.g., utility wires 34,000 linear feet [lf] estimated 4 ft per pound [Navy 2010c]) would also be recycled or appropriately disposed as a requirement of the demolition contract. Steel debris that could not be recycled would receive authorization from the NRSW solid waste management program for disposal at Miramar landfill.
- Approximately 3,100 lf of plastic fender material would be removed from the fuel pier (Navy 2010c). Reuse or recycling of the plastic fenders would be determined as appropriate. Any material not suitable for reuse or recycling would receive authorization from the NRSW solid waste management program for disposal at Miramar landfill.

0 25 50 Meters

0 100 200 Feet

Source: NAVFAC Southwest 2011a

Figure 2-8
Contractors' - Laydown Area

N

2.3.2 Demolition/Construction Equipment and Phasing

There would be no in-water demolition, construction, and dredging during the least tern season (April 1 through September 15). Demolition and construction work (including pile driving) would occur between the hours of 7:00 A.M. and 4:00 P.M., Monday through Friday. Contract specifications would provide work day and hour restrictions that are consistent with City of San Diego noise ordinances.

The new fuel pier would be constructed concurrently with demolition of the existing pier. The north segment of the existing pier would be demolished first while the existing approach and south segment would remain operational. Fueling capabilities would be provided by the south segment. During the estimated construction period of approximately four years, fuel pier operations would continue with no more than 45 days total downtime. As described below, the two phases are designed with some overlap to maintain operational capability and make full use of the available construction timeframe.

To maintain continuous fueling capability, access to the existing south pier would be required as construction gets underway. Access to the new north pier would be required during later phases for both construction and fueling activities. According to engineering estimates there would be approximately 500 to 700 ft of open water between the pier construction activity and the dredging activity. Figure 2-9 shows the construction and navigation zones. In the event that construction and dredging take place concurrently, there would be sufficient space to accommodate both operations and normal nonmilitary boat traffic.

Construction and dredging activities would take place outside the San Diego Harbor navigation channel. The new fuel pier construction zone is approximately 1,200 ft from the channel. The dredge footprint, where the dredge vessels would operate, lies outside the channel. Most of the vessels involved with the project would transit the channel intermittently, with the exception of the sediment transport barges that may make more frequent trips to the nearshore dredged material beneficial reuse site.

Phase 1 – Fuel Pier Construction: Project Indicator Pile Program, Temporary Mooring Dolphin, North Segment Demolition (350 lf). A temporary mooring dolphin would be constructed to allow vessels to berth and load/unload fuel while the north segment of the existing pier is under demolition. The same pile driving equipment and barges used to construct the temporary mooring dolphin would later be used to construct the new fuel pier. Approximately 12 steel pipe indicator piles (36-inch and 48-inch diameter, exact mix to be determined later) would be driven in the new pier alignment. The purpose of the indicator piles is to verify the driving conditions and establish the final driving lengths prior to fabrication of the final production piles that would be used to construct the new pier.

The north segment would be demolished by water access using barges to provide a working area for the crane and equipment. The demolition waste would be placed on two barges and hauled offsite for processing, recycling, and disposal. Water access is preferable for the heavy equipment and demolition waste to keep the existing pier operational during the demolition phase. Access to the existing pier is necessary for laborers, trucks, and removal of pier appurtenances.

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0 50 100 Meters

0 150 300 Feet

Figure 2-9
Navigation/Construction Zone

Sources: NAVFAC Southwest 2011a; NOAA 2012

Some equipment used for demolition may include: hydraulic hammers mounted to back-hoes for breaking concrete, front-end loaders, fork-lifts, concrete saws, steel cutting torches, and excavators with hydraulic thumb shears. The floating barges would be supported by tug boats and small work boats. While demolition of the north segment of the existing fuel pier is underway, the steel piles for the new pier approach segment would be fabricated offsite and transported to NBPL. Other construction equipment needed for Phase 2 would be mobilized to NBPL within this time.

Phase 1 - Approach Pier (Connection to Shore) Construction (700 lf). It is not necessary to wait for the complete demolition of the north segment to begin construction. The approach pier construction would begin after the piles have been fabricated offsite and delivered. The piles would likely be delivered by barge. The approach pier construction would require two barge-mounted cranes, one with a pile driving rig and one for constructing the pier. Two additional barges would be used to store the piles, concrete formwork, steel reinforcement, and precast concrete deck sections. The floating barges would be supported by tug boats and small work boats. Construction from shore and/or the remaining fuel pier approach segment is a possibility for a small percentage of the work. Additional equipment would include front-end loaders, fork-lifts, steel welding and cutting equipment, concrete placement and finishing equipment, concrete saws and drills, and carpentry tools for building formwork. Materials delivered by truck may include concrete, reinforcing steel, utility pipes, and other miscellaneous construction materials.

Phase 1 - North Pier Construction (600 lf) & Mooring Dolphins). The north pier would be constructed concurrently with the approach pier. The pile driving for the north pier would begin after the pile driving for the approach pier is complete, most likely using the same pile driving rig. The north pier construction would require a second barge mounted crane for the pier construction. Two additional barges and equipment would also be required as described in Phase 2. Two 14-ft MLLW mooring dolphins and connecting catwalks would also be constructed at this time.

Phase 2 – South Pier Construction (1,100 lf). The south berthing dolphin (13 ft MLLW) and mooring dolphin (14 ft MLLW) construction would begin after the approach pier, north pier, and mooring dolphins are operational. This segment would be constructed using a pile driving rig, and two barge mounted cranes. Additional barges and equipment would also be required as described in Phase 1. When the new south berthing and mooring dolphins are completed, the new pier section would be connected via walkways.

Phase 2 - South Pier and Approach Pier Demolition. The old south pier and old approach pier demolition would begin after the new south pier is operational. The temporary mooring dolphin near the north pier would also be demolished at this time, and the debris would be recycled along with the south pier demolition debris. This phase would require two barge mounted cranes to expedite the demolition of the existing pier. The other equipment used would be the same as Phase 1.

Turning Basin Dredging. Dredging for the turning basin could occur any time before, during, or shortly after the construction process. There would be no dredging during the least tern foraging season, April 1 to September 15. There is no specific intent for the Navy MMP to remain at its existing location during the dredging phase. However, under Alternative 1, should dredging take place separately from the pier replacement effort (i.e., either before or after construction and demolition), the Navy MMP could occupy its current location if the assumptions listed in Section 2.2.2 are met.

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2.3.3 Phased Construction of Replacement Fuel Pier

During development of the new pier design several measures were adopted to minimize impacts to eelgrass. These measures include: pier alignment positioned to minimize eelgrass disturbance; pier extended into deeper water to minimize dredging; existing sheet piling left in place to minimize sediment and eelgrass disturbance; and use of mooring dolphins to reduce the size of new pier footprint and minimize bay shading.

Either alternative would involve construction of a new double deck fuel pier. The approach segment would be 700 ft long by 50 ft wide. The new pier approach segment would connect to shore as a single deck with a ramp leading to the upper deck of the double deck berthing segment. The berthing segment would be 605 ft long by 50 ft wide, supplemented with three mooring dolphins and one berthing dolphin to extend berthing length to 1,100 ft. The approach segment would be constructed approximately 5 ft north of the existing pier to minimize disturbance to eelgrass and to facilitate connecting the pier with pipelines to onshore NBPL DFSP fuel storage facilities. The new pier approach segment would be 200 ft longer than the existing pier approach segment, so the berthing segment of the new pier would stand in a deeper, previously dredged location where most of the area to be used by vessels approaching the pier already meets the minimum depth requirement of 40 ft. This placement would accommodate a wider variety of ships than is currently possible at the existing fuel pier where depths are 30 to 40 ft (Figure 2-10). No dredging would be needed alongside the pier during construction, and the need for future maintenance dredging along the pier would be reduced or eliminated. The top of the lower deck would be set at 13 ft MLLW, approximately 5 ft above extreme high tide. The new pier upper deck elevation would be 28 ft above mean lower low water (MLLW) and 20 ft above extreme high tide. The upper deck would have sufficient height needed for the pier fuel load arms to safely reach fuel transfer points on the majority of larger ships (Navy 2010a).

The 1,100 ft berthing length was chosen to provide flexibility in fueling multiple types of vessels at the proposed new fuel pier, including the TAKR (large, medium speed roll-on/roll-off ship, 951 ft long), which requires the 1,100 ft berthing length. The inner berths provide two additional berthing areas, the south and north inner berths. The south inner berth accommodates vessels up to 500 ft long and the north inner berth provides a small craft berthing area for vessels up to 400 ft long. The existing fuel pier total area is 71,180 square feet/1.63 acres (sf/ac). The total area of the new pier (including the 700 ft long approach segment and dolphins) would be 65,865 sf/1.51 ac. This would be a decrease of 5,315 sf/0.12ac of bay shading compared to the area of the existing fuel pier.

The replacement pier structure, including the mooring dolphins, would consist of steel pipe piles, supporting concrete pile caps and cast-in-place concrete deck slabs. Concrete material may be delivered from either trucks or barges. The upper 10 ft of the steel wall pipe piles would be filled with concrete as part of the connection between the piles and the pier deck. Approximately 554 total piles would be installed. Concrete pilings are not suitable to support the double-deck pier due to the structural seismic forces, so steel structural pilings would be used. Design of the fuel pier takes into account seismic loading, vessel loading, gravity loads and functionality of the overall system. The state of California enforces special requirements for marine oil terminals, particularly with regard to seismic criteria, and the Navy has agreed to comply with the California marine oil terminal requirements for this facility. The design of the piles is governed by loading conditions that include seismic loads.

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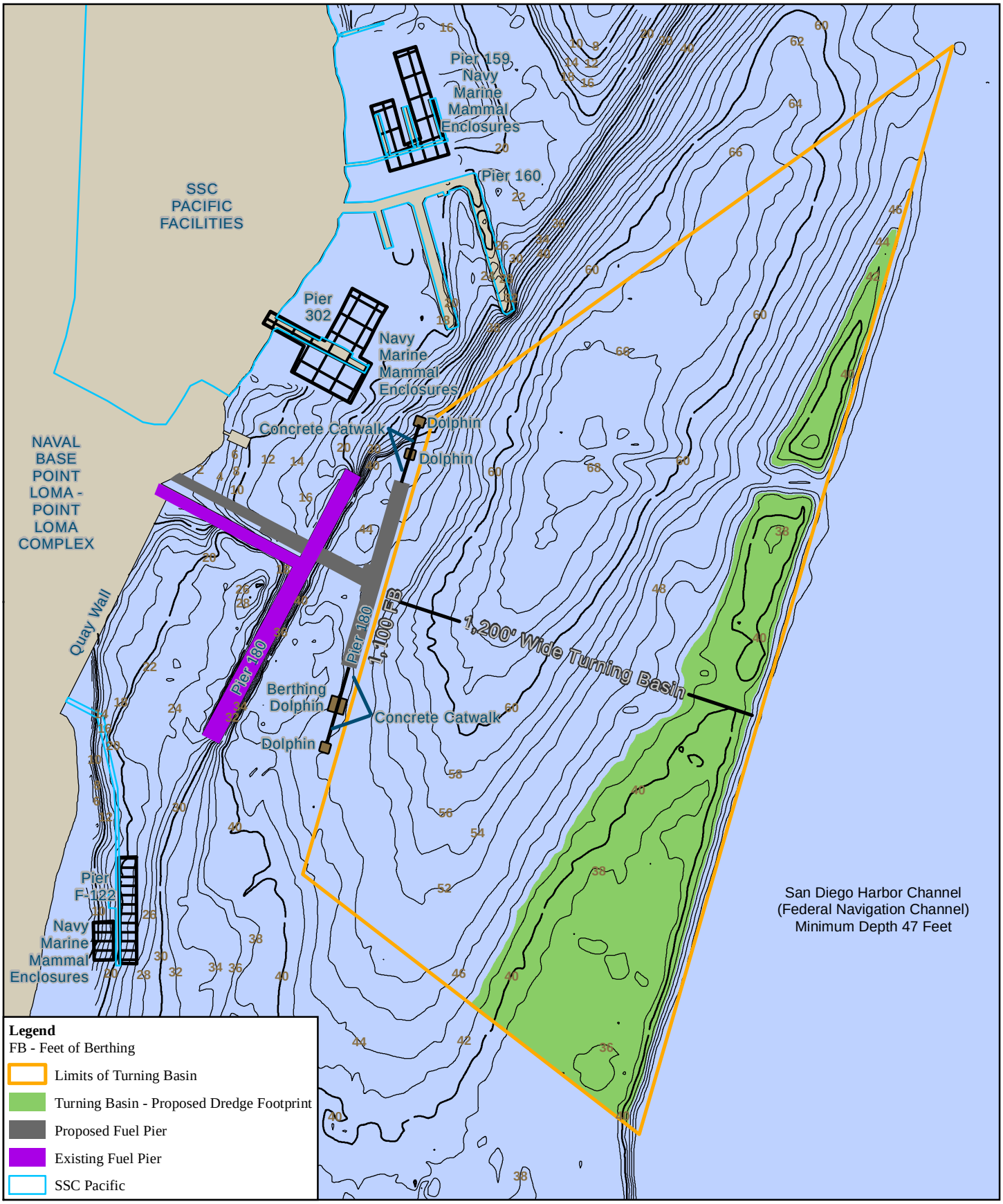

0 50 100 Meters

0 250 500 Feet

Figure 2-10
Proposed New Fuel Pier and
Turning Basin Dredge Footprint

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Sources: NAVFAC Southwest 2011a; NOAA 2012

The structural analysis performed has determined that concrete piles of sizes available in southern California cannot develop sufficient strength and stiffness to withstand the design loads considering the water depth at the site, the geotechnical conditions, and with the deflection limitations needed for the fuel operations. The sizes of the steel piles are dependent on water depth, subsurface soil conditions, and the mass of the deck structure. In most areas, a 36 inch diameter steel pile is adequate to meet the criteria. In other areas, a 48 inch diameter pile is necessary.

The new steel piles would be protected from seawater corrosion with a combination of coating and cathodic protection systems with anodes (aluminum) that would require replacement approximately every 20 years. The existing sheet pile system would continue to be protected from corrosion with its existing (protected/reconnected) impressed current cathodic protection system. The service life of the entire pier structure would be 75 years.

Table 2-4 below lists the types and numbers of pilings to be installed. The project construction schedule calls for pile driving during four "windows" of opportunity that would occur in Phase 1 and Phase 2 episodes of pile driving. There would be no pile driving or other in-water construction or demolition during the least tern foraging season, from April 1 through September 15 of each year that the project is ongoing. Due to these restrictions on in-water construction, pile driving could take up to three years to complete. Pile driving would occur during normal working hours (7:00 A.M. to 4:00 P.M.). The impact pile driver would be used for all three types of piles (steel, concrete and fiberglass) The steel wall pipe piles would first be driven with a vibratory hammer for the majority of the embedment, after which each steel pile takes 30 to 120 minutes for the final driving element at a rate between 25 and 150 blows per foot for the last 10-15 ft. The concrete piles would first be jetted, and then driven the last few feet with the impact hammer. The fiberglass piles do not need to be embedded very deeply into the subsurface, so they would be driven for the entire length. Use of steel wall pipe, concrete, and fiberglass rather than creosote wood pilings would be consistent with Navy policy and is preferred by the Regional Water Quality Control Board (RWQCB) because, unlike creosote pilings, these materials are not a potential source for polycyclic aromatic hydrocarbons (PAHs) to the bay. The fender system for the pier would include foam-filled fenders at the berths and plastic log camels.

Table 2-4. Replacement Fuel Pier Pilings to Be Installed

Pile Type	***Number***
48-in diameter x 1-in steel wall pipe piles	77
36-in diameter x 1-in steel wall pipe piles	228
24-in diameter x 1-in prestressed concrete piles	165
16-in diameter concrete-filled fiberglass piles	84
Total	**554**

Source: Moffatt & Nichol – Blaylock 2012

Concrete catwalks would connect the berthing and mooring dolphins to the main pier (refer to Figure 2-10). The approach segment would be of similar construction to the berthing pier. The main pier decks would be designed for a 50 ton mobile crane, 20 ton truck load and 10 ton forklifts (5 ton forklift on the lower deck); heavy equipment would not be operated on the berthing or mooring dolphins.

There would be fueling stations on the upper and lower decks of the new fuel pier berthing segment. Each fueling station would have the capability to supply diesel fuel marine (DFM) and JP-5 turbine (jet) fuel to vessels. The upper deck would be used for offloading fuel from tankers to the tank farm and for supplying fuel to higher profile vessels. The lower deck would be used for fueling smaller profile vessels. Table 2-5 below lists the fueling stations on the two decks of the berthing segment of the new fuel pier.

Table 2-5. New Pier Fueling Stations

Deck	*Side*	*Product*	*Number of Stations*
Upper	Outboard	Fuel	4
Upper	Outboard	Lube Oil	2
Upper	Inboard	Fuel	4
Upper	Inboard	Lube Oil	1
Lower	Outboard	Fuel	4
Lower	Outboard	Lube Oil	1
Lower	Inboard	Fuel	3
Lower	Inboard	Lube Oil	0

The upper deck would also have six piping connections to receive ballast water from fleet tankers and other larger ships. An 8-inch diameter oily water pipe would be used to transfer the ballast water to the NBPL Fuel Oil Reclamation (FOR) facility. The ships could either pump directly to the oily water receipt tank at the treatment system or transfer to the smaller collection tank located on the pier. A pump at the collection tank would then transfer the oily water to the receipt tank at the treatment system.

Pier deck design is such that all rainfall accumulating on the lower deck as well as rainfall from the 85th percentile storm event accumulating on the upper deck of the new pier would be collected on the pier and sent to the FOR receipt tank for treatment. . The upper deck would be equipped with underflow scuppers that would permit a portion of the runoff from large storm events to discharge to the bay. The underflow design would prevent surface sheen and floating fuel from being discharged to the bay and also allow the "first flush" to be sent to the FOR Receipt Tank.

The pier operations would be supported by two pipelines for each fuel product and two for lube oil. There would be a 16-inch and an 8 inch pipeline for loading/unloading JP-5. For loading and unloading DFM, there would be a 16 inch and a 10 inch pipeline. There would be two 6-inch pipelines for loading lube oil. The 16 inch pipes would support the fueling stations on the outboard side while the 8 inch JP-5 and 10 inch DFM pipes would support the fueling stations on the inboard side.

The 50 ft top-of-deck width is the minimum requirement for a fuel pier per DoD Unified Facilities Criteria (UFC). The new fuel pier would provide adequate deck space on the berthing segment by using a double deck structure to separate the fuel lines from operations on the berthing segment and provide containment for fuel pipelines and utilities. On the berthing segment the pipelines and utilities would be hung beneath the upper deck. Utilities would be in a dedicated vault separate from the pipelines. On the approach segment, fuel lines would be

stacked in pipe racks running along one side of the lower deck. At the "T" juncture of the approach and berthing segments, the fuel lines' orientation would transition from horizontal along the lower deck to vertical to reach the upper deck, then horizontal again beneath the upper deck.

Concrete containment curbs would be incorporated into the pier deck design surrounding all fueling arms, fueling risers, and fuel pipes. There would be sumps in curbed containment areas in both pier decks to capture spilled fuel as well as rain water. Sumps located in the upper deck would be fitted with drains that would be piped to a collection tank on the lower deck. Sumps in the lower deck would connect to the FOR. There would be a 1.25 ft high concrete curb around the perimeter of the lower deck and 3.75 ft high concrete curb around the upper deck.

The total fuel volume of the new pier pipelines would be 49,000 gallons, an increase of 22,960 gallons (approximately 88 percent) from the existing pipeline capacity of 26,040. The dual piping configuration would allow fueling operations to take place on both sides of the pier simultaneously, and include a cross-over capability so that fuel could be transferred from one side of the pier to the other should one side shut down temporarily.

The following would all be upland work. An existing underground trench containing piping from the onshore fuel storage facilities would be extended to the pipelines on the new pier. The connection for the new pipelines would be located between 35 and 65 ft from the existing pier abutment. With the exception of some electrical duct bank work would be located in proximity to the existing pier abutment and the new pier abutment. In addition to the fuel pipelines, an 8-inch diameter fire suppression water line would be installed on the new pier and connected to the onshore potable water supply system (Navy 2010c).

The total disturbed area on shore would be less than one acre, comprising previously disturbed areas that are paved and unpaved. The paved area northwest of the existing fuel pier would be excavated (an area approximately 20 ft long, 6 ft wide, to a depth of about 5 ft) to extend the underground pipeline trench to the new pier and to install underground utilities and subsequently re-paved. The existing 12-in diameter storm water outfall located immediately north of the existing fuel pier abutment would be relocated to the north side of the new pier abutment. A portion of the landscaped area between the existing fuel pier and lube oil storage tanks would be paved as part of the new pier landside abutment. Three palm trees would be removed from the landscaped area. A new security fence with a motorized gate would be constructed at the entrance to the new pier.

After the new pier is completed, the quaywall at the entrance to the old fuel pier would be rebuilt. This work would include the placement of approximately 100 cubic yards of concrete to repair the quay wall. There would also be some grading and asphalt repairs in this area. Repairs to the quaywall would also include removal of two closed underground storage tanks (Tanks 115A and 115B).

The connection between the new and old pier abutments would be constructed by placing closely-spaced 48 inch diameter steel-pipe piles along the base of the new and existing bulkhead. The gaps between the piles would be closed by welding steel "wings" between the piles. A concrete cap would be placed at the top of the piles to support the new pier approach and provide a continuous surface. All the work would be performed above mean higher high water. All the work would be performed above mean higher high water.

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2.3.4 Regulated Navigation Zones

The approach segment of the new fuel pier from shore bayward (east) would be 700 ft long as compared with 500 ft for the existing fuel pier. The new pier berthing segment north end would be about 100 ft further east into San Diego Bay than the existing fuel pier, and the south end would be about 300 ft feet further bayward. While the new pier would not extend beyond the existing Security Zone east of the pier, there would not be sufficient security standoff distance between the new pier headline and the Security Zone boundary. The Navy Anti-Terrorism/Force Protection required standoff distance for the fuel pier is 500 ft. The Navy has coordinated with the USCG to amend the Security Zone east of the pier by 250 ft (200 ft for the additional approach length and 50 ft for the berthing pier width) to provide adequate security standoff distance of 500 ft for the proposed new fuel pier alignment. The new pier would also extend beyond Navy waters into waters that are under the jurisdiction of the California State Lands Commission (CSLC). Following completion of the National Environmental Policy Act (NEPA) process, Navy counsel would provide written notification to CSLC of the extension of Navy facilities into state waters, (NAVFAC Southwest 2010).

The Navy would also coordinate with the USCG to establish a temporary Security Zone that would extend 150 ft bayward from the temporary Navy marine mammal facilities to ensure civilian craft to do not interfere with restricted maneuverability of Navy small boats operating within immediate vicinity of Navy marine mammal enclosures (SSC Pacific 2012). . There would be approximately 320- ft of open water for civilian boat traffic to navigate between the proposed temporary Security Zone and west Harbor Island. Signs would be posted alerting vessels that entry into the temporary Security Zone is prohibited without permission of the Captain of the Port. The temporary Security Zone would be removed when the Navy marine mammal program has returned to its existing location. Regulated Navigation Zones are shown in Figure 2-11.

2.3.5 Dredging and Sediment Disposal

Vessel traffic moves in and out of San Diego Bay via the San Diego Harbor Channel (navigation channel) that is maintained at a depth of 47 ft MLLW by the USACE (Figures 2-8 and 2-9) (NOAA 2012). Large vessels approaching the fuel pier in the channel from the south (inbound) require an area of open water with sufficient depth, known as a turning basin, to safely align at the pier. The proposed new pier layout would include a minimum 1,200 ft wide turning basin between the outboard (eastern) side of the pier and the navigation channel, to provide safety for the berthing operations of the large vessels being serviced at the facility. The north and south limits of the turning basin would be bounded by the existing channel markers located to the northeast and southeast of the fuel pier (Figure 2-11). The design depth for the turning basin would be 40 ft below MLLW (38 ft vessel draft plus 2 ft under keel). An additional 2 ft of dredge depth would be included as overdredge allowance, or tolerance that could vary depending on the precision of the dredging contractors' equipment and methods. Thus, the maximum project dredge depth would be 42 ft MLLW, but the entire overdredge volume might not be recovered if the contractor is able to excavate to 40 ft with less than 2 ft of tolerance.

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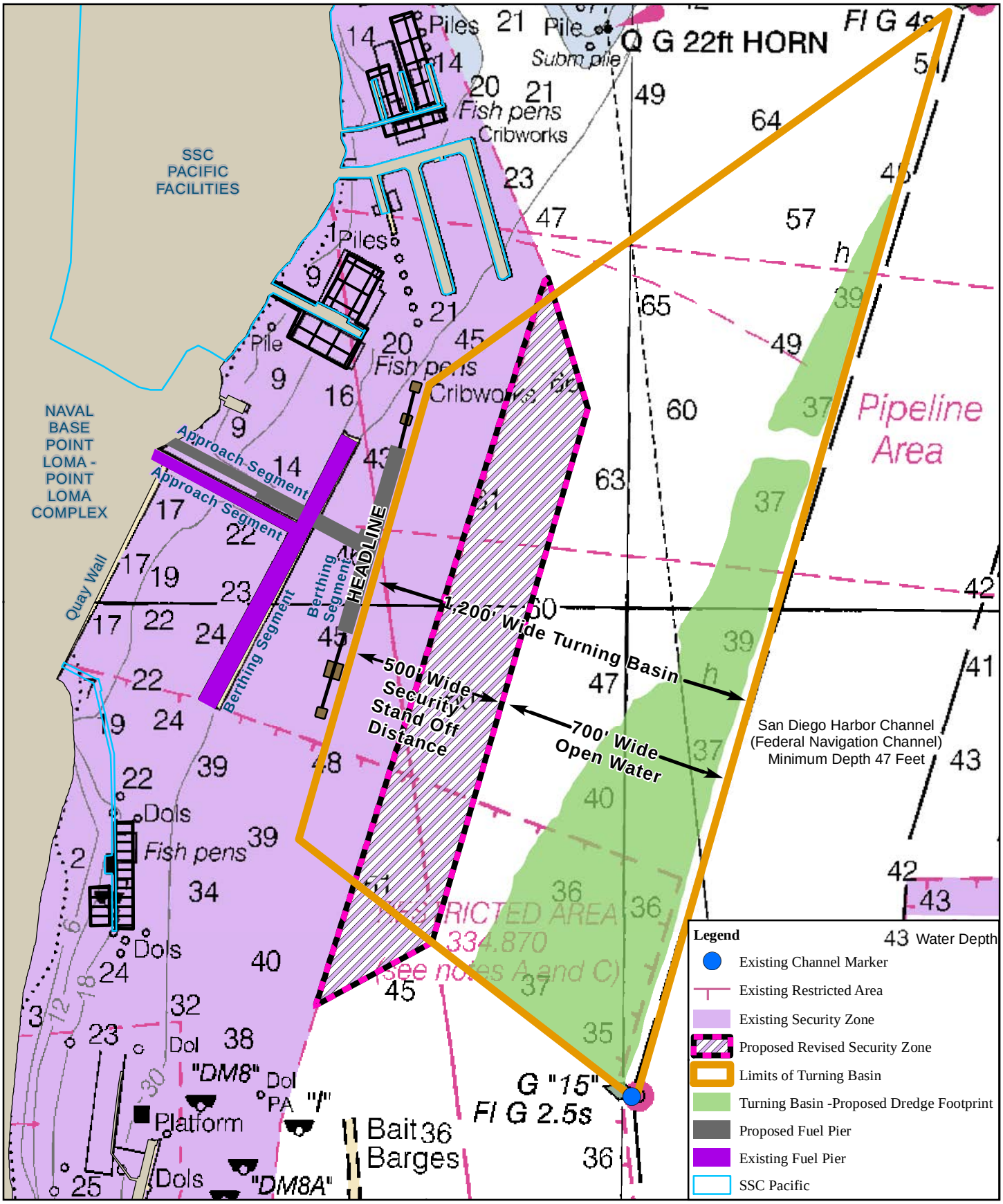

0 50 100 Meters

0 250 500 Feet

Figure 2-11
Regulated Navigation Zones

Sources: NAVFAC Southwest 2011a; Navy 2012b; NOAA Chart 18773 San Diego (NOAA 2012)

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The majority of the existing bathymetry is deep enough to accommodate safe vessel operation. However, there is a wedge-shaped high spot adjacent to the western edge of the navigation channel where bottom depths rise from -40 to -36 ft MLLW (refer to Figure 2-10). This wedge-shaped area (approximately 463,000 sf/10.6 ac) would need to be excavated to bring it to a minimum of 40 ft MLLW. The proposed dredge footprint would be located approximately 700 ft east of the new fuel pier, as illustrated in Figure 1-8. The dredge footprint would be limited to the area shown in green on Figure 2-5. The estimated volume of dredging required is shown in Table 2-6.

Table 2-6. Proposed Dredging Volume

Site	*Design Depth (-40 ft MLLW)*	*Overdredge (2 ft)*	*Total*
Turning Basin	40,000 CY	40,000 CY	80,000 CY

Note: CY = Cubic Yards

As stated above in Section 2.3.3, underwater pipelines that supply JP-5 to NAS North Island are in the project area. The Navy would work with contractors to establish a safety buffer zone between the pipelines and the dredge footprint and would ensure that all contractors' vessels and equipment remain outside the buffer zone during dredging operations. Sediment samples from the dredge footprint were collected in November 2010 and tested in accordance with regulations contained in Title 40 Code of Federal Regulations (CFR) Parts 220-228. The sediment characterization report is included as Appendix D of the EA. The sediment characterization report was provided to USEPA and USACE for review and comment on potential sediment disposal options. The agencies determined that the dredged material is suitable for unconfined aquatic disposal (USEPA 2011).

Depending on availability, a hopper (hydraulic) dredge or a medium size, 8-12 cy bucket, barge-mounted clamshell dredge would be used (Navy 2010d). If a clamshell dredge is used, the specific make and model of the bucket would be determined by the selected contractor and permit conditions. If a hopper dredge is used, the Navy would plan to coordinate dredging to occur after the MMP has been moved to the temporary relocation site at NMAWC. However, if availability does not permit this, the hopper dredge would be operated to minimize turbidity and maintain water quality necessary for the health and wellbeing of the Navy marine mammals.

Dredge material would be loaded into a 5,000-10,000 cy capacity barge and transported to the beneficial reuse site south of the Imperial Beach pier where it would be placed in the nearshore zone (Figure 2-6). Daily dredge production, including transport and placement at the beneficial reuse site can be assumed to be 2,000 cy. Maintaining this as an average production rate would enable up to 80,000 cy of material dredged from the turning basin to be dredged and placed at the beneficial reuse site in approximately three months (Navy 2010d). Dredging and beneficial reuse for nearshore replenishment of dredged materials would comply with USACE requirements for dredging and sediment disposal. The sediment in the proposed dredging area is classified as fine sand; as such it is similar to sediments at the beneficial reuse site (Tierra Data, Inc. 2012).

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2.4 Dates of Construction

Assuming timely completion of the regulatory and NEPA processes, in-water activities would begin in September 2013, and proceed to completion in early 2017.. Pile driving, dredging, and in-water demolition that requires jetting and vibratory pile extraction would only occur between September 16 and March 31, inclusive, whereas all other construction and demolition activities could occur throughout the year.

2.5 Duration of Activities

To facilitate understanding of the project and its potential effects, a year-by-year breakdown is provided below. Year 1 starts with the first in-water construction activities on 30 September 2013; subsequent years also begin on 30 September.

2.5.1 Year 1

No work will begin on the Proposed Action until all required permits and approvals are in place. Under the Proposed Action, 604 piles will be installed, including 554 for the new pier (see Table 2-4) and 50 18-inch concrete piles to support the temporary facilities for the Navy Marine Mammal Program at NMAWC. Pile driving would occur only during daylight hours, nominally 0700-1600.

It is assumed that the contractor will drive approximately 2 steel piles per day, and 5 concrete or fiberglass piles per day. Each pile is assumed to require up to 2 hours of driving. Steel piles would be driven initially with a vibratory pile driver, and then finished as necessary with an impact pile driver. Working assumptions are 1-1.5 hours of vibratory pile driving and up to 0.5 hour of impact pile driving for each steel pile. Concrete and fiberglass piles would be jetted then driven with an impact pile driver only; sound levels are much lower for these types of piles.

The currently proposed construction schedule includes the following non-overlapping, consecutive episodes of pile driving within the first year:

- Installation of 50 18-inch square concrete piles to support the relocated facilities of the Navy Marine Mammal Program to NMAWC. Pile driving is estimated to occur on 16 days.
- Installation of steel indicator piles to occur over 17 days.
- Installation of steel temporary dolphin piles to occur over 5 days.
- Installation of 24 steel abutment piles to occur over 13 days.
- Installation of approximately 26 steel structural piles over 15 days.

Steel piles are assumed to be a mix of 36- and 48-inch diameter. As noted above, pile driving would likely occur on only a few hours of each day.

Demolition of the existing pier would occur at the rate of approximately 5 piles per day. Demolition of the north segment of the existing pier is scheduled to occur within the period of this IHA. There are no steel piles in the north segment; only 12-inch timber piles, 18- and 24-inch square concrete piles, and 13-inch diameter plastic piles. Demolition of the north segment of the pier is scheduled to occur during year 1. That activity is estimated to require 84 days, with approximately one fourth of the effort involving pile removal, a portion of which may involve the use of a vibratory extractor. During the first year, it is assumed that vibratory pile extraction could occur on up to 21 days.

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2.5.2 Year 2

During the second year of construction there would be several non-overlapping episodes of pile driving, including:

- Steel structural piles for the access pier, 45 days
- Fiberglass-concrete secondary fender piles for the access pier, 10 days. Since this would occur in the same timeframe as concrete pile driving (below) – which generates louder sound – this source does not need to be modeled.
- Steel structural piles, 45 days
- Steel mooring dolphin piles, 12 days
- Concrete primary fender piles, 15 days

No in-water demolition activities are scheduled during year 2.

2.5.3 Year 3

During the third year of construction there would be several episodes of pile driving, including:

- Concrete primary fender piles, 15 days
- Fiberglass-concrete secondary fender piles, 12 days
- Steel mooring dolphin piles, 12 days
- Steel abutment piles, 10 days

The abutment piles and mooring dolphin piles would be driven within the same timeframe, over a combined 12-day period.

Demolition of the remaining structure is estimated to require 154 days, with vibratory extraction occurring on approximately ¼ of those days (39 days). It is assumed that removal of the 24 concrete-filled steel piles would require vibratory extraction on 6 of the 39 days.

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3 ESSENTIAL FISH HABITAT

EFH is described as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity" (see 50 CFR § 600.10 for further clarification). Regional Fishery Management Councils are required to identify EFH in Fishery Management Plans pursuant by the MSFCMA [16 United States Code [USC] §180l-189ld].

The PFMC is responsible for designating EFH for all federally managed species occurring in the coastal and marine waters off the coasts of Washington, Oregon, and California, including the Puget Sound. The PFMC has designated EFH for species within the FMPs for each of the four primary fisheries that they manage: Pacific Coast Groundfish, Pacific Coast Salmon, Coastal Pelagic Species, and West Coast Fisheries for Highly Migratory Species (PFMC 1998, 2003, 2007, 2008).

In addition to designating EFH, the PMFC is also responsible for identifying Habitat Areas of Particular Concern (HAPC) for federally managed species. EFH that is considered to be particularly important to the long-term productivity of populations of one or more managed species, or to be particularly vulnerable to degradation, also may be identified by NMFS HAPC. For types or areas of EFH to be considered HAPC, at least one of the following must be demonstrated:

- The importance of the ecological function provided by the habitat
- The extent to which the habitat is sensitive to human-induced environmental degradation
- Whether, and to what extent, development activities are, or would be, negatively impacting the habitat type
- The rarity of the habitat

The proposed project area is within EFH and includes eelgrass habitat which has been designated HAPC by PFMC. The coastal waters of southern California, which includes San Diego Bay, are designated as EFH for two Fishery Management Plans (FMPs): Pacific Coast Groundfish (PFMC 2008) and Coastal Pelagic Species (PFMC 1998a). The PFMC has only designated HAPC for groundfish. The HAPC are seagrass, canopy kelp, rocky reef, and estuarine habitats along the Pacific coast, including Puget Sound (PFMC 2008). Two HAPC, estuarine habitats and eelgrass, a species of seagrass, are in San Diego Bay (NAVFACSW 2010).

3.1 Essential Fish Habitat Designations

Of the approximately 90 species of fish previously identified in San Diego Bay (Bay), nine are managed by the NMFS under two Fishery Management Plans (FMPs) - the Coastal Pelagics and Pacific Groundfish Management Plans (PFMC 1998a, 1998b, 2011). Four are managed under the Coastal Pelagics FMP: northern anchovy, pacific sardine, pacific mackerel, and jack mackerel. Five species are covered under the Pacific Groundfish FMP and occur, although not in abundance, in San Diego Bay: California scorpionfish, grass rockfish, English sole, curlfin sole, and leopard shark (NAVFACSW 2010; NAVFACSW and POSD 2011). The fish species are discussed in detail in the next subsection. Sections 3.2 and 3.3 provide detailed descriptions of the local-scale habitats utilized by the managed fish species. Ecosystem function and productivity of the habitats are summarized.

Table 3-1 is a summary of the local-scale habitats that the eight managed fishes are expected to utilize in the northern half of San Diego Bay. The data is excerpted from NAVFACSW (2010)

which provides characterizations of the potential community of fishes, including the managed species, and other marine organisms at each habitat. Three natural habitats, bare mud, bare sand, and eelgrass (a designated HAPC for groundfish) are in the proposed project area. Six habitats are man-made: riprap, marina, wharf, artificial reef, bulkhead wall, and launch ramp. Riprap, wharf, and bulkhead wall habitats are in the proposed project area.

Highly mobile, mixed schools of pelagic finfish frequently occur under and around the fuel pier in the proposed project area. Northern anchovy and Pacific sardine move through and feed in the water column of all natural and manmade habitats within the proposed project area (Table 3-1, NAVFACSW 2010). Pacific mackerel and jack mackerel occur infrequently in the northern bay, but would be expected to occur in the water column of all habitats with the likely exception of waters along the armored shoreline (riprap and bulkhead wall).

Table 3-1. Summary of federally managed fishes observed in habitats of the northern half of San Diego Bay (excerpted from NAVFACSW 2010)

Common name	*Bare sand**	*Bare mud**	*Eelgrass**	*Riprap**	*Marina*	*Wharf**	*Artificial Reef*	*Bulkhead wall**	*Launch ramp*
Coastal Pelagic Species:									
northern anchovy	x	x	x	x	x	x	x	x	x
Pacific sardine	x	x	x	x	x	x	x	x	x
Pacific mackerel	x	x	x		x	x	x	x	x
jack mackerel	x	x	x***		x	x			
Groundfish:									
curlfin sole	x	x							
English sole	x	x							
California scorpionfish			x	x	x	x	x	x	
grass rockfish			x						
leopard shark			x**						

Notes: * habitat present in the proposed project area based on maps from NAVFACSW 2010
** leopard shark observed by Hoffman 1986 referenced by Robbins 2006.
***observed in an eelgrass transplantation bed (Pondella et al.2006)

The managed groundfish species are expected to be uncommon if not rare under the fuel pier. California scorpionfish is a rocky reef residing species known to occur under wharfs and other man-made hard structured habitats in north San Diego Bay (Table 3-1, NAVFACSW 2010). Similarly, grass rockfish reside in shallow rocky reef habitat in coastal waters; however, the species has not been observed around wharfs and other artificial hard structures in the north bay. Wharf habitat offer little or no crevices and ledges that rocky reef residing groundfish use as shelter. Curlfin sole and English sole, both uncommon in the bay, would be expected to utilize unvegetated soft bottom habitat (i.e., bare sand and bare mud) but have not been observed under wharves in the northern half of the bay. Leopard shark has not been observed in the various man-made hard structured habitats in north San Diego Bay (Table 3-1, NAVFACSW 2010).

California scorpionfish, grass rockfish, and leopard shark, all uncommon in the San Diego Bay, will utilize eelgrass beds as juvenile nursery habitat and a resource for prey. The three species

have been observed in the north bay. Curlfin sole and English sole are not known to occur in eelgrass beds of the north bay (Table 3-1, NAVFACSW 2010).

3.1.1 Coastal Pelagic Species (CPS)

The CPS fishery includes four finfish (Pacific sardine, Pacific (chub) mackerel, northern anchovy, and jack mackerel) and the invertebrate, market squid (PFMC 1998). CPS finfish are pelagic in the water column near the surface and are not associated with substrate. These fishes generally occur above the thermocline in the upper mixed layer. For the purposes of EFH, the four CPS finfish are treated as a single species complex, because of similarities in their life histories and similarities in their habitat requirements. Market squid are also treated in this same complex because they are similarly fished above spawning aggregations.

All except for market squid are likely to occur in San Diego Bay. The CPS finfish are highly transient and two, northern anchovy and Pacific sardine, can be found throughout San Diego Bay. Jack mackerel are typically only found in the north bay, in the vicinity of the project area, and Pacific mackerel are found throughout much of the bay excluding its southern portion (Allen et al. 2002).

Essential fish habitat for the CPS finfish is defined both through geographic boundaries and by sea-surface temperature ranges (PFMC 1998a). Specific EFH boundaries (i.e., the habitat necessary to provide sufficient fishery production) are based on best available scientific information and described in the Coastal Pelagics Fishery Management Plan (PFMC 1998b). The east-west geographic boundary of EFH for each individual Coastal Pelagic Species finfish and market squid is defined to be all marine and estuarine waters from the shoreline along the coasts of California, Oregon, and Washington offshore to the limits of the exclusive economic zone (200 miles) and above the thermocline where sea surface temperatures range between 10 degrees Celsius (°C) and 26°C. The southern extend of EFH for CPS finfish is the U.S.-Mexico maritime boundary. The northern boundary of the range of CPS finfish is more dynamic and variable due to the seasonal cooling of the sea surface temperature. The northern EFH boundary is, therefore, the position of the 10°C isotherm which varies both seasonally and annually. San Diego Bay is entirely within the boundary of EFH for CPS finfish.

Aside from their value to commercial Pacific fisheries, CPS finfish species are also recognized for their importance as food for other fish, marine mammals, and birds (63 FR 13833). Marine mammals and birds regularly are seen foraging in the intertidal, shallow, and deep water habitats of San Diego Bay. Two marine mammal species, California sea lion (*Zalophus californianus californianus*) and coastal bottlenose dolphin (*Tursiops truncatus*) are known to move in and out of the north bay in search of fish prey (NAVFACSW and POSD 2011). About 40 species of migratory and resident birds have been seen in the various shallow and deep water habitats of the bay at one time or another foraging on schooling pelagic fish. CPS are considered sensitive to overfishing, the loss of habitat, reduction in water and sediment quality, and changes in marine hydrology, including entrainment through water intakes (PFMC 1998).

Following are descriptions of CPS finfish that occur in San Diego Bay which is designated EFH:

Northern anchovy (*Engraulis mordax*) are small, short-lived fish that are typically found in schools near the water's surface and are pelagic at all life stages. They are found from British Columbia to Baja California and have recently appeared in the Gulf of California. Northern anchovies are divided into northern, central, and southern sub-populations. The central

subpopulation is located in the Southern California Bight, between Point Conception, California and Point Descanso, Mexico (PFMC 1998).

Anchovy grow to approximately eight inches and rarely live beyond four years. The central subpopulation is all sexually mature at age two. Anchovy spawn during every month of the year, but spawning increases in late winter and early spring (peaking from February to April). Natural mortality is thought to be M = 0.6 to 0.8 year^{-1}, which means that 45% to 55% of the total stock would die each year of natural causes if no fishing occurred (PFMC 1998).

Northern anchovy in the central subpopulation are typically found in waters that range from 12°C to 21.5°C. Anchovy eggs are most abundant at about 14°C. Spawning adults, planktonic eggs, and larvae are found near the surface, generally in waters about 14°C at depths of less than 50 meters (PFMC 1998). Anchovy juveniles school near the surface over soft and hard-bottom areas, and in eelgrass, bays and estuaries (Robbins 2006).

In San Diego Bay, highly mobile schools of northern anchovy spend the majority of their time and feed in the water column in all the natural and man-made habitats of the north bay including those within the proposed project area (Table 3-1). The bay serves as a nursery area for this species; 100% of northern anchovy collected in quarterly surveys throughout the bay over a course of five years (1994-1999) were juveniles (Allen et al. 2002). Spawning primarily occurs outside of the bay, and the pelagic eggs and larvae are advected into the bay. Young-of-year northern anchovy recruit to the midwater of nearshore habitats and the channel, and abundances peak in late spring and early summer (Allen et al. 2002; Allen 1999 referenced by Robbins 2006). During this time, northern anchovy can numerically dominate the fish assemblage in the northern quadrant of the bay where the proposed project area is situated (Allen et al 2002; Pondella and Williams 2009a and 2009b).

Northern anchovy eat phytoplankton and zooplankton by either filter feeding or biting, depending on the size of the food. Northern anchovy are subject to natural predation throughout all life stages and are important forage for other species. Eggs and larvae fall prey to an assortment of invertebrate and vertebrate planktivores. As juveniles, anchovy are vulnerable to a wide variety of predators, including many recreationally and commercially important species of fish. Adult anchovy are fed upon by numerous fishes (some of which have recreational and commercial value), mammals, and birds including the endangered least tern (*Sterna albifrons browni*) which nests in the vicinity of the project area (PFMC 1998a; NAVFACSW 2010).

Pacific sardine (*Sardinops sagax*) are small schooling fish that typically grow to approximately 12 inches and may live as long as 13 years, but they are usually younger than five years old. When the population of Pacific sardine is large, it is abundant from the tip of Baja California to southeastern Alaska, and throughout the Gulf of California. Pacific sardine are highly mobile and move seasonally along the coast. Older adults may move from spawning grounds in southern California and northern Baja California to feeding grounds off the Pacific northwest and Canada. Pacific sardine is typically distributed more offshore than northern anchovy. Pacific sardine occur in estuaries, but the fish are most common in the nearshore and offshore domains along the coast (PFMC 1998). Spawning occurs year-round peaking April through August. Eggs and larvae occur nearly everywhere adults are found and eggs are most abundant between 14°C and 15°C. Sardine spawn in loosely aggregated schools in the upper 164 ft (50 meters [m]) of the water column. The main spawning area for the historical population off the U.S. was between Point Conception and San Diego, CA, out to approximately 100 mi (160 km).

In the proposed project area, Pacific sardine, like northern anchovy, occur in highly mobile schools and feed in the water column in all the natural and man-made habitats (Table 3-1). The species is among the numerically dominant taxa during the summer and fall in the northern quadrant of the bay (Allen et al 2002; Pondella and Williams 2009a and 2009b). The bay serves as a nursery area for this species; 96% of Pacific sardine collected in quarterly surveys throughout the bay over a course of five years (1994-1999) were juveniles (Allen et al. 2002).

Pacific sardines feed on phytoplankton and zooplankton. The fish are heavily preyed upon at all life stages. Sardine eggs and larvae are consumed by an assortment of invertebrate and vertebrate planktivores including northern anchovy. Juvenile and adult sardines are consumed by a variety of predators, including commercially important fish (e.g., yellowtail, barracuda, bonito, tuna, marlin, mackerel, hake, salmon, and sharks), seabirds (pelicans, gulls, and cormorants) and marine mammals (sea lions, seals, porpoises, and whales). In all probability, sardines are forage for the same predators that prey on northern anchovy (PFMC 1998).

Pacific (chub) mackerel (*S. japonicus*) range from Mexico to southeastern Alaska. Pacific (chub) mackerel can grow to 25 in (63 centimeters [cm]) and reach 11 years old; commercially fished Pacific (chub) mackerel rarely exceed 16 in (40 cm) and are under four years old. Adults are midwater pelagic fish and migrate inshore from July to November. They are most abundant south of Point Conception, California and usually appear within 20 mi (30 km) offshore. Pacific stock spawns from Eureka, California, south to Cabo San Lucas in Baja California between 2 and 199 mi (3 to 320 km) from shore. In general, juvenile Pacific mackerel are found along open coast sandy beaches, in kelp beds, bays, and estuaries (PFMC 1998a).

In San Diego Bay, Pacific mackerel has been observed in all major natural and man-made habitats except the shallow waters over riprap (Table 3-1). This highly summer-seasonal species is far less abundant than northern anchovy or Pacific sardine in the bay, and like these two species, is most likely to occur in the northern quadrant (Allen et al. 2002). The species is likely to occur in the proposed project area.

Like sardines and anchovies, Pacific mackerel are schooling fish, and they may school with other pelagic species such as jack mackerel and sardines. Pacific mackerel feed on copepods, squid, euphausiids, and small fishes including their own larvae (Robbins 2006). They are also heavily preyed upon by a variety of fish, mammals, and sea birds.

Jack mackerel (*T. symmetricus*) are a schooling fish that range widely throughout the northeastern Pacific. They grow to about 24 in (60 cm) and can live 35 years or longer. Much of their range lies far offshore outside the 200-mile U.S. Exclusive Economic Zone.

Jack mackerel in southern California are more likely to appear on offshore banks in late spring, summer, and early fall. The spawning season for jack mackerel off California extends from February to October, with peak activity from March to July. Little is known about the maturity cycle of large fish offshore, but peak spawning appears to occur later in more northerly waters. Small jack mackerel (up to six years of age) are most abundant in the Southern California Bight, where they are often found near the mainland coast and islands and over shallow rocky banks.

Young juvenile fish sometimes form small schools beneath floating kelp and debris in the open sea. In southern California waters, jack mackerel schools are often found over rocky banks, artificial reefs, and shallow rocky coastal areas including kelp beds. They remain near the bottom or under kelp canopies during daylight and venture into deeper surrounding areas at night.

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Jack mackerel is least common among the managed pelagic finfish species in the bay (Allen et al. 2002). Jack mackerel has been observed over bare sand, bare mud, and eelgrass, in marinas and under wharves in northern San Diego Bay (Table 3-1). Jack mackerel have been observed over eelgrass only in an experimental transplanted bed located across the channel from the proposed project area (Pondella et al. 2006). The species is likely to occur in the proposed project area.

Small jack mackerel taken off southern California and northern Baja California eat large zooplankton, juvenile squid, and juvenile northern anchovy. Larvae feed almost entirely on plankton. They provide forage for a variety of fish, mammals, and sea birds. In the north bay, sea lions and coastal bottlenose dolphin opportunistically prey on this species.

3.1.2 Groundfish Species

The Pacific Coast Groundfish FMP manages 82 species over a large ecologically diverse area covering the entire west coast of the continental United States. Although groundfish are those fish considered demersal (fish that live on or near the seabed), they occupy diverse habitats at all stages in their life histories. EFH areas may be large because a species' pelagic eggs and larvae are widely dispersed, for example, or comparatively small as is the case with the adults of many nearshore rockfishes which show strong affinities to a particular location or type of substrate (PFMC 2008). Two marine mammal species, California sea lion (*Zalophus californianus californianus)* and coastal bottlenose dolphin (*Tursiops truncatus*) are commonly seen in the north bay and are known to opportunistically prey on groundfish (NAVFACSW and POSD 2011).

The following are descriptions of the four groundfish species that occur in San Diego Bay, although uncommon, and have designated EFH in the bay:

English sole (*Pleuronectes vetulus*) are found in water less than 985 ft (300 m) along the open coast from Baja California to the Gulf of Alaska (PFMC 1998c). English sole use nearshore coastal and estuarine waters as nursery areas. Adults and juveniles prefer soft bottoms composed of fine sands and mud, but may also occur in eelgrass habitats.

This species may reach ages in excess of 20 years. Females generally reach maturity after four years. Spawning occurs offshore in waters shallower than 330 ft (100 m), primarily during the autumn and winter, depending on the stock. Pelagic eggs and larvae are uncommon south of Point Conception (Robbins 2006). Juveniles and adults are carnivorous, feeding on polychaetes, small bivalves, clam (*Tagelus californianus*) siphons, brittlestars, and other benthic invertebrates. Both forage in intertidal areas of shallow bays and estuaries (Robbins 2006).

English sole is uncommon in the San Diego Bay, and few have been collected infrequently over bare mud and sand habitat in the northern quadrant of the bay. The species has not been observed in eelgrass habitat in San Diego Bay (Allen et al. 2002; NAVFACSW 2010, Table 3-1).English sole is unlikely to occur in the proposed project area.

Curlfin sole (*Pleuronichthys decurrens*), also known as curlfin turbot, are found along the Pacific Coast of North America from the Bering Sea south to San Quintin, Baja California (NMFS 2007). Adults are demersal (bottom dwellers) and are associated with soft bottoms, occurring all along the west coast at depths from 125 to 1,150 ft (38 to 350 m). This species spawns from April to August and grows to a maximum size of 15 inches (37 cm). Eggs and

larvae are pelagic. Curlfin sole feed primarily on polychaete worms, crustacean eggs, and brittle star fragments.

Curlfin sole is documented to occur in bare sand and bare mud habitat in northern San Diego Bay (Table 3-1, NAVFACSW 2010). However, the species is very uncommon in San Diego Bay; no specimens were collected during quarterly surveys from 1994-1999 or surveys in 2008 (Allen et al. 2002; Pondella and Williams 2009a and 2009b). Kramer (1991) conducted extensive trawl and seine surveys in San Diego County and found that curlfin sole were very uncommon nearshore along the open coast and absent from catches in San Diego Bay. The flatfish has not been found in eelgrass beds of San Diego Bay. Thus, curlfin sole is unlikely to occur in the proposed project area.

California scorpionfish (*Scorpaena guttata*) is a benthic species found from central California to the Gulf of California in depths between the inter-tidal and 555 ft (170 m). California scorpionfish is a valuable commercial fish with most of the catch taken in traps or by hook and line in shallow habitat for the live fish fishery (Leet et al. 2001). Fish are reproductively mature in 2-4 years, grow to 17 inches, and live as long as 21 years. Preferring warmer water, the species is common as far north as Santa Barbara with abundances highest off San Diego. While they are most abundant on hard bottom (such as rocky reefs, sewer pipes and wrecks), they are also found on sand (Leet et al. 2001). California scorpionfish do not appear to be territorial or have restricted home ranges. This species is active at night and feeds nocturnally on a wide variety of foods, including crabs, fishes, octopi, isopods and shrimp (Love et al. 1998).

California scorpionfish make extensive spawning migrations in late spring and early summer, when most adults move from shallow nearshore areas to 12 to 360 foot depths. Spawning occurs from April to August, peaking in June and July. Individuals likely return to the same spawning ground year after year (Love et al. 1998). Large aggregations rise up off the bottom when spawning, sometimes approaching the surface. Scorpionfish are oviparous, have external fertilization, and females produce minute eggs imbedded in the gelatinous walls of hollow, pear-shaped "egg-balloons." These paired structures, each 5 to 10 in long, are joined at their small ends. The egg masses float near the surface and the eggs hatch within five days. Very young fish live in shallow water, hidden away in habitats with dense algae and bottom-encrusting organisms (Leet et al. 2001).

California scorpionfish occur somewhat frequently in very low numbers in San Diego Bay. From 1994-1999, 37 California scorpionfish were collected in quarterly surveys in the north bay comprising less than 0.01% of the total catch throughout the bay (Allen et al. 2002). NAVFACSW (2010) indicates that California scorpionfish occurs in all manmade habitats comprised of hard structure (Table 3-1). Juvenile and adult California scorpionfish has been collected in eelgrass (a designated HAPC) and channel habitats of north and north-central San Diego Bay (Allen et al. 2002; Pondella and Williams 2009a and 2009b). Pondella et al. (2006) reports the species was observed in an established natural eelgrass bed near Shelter Island and in experimental artificial reefs set in the north bay across the channel from the proposed project area. Thus, California scorpionfish may occur in the proposed project area in eelgrass habitat, under the pier, and on the sandy soft bottom in the turning basin.

Grass Rockfish (*Sebastes rastrelliger*) is a common, shallow-water rockfish found from Playa Maria Bay, Baja California to Yaquina Bay, Oregon, although they are most common south of southern Oregon. Among rockfishes, they have one of the shallowest and narrowest depth

ranges. They are found from the intertidal zone to 184 ft, frequently less than 49 ft, and are commonly found from the intertidal to 20 ft. The species is common in nearshore rocky areas, along jetties, and in kelp. Around reef structures, adults may be found hiding in crevices (PFMC 2005). Grass rockfish have become an important component of the live-fish fishery.

Both sexes of grass rockfish begin to mature at 9 inches and are fully mature at 11 inches; these lengths correspond to ages 2 to 5 years for males and 3 to 5 years for females. Larvae are released from January to March (PFMC 2005). Grass rockfish habitat generally is restricted to rocky areas (Leet et al. 2001).

Grass rockfish are documented to occur in eelgrass beds, a designated HAPC, but not in any other habitat in the north bay (Table 3-1). Juveniles of shallow dwelling rockfish species will inhabit eelgrass habitat as shelter and resource for prey for months; however, no life history stage of this or other rockfish species is dependent on eelgrass beds. Grass rockfish is very uncommon in San Diego Bay; no specimens of this species or other rockfishes (*Sebastes* spp.) were collected in more than five years of fish surveys in eelgrass, unvegetated nearshore and channel habitats in the bay (Allen et al. 2002; Pondella et al. 2006; Pondella and Williams 2009a and 2009b). Thus, grass rockfish are unlikely to occur in the project area.

Leopard shark (*Triakis semifasciata*) are found from southern Oregon to Baja California, Mexico including the Gulf of California. The recreational leopard shark catch appears to be greater than the commercial catch, and the species does not appear to be at risk with current conservation measures managing fishing exploitation (Leet et al. 2001). They are most common in northern California bays and estuaries and along southern California beaches. They are also common in enclosed, muddy bays, and also reside in flat, sandy areas, mud flats, sandy and muddy bottoms, strewn with rocks near rocky reefs, and kelp beds (PFMC 2005). Leopard sharks are most common on or near the bottom in waters less than 13 ft deep, but have been caught as deep as 300 ft.

The maximum recorded length of a leopard shark is six ft, but most do not exceed five ft in length. Females may take 10 to 15 years to reach maturity, while males may only take 7 to 13 years. Maximum age is reported to be 30 years. Female leopard sharks give birth annually to a litter of 7 to 36 live "pups" along sandy beaches and in protected bays from about March through July (Leet et al. 2001). Leopard shark, most active at night, is a nomadic, opportunistic benthic predator that feeds on a variety of prey including worms, crabs, clams, octopus, pelagic forage fishes, and soft-bottom and reef dwelling fishes. Leopard shark can be a key predator in sandy subtidal habitat (Leet et al. 2001; NAVFACSW 2010). California sea lion, regularly seen hauled out on the bait barges near the proposed project area, will prey on leopard shark opportunistically (NAVFACSW and POSD 2011).

Leopard shark have been documented to utilize intertidal sandy beach and subtidal soft–bottom sediments (mud, sand, and silty sand), two habitat components of San Diego Bay (Hoffmann 1986 referenced by Robbins 2006). These habitats can be influenced by seasonal freshwater input, and thus are designated estuarine HAPC for this managed groundfish species (Table 3-1). The species has been collected in eelgrass beds in Richardson Bay within San Francisco Bay (http://www.tiburonaudubon.org/conserve_bay.php). In Humboldt and San Francisco Bay, females have been observed releasing their young in beds of eelgrass, while in southern California females are thought to release their pups along more open coastal areas (Carlisle and Smith 2009). No specimens were collected over six years of surveys by Allen et al. (2002) and

Pondella and Williams (2009a and 2009b). Thus, leopard shark is expected to be very uncommon in San Diego Bay.

3.2 Habitat Areas of Particular Concern (HAPC) Designations

Out of the four primary fisheries managed by the PFMC, HAPC has only been identified for groundfish. The four HAPC designated for these species include seagrass, canopy kelp, rocky reef, and estuarine habitats along the Pacific coast, including Puget Sound (PFMC 2008). Two of these HAPC, estuarine habitats and eelgrass, a species of seagrass, are designated in San Diego Bay (NAVFACSW 2010).

Estuaries are protected nearshore areas such as bays, sounds, inlets, and river mouths, influenced by ocean and freshwater. Because of tidal cycles and freshwater runoff, salinity varies within estuaries and results in great diversity, offering freshwater, brackish and marine habitats within close proximity. Estuaries tend to be shallow, protected, nutrient rich, and are biologically productive, providing important habitat for marine organisms, including groundfish (PFMC 2005).

The inland extent of the estuary HAPC is defined as Mean High Higher Water (MHHW), or the upriver extent of saltwater intrusion, defined as upstream and landward to where ocean-derived salts measure less than 0.5 parts per trillion (ppt) during the period of average annual low flow. The seaward extent is an imaginary line closing the mouth of a river, bay, or sound; and to the seaward limit of wetland emergents, shrubs, or trees occurring beyond the lines closing rivers, bays, or sounds. This HAPC also includes those estuary-influenced offshore areas of continuously diluted seawater (PFMC 2005).

Southern California estuaries can be considered distinct from the more classically defined estuaries of northern California. This is due to the relatively low rainfall and reduced influence of rivers in southern estuaries. Southern estuaries, including San Diego Bay, have been termed "intermittent estuaries" because they less frequently exhibit the salt-wedge hydrologic model (Allen et al. 2006).

The seagrass HAPC includes those waters, substrate, and other biogenic features associated with eelgrass species (*Zostera* spp.), widgeongrass (*Ruppia maritima*), or surfgrass (*Phyllospadix* spp.) (PFMC 2005). The eelgrass beds are the only vegetated habitat within the proposed project area in San Diego Bay. A description of the habitat and its use by fishes is in section 3.3.4.

3.3 Descriptions of Habitats

The project site is located at the NBPL Defense Fuel Support Point, San Diego California. NBPL is located on the west side of northern San Diego Bay, directly opposite NAS North Island, and about 2 km from the mouth of the bay. For management purposes, San Diego Bay is divided into four hydrodynamic-based quadrants: North Bay, the Marine Region; North-Central Bay, the Thermal Region, South-Central Bay, the Seasonally Hypersaline Region; and South Bay, the Seasonally Estuarine Region (Allen et al. 2002; Navy, 2010). The proposed project area is within the northern part of the bay (north bay).

San Diego Bay is a naturally formed embayment and is the largest estuary between San Francisco Bay and Baja California. The bay is long and narrow with a crescent shape extending in a northwest to southeast direction. The north bay is connected to the Pacific Ocean through a mouth approximately 1 km wide. The south bay is closed and without substantial tributaries. The

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San Diego River has been diverted from the Bay, and two small channels, the Otay River and Sweetwater River provide intermittent seasonal flows. The Otay River enters San Diego Bay at its southernmost extent and the Sweetwater River channel enters approximately 7 km to the north on the eastern shore. Freshwater input to the Bay is limited for the most part to surface runoff from urban areas (e.g., from the over 200 storm drains). For about nine months of the year, the bay receives no significant amount of fresh water. The absence of significant fresh water inflow for much of the year means that normal estuarine circulation in the bay is weak (NAVFACSW 2010). Given its proximity to the mouth of the bay and little freshwater input through much of the year; the proposed project area in the north bay is strongly influenced by the coastal marine environment outside of the bay.

San Diego Bay presently has 8,779 ac of shallow and deep water habitat. The Bay is characterized by a wide range of marine habitats including the water column, soft-bottom which predominates in the bay, eelgrass, and artificial hard substrates primarily associated with piers and jetties (NAVFACSW and POSD 2011). These habitats, discussed in sections herein, represent important breeding, nursery, and feeding areas for hundreds of fish species and their prey (NAVFACSW and POSD 2011).

San Diego Bay has experienced substantial historical degradation and loss in quantity and quality of intertidal and subtidal habitat as a result of human development. Losses of intertidal habitat have been severe; up to 90 percent of intertidal areas in the north and central San Diego Bay have been lost, partially due to the diversion of the San Diego River (NAVFACSW and POSD 2011). Intertidal areas have historically been filled with dredged material. The intertidal zone is also threatened by shoreline alteration and development such as the building of piers, docks and seabreaks, as well as the placing of riprap to slow erosion of the crumbling sandstone cliffs, which can often lead to unintended but devastating changes in sedimentation along the shoreline. Less than 16 miles of "soft" shoreline remain (NAVFACSW and POSD 2011). The entire shoreline inshore of the proposed project area is armored with riprap and a bulkhead wall.

Marine mammals and birds regularly are seen foraging in the intertidal, shallow, and deep water habitats of San Diego Bay. There are two marine mammal species, California sea lion (*Zalophus californianus californianus*) and coastal bottlenose dolphin (*Tursiops truncatus*) that are known to occur in proximity to the project site (NAVFACSW and POSD 2011). Pacific harbor seal (*Phoca vitulina richardsi*) are seen on only an occasional basis. These highly mobile marine mammals are opportunistic predators preying on pelagic and benthic fishes. None of the three marine mammals are listed as threatened or endangered under the Endangered Species Act. More than 300 bird species have been documented to use the bay, and about 40 of these species forage on fish in shallow and deep waters. Among these is the California least tern (*Sterna antilarium browni*), a federal and state endangered species that has been listed since 1970. Many, like the least tern, are migratory species that seasonally utilize the resources provided by the various habitats in San Diego Bay.

This EFH assessment refers to habitat specific information in NAVFACSW (2010) to evaluate how the actions proposed may affect managed fish species and EFH designated by the PFMC. NAVFACSW (2010) provides a broad-scale, qualitative assessment of habitat classifications within San Diego Bay with a map and description of those habitats. The habitat characterization provides information on the use of dominant habitat in San Diego Bay by managed fish species and on ecosystem function and productivity generally within these habitats present in the bay. Habitats found in the project area are bare mud, bare sand, eelgrass, riprap, wharf, and bulkhead

wall. Additional information about habitat use by fishes was from field surveys reported in Allen et al. (2002) and Pondella and Williams (2009a and 2009b).

3.3.1 Water Column Habitat

Stratification, Salinity, and Temperature

Southern California estuaries can be considered distinct from the more classically defined estuaries of northern California. This is due to the relatively low rainfall and reduced influence of rivers in southern estuaries. Southern estuaries have been termed "intermittent estuaries" because they less frequently exhibit the salt-wedge hydrologic model (Allen et al., 2006). Stratification, salinity, and temperature and the spatial and temporal variability of these properties in the bay have been markedly altered by water diversion, shoreline development, and dredging.

In San Diego Bay, freshwater input is now limited to surface runoff from urban areas (e.g., the over 200 storm drains and intermittent flows from several rivers and creeks after storms). For about nine months of the year, the bay receives no significant amount of fresh water. Evaporation approximately balances the freshwater input from all sources over the course of the entire year. Salinities near the bay entrance approach those of the nearby open ocean (31.2 to 31.4 practical salinity units [psu]). In contrast, south bay evaporation of 62.7 in/year and poor flushing produce salinities as high as 37 psu in late summer, decreasing to lows of 22 psu following heavy rain. The summer occurrence of hypersalinity in south bay may lead to stratified, density-driven flushing in the fall. This process moderates the build-up of hypersaline conditions in south bay (NAVFACSW and POSD 2011).

Temperature and density gradients, both with depth and along a longitudinal cross-section of the bay, drive tidal exchange of bay and ocean water beginning in the spring and continuing into fall. In the winter, thermal gradients are absent, with cooler air temperatures and higher winds causing the bay to be nearly isothermal. The average surface temperature is estimated to be 63.3 degrees Fahrenheit (°F) (17.4°C). Over the length of the bay, the maximum vertical temperature gradient is about 0.3° F/ft (0.5°C/m) during the summer. The typical longitudinal temperature range is about 45 to 50°F (7 to 10°C) (about 0.3 to 0.5°C/km) over the length of the bay during the summer (NAVFACSW and POSD 2011).

Colder, denser water moves into the bay as a front at greater depths. As described above, the importance of this stratification depends on the state of the tide, the strength of the wind, and time of year. Estimates of the tidal exchange ratio at the bay entrance (the proportion of water coming in the bay with the flood tide that is new oceanic water versus recycled bay water) range from 0.5 to 0.7 (NAVFACSW and POSD 2011).

Tidal exchange in the bay exerts control over the flushing of contaminants, transport of aquatic larvae, salt and heat balance, and residence time of water. Tidal current velocities range from 0.6 to 2.7 ft/second (0.2 to 0.8 m/second) at the mouth to much lower in central and south bay. During an average tidal cycle, the volume of water leaving the bay is about 13%. This bay water mixes with ocean water. During the next flood tide, this mix gets pulled back into the bay.

The residence time of water in the north bay where the proposed project area is located is short except for side basins where commercial and marina activities are located. In contrast, it can take from 10 to 100 days for water in the bay as a whole to be exchanged, depending on the tidal

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amplitude. Residence times in south bay may be months, ranging from 20 to 300 days (NAVFACSW and POSD 2011).

Dissolved Oxygen

Dissolved oxygen concentrations in surface waters of San Diego Bay in April and July 2008 and June 2009 ranged between about 4.5 and 6.6 milligrams oxygen per liter (mg O^2/l) (Pondella and Williams 2009a, 2009b). Dissolved oxygen concentrations in the north bay are most similar to that in coastal waters outside of the bay. Dissolved oxygen generally decreases from north to south with most of the decrease observed between the North and North-Central quadrants of the bay.

Turbidity

Natural, or ambient, turbidity comprised of both organic and inorganic suspended particles is distinguished here from turbidity caused by dredging or other human activities. Ambient turbidity varies spatially and over time, with waters of San Diego Bay becoming more turbid, or less transparent, as distance increases from the entrance. Wind and wave action cause a marked increase in turbidity during the winter and early spring in the bay. Shallow areas are more affected than deep waters. The wind is able to scour up the finer sediments of this region at that time of year. Turbidity also varies through the day with both wind and tides.

Estuarine organisms tend to be adapted to higher turbidity levels than those of the open coast. For example, the well-known paucity of suspension feeders such as tunicates, hydroids, and sponges in many estuaries may be due to clogging of the feeding apparatus with silt. The more turbid estuaries are known to have very few suspension feeding species, whereas less turbid estuaries are covered by bryozoans, tunicates, and sponges (in rocky subtidal areas) (NAVFACSW and POSD 2011).

Use of Water Column habitat by fishes

The water column habitat extends over subtidal depths ranging from -2.2 (-0.7 m) to >-20 ft (-6m) MLLW in San Diego Bay. The substrates in the water column habitat differ with depth and location in the bay, and include mud, sand, and man-made hard structure. The kind of substrate in the vicinity will influence the species assemblage in the water column habitat. Furthermore, the water column properties of temperature, salinity, stratification, turbidity, dissolved oxygen, and turbidity also influences what species are likely to occur.

In general, coastal pelagic fishes numerically dominated the catches of surveys conducted over 5 years in San Diego Bay (Allen et al. 2002). Together, northern anchovy and Pacific sardine (two managed species) and topsmelt (*Atherinops affinis*), slough anchovy (*Anchoa delicateissima*) and California grunion (*Leuresthes tenuis*) across all habitats comprised 95% of the total fish collected in the northern quadrant of San Diego Bay. In contrast, the slough anchovy, an indigenous estuarine species that utilizes the bay throughout its life history, was most abundant in the southernmost quadrant and decreased in abundance further north toward the mouth of the bay.

The water column habitat is an important nursery area for coastal pelagic fishes: juvenile represented 100% of the northern anchovy catch in San Diego Bay, 96% of the Pacific sardine, 73% of topsmelt, 66% of California grunion, and 43% of slough anchovy (Allen et al. 2002). These pelagic fish species are forage for other fishes, marine mammals, and birds. Two marine

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mammal species, California sea lion and coastal bottlenose dolphin, regularly occur in the north bay. California least terns forage in waters less than 60 feet deep.

3.3.2 Sediments

Physical and Chemical Properties of Sediments

Historically, the bay floor and margins were characterized by sand, silt, clay, mud (silt and clay less than 62 microns in diameter), and mudstone. Sands were most common at the mouth and along the western margins, while finer mud deposits characterized the eastern margins and southern extremity of the bay. The mud sits upon layers of sand and sandy-silt, then on older semi-consolidated sediments. Dredging exposes these sandier layers. Only 17 to 18% of the original bay floor remains undisturbed by dredge or fill. Figure 3-1 shows the cumulative history of dredge and fill activity. The diversion of the San Diego River and the damming of the Sweetwater and Otay Rivers has significantly reduced natural sedimentation sources into the bay. Present contribution of sediment from all potential sources is minimal (NAVFACSW and POSD 2011).

As a result, the bay's sediment composition and distribution is highly altered. Figure 3-2 shows the present pattern of fine sediments (as represented by percent silt and clay) on the bay floor (compiled by Space and Naval Warfare Systems Command [SPAWAR] from several sources). Such characteristics of the bay's sediment can help explain the distribution and abundance of organisms that are closely tied to substrate. Reflecting the present hydrodynamic regimes, grain size can also explain the fate and loading of sediment contamination (NAVFACSW and POSD 2011).

More than half of the shoreline of San Diego Bay is protected by piers, docks, bulkheads, revetments, and riprap (Figure 3-3). The remaining unprotected shoreline is predominantly on the leeside of prevailing winds (the western shoreline). As a result, only about 18 to 20% of the unprotected shoreline and 7% of the overall bay shoreline appears subject to significant erosion; therefore, unprotected shoreline is a minimal potential contributor of sediment to the bay (NAVFACSW and POSD 2011).

Metals and Organic Contaminants

As part of California's ongoing Bay Protection and Toxic Cleanup Program, San Diego Bay's sediment was evaluated for chemical and biological conditions between October 1992 and May 1994 (Fairey et al. 1996 and Addendum Fairey et al. 1998). Results indicated chemical pollution based on established sediment quality indicators, developed by the National Oceanic and Atmospheric Administration (NOAA) and the State of Florida and used as a substitute for absent USEPA and California guidelines. The study used a weight-of-evidence approach. Sediment quality indicators were exceeded at all San Diego Bay stations and the number of exceedences was high at most stations. Chlordane, PAHs and polychlorinated biphenyls (PCBs) were the pollutants most often found at elevated concentrations. Copper, lead, mercury and zinc were often found at elevated levels in the Naval Shipyard areas, although the data indicate the probability of metal toxicity is low. This is consistent with previous results demonstrating elevated chemical concentrations at several of these stations (NAVFACSW and POSD 2011).

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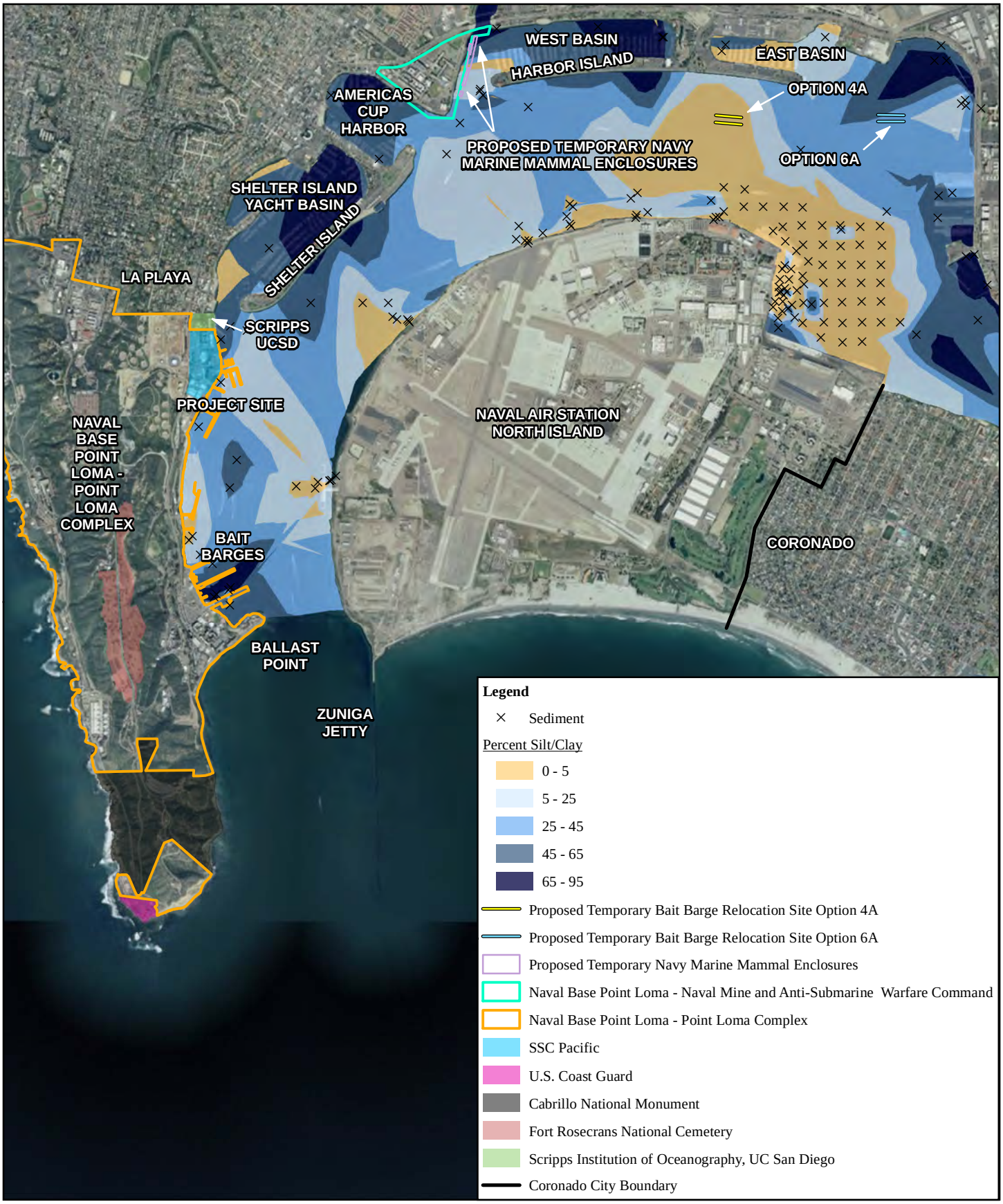
0 0.25 0.5 Kilometers

0 0.25 0.5 Miles

Figure 3-1
Cumulative History of Dredge and Fill Activity in San Diego Bay

Sources: NAVFAC Southwest 2011; POSD 2011



0 0.25 0.5 Kilometers
0 0.25 0.5 Miles

Figure 3-2
Sediment Composition in San Diego Bay

Sources: NAVFAC Southwest 2011; POSD 2011

N

0 0.25 0.5
Kilometers
Miles
0 0.25 0.5

Sources: NAVFAC Southwest 2011; POSD 2011

Figure 3-3
Shoreline Habitats

N

Use of Unvegetated Soft Substrate Habitat by Fishes

Estuarine sediments are the sites of key ecological functions such as decomposition, nutrient cycling, and nutrient production (NAVFACSW 2010). Infaunal invertebrates in these sediments increase percolation of water and oxygen levels through bioturbation and suspension feeding. Shredders such as gastropod mollusks break up large pieces of organic matter, while deposit feeders both transform and bury or bring up organic matter. Dominant suspension feeders are often bivalve mollusks, but some polychaetes, crustaceans, and sponges also perform this function. These animals can increase water clarity and light levels, and reduce pollutants. Infaunal and epifaunal invertebrates serve as the major food base for many species of fish and larger invertebrates including shrimp, crabs, lobster, halibut and croaker which transfer this production across habitats.

Based on the abundances and distribution of 40 top ranking fishes by total biomass or abundance in surveys from 1994 through 1999 of intertidal, unvegetated nearshore, eelgrass (vegetated nearshore), and channel habitats within San Diego Bay, Allen et al (2006) reported that at least 8 fish species were associated with soft substrate habitats in the nearshore and channel habitats in the north bay. The area that Allen et al (2006) surveyed in the north bay is located off NAS North Island about 3 km toward the interior of the bay from the proposed project area. Large, predatory benthic species, spotted sand bass (*Paralabrax maculatofasciatus*), barred sand bass (*Paralabrax nebulifer*), round stingray (*Urolophus halleri*), and black croaker (*Cheilotrema saturnum*) are residents in the nearshore areas and channels of the north bay and throughout the interior of the bay to its southernmost area. Four resident, benthic flatfishes occur primarily in channel habitat: juveniles and adults of California halibut (*Paralichthys californicus*) and diamond turbot (*Hypsopsetta guttulata*) occur throughout the bay in both channel and nearshore sand and mud habitat; and spotted turbot (*Pleuronichthys ritteri*) and California tonguefish (*Symphurus atricata*) are primarily found in channel habitat of the north bay. None are EFH groundfish species.

3.3.3 Artificial Hard Substrate habitat and its Use by Fishes

The shoreline surrounding both the fuel pier and the NMAWC site has been modified and is now predominantly comprised of manmade structures (quay wall, piers and riprap) (Figure 3-3).

Large piers, such as the existing and proposed new construction of the fuel pier, provide a high concentration of piles, and impose a high degree of shading on the water column (NAVFACSW 2010). These structures are generally concrete decks with pre-stressed concrete piles. Associated fender systems are constructed from a variety of materials including foam filled or pneumatic rubber, recycled plastic piles, fiberglass piles filled with concrete, and untreated timber. In contrast to small piers, water movement and illumination can be significantly affected around and under large pier structures (Figure 3-4).

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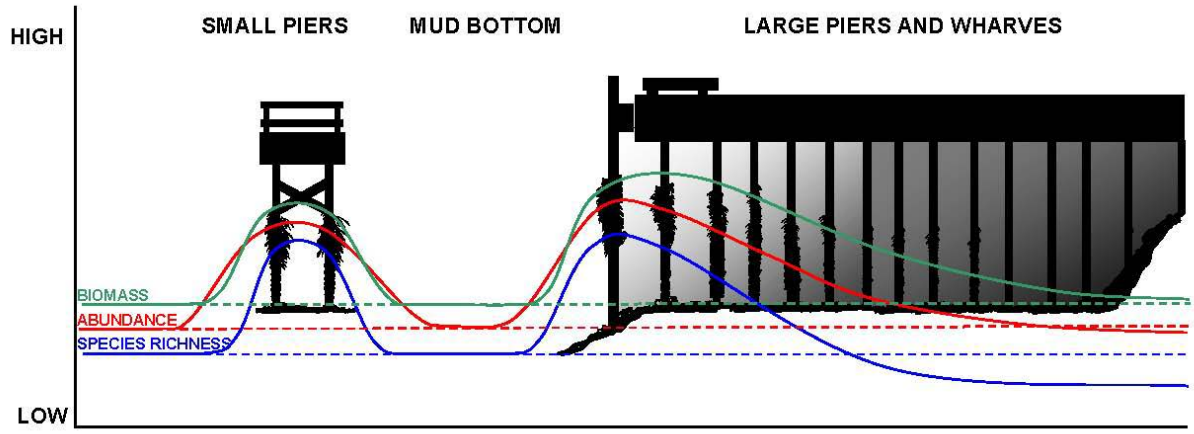
Figure 3-4. Biomass, Abundance, and Species Richness at small and large piers



At more exposed portions of larger piers, similar elevation of biomass, abundance and richness of fish communities is seen as with smaller piers (NAVFACSW 2010). Microalgae and drift kelp are within the upper portions of the pier at elevations that would be low intertidal and shallow subtidal zones. Below the algal communities, encrusting growth of sponges, bryozoans, rock jingles, and tube-forming polychaetes often occur. These algal and encrusting invertebrate communities host a number of mobile invertebrates and small fish such as blennies, pipefish and kelpfish and can also attract perches, opaleye, and scorpionfish. Sand bass and kelp bass often occur in association with such piers. As encrusting organisms die or are broken free of the piles, they drop to the bayfloor and create a zone of enriched sediment and more diverse rubble that supports gobies, blennies, and scavenging demersal fish at higher concentrations than typically observed away from the structures. Within the water column around piers, schooling pelagic fish tend to aggregate for shelter or forage. This often attracts larger predatory fish as well. Around small piers and at the exposed portions of larger piers, the biomass, abundance, and species richness of fish typically rises relative to that observed in surrounding open mud bottom habitats.

However, larger piers tend to include areas beneath the piers that experience reduced circulation and light levels (NAVFACSW 2010). Pile communities of large piers are distinguished from natural intertidal reefs and the man-made hard substrate habitats of riprap armorment, pontoons, docks, and artificial reefs, by having extensive intertidal areas (periodically exposed to air) and limited light. Merkel & Associates (1999 referenced in NAVFACSW 2010) performed a study of wharf shading impacts to associated encrusting communities and to fish. Infaunal communities continued to be present in the shaded regions. In contrast, it was determined that encrusting pile communities were not as numerous or species rich on the inside shaded piles. These areas promote a gradient of cryptic invertebrate community development beginning with jingles and bryozoans in the twilight zone, transitioning to sponges and ultimately very little growth in the darkest most quiescent waters beneath the piers. Only one detailed study including multi-season data has been conducted describing the invertebrate communities on concrete and wooden piles in San Diego Bay (Ford et al. 1975 referenced in NAVFACSW 2010). This study was conducted on concrete and wooden piles at the B Street, Broadway, and Navy Piers during 1972-1973. The attached and free living invertebrates associated with the piles included polychaete worms, crustaceans, molluscs, cnidarians, tunicates, and sponges in order of abundance. Species composition and abundance was found to be highly seasonally variable.

The invertebrate fouling community on the pilings appears to attract schooling fish, which feed on the attached invertebrates and algae. The piers provide refuge to principally nocturnal species such as black croaker, round stingray, smooth hound. As a result, large numbers of fish may be found beneath pier structures and biomass may exceed that of open waters due to fish size, however, species richness generally is depressed below that observed in open bay environments. In the deepest recesses of the piers, fish abundance and biomass also decline to low levels (NAVFAC SW 2010). Total fish abundance is heavily influenced by transient, schooling pelagic fish. Fish surveys beneath large wharfs at Pier 13 at Naval Station and CVN Pier 700 at NAS North Island showed that seasonal differences in fish communities can be greater than differences associated with the light gradient (NAVFACSW and POSD 2011).

The invertebrate and fish community of large piers are reported to differ between the north and south areas of San Diego Bay. The communities present on these and other manmade structures, as well as communities on soft bottom habitats and in the water column are subject to the same gradient in availability of oceanic water with distance from the mouth of the bay. The availability of food with a moving current, the supply of larval recruits, and water quality all depend on the level of flushing (NAVFACSW 2010). Species characteristic of open coastal communities were observed in a north bay pier site and were not present at a pier site in the southern bay (NAVFACSW 2010). These included the California scorpionfish (*Scorpaena guttata*), rock scallop (*Crassedoma giganteum*), California sea cucumber (*Parastichopus californicus*), giant spined star (*Pisaster giganteus*), and giant keyhole limpet (*Megathura crenulata*).

3.3.4 Vegetated Substrate: Eelgrass habitat and Its Use

Eelgrass (*Zoestera marina*) is a subtidal marine angiosperm typically found in protected bays and estuaries throughout the temperate Northern Hemisphere. In the San Diego region, eelgrass growth is generally limited at its upper limit by desiccation stress and at its deeper limit by light availability. Eelgrass is typically found on loose sands and stable muds, and it does not grow on steep slopes. As has occurred in bays and estuaries all along the Pacific coast and elsewhere in the world, eelgrass beds in San Diego Bay have suffered substantial losses and impacts due to their location in sheltered waters where human activity is concentrated. Historic losses were due to bay fill and deepening. Today, eelgrass is protected under the Clean Water Act and other laws, and any impacts are fully mitigated.

As of 1999, Eelgrass beds occupy 1,065 acres (431 ha) or 7% of the total acreage in San Diego Bay (NAVFACSW and POSD 2011). About 29% of the existing shallow waters (-2.2 to -12 ft [-0.7 to -4m] MLLW) are vegetated with eelgrass. This represents an overall loss of 41% from historic proportions due to filling in of the bay margins and dredging to deeper depths. Eelgrass beds have persisted for years in areas of San Diego Bay ranging from zero MLLW to depths of at least 23 ft (7 m) below MLLW, depending on levels of light and water turbidity (Figures 3-5, 3-6, and 3-7). In the south bay the depth range is from 0.0 to 1.8 m (0.0 to –6 ft) MLLW, central bay 0.0 to –2.4 m (0.0 to –8 ft) MLLW, and north bay 0.0 to –3.7 m (0.0 to –12 ft) MLLW. Near the mouth in north bay, there is a different form (wider blades) that extends down to –5.5 to 7.3 m (–18 to –24 ft). In 2004, eelgrass coverage was estimated at approximately 147 acres in the northern ½ of the bay, compared to approximately 1,240 acres in the southern half. The potential area for eelgrass growth in San Diego Bay may be saturated such that these beds currently exist to the extent that bathymetric regime, water clarity for sunlight, water temperature, and characteristics of the sediment allow (NAVFACSW and POSD 2011).

0 0.25 0.5 Kilometers

0 0.25 0.5 Miles

Figure 3-5
Eelgrass Beds in the Project Area

N

0 0.1 0.2 Kilometers

0 0.1 0.2 Miles

Figure 3-6
Eelgrass in the Vicinity of the Fuel Pier

N

0 40 80 Meters

0 150 300 Feet

Figure 3-7
Eelgrass in the Vicinity of the Proposed Temporary Marine Mammal Enclosure Relocation Site

N

Sources: Navy 2007; NOAA 2012; NAVFAC Southwest 2011a, 2012

Eelgrass occurs in the shallow subtidal zone (-2.2 to -12 ft MLLW) to the north of the existing fuel pier. As of 2011, there was 0.05 ac of eelgrass and an additional 0.05 ac of habitat that historically supported eelgrass where the new fuel pier is proposed. Large eelgrass beds also occur outside of the project area approximately 1100 ft to the north of the proposed fuel pier along the southern tip of Shelter Island and 1400 ft across the bay along the western edge of North Island. Eelgrass occurs adjacent to the Navy marine mammal enclosures to the south of the existing pier. As of 2011, there was 0.67 ac of eelgrass and an additional 0.32 ac of habitat that historically supported eelgrass located at the proposed temporary Navy marine mammal enclosure relocation site. Eelgrass habitat within the new fuel pier and marine mammal relocation areas are a tiny proportion of the 1,831 ac of eelgrass as of 2011 and an additional 868 ac of habitat that historically supported eelgrass within and adjacent to San Diego Bay

The roots and rhizomes of eelgrass help stabilize the unconsolidated substrate by forming an interlocking matrix that inhibits erosion. The plants themselves keep water clearer by trapping fine sediments and preventing their resuspension. Leaves cut down wave action and currents; the resulting decrease in turbulence causes more fine sediment to be deposited. Eelgrass beds are an important component of the San Diego Bay food web. Much of the eelgrass primary productivity enters the food web as detritus. Sediments within eelgrass beds are loaded with detrital leaves, rhizomes, and nutrients that fuel infaunal invertebrates. These provide food for fishes and sometimes birds including the endangered California least tern. Fish and invertebrates use eelgrass beds to escape from predators, as a food source, and as a nursery. Eelgrass plants provide surfaces for egg attachment and sheltered locations for juveniles to hide and feed. Abundant algae and invertebrates that grow on the leaf blades provide primary and secondary productivity for consumption by larval and juvenile fish. Fish produced from these beds are consumed by fish-eating birds, including the California least tern. Waterfowl, especially surf scoter, scaup, and brant are present in high numbers in late fall and winter. Black brant, in particular, rely heavily on eelgrass of central and south bay as they are one of the few birds that consume it directly. A small population of the federally endangered eastern Pacific green sea turtle (*Chelonia mydas*) feeds on eelgrass growing in several beds near the South Bay Power Plant in south bay (USFWS 1997).

Based on the abundances and distribution of 40 top ranking fishes by total biomass or abundance in surveys from 1994 through 1999 of intertidal, unvegetated nearshore, eelgrass (vegetated nearshore), and channel habitats within San Diego Bay, Allen et al. (2006) reported that at least 11 fish species were associated with eelgrass beds in the north quadrant of the bay. The eelgrass habitat that Allen et al. (2006) surveyed in the North Bay is located off NAS North Island about 3 km toward the interior of the bay from the proposed project area. Eelgrass habitat in the north bay is a nursery area for the young-of-year of eight species: black surfperch (*Embiotoca jacksoni*), dwarf surfperch (*Micrometrus minimus*), spotted kelpfish (*Gibbonsia elegans*), kelp bass (*Paralabrax clathratus*), spotted sand bass (*Paralabrax maculatofasciatus*), bay blenny (*Hypsoblennius gentilis*), salema (*Xenistius californiensis*), and California halibut (*Parlichthys californicus*). These species diminished in abundance further south into the bay. The adults and juveniles of four year-round bay residents: shiner surfperch (*Cymastogster aggregata*), giant kelpfish (*Heterosticus rostratus*), barred pipefish (*Syngnathus auliscus*) and bay pipefish (*Syngnathus leptorhynchus*) were associated with eelgrass habitat in all quadrants of the bay except the southernmost.

Near the proposed project area, eelgrass habitat supports a diversity of fish species. Pondella et al. (2006) conducted quarterly scuba surveys from 1997 to 2002 to monitor and evaluate eelgrass mitigation and fishery enhancement structures in San Diego Bay. Pondella et al. observed 32 fish species in the eelgrass transplantation bed that was inshore of rocky artificial reef structures located off NAS North Island across the channel from the proposed project area. Three EFH species, northern anchovy, jack mackerel, and Pacific sardine, were observed in the transplantation site. About 1.5 km northeast of the fuel pier, a persistent eelgrass bed on a 2 m depth shoal at the west end of Shelter Island was used as a control. There, Pondella et al. found a similar assemblage of 28 fish species which included one EFH species, California scorpionfish; interestingly, the highly transient EFH pelagic species were not observed.

3.3.5 Vessel Traffic and Ambient Underwater Soundscape

As illustrated by Table 3-2 below, San Diego Bay is heavily used by commercial, recreational, and military vessels, with an average of 82,413 vessel movements (in or out of the bay) per year. This equates to about 225 vessel transits per day, a majority of which are presumed to occur during daylight hours. The number of transits does not include recreational boaters that use San Diego Bay, estimated to number 200,000 (San Diego Harbor Safety Commission 2009).

Table 3-2. Port of San Diego Average Annual Vessel Traffic

VESSEL TYPE	VESSEL MOVEMENTS (Inbound and Outbound)		
	Subtotal by Vessel Type		*Total*
	Cargo	*Others*	
Total Annual Movements for All Vessel Types			**82,413**
Deep Draft Commercial Vessel (Cargo plus Cruise)			1,175
Cargo Ships (largest vessel: 1,000' length,106' beam, 41'draft)		740	
Bulk	20		
Container Ships	100		
General Cargo	180		
Roll On/Roll Off	440		
Cruise Ships (largest vessel: 1,000' length, 106' beam, 34' draft)		435	
Excursion Ships (largest vessel: 222' length, 57' beam, 6' draft)		68,000	68,000
Commercial Sportfishing (average vessel size: 123' length, 32' berth, 13' draft)		10,094	10,094
Military (largest vessel: 1,115' length, 252'beam (flight deck), 39' draft)		3,144	3,144

Note: Tug traffic was not included in the above statistics since inner harbor tug movements alone exceed 7,000 for a typical year.

Source: San Diego Harbor Safety Committee 2009.

Based on acoustic monitoring of ship noise in Glacier Bay, Alaska (Kipple and Gabriele 2007), sound source levels from a variety of vessel types and sizes are typically within the range of 160-170 decibels (dB) at 1m. Ship noise occurs over a broad frequency range (roughly 0.1 to 35

kilohertz [kHz]), with peak noise at higher frequency for smaller vessels. Ship noise thus has the potential to obscure underwater sound that would otherwise emanate from the project site to locations farther up the bay or offshore through the mouth.

In the project area, extensive measurements were made of underwater noise levels during March and April 2012 (Appendix A). Mean and median values were predominantly in the range of 120-130 dB referenced at 1 micro pascal (re 1µPa), with substantially higher intermittent sound in excess of 150 dB re 1µPa due to passing ships, and sound energy concentrated between 100 Hz and 2 kHz, broadly overlapping the peak frequencies expected for pile driving.

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4 ASSESSMENT OF IMPACTS AND MITIGATION MEASURES

An adverse affect to EFH is "any impact that reduces the quality and/or quantity of EFH" (see 50 CFR § 600.91O(a) for further clarification).

4.1 Impacts to Essential Fish Habitat

Four managed coastal pelagic fish species (PFMC 1998a), northern anchovy, Pacific sardine, jack mackerel, and Pacific mackerel occur in San Diego Bay (NAVFACSW AND POSD 2011; Allen et al. 2002; Pondella et al. 2006, Pondella and Williams 2009a and 2009b).Northern anchovy and Pacific sardine, can be found throughout the bay in all habitats. Jack mackerel were only found in the north bay survey area and Pacific mackerel were found at all but the southern survey stations (Allen et al. 2002). The managed groundfish species, California scorpionfish, curlfin sole, English sole, grass rockfish, and leopard shark are known to occur in San Diego Bay; however, all likely are uncommon in the proposed project area and in the bay at large. (NAVFACSW AND POSD 2011; Allen et al. 2002; Pondella et al. 2006, Pondella and Williams 2009a and 2009b).

The area surrounding the Fuel Pier is not optimal habitat for FMP species in San Diego Bay due to the existing usage of the facilities, armored shoreline, and historic dredging in the channel adjacent to the site. Juvenile and adult pelagic fish of species which might visit the area are mobile and would be able to avoid any action that may occur at the project site. EFH species and most other fish species that are known to occur around eelgrass habitat, non-vegetated intertidal and subtidal mud and sand habitats, and man-made structures in San Diego Bay may already avoid the proposed project site due to the large amount of vessel traffic through the area and dredging activities. Eggs and larvae should not be harmed by the renovations at the Fuel Pier. Short-term impacts associated with pier demolition and replacement, and with the temporary relocation of the marine mammal program, will occur from increased suspended sediments and noise levels. Turbidity may impact sight feeding, but affected EFH species and other fishes will presumably disperse to surrounding habitats where feeding will be less problematic.

Impacts from in-water project activities would adversely affect EFH by shading eelgrass habitat and by temporarily displacing EFH species due to increased sediment suspension and underwater noise from pier demolition, construction, and dredging activities. However, all of the managed species are not dependent on either eelgrass habitat or artificial substrates, and routinely experience turbid and noisy conditions due to natural processes and ship traffic within the bay. Many fishes that occur in eelgrass feed in unvegetated areas as well, as documented by Allen (1998). For these reasons and for the reasons discussed below, the adverse effects that would be created by the proposed project would be minimal.

4.1.1 Underwater Acoustic Analysis

Most if not all of the fish species occurring in the area routinely experience noisy conditions due to natural processes such as wave action and sounds generated by fishes and invertebrates, and anthropogenic activities such as ship traffic and construction throughout the bay. Much of the ongoing and future infrastructure and industrial maintenance and development in San Diego Bay include pile driving activities. There is increased concern about the potential effect that pile driving has on fishes and other aquatic organisms.

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Popper and Hastings (2009) critically examined the peer-reviewed and grey literature on the effects of anthropogenic sounds on fishes and found that very little is known and the results from what are mostly cage-in-field and tank studies are equivocal. Moreover, there is uncertainty in extrapolating the physiological and behavioral effects of sound at different frequencies, pulse rates, intensities, and distances from the source. Injury to fish from intermittent sounds can begin at 206 dB root mean square (rms) re 1µPa (NOAA et al. 2008). However, reef-associated fish have shown only minor behavioral responses to sounds of 210 dB re 1 µPa at 16 m and 195 dB re 1 µPa at 109 m from a seismic air-gun source while remaining on the reef (Wardle et al 2001 summarized in Popper and Hastings 2009). Sound levels as low as 160 dB re 1 µPa for continuous and/or intermittent sounds and 140 dB re 1 µPa from pile driving can cause behavioral disturbance observable as changes in swimming speed and direction (Navy 2011; Mueller-Blenke 2010; CALTRANS 2009). No physical injury or behavioral response has been associated with vibratory pile driving in two reported studies which did not report sound levels (Popper and Hastings 2009).

In 2008, NOAA Fisheries, U.S. Fish and Wildlife Service (USFWS), California Department of Fish and Game, and transportation agencies of California, Oregon, and Washington agreed in principle to assess project effects using Interim Criteria for Injury to Fish from Pile Driving Activities (FHWG 2008). These interim criteria are provided in Table 4-1. The criteria were developed principally for salmonids in the Northwest and they are conservative, indicating the potential for the identified effect, rather than a likelihood of occurrence. The Navy has not adopted these criteria.

Table 4-1. Interim Criteria for Fish Injury and Disturbance by Underwater Sound from Pile Driving

Effect	*Size of Fish*	*Underwater Impact Pile Driving Criteria*	*Underwater Vibratory Pile Driving Criteria*
Onset of Injury	All fish	206 dB peak re: 1µPa	N/A
	≥ 2 grams	187 dB SEL[1] re: 1µPa^{2}sec	N/A
	< 2 grams	183 dB SEL[1] re: 1µPa^{2}sec	N/A
Behavioral Impacts	All fish	150 dB rms[1] re: 1µPa	150 dB rms re: 1µPa

1. SEL = sound exposure level, rms = root mean square

Recent controlled experiments exposing fish to pile driving noise (CALTRANS 2010; Halverson et al. 2011) and critical reviews (Popper and Hastings 2009; Halverson et al. 2011) have not found evidence of injuries at SELs well above these criteria, and thus do not support their use as thresholds for injuries to fish from pile driving operations.

Underwater sound levels received at a given distance from an acoustic source such as pile driving are a function of the source level and transmission loss (TL). TL underwater is the decrease in acoustic intensity as an acoustic pressure wave propagates out from a source. TL parameters vary with frequency, temperature, sea conditions, current, source and receiver depth, water depth, water chemistry, and bottom composition and topography. The general formula for transmission loss is:

$$TL = B * \log10(R) + C * R, \text{ where}$$

B = logarithmic (predominantly spreading) loss

C = linear (scattering and absorption) loss

R = ratio of receiver distance to source reference distance (usually 1m or 10m)

As widely used in the evaluation of underwater sound from pile driving, linear loss (C) is assumed equal to zero, and "practical spreading" (B=15) is assumed, resulting in the formula for transmission loss is TL = 15 log10 R. For this application, however, a site-specific model was developed for TL from pile driving at a central point at the project site (Appendix B). The model is based on historical temperature-salinity data and location-dependent bathymetry. The model's predictions result in a slightly lower average rate of TL than practical spreading, and hence are conservative. For pile driving at the Navy's Marine Mammal Program relocation site (NMAWC), no site-specific modeling was conducted, and practical spreading loss is assumed.

For each of the project underwater sound sources (Table 4-2), transmission losses based on the model or practical spreading were calculated and mapped with GIS, resulting in the underwater sound contours shown in Figures 4-1 through 4-7. The figures reflect the conventional assumption of a "sound shadow" effect, wherein sound transmission from the source is truncated and not reflected where it intercepts a shoreline or structure. Although the influence of Zuniga Jetty was not modeled, it is reasonable to assume that project sound would not propagate east of the jetty (P. Dahl, personal communication). Hence the projection of sound through the mouth of the bay into the open ocean would be truncated along the jetty and narrower in reality than shown in the figures.

Seaward of the entrance to the bay, underwater noise from vessels moving into and out of the bay (Section 3.3.5) would presumably fill in and dominate the underwater soundscape across the frequency range of pile driving, masking sound that is of lesser amplitude than typical vessel noise of 150-160 dB (Kipple and Gabrielle 2007). As such, the extension of the model 4-5 km south of the entrance is considered sufficient to cover all scenarios in which fish might reasonably be expected to respond to sound from pile driving or extraction.

To estimate the SEL to which a fish at a given location would be exposed through multiple hammer strikes, a simple summation procedure is used where total SEL = Single Strike SEL + 10log (number of strikes), with a maximum of 100 repeat strikes per pile and 2 piles per day. The associated areas of potential effect within associated potential zones of influence (ZOIs) are shown in Table 4-2.

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Table 4-2. Calculated ZOIs Corresponding to Interim Criteria for Fish

Description	*Area of Potential ZOI (km^2)*						
	Source, dB peak @ 10m	***Source, dB rms @ 10m***	***Source, dB SEL @ 10m***	***All Fish Injury – 206 dB peak***	***Fish ≥2g Injury – 187 dB SEL***	***Fish < 2g Injury - 183 dB SEL***	***All Fish Behavior 150 dB rms***
Impact driving steel piles	210	195	180	0.0022	0.1949	0.5718	10.8251
Vibratory driving steel piles	195	180	180	N/A	N/A	N/A	4.0519
Impact driving 24-inch concrete piles	188	176	166	0	0.0010	0.0052	2.3583
Impact driving 16-inch concrete-fiberglass piles	184	173	163	0	0.0003	0.0014	1.3123
Impact driving 18-inch concrete piles at marine mammal relocation site	184	173	163	0	0.0002	0.0008	0.2397
Vibratory extraction – steel piles	180	172	172	N/A	N/A	N/A	1.0240
Vibratory extraction – non-steel piles	170	160	160	N/A	N/A	N/A	0.0240

Notes: All sound levels expressed in dB re 1 µPa rms. dB = decibel; N/A = not applicable; rms = root-mean-square; µPa = micropascal. Pile driving sound sources based on CALTRANS 2009; WSDOT 2010, 2012, NMFS 2010. SELs for fish injury were calculated by assuming 200 hammer strikes per day.

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0 0.25 0.5 Kilometers
0 0.25 0.5 Miles

Figure 4-1
Underwater Sound from Impact Pile Driving,
36-48 " Steel Piles (Source = 195 dB rms)

N

0 0.25 0.5 Kilometers
0 0.25 0.5 Miles

Figure 4-2
Underwater Sound from Vibratory Pile Driving, 36-48" Steel Piles
(Source = 180 dB rms)

N

0 0.25 0.5 Kilometers
0 0.25 0.5 Miles

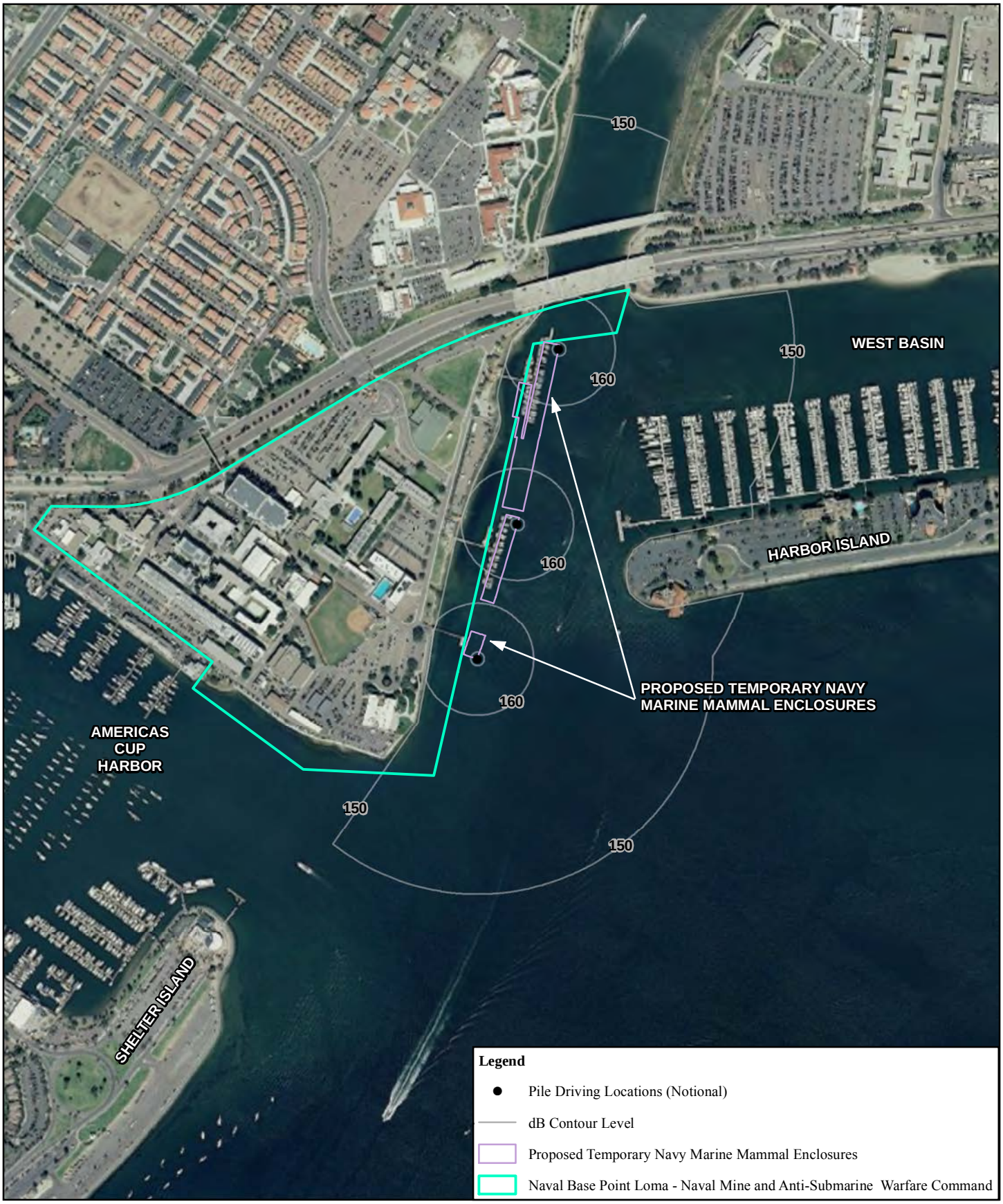
Figure 4-3
Underwater Sound from Impact Pile Driving,
24" Concrete Piles (Source = 176 dB rms)

N

0 0.25 0.5 Kilometers
0 0.25 0.5 Miles

Figure 4-4
Underwater Sound from Impact Pile Driving,
16" Fiberglass-Concrete Piles (Source = 173 dB rms)

N



0 100 200 Meters
0 300 600 Feet

Figure 4-5
Underwater Sound from Impact Pile Driving at Marine Mammal Relocation Site, 18" Concrete Piles (Source = 173 dB rms)

N

0 0.25 0.5 Kilometers
0 0.25 0.5 Miles

Figure 4-6
Underwater Sound from Vibratory Steel Pile Extraction
(Source = 172 dB rms)

N

0 0.25 0.5 Kilometers
0 0.25 0.5 Miles

Figure 4-7
Underwater Sound from Vibratory Non-Steel Pile Extraction
(Source = 160 dB rms)

N

Temporary Relocation of the Marine Mammal Enclosures

Since the relocation of the mammal enclosures used for the Navy's Marine Mammal Program is temporary, potential impacts on fish resulting from such relocation would also be temporary. Fish up to a distance of 341 m from the pile driving location may be disturbed by underwater sound in excess of 150 dB, but the areas of potential injurious effects are very small (Table 4-2 and Figure 4-5), and fish would be expected to disperse away from or avoid the area during pile driving, rather than remain stationary and risk injury. Therefore, there would be no adverse effect from sound levels on EFH under the Magnuson-Stevens Act from the temporary relocation of the marine mammal enclosures to Pier 619 and Marinas 548 and 607.

Underwater Noise from Pier Demolition and Construction

As described in Section 2.5, pile driving and demolition activities generating underwater sound would occur seasonally (essentially limited to fall-winter months) and intermittently over a three-year period. Figures 4-1 through 4-7 (with the exception of 4-5) show the underwater sound contours associated with various activities and Table 4-2 provides the corresponding areas of effect. In general, areas of potential injury are small and limited to the immediate area of pile driving, whereas the areas of potential behavioral effects, particularly for steel pile installation are relatively large, up to 10.8 km^2.

The 206 dB injury threshold would only be exceeded during impact installation of the steel piles, and only encompassing 0.0022 km^2 - within about 26 m of the pile driver. It is unlikely that fish would remain this close to the pile being driven after the ramp-up period. The areas encompassing the weight-based criteria for potential injury are somewhat larger (Table 4-2), but as noted previously, there is little evidence for injurious effects to fish at these SELs (Popper and Hastings 2009; CALTRANS 2010; Halverson et al. 2011).

In general, fish are likely to be temporarily disturbed or leave the immediate project area of demolition and construction until activities cease. Thus, underwater noise would create an adverse effect on EFH under the Magnuson-Stevens Act, but this effect would be minimal due to its limited temporal and geographic scale. Furthermore, fish species would return to the project area following the completion of in-water activities.

Underwater Noise from Dredging and Disposal

Underwater noise from dredging and disposal would have temporary adverse effects due to direct displacement of pelagic and benthic fishes, possibly including managed coastal pelagic and groundfish species. Individuals might respond to the noise associated with dredging and disposal by moving away from the sound source, and transient fishes may avoid entering the area while activities are underway. Conspecific communication and behaviors associated with avoiding predators or finding prey might be affected. Thus, underwater noise would create an adverse effect on EFH under the Magnuson-Stevens Act, but this effect would be minimal due to its limited temporal and geographic scale. There is no risk of physiological injury to fish from the sound generated by the dredging and disposal activities. Furthermore, fish species would return to the project area following the completion of in-water activities.

4.1.2 Water Column

Dredging and Other Sediment Disturbance

Dredging, sediment disposal, and sediment disturbance during pile removal and installation would have temporary adverse effects due to direct displacement of pelagic and benthic fishes, possibly including managed coastal pelagic and groundfish species, by sediment disturbance (turbidity) in the water column during the dredging and sediment disposal operations.

Turbidity plumes of suspended particulates may reduce light penetration and lower the rate of photosynthesis (e.g., adjacent eelgrass beds) and the primary productivity of an aquatic area if suspended for variable periods of time. CPS finfish may suffer reduced feeding ability if suspended particulates persist. The contents of the suspended material may react with the dissolved oxygen in the water and result in short-term oxygen depletion to aquatic resources. Toxic metals and organics, pathogens, and viruses absorbed or adsorbed to fine-grained particulates in the material may become biologically available to organisms either in the water column or through food chain processes.

This greater potential for adverse effects would exist if there were substantial amounts of fine sediments; however, testing of samples of material to be dredged indicated that grain sizes are predominately of coarser grain, beach-compatible grain sands. This material settles quickly instead of remaining suspended in the water column. Based on observations of turbidity caused by bottom disturbances in areas similar to the project sites, turbidity plumes are expected to persist for less than one hour following disturbance (AMEC 2008).

On the beneficial side, dredging could increase water circulation and indirectly benefit fish resources. Tidal flushing and mixing are important for transporting organisms especially plankton, dispersing pollutants, maintaining water quality for marine life, and moderating water temperature that has been affected by exchange with the atmosphere or heating, such as by the South Bay Power Plant (NAVFACSW and POSD 2011).

4.1.3 Benthic Habitats and Communities

Dredging and Sediment Disposal

Dredging would have temporary adverse effects due to a) direct displacement of benthic and pelagic fishes, possibly including managed groundfish species, by noise and sediment disturbance (turbidity) during the dredging operation; and b) the excavation and removal of infaunal prey resources. No vegetation occurs within the proposed dredging footprint. Greater potential for adverse effects would exist if there were substantial amounts of fine sediments and organisms in the proposed project area; however, testing of samples of material to be dredged indicated that grain sizes are predominately of coarser grain, beach-compatible grain sands. This material settles quickly instead of remaining suspended in the water column. Based on observations of turbidity caused by bottom disturbances in areas similar to the project sites, turbidity plumes are expected to persist for less than one hour following disturbance (AMEC 2008).

Sediment disposal would occur at the previously reviewed and approved nearshore sediment enrichment site at Imperial Beach and as such would have only minor, temporary effects on the benthic habitat and community.

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Hence, there would be minimal, temporary, adverse effects on EFH due to sediment disturbance during project activities.

Habitat Alteration

Pier removal would reduce the algal and invertebrate production associated with encrusting communities on the pilings but would only impact eelgrass by temporarily increasing turbidity, as discussed above. Also as discussed above, dredging could indirectly improve EFH by increasing water circulation. Hence, there would be minimal, temporary, adverse effects on EFH from habitat alteration due to pier removal and dredging activities.

Based on the number and sizes of piles that are part of the existing fuel pier versus the proposed new pier, there would be a net decrease in underwater hard surface area, as well as a change in the type of substrate. This is viewed as inconsequential for EFH given the abundance of artificial substrate habitat in San Diego Bay.

Pier construction would result in a net decrease of 5,315 sq ft (0.12 ac) of surface shading. A portion of this area is also eelgrass habitat. During development of the pier design, the alignment for the proposed pier was positioned to minimize eelgrass disturbance and reduce the amount of eelgrass habitat shaded. However, not all eelgrass could be avoided, and approximately 0.05 ac of eelgrass surveyed in 2011, and an additional 0.05 ac of habitat that historically supported eelgrass, would be permanently shaded. In addition, approximately 0.67 ac of eelgrass habitat as of 2011, and an additional 0.32 ac of historical eelgrass habitat, would be subject to disturbance and shading by the Navy Marine Mammal Program relocation to NMAWC; this impact would be temporary as the facilities would be removed after approximately 4 years.

Thus, there would be an adverse effect to EFH from pier construction due to the shading of eelgrass habitat; however, this impact would be minimal and would be offset by use of the Navy's eelgrass mitigation bank. Temporary impacts at NMAWC would also be offset by the mitigation bank, but upon successful reestablishment of eelgrass within impacted areas at the NMAWC location, the bank would be credited for the reestablished acreage.

Although fish abundance, diversity, and biomass beneath the inner portions of large piers may be reduced compared to open water, they are elevated near the outer margins of pier structures. This is in part due to the fact that, over time, algae and invertebrates are expected to colonize the new pier, and the resultant production of organic material from the new pier would tend to offset the effects of reduced sunlight.

The new pier would create habitat for fish that is generally similar to that of the existing pier, with a net loss of structural habitat, and a corresponding gain of open water habitat. Overall, the small magnitude of change and similarity of existing and future conditions suggests no ecological change related to fish abundance, diversity, or biomass would be expected to occur in the project vicinity. To the extent that structural and/or shaded habitats are preferred or avoided by certain species, utilization of the project site by different fish species may shift slightly toward or away from the project site, relative to the existing condition. Considering this, and the characteristics of the EFH species that may potentially occur in the project area and the habitat characteristics of the area itself, there would be no adverse effect to EFH from the small increase of open water habitat.

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4.1.4 **Marine Vegetation: eelgrass beds**

Temporary Relocation of the Marine Mammal Enclosures

Since the relocation of the mammal enclosures used for the Navy Marine Mammal Program is temporary, potential impacts resulting from such relocation would also be temporary. The only HAPC in the area, eelgrass, is growing or has previously grown under the active Pier 619 and Marinas 548 and 607. One permanent eelgrass monitoring transect, NB5, is located between Pier 619 and Marina 548 (NAVFAC SW 2008). Since the bottom of the mammal enclosures is a mesh and is not an opaque, solid structure, any eelgrass underlying the enclosures would be only partially shaded. The small number of piles would allow pile driving to be completed in eight days. Underwater peak sound levels are expected to be no more than 184 dB rms re 1 µPa at 10 m and as such, there is very little potential for injury to fish in eelgrass beds. Areas within the interim SEL criteria for injury are very small (Table 4-2), and as noted above, there is little evidence to suggest that injuries would occur at these SELs. Fish may respond to the pile driving noise by leaving the area; however, species would return to the project area following the completion of in-water activities. Therefore, there would be no adverse effect on EFH under the Magnuson-Stevens Act from the temporary relocation of the marine mammal enclosures to Pier 619 and Marinas 548 and 607.

Pier Removal

Pier removal would only impact eelgrass by increasing turbidity, as discussed above. Also as discussed above, dredging could indirectly improve EFH by increasing water circulation. Hence, there would be minimal, temporary, adverse effects on EFH from habitat alteration due to pier removal and dredging activities.

Relocation of Everingham Brothers Bait Company Bait Barges

Both proposed bait barge temporary location sites are located over deep subtidal soft sediment habitat and would not shade any eelgrass. Therefore, the temporary relocation of the bait barges would not result in any impacts to eelgrass habitat or community.

Pier Construction

Pier construction would result in a net decrease of 5,315 sq ft (0.12 ac) of surface shading. A portion of this area is also eelgrass habitat. During development of the pier design, the alignment for the proposed pier was positioned to minimize eelgrass disturbance and reduce the amount of eelgrass habitat shaded. However, not all eelgrass could be avoided, and approximately 0.05 ac of eelgrass surveyed in 2011, and an additional 0.05 ac of habitat that historically supported eelgrass, would be permanently shaded. In addition, approximately 0.67 ac of eelgrass habitat as of 2011, and an additional 0.32 ac of historical eelgrass habitat, would be subject to disturbance and shading by the Navy Marine Mammal Program relocation to NMAWC; this impact would be temporary as the facilities would be removed after approximately 4 years.

Dredging and Sediment Disposal

Dredging would be limited to the area of the Turning Basin (Figure 2-2). All of the 17.9 ac proposed to be dredged occur in deep subtidal water and have been dredged historically. Eelgrass habitat is inshore and outside of the area that would be affected by turbidity and vessel traffic associated with the dredging and sediment disposal (Figure 3-5). Dredging would occur during

ebb tide when any turbidity that was actually caused would flow away from eelgrass habitat. As such, there would be no injury to fish in eelgrass beds. On the beneficial side, dredging could increase water circulation and indirectly benefit eelgrass habitat. Therefore, there would be no adverse effect on EFH under the Magnuson-Stevens Act from dredging and sediment disposal.

4.2 Proposed Mitigation Measures and Guidelines for EFH Protection

Avoidance and minimization measures integrated into the project design pertaining to EFH include the following:

1. Dredging and other in-water demolition or construction that is a source of turbidity and underwater noise would avoid the endangered California least tern breeding season (April 1 - September 15).
2. Eelgrass mitigation bank credits would be used to offset any remaining eelgrass impacts.
3. The contractor would use only clean construction materials suitable for use in the oceanic environment. The contractor would ensure no debris, soil, silt, sand, sawdust, rubbish, cement or concrete washings thereof, chemicals, oil or petroleum products from construction would be allowed to enter into or placed where it may be washed by rainfall or runoff into waters of the U.S. Upon completion of the project authorized, any and all excess material or debris would be completely removed from the work area and disposed of in an appropriate upland site.
4. Spill kits and cleanup materials would be present during construction should there be a leak into the surrounding water.
5. During project implementation the Navy would regularly monitor construction activities to ensure that no deviation from the project as described herein are occurring. The Navy would report any violation of authorized impacts to NMFS within 24 hours of its occurrence.

The following avoidance and minimization measures would be followed during the proposed pile driving and dredging activities.

1. Prior to the start of pile driving each day, after each break of more than 30 minutes, and if any increase in the intensity is required, the Navy would use a ramp-up procedure. The procedure involves a slow increase in the pile driving to allow animals in the area to disperse.

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5 CONCLUSIONS

As described in the above effects analysis, the Navy has determined that the project, regardless of which design alternative is ultimately chosen during the NEPA process, would have minimal, adverse effects on EFH for federally managed fish species within the Coastal Pelagic Species and West Coast Groundfish FMPs. Of the 94 or more species which are federally managed under these plans, nine are likely to occur near the project site and could be affected.

Potential impacts to EFH would differ from species to species, depending on life history, habitat use (by demersal or pelagic species), and abundance in the project area. Juvenile fish of the EFH pelagic species (northern anchovy, Pacific sardine, Pacific mackerel and jack mackerel) are in transient schools that can number a few fish to 10,000s and freely move through the proposed project area among all intertidal and subtidal habitats. Five EFH groundfish species (California scorpionfish, grass rockfish, curlfin sole, English sole, grass rockfish, and leopard shark) are uncommon if not rare in the proposed project area. California scorpionfish is expected to be the most abundant among the five demersal species and the most likely to occur under the fuel pier structure and in the turning basin area. This species is not territorial and does not have restrictive home ranges. Juveniles of California scorpionfish, grass rockfish, and leopard shark are reported to utilize eelgrass beds as nursery habitat in San Diego Bay. Soft sediment habitat under the pier and in the turning basin area is where the flatfishes, curlfin sole and English sole, are most likely to occur. Leopard shark are transient predators that if present would be expected to freely move in and out of the project area. The effects of the project would include the temporary removal of habitat that provides shelter and/or prey resources; increased turbidity; and behavioral disturbance due to noise.

The area surrounding the Fuel Pier is not optimal habitat for FMP species in San Diego Bay due to the existing usage of the facilities, armored shoreline, and dredging in the channel adjacent to the site. Juvenile and adult pelagic fish of species which might visit the area are mobile and would be able to avoid any action that may occur at the project site. Most species may already avoid this area due to the large amount of vessel traffic through the area and dredging activities. Eggs and larvae should not be harmed by the renovations at the Fuel Pier. Short-term impacts associated with pier demolition and replacement, and with the temporary relocation of the marine mammal program, will occur from increased suspended sediments and noise levels. Turbidity may impact sight feeding, but affected species will presumably disperse to surrounding waters where feeding will be less problematic. Although there will be an Adverse Effect to EFH as described in the Act, but based on the inclusion of the Best Management Practices cited above the effects will be short-term and localized and will have no long-term effect on the EFH, FMP species, or ecological functions provided by the EFH.

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Appendix A
Acoustic Transmission Loss Model for Pile Driving

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This memorandum summarizes our results of modeling acoustic transmission loss (TL) for San Diego Bay associated with underwater noise generated by impact pile driving. The TL modeling assumes a nominal pile driving location at position 477888.7 N, 3618101W where the nominal water depth is 14.7 m. A note on the model deliverable in the form of ArcGIS raster data is given at the end of this memorandum.

Our model assumes an average sound speed of 1504 m/s based on historical temperature-salinity data, and location-dependent bathymetry, both provided to us by NAVAC. Note that for purposes of modeling TL we have smoothed this bathymetry over a 100 m smoothing window and removed any features considered artifact. For geoacoustic properties of the sediments we use sound speed[1] and attenuation[2] for sand based a frequency of 500 Hz. Additional assumptions entering into the modeling are summarized as follows:

1. The spectrum of acoustic energy associated with impact pile driving is confined to frequencies less than about 2000 Hz[3]
2. The model is intended to simulate depth-averaged TL, which is specifically applicable to peak pressure emanating from an impact pile driving source, but also applies more generally to SEL and RMS measures.
3. The concept of a Mach cone that emanates from impact pile driving is incorporated in our TL model which causes the acoustic amplitude to decay as $R^{1/2}$ (cylindrical spreading) where R is range from the pile source, out to range of R*, or roughly 3 times the water depth. The Mach cone and precise definition of R* are discussed in ref.[3].
4. Beyond ranges of R* the amplitude decays as $R^{3/2}$. This decay mirrors the so-called practical spreading model (PSM), but our model differs fundamentally from the PSM. The primary differences are (i) model properties associated with R*, and (ii) depth-dependence in our model.
5. Depth-dependence is handled in two ways. For cases in which the depth increases from the source impact pile driving, the sound pressure amplitude decays as $(H/Ho)^{1/2}$ where H is the depth as a function of range from source and Ho is the depth at the source. This behavior applies unless and until the depth reaches a modal cut-off depth, associated with a frequency of 500 Hz. At this point the modal decay coefficient corresponding to the first mode at 500 Hz is applied, which increases TL at a rate significantly greater than $R^{3/2}$.

Numerical results of the model are incorporated into a TIFF file (Dahl_Model.tif) that is attached to this email report. This file can be added as a layer in an ArcGIS map and transects can be drawn and interpolated (using the Interpolate Shape tool). In this way the model associated with any radial transect that originates from the source location can be extracted. Figure 1 displays a summary of the model for San Diego Bay along with two representative transects, with TL versus range for these two transects plotted in Fig. 2.

[1] K. L. Williams, D. R. Jackson, E. I. Thorsos, D. Tang, and S. G. Schock,"Comparison of sound speed and attenuation measured in a sandy sediment to predictions based on the Biot theory of porous media," IEEE J. Ocean. Eng. 27, 413–428 (2002).

[2] J. Zhou, X. Zhang, and D. P. Knobles, "Low-frequency geoacoustic model for the effective properties of sandy bottoms," J. Acoust. Soc. Am. 125, 2847–2866 (2009).

[3] P.G. Reinhall, & P.H. Dahl, "Underwater Mach wave radiation from impact pile driving: Theory and observation", J. Acoust. Soc. Am. 130, 3, 1209-1216 (September 01, 2011).

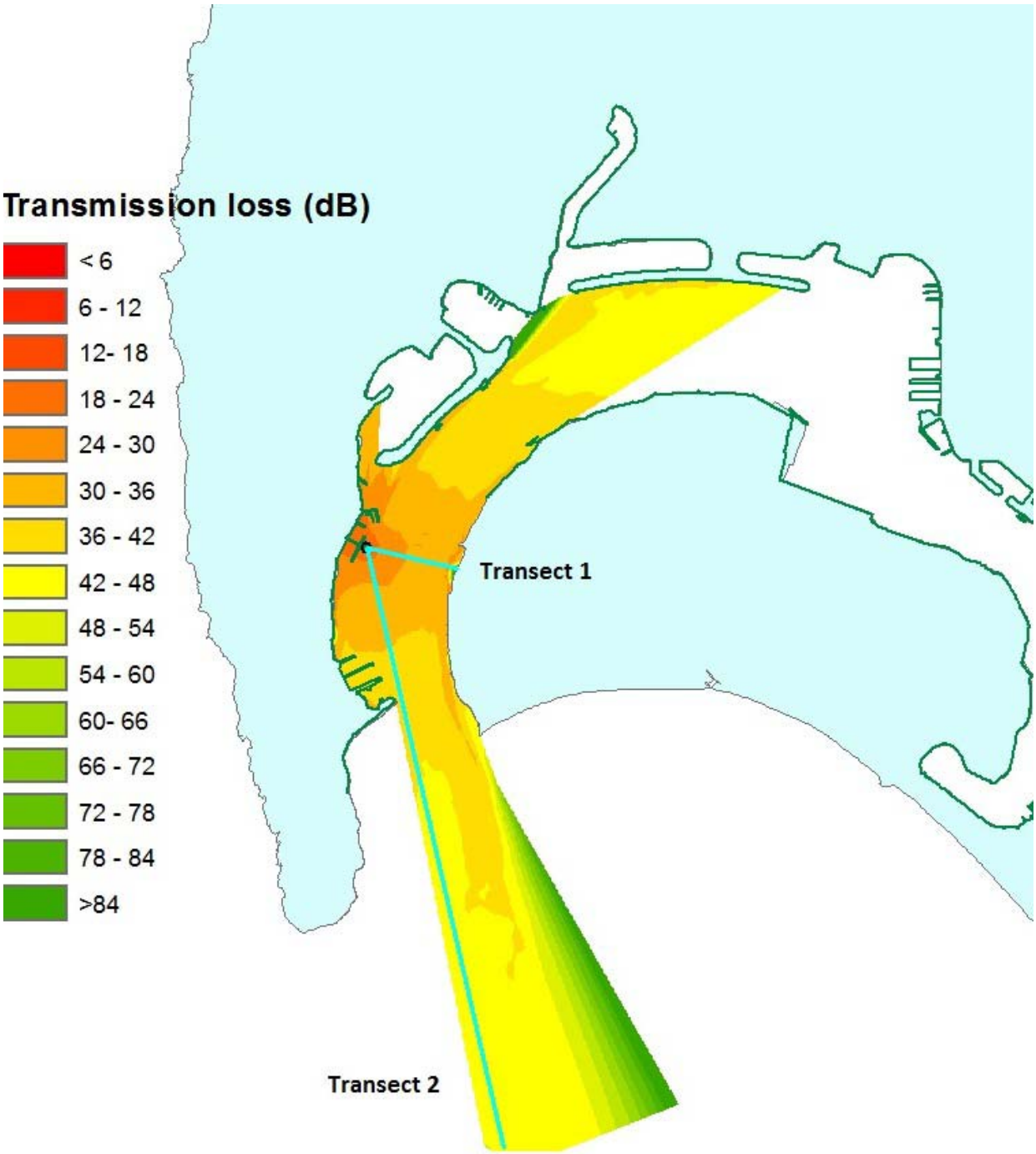


Figure 1. Transmission loss in San Diego associated with impact pile driving source located at 477888.7 N, 3618101W. Two transects that originate from the source are shown.

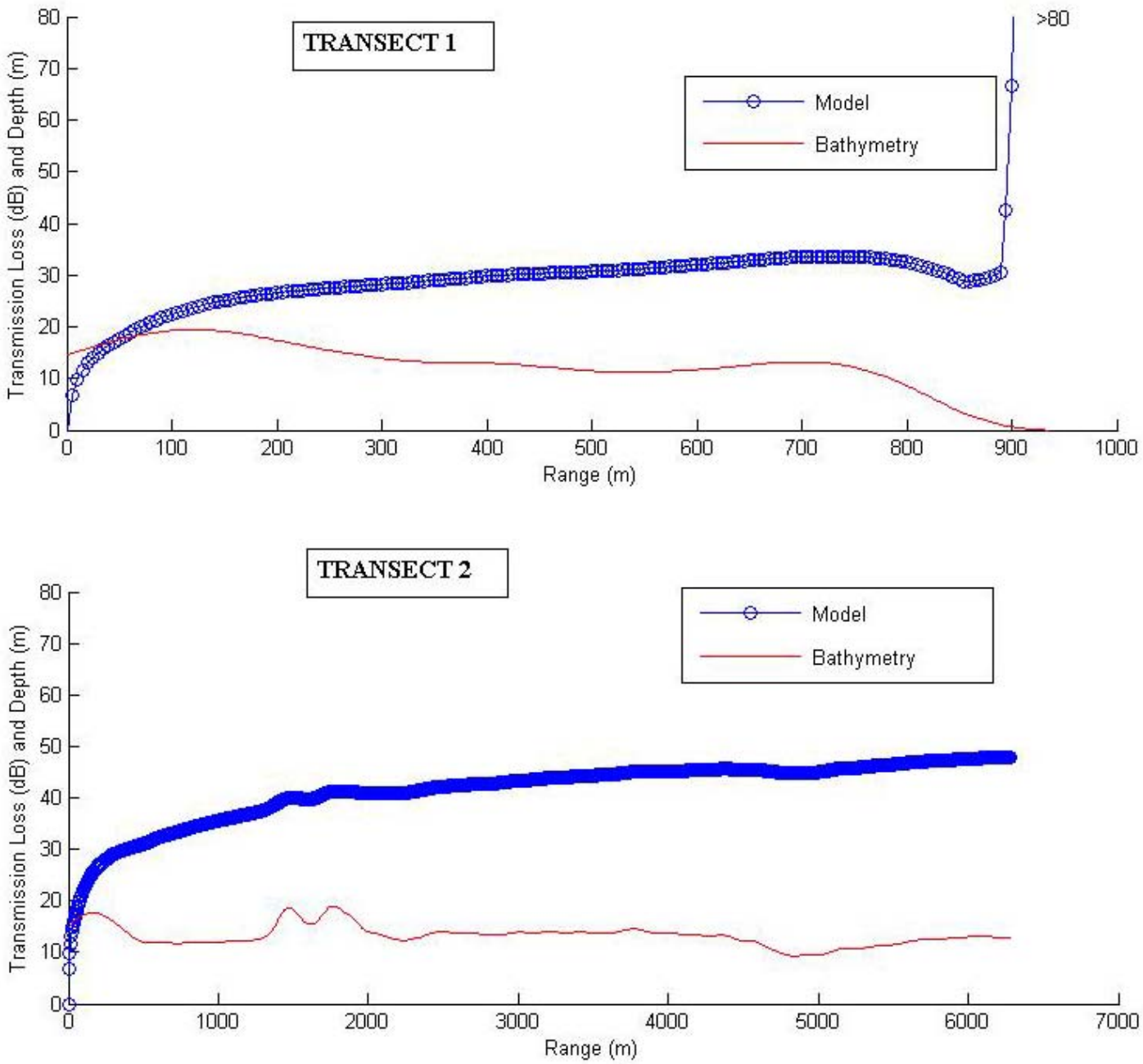
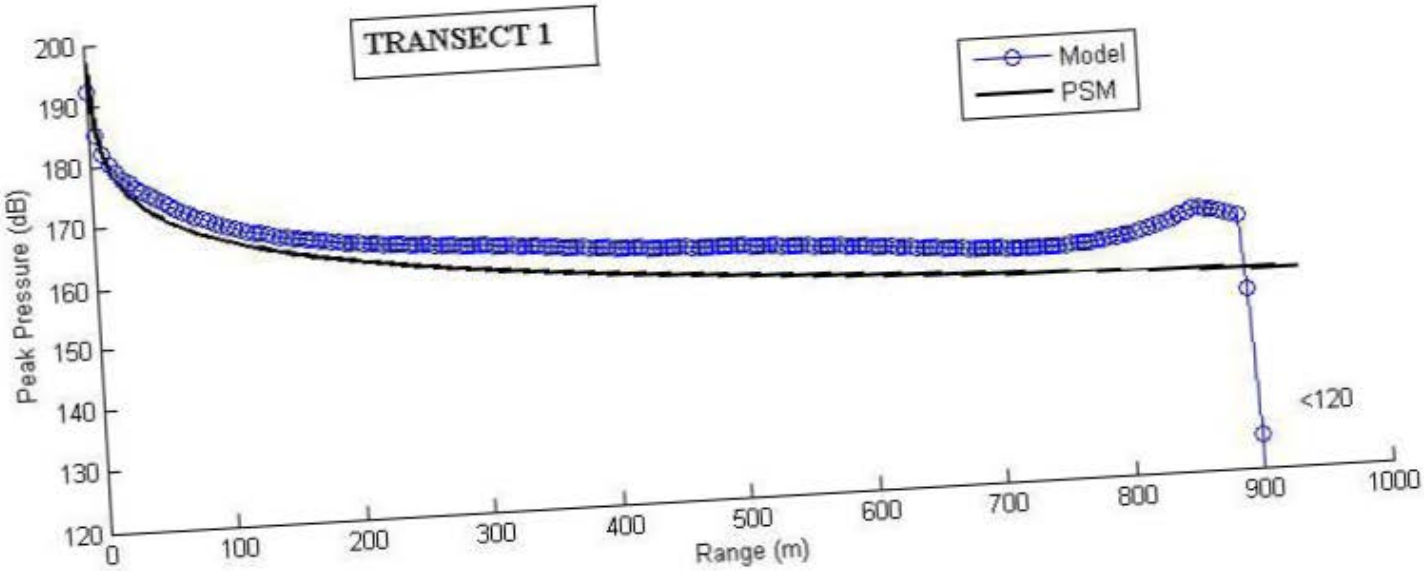


Figure 2. Transmission loss (in dB) and bathymetry (in m) for sample transects in San Diego plotted on the same scale. Note that for transect 1 only the first 80 dB of TL is plotted.

An example of how the model is applied, along with how results from it can differ from results obtained with the PSM is shown in Fig. 3. For this we assume a pile driving peak amplitude of 182 dB re 1 μPa exists at range 10 m for water depth 14.7 m, as given by the Cal Trans Report[4] for 0.6 m (24 inch) AZ steel sheet pile. Current use of the PSM takes this 182 dB value as a 10-m datum, from which estimates at extended range R m from the pile are computed to be equal to 182 – 15log10(R/10). For

[4] California Department of Transportation, "Technical Guidance for the Assessment and Mitigation of the Hydroacoustic Effects of Pile-driving on Fish" (2009).

example, at range 100 m, the estimate for peak level is reduced by 15 dB and is estimated to be 167 dB re 1 μPa. The model provided here gives TL starting from range 1 m (0 dB), and will show a TL at 10 m equal to 10 dB owing to cylindrical spreading and the influence of R*. Thus, to use the Cal Trans value as a 10-m datum, *one must subtract 10 dB from our model TL curve such that at range 10 m TL = 0 dB.* Results of this simple operation are shown in Fig. 3 along with comparable results using the PSM.



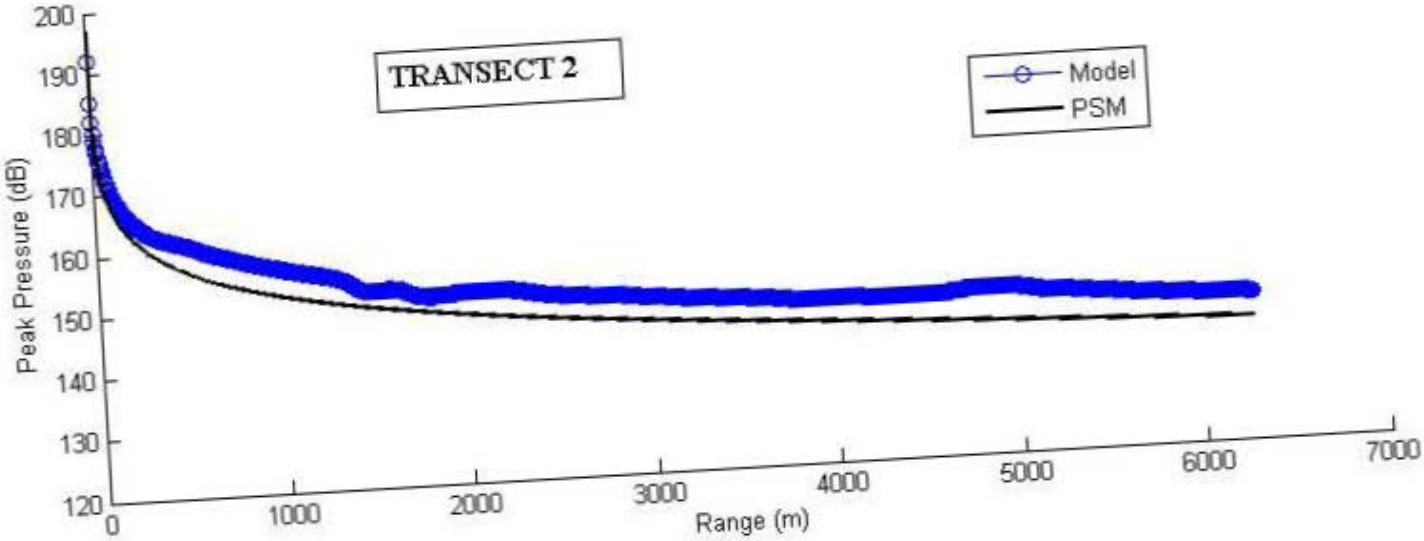


Figure 3. Comparison of peak levels calculated using PSM and Model based on a peak amplitude of 182 dB re 1 μPa, at range 10 m (or 10-m datum) .

A note on ArcGIS raster data

The model incorporated into a map of TL, such as Fig. 1, is provided in .tif format and included in the attached zip file. Note that recovery of the model TL curve associated with a particular transect from the ArcGIS raster data will produce an artifact in that curve for ranges < 10 m as shown in Fig. 4. A simple work-around for this effect is to ensure in subsequent calculations that TL = 0 dB for range = 1 m, and TL = 10 dB for range = 10m; beyond these ranges the accuracy of the recovered TL curve will be sufficient.

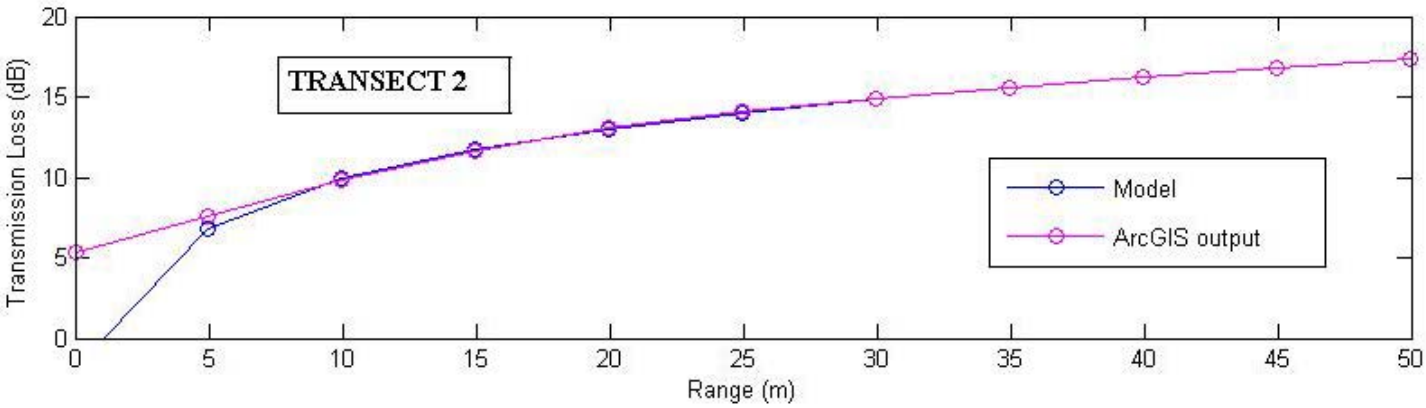


Figure 4. Comparison of ArcGIS output and Matlab model output for Transmission loss (in dB) for transect 2. The first 50 m of range is displayed.

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Appendix B
Ambient Underwater Sound Measurements in San Diego Bay

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P-151 Fuel Pier MILCON

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Ambient Sound Data Acquisition

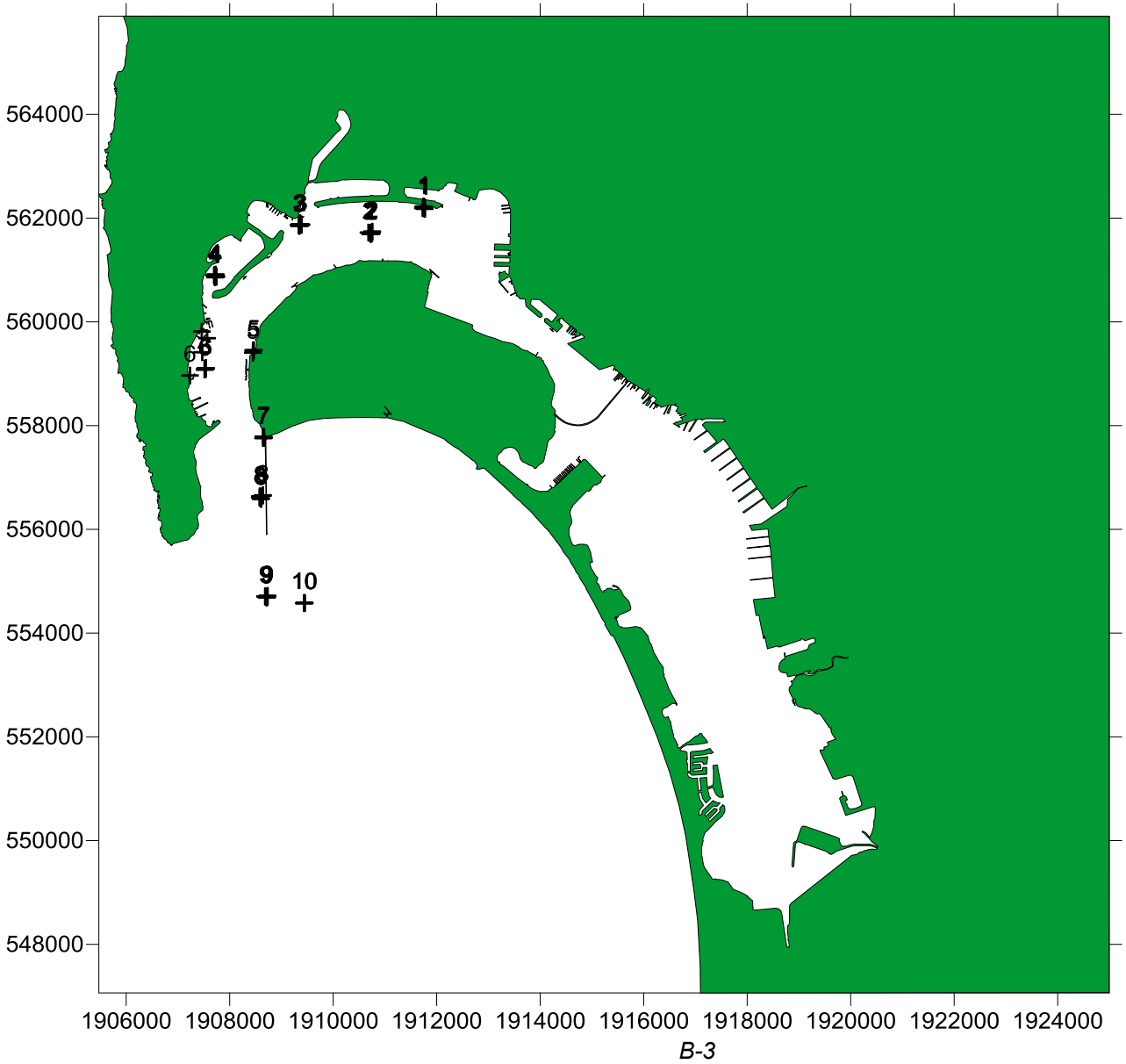
Tierra Data Inc. (TDI) in collaboration with Dr. Ken Richter of SPAWAR Systems continue to collect, process, and analyze ambient acoustic data within the projected zone of influence (ZOI) for both impact driven and vibrator pile driving scheduled to take place during the construction of the P – 151 MILCON within San Diego Bay. Acoustic data is being collected within the ZOI using a Larson Davis 831 sound meter and Rison hydrophone deployed from a 20 ft. Boston Whaler either anchored or tied to a buoy or structure. Existing acoustic data was collected intermittently from February 2012 to the present on or adjacent to the existing fuel pier or within approximately 200 meters. Data acquisition events lasted from 10 to 15 minute intervals when collected from the vessel adrift in the bay to several hours on the fuel pier. Measurement were collected at a rate of 100 measurements per second and averaged over the sampled time period to document the average and maximum sound exposure levels.

Data analysis of the existing data sets was performed by Dr. Ken Richer and presented to the project proponent. Average ambient sound levels varied on marginally and where determined to range between roughly 125 and 132 dB. Acoustic sound modeling of the project footprint and San Diego Bay, performed by Dr. Peter Dahl of the University of Washington, provided sound transition loss contours that approximate the location of defined sound levels from known sound sources. Additional acoustic data acquisition will now focus on documenting the ambient sound levels at the 160 dB RMS for impact pile driving and the 120 dB RMS for vibratory pile driving. Acoustic data logging by the LD 831 sound meter will be reduced to a lower rate to develop averages over longer time periods and extend overnight to capture potential variation in the ambient sound levels within the Bay.

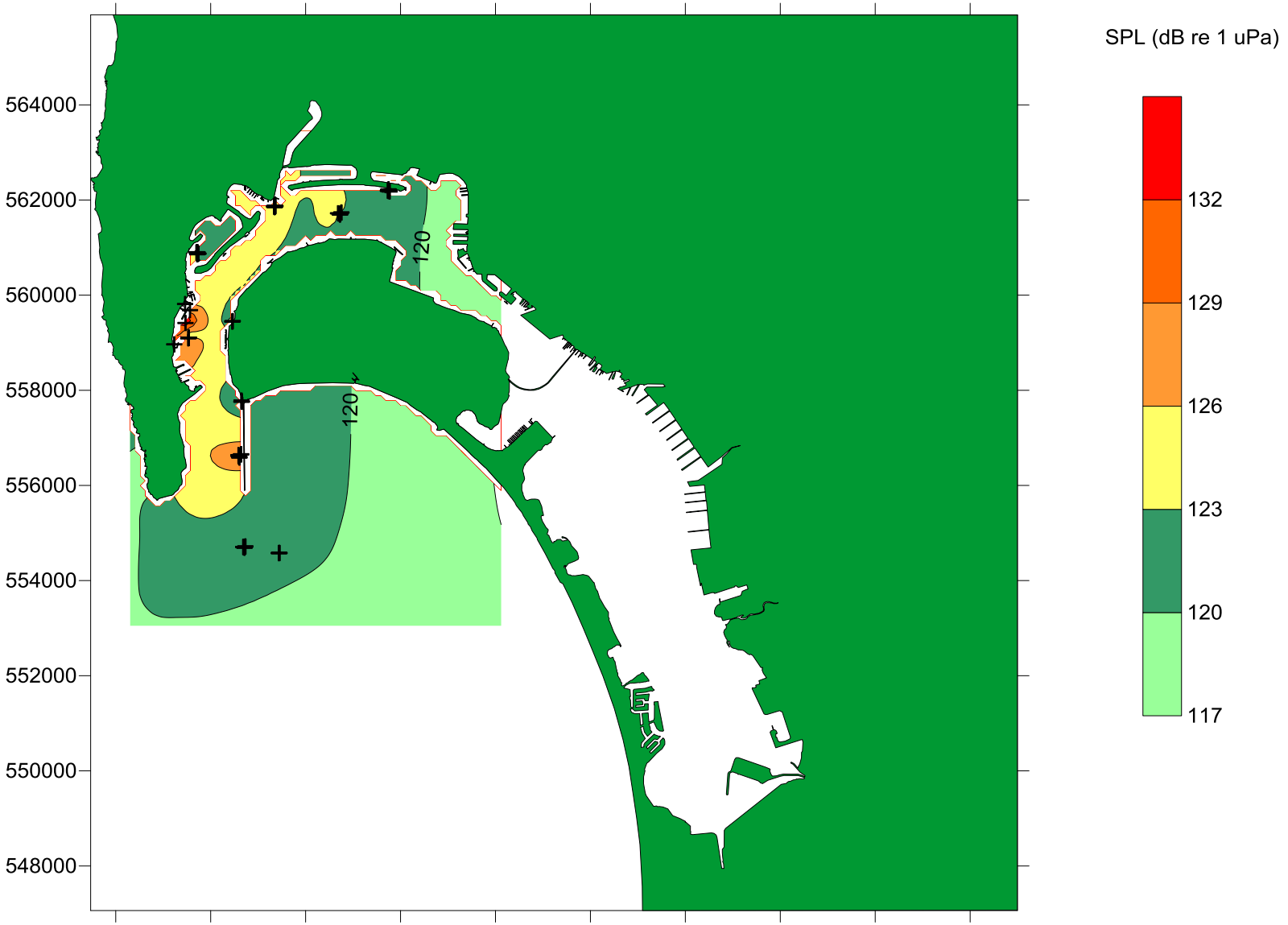
Data collection will begin April 30, 2012 and proceed throughout the week to the maximum extent possible. The LD 831 is currently integrated with n external GPS and collected data files will be downloaded daily and forward to Dr. Ken Richter for processing and the conclusion of each event.

Figure 1. Acoustic footprint and ambient sound sampling locations for the -151 Fuel Pier MILCON.

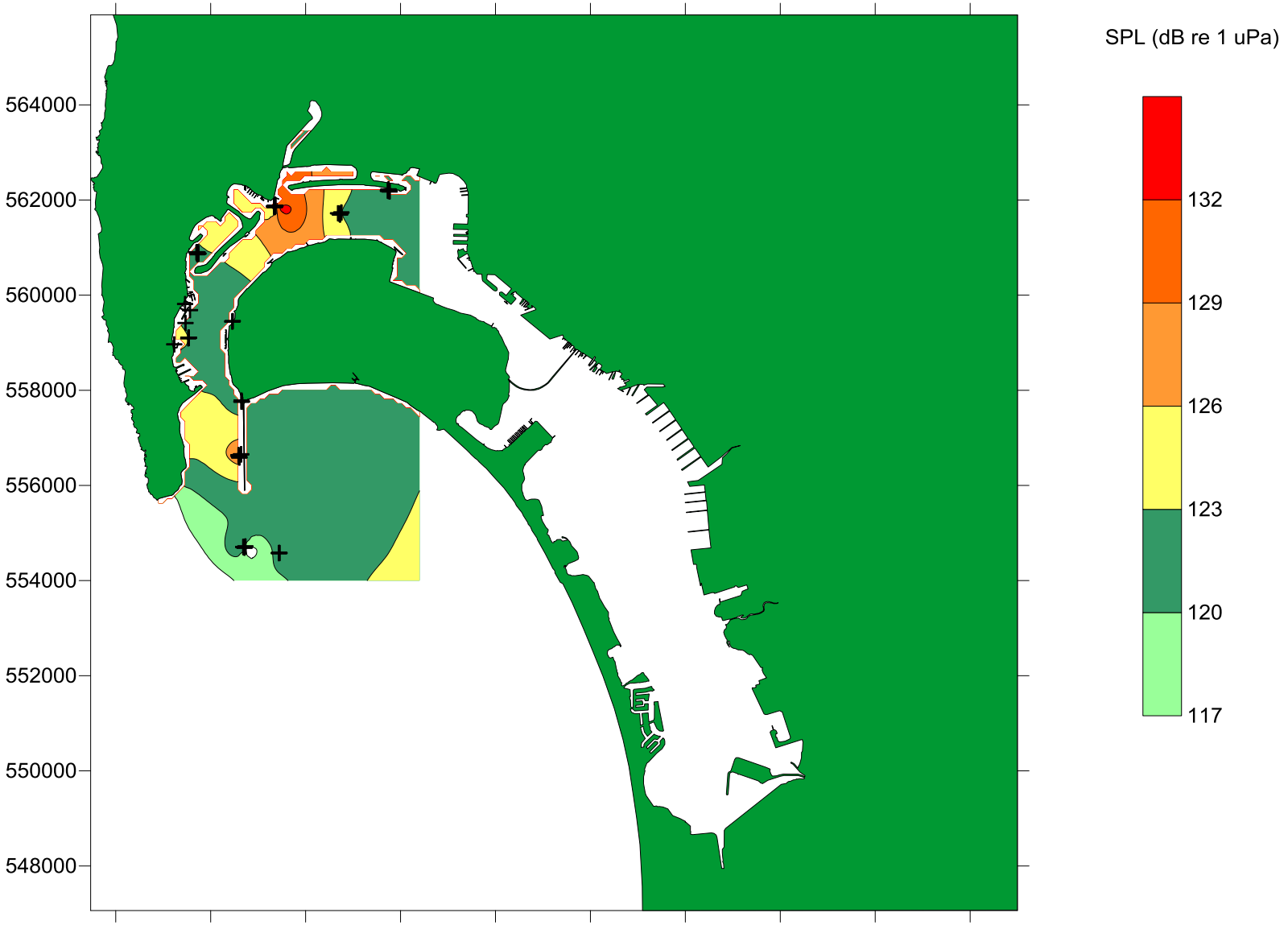
Station locations



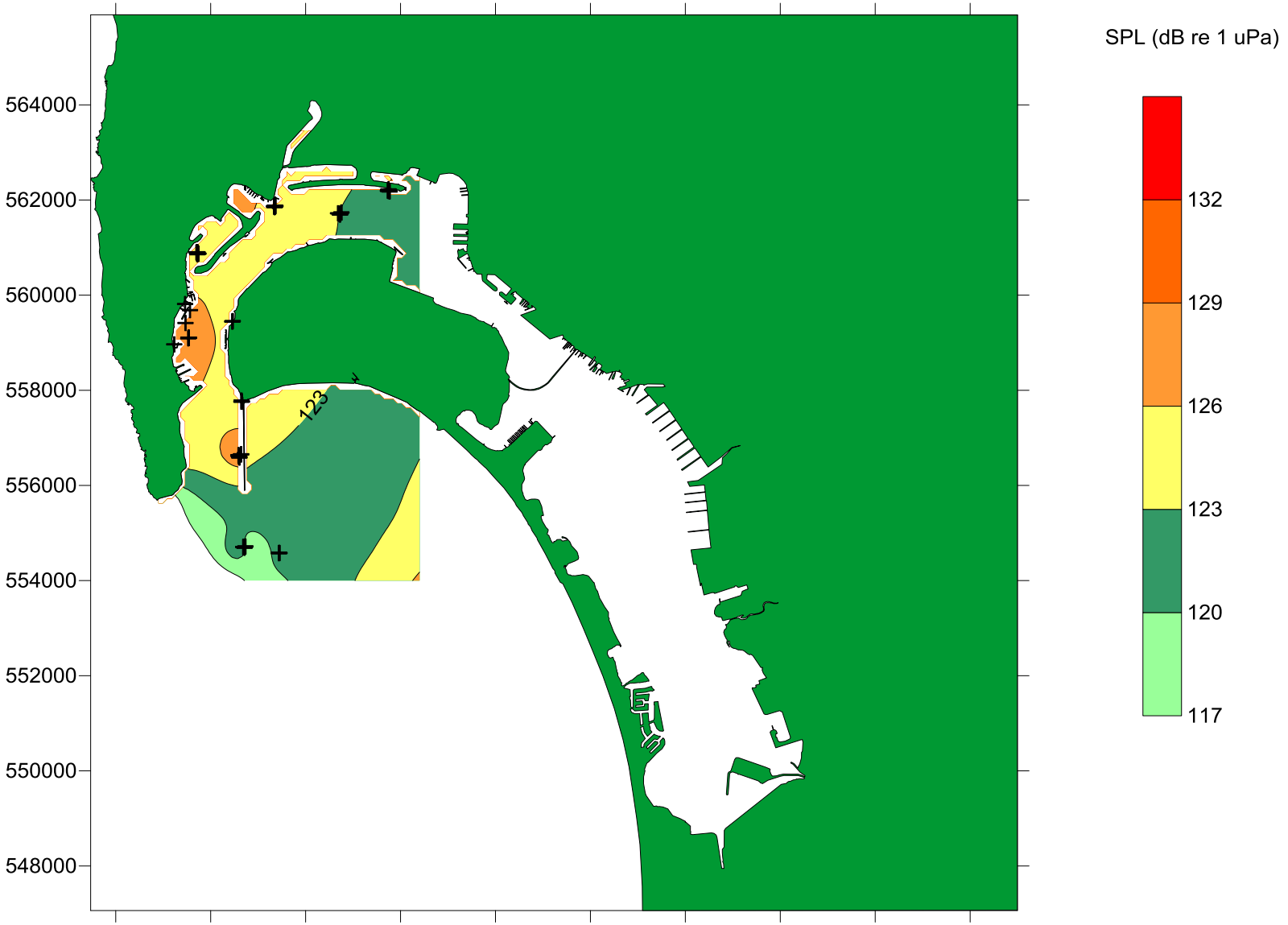
Median ambient rms sound pressure



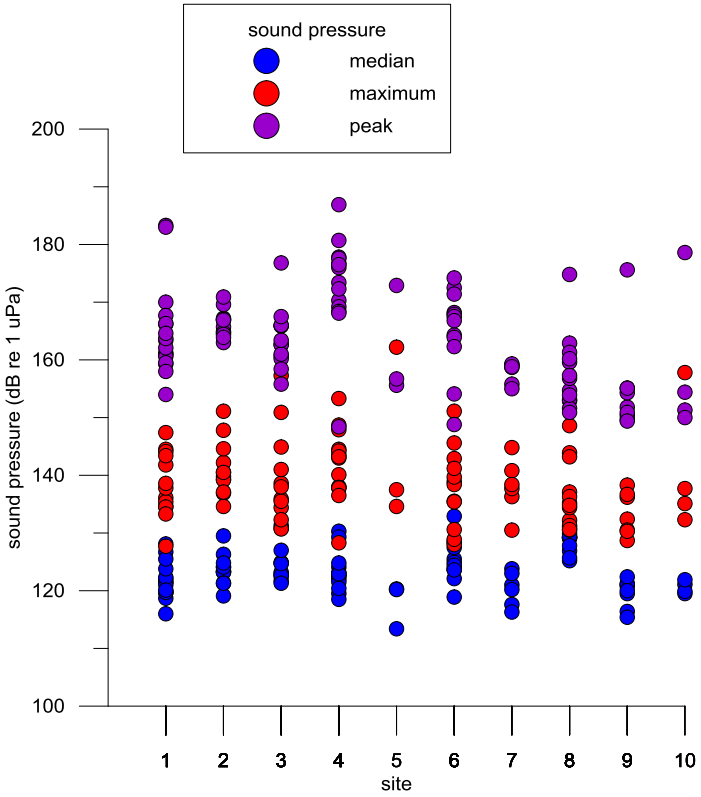
Median ambient rms sound pressure near the surface (~ 1 m)



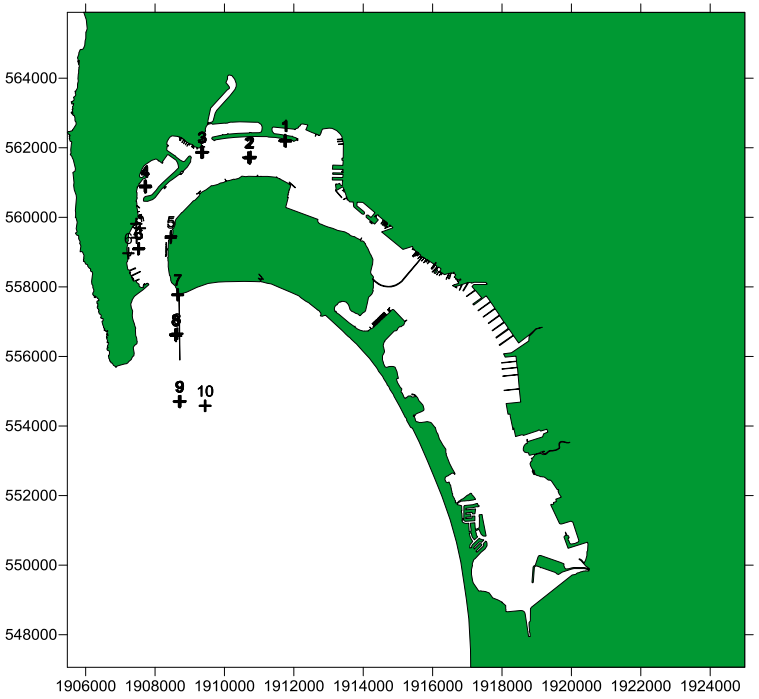
Median ambient rms sound pressure at depth (4-15 m)



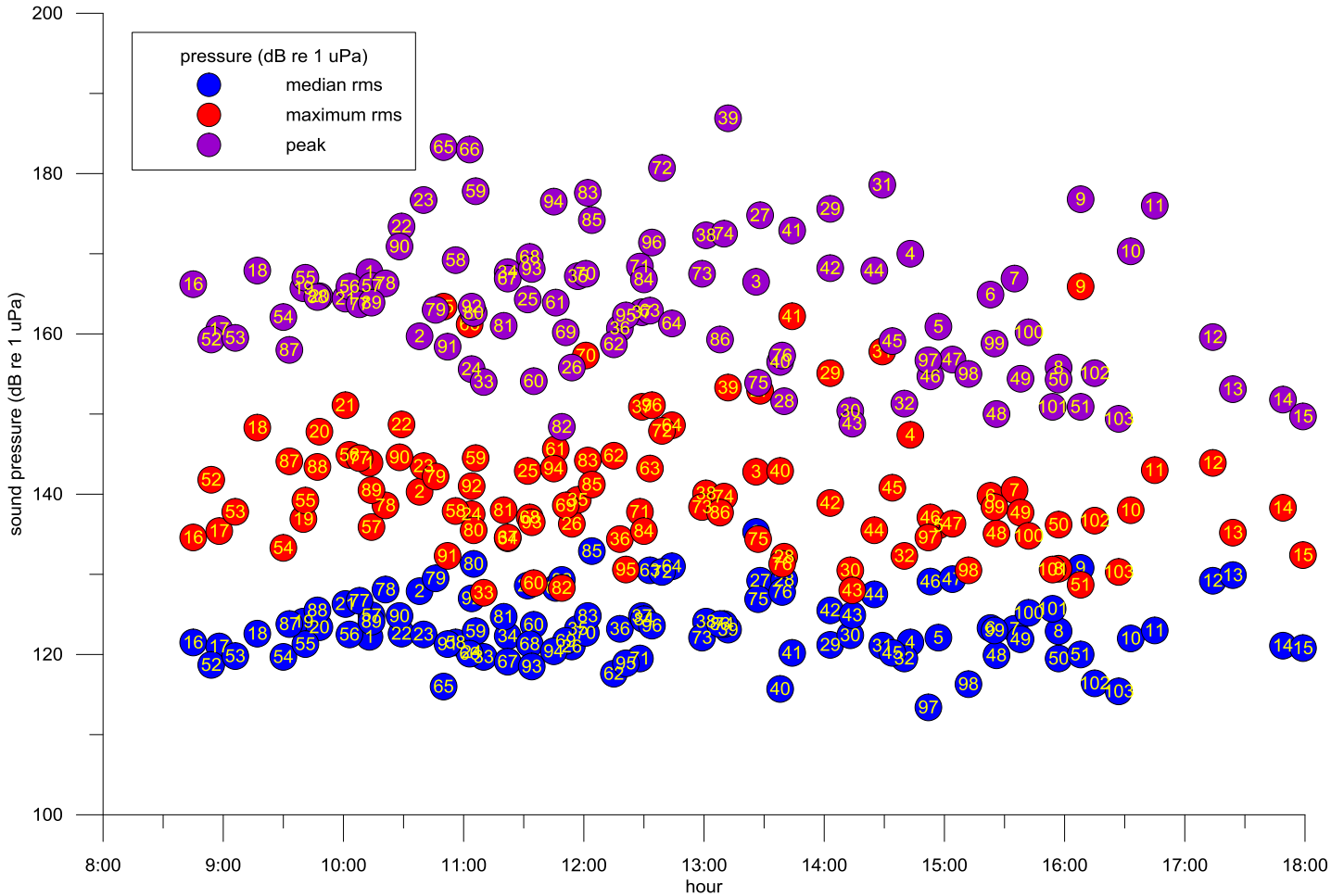
Ambient sound pressure versus location



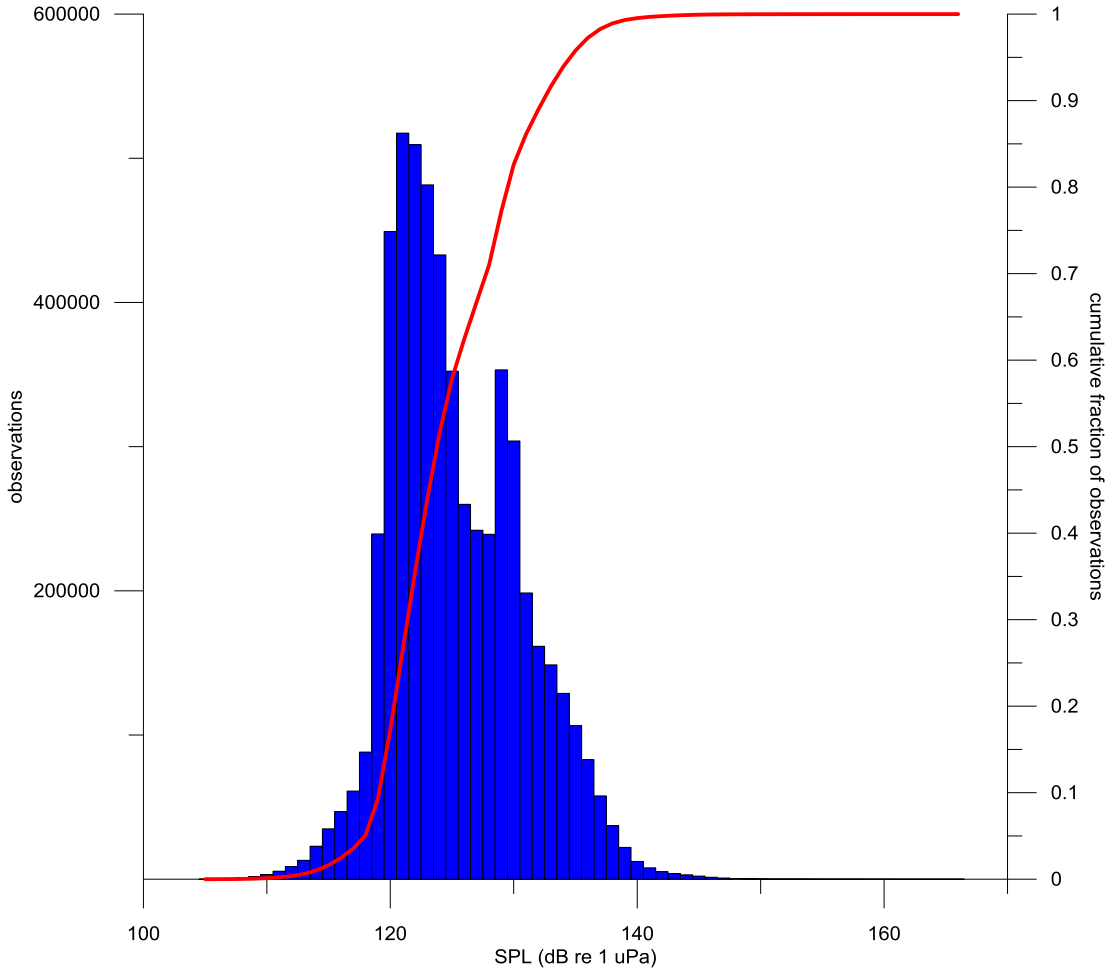
Station locations



Ambient sound levels measred over 10 minutes, labels denote observation # in summary .xls



Background sound pressure levels at all sites



Appendix E.2

Memorandum of Understanding Between U.S. Fish and Wildlife Service and the U.S. Navy Concerning Conservation of the Endangered California Least Tern in San Diego Bay, California

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MEMORANDUM OF UNDERSTANDING
BETWEEN
U.S. FISH AND WILDLIFE SERVICE
AND
THE U.S. NAVY
CONCERNING CONSERVATION OF
THE ENDANGERED CALIFORNIA LEAST TERN
IN SAN DIEGO BAY, CALIFORNIA

This Memorandum of Understanding (MOU) is entered into by the Department of the Interior, U.S. Fish and Wildlife Service, hereinafter referred to as the Service, and the U.S. Navy represented by Commander, Navy Region Southwest, hereinafter referred to as the Navy, pursuant to the Endangered Species Act of 1973, as amended (16 U.S.C. 1533, 1534, 1536). This MOU continues efforts in endangered species conservation between the Service and the Navy in Southern California started in October 1987 and renewed in 1993. The Navy has requested extensions of the MOU for 1999 and 2000, which have been agreed to by the Service.

BACKGROUND

The purpose and objective of the MOU is to establish standards and conditions for Navy in-water construction activities conducted in San Diego Bay to prevent adverse effects to the State of California and federally listed endangered California least tern *(Sterna antillarum browni)* [tern], while optimizing the Navy's ability to proceed with in-water construction as needed and in full compliance with the applicable portions of the federal Endangered Species Act and its regulations. Maintenance, construction, and demolition of Navy facilities routinely require in-water construction activities in San Diego Bay including pier and quay wall construction and repair, pile driving, placement of sheet pile, riprap, dredging, and removal of existing dolphins, piers and piles.

This MOU defines geographical areas and physical conditions under which in-water Naval construction activities may occur in San Diego Bay without the need to conduct formal consultation pursuant to section 7 of the Endangered Species Act. Attachment A of the MOU provides a list of conservation measures to be implemented by the Navy to improve nesting and foraging success of the tern population dependent upon San Diego Bay (Bay) and the near shore marine waters of the Pacific Ocean (Ocean). Land-based Naval construction activities that may affect the tern are not covered under this MOU and will be addressed on a case-by-case basis through consultation with the Service pursuant to the Endangered Species Act.

DESCRIPTION AND BIOLOGY

The occurrence in and use of Bay by the tern typically occurs between April 1 and September 15 of each year. During this period the tern migrates north from wintering areas in Central and South America to southern California coastal areas to nest and raise its young. There are six recognized tern nesting colonies adjacent to the Bay. These nesting colony locations include Naval Air Station (NAS) North Island; Naval Amphibious Base (NAB) Coronado; Lindbergh Field (San Diego International Airport); "D" Street Fill, a parcel of land jointly administered by Sweetwater Marsh National Wildlife Refuge and the Port of San Diego; Chula Vista Wildlife Reserve; and the levees at South San Diego Bay National Wildlife Refuge (Figure 1). The first two of the above listed locations are located on Navy property. NAS North Island includes the main nesting colony, known as the "Mat" site and four alternate nesting colony sites, Runway 1-1, Ammo Dump, Runway 1-8 and the base of Zuniga Point. These alternate nesting colony sites are shown in Figure 2. NAB Coronado has three main tern nesting sites including North and South Delta Beaches, which are adjacent to the Bay, and the Ocean Beach site, which is adjacent to the Pacific Ocean (Figure 3).

During the nesting season, adult terns and their young feed almost exclusively on small marine fish captured in the surface waters (top two feet) within the Bay, in river mouths in the Bay such as the Sweetwater Channel, and in near shore ocean waters adjacent to the Silver Strand. Figures 2-5 depict tern nesting sites and foraging areas on or adjacent to Navy lands in the Bay.

Major reasons for the failure of tern breeding colonies adjacent to the Bay, including those found on Navy properties, are believed to have been avian and mammal predation, loss of nesting and foraging habitat, and human disturbance. Additional adverse impacts to the terns can occur if in-water construction activities inhibit or prevent foraging opportunities for the tern or disrupt nesting pairs on the colony. Poor foraging may affect the survival of chicks by requiring adult terns to forage farther from their nesting colony or for a longer period of time, thus leaving tern chicks at the nesting colony unprotected from predators. It has also been shown that chick survival can be reduced during El Niño events when size and availability of food resources are typically altered.

STATUS OF CONSERVATION EFFORTS

In accordance with the 1987 MOU, the Navy established a permanent, full-time natural resource position at the Naval Facilities Engineering Command office in San Diego in 1988 to manage a tern conservation program and coordinate with the Service on Navy projects that may affect the tern. The natural resource position developed and managed the overall strategy for the tern colonies on Navy lands in four major areas: predator management, tern monitoring, site preparation of tern nesting colonies, and biological information gathering. Through establishment of this position these management objectives have been successfully met.

Predator management has been carried out under a Cooperative Agreement with the U.S. Department of Agriculture, Wildlife Services (WS), formerly known as Animal Damage Control,

since March 1988, when initial efforts to control both avian and mammalian predators began. Predator management activities have been conducted at NAS North Island, Naval Training Center (NTC) San Diego, and NAB Coronado since the 1989 breeding season. Predator management and biological monitoring of the NTC colony site was suspended after the 1998 tern nesting season by the Navy as a result of the cessation of base operations under the 1993 Base Closure and Realignment Act. The Service acquired the NTC tern colony and a 15-acre buffer area from the Navy when this installation permanently closed. The NTC property was exchanged for Western Salt property owned by H.G. Fenton Company and lands administered by the State Lands Commission. These lands totaled approximately 1,400 acres. This action was described in an internal section 7 consultation (1-6-98-FW-49) dated October 13, 1998 and released the Navy from any future tern management responsibilities for NTC.

The Navy's predator management program has resulted in significant reductions in the numbers of both avian and mammalian predators found at the tern nesting sites, thereby enhancing the species' productivity. From 1984 to 1987 the tern fledglings per pair averaged .38; between 1988 and 1991 the number of tern fledglings averaged .50 per pair, a 32% increase in fledgling production. Between 1992 and 1999, tern fledglings per pair averaged .66, an increase of over 74% from the 1984-1987 period. Undoubtedly, a significant portion of the increased productivity can be attributed to the predator management program.

The implementation of an objective, scientific, long-term monitoring program for tern nesting colonies has provided critical information essential in developing a prudent management strategy in San Diego Bay. The retention of a tern expert since 1988 to oversee monitoring of individual nesting sites and prepare annual reports on breeding success of the tern colonies occurring on Naval property has been a key element in this successful monitoring program. This expert is exceptionally familiar with tern populations in San Diego County and specifically in San Diego Bay, and has provided the Navy with sound, basic information on the breeding biology of the terns at the Navy sites, and has been instrumental in advising the Navy in the development of its overall tern conservation strategy.

The Navy also funded basic research in assessing the effects of in-water pile driving activities on fish behavior, as well as research in identifying foraging areas important to the terns. Key foraging areas for the tern adjacent to Navy lands (See shaded areas in Figures 2-5) were identified as part of this research along with long-term observations of the tern.

Major improvements have been completed by the Navy adjacent to their tern nesting colonies. A 10-acre tern nesting site was first prepared in 1988 at South Delta Beach, NAB Coronado. This site has been prepared and monitored every year since then and supported its first successful tern nest in 1992. In 1996 the South Delta Beach site was further enhanced by expanding the 10-acre nesting site to 15 acres, adding a four-foot sand berm along the tidal flats to protect tern nests from high tide events, and placing a two-foot layer of clean sand (without a soil component) in the center portion of the original 10-acre site to enhance nesting substrate for the tern and reduce the likelihood for the establishment of predatory ant colonies that have been documented to

adversely affect tern eggs and chicks. These improvements have contributed significantly to tern use of South Delta Beach, increasing the number of active nests from one in 1992 to 80 in 1999.

The North Delta Beach nesting area has also been enhanced to protect nesting terns. In 1992, large, low profile signs were placed facing the Bay warning pleasure boaters of the sites' protected status. In 1996, a sand berm was also placed along the northern and a portion of the eastern shoreline to protect tern nests in areas prone to flood at high tides. These improvements have helped the North Delta Beach site to grow from 46 nests in 1989 to 344 nests in 1999. Ten acres of eelgrass was planted in the spring of 1990 immediately east of North Delta Beach as compensation for Naval construction projects. Eelgrass provides important habitat for a number of species of marine fish, including tern forage species, and may provide an enhanced foraging area for terns that nest on the North and South Delta Beach sites. Beginning in November 2000, the Navy constructed an enhancement island approximately .5 km north of North Delta Beach using dredge materials to provide approximately 20 acres (9 acres of inter-tidal and 11 acres of sub-tidal) of potential foraging area for terns and other marine birds.

Fences have been built or replaced at NAS North Island (1992) and the south edge of the South Delta Beach (1994) tern colonies. Permanent grids have been established at North and South Delta Beach and NAS North Island tern colony sites. These grids serve to mark nest sites so that they can be definitively located and monitored from year to year for the purposes of measuring changes.

In 1997, the Navy, San Diego Gas and Electric Company, and the City of Coronado jointly combined efforts to underground power lines along Highway 75 that parallel Delta Beach. This effort resulted in reduced perching opportunities for avian predators of the tern, and eliminated the possibility for tern mortality due to impact with the overhead wires.

SPECIFIC OBLIGATIONS OF THE PARTIES

The Navy and the Service mutually agree that the goal of this MOU is to promote the survival and the recovery of the tern population in San Diego Bay. To help achieve this goal, the protection and enhancement of the nesting colonies and preservation of sufficient foraging opportunities immediately adjacent to tern nesting colonies shall be pursued on both Navy and Service owned lands.

The Navy and the Service will hold two meetings each calendar year to discuss the obligations and provisions of the MOU. The meetings will be held in April and October at a time and location to be mutually agreed to by Service and Navy representatives. The purpose of the April meeting will be to identify and review the future Navy construction projects, to the extent feasible. This meeting will focus on the known projects that could affect biological resources of San Diego Bay or the near shore marine waters of the Pacific Ocean utilized by the tern.

During the October meeting the following will be jointly reviewed by the Navy and the Service to evaluate whether identified objectives should be modified or reprioritized or new objectives

should be added: a) tern recovery objectives, b) the priority of tern compensation projects to be initiated during the current fiscal year, c) funding needed to implement the objectives, 4) recommendations for improving tern management, and 5) opportunities to cooperatively partner to achieve meeting the identified conservation objectives.

MOU objectives in subsequent years will be mutually determined through these meetings when the previous year's results are reviewed and the next year's objectives are proposed. All in-water construction projects are subject to this MOU regardless of whether they were foreseen prior to and briefed at the April or October meeting. In addition to Service and Navy representatives, the appropriate contractor and other government personnel who have worked at the Navy tern colony sites shall attend the October meeting. Attachment A will be revised annually, as necessary, to reflect these decisions. The mutually agreed to objectives will be described in a letter to the Service prepared by the Navy.

The Parties may forego the April and/or the October meeting in any year, because in some years the purposes of the meetings may be accomplished through other communications between the parties.

At any time during this MOU should the Navy require emergency in-water repairs to any of its piers, wharfs, pilings or quay walls during the tern breeding season, the Navy shall present the Service with all available information on the emergency need, including but not limited to, a brief page of description of the work needed to be done, the method(s) to be used to effect the repairs, an estimate of the number of days needed to complete in-water repairs as well as for the total repair, a detailed map showing the portion(s) of the structure(s) requiring the repair, and any measures the Navy will incorporate into the project to avoid and/or minimize effects to the terns. The Service then agrees to review the Navy submittal and provide a brief written response within 5 working days unless otherwise mutually agreed upon.

Each of the meetings described above, as well as actions for emergency in-water repairs, will constitute informal consultation between the Service and the Navy pursuant to section 7 of the Endangered Species Act, where mutually agreed upon conservation measures can be incorporated into the project description so as not likely to adversely effect the tern.

NAVY OBLIGATIONS

In order to support Naval activities in San Diego Bay, various types of in-water construction activities are conducted in the waters of San Diego Bay. The Navy believes that to accomplish this construction in a timely manner, to reduce costs, and to ensure required fleet support, it is necessary to be able to initiate construction throughout the year, including during the tern nesting season (April 1-September 15).

In concert with the goal of this MOU, subject to limitations discussed in the Miscellaneous Provisions section of this MOU, the Navy will: (1) to the maximum extent practicable eliminate impacts from in-water construction occurring within tern nesting and foraging areas by

scheduling construction activities outside the tern nesting season (September 16 to March 31) or incorporate specific measures within individual projects to minimize potential affects to terns (i.e. employment of silt curtains during dredging operations, use of vibratory hammer instead of use of a conventional piston driven pile driver etc.) and/or (2) offset effects of in-water construction to terns by implementing the obligations identified in this MOU. The Navy will provide a management program that will continue a predator management effort at its current level for tern colonies existing on Navy properties in and adjacent to San Diego Bay, and provide additional or improved nesting and foraging habitat wherever possible. The Navy agrees to accomplish items one through six below and complete the specific obligations outlined in Attachment A by providing an annual funding source of at least $250,000 for the purpose of implementing this tern management program. Current obligations are listed in order of priority. If the stipulated tern recovery obligations can be accomplished for less than the amount of annual funds identified above, then the amount committed for that year by the Navy can be decreased accordingly. It is recognized by the Navy that a proactive program for enhancing tern survival continues to be included within these funds.

In addition to the implementation of compensation measures identified in Attachment A of this MOU, and subject to the availability of appropriated funds, the Navy agrees to: (a) as necessary, continue to study and evaluate through research projects the effects of in-water construction activities on the foraging behavior of marine birds, especially terns, in San Diego Bay, (b) maintain a permanent position to oversee the Navy's in-water construction MOU conservation program obligations to the tern in San Diego Bay, and (c) place a high priority in using clean dredged material from Navy projects to enhance the substrate of tern nesting colony sites and foraging areas within San Diego Bay. These obligations are further described below:

1. Reserve funding and designate a Navy biologist to oversee, coordinate and implement the Navy's obligations identified in this MOU, including executing contracts to provide annual tern monitors and predator management personnel at Navy tern nesting colony sites. In addition, a program to control predatory ants at tern colony sites is required so long as this predator continues to be identified as a threat to tern eggs or chicks at individual tern nesting sites.

2. Meet with Service personnel in April of each year to discuss planned Navy in-water projects in San Diego Bay and near shore marine waters of the Pacific Ocean utilized by the tern, and other projects adjacent to tern colonies that may affect the tern and its nesting and foraging habitat, and seek mutually agreed upon conservation measures to avoid or minimize effects to this species. During these meetings the Navy will provide the Service with an updated table or list that summarizes individual in-water construction projects and the amount of San Diego Bay waters that have been covered by wharves, piers, and/or floating structures.

3. In October of each year, meet with the Service to discuss tern recovery objectives, the priority of tern compensation projects to be initiated during the current fiscal year, funding needed to implement the objectives, and recommendations for improving tern management on Navy

lands. Any changes to these mutually agreed upon tern recovery objectives will be identified in a letter prepared by the Navy within 45 days from the October meeting.

4. Give a high priority to using non-contaminated, beach quality dredged material of appropriate sediment grain size from future Navy dredging projects as a source of material to enhance: (a) the substrate of existing tern nesting colony sites on San Diego Bay Naval bases or (b) foraging habitat for the tern in San Diego Bay. This latter enhancement option involves the shallowing of San Diego Bay waters that are greater than -10 feet Mean Lower Low Water (MLLW) or deeper.

5. When the parties mutually identify specific issues concerning the tern that may be the result of the Navy's in-water construction activities conducted in San Diego Bay, and when the parties determine a study is necessary, a study plan will be developed by the Navy in consultation with the Service to investigate and attempt to resolve the issue. Issues may need to be prioritized, and if so, will be prioritized jointly by the Navy and the Service. Issues may require a focused study to resolve the issue and could include, but are not limited to, impacts to nesting terns, tern foraging behavior or foraging areas. The specific study design will be developed in consultation with the Service. Such studies may require that contractors obtain a Section 10(a) permit from the Service.

6. The Navy will provide the Service copies of its annual tern monitoring reports that summarize numbers of nests, eggs, chicks, fledglings, and adults that occurred at each Navy tern nesting colony, as well as copies of any tern research reports prepared for the Navy.

SERVICE OBLIGATIONS

Through informal consultation conducted in the development of this MOU, the Service hereby agrees that:

1. The Service recognizes that the proactive management program as implemented by the Navy has resulted in direct benefits (i.e., increases in fledgling production) to terns that would not have been achievable with rescheduling in-water construction during the non-breeding season of the tern or compensation obtained on a project-by-project basis and will include such recognition during its analysis of whether a Navy activity triggers formal, informal, or any consultation at all.

2. Navy in-water construction activities may be conducted in the Bay or the Ocean during any time of the year without the requirement of conducting a formal section 7 consultation because they are not likely to adversely affect the tern, provided that the projects are located outside the shaded (nesting) areas shown in Figures 2–5, and provided that:

    a. Surface turbidity resulting from dredging projects must not be allowed to intrude into those areas that are within a one-kilometer (i.e., 3,280.6 feet or 0.6 mile) radius from all active tern nesting colonies located in Bay. Surface turbidity is defined as an obvious

discoloration of the top three meters (9.8 feet) of the water column visible to the human eye. Surface turbidity from any dredging project conducted between April 1 and September 15 shall not exceed 1 hectare (2.47 acres) in length or width, persist longer than one (1) hour, and be in or adjacent to a foraging area of high to very high value to foraging terns as identified in Figures 2-5 by the shaded areas.

b. Noise from pile driving, sheet pile driving, or other heavy construction activity within 500 meters of an active tern nesting area is not to exceed ambient decibel levels as measured at the perimeter of individual tern nesting areas. Vibrations from these activities shall not be allowed to disrupt nesting or loafing terns, particularly in areas of the Bay that have been previously filled.

3. Proposed Naval projects located in the shaded areas (Figures 2–5) would require initial review by the Service through informal consultation if in-water construction activity during the nesting season (April 1 to September 15) is desired. The Navy will avoid formal consultation if it can be demonstrate to the Service that its proposed project is not likely to adversely affect the tern. If the Navy gives the Service a letter or other written communication showing the Service that the conditions listed below will be met, the Service will concur with the Navy's assessment. The Service will review these projects on a case-by-case basis or as a group of projects with similar objectives, and will respond in writing whether they concur with the Navy's assessment. If the Service does not concur, it shall specify which of the conditions listed below have not been properly shown, and the reasons that it believes that they have not.

a. The Navy's written communication to the Service must contain detailed discussion of dredging methodology and means to control turbidity from project construction activities, including dredged material disposal. This information will be provided to show that the project is not likely to adversely affect tern nesting or foraging activities.

b. Noise levels from pile driving, sheet pile driving, or other heavy construction activity shall be as described in 2.b. above. Vibrations from these activities shall not be allowed to disrupt nesting or loafing terns.

4. The Service will review and evaluate all studies that are conducted in conjunction with this MOU on a continuous basis with the intention of modifying the restrictions placed on Navy in-water construction activities, as warranted.

5. The Service shall attend a minimum of two meetings each year with the Navy (i.e. April and October) to determine the priority of tern compensation projects to be initiated during the next fiscal year and review the Navy's current list and description of proposed construction projects to be conducted in the Bay and near shore marine waters of the Ocean. The mutually agreed upon tern compensation projects will be identified in a letter prepared by the Navy within 45 days from the October meeting.

6. The Service agrees to monitor and conduct predator management at each Service tern nesting colony and to provide the Navy with copies of its annual tern monitoring reports that summarize numbers of nests, eggs, chicks, fledglings, and adults that occurred at each Service tern nesting colony, as well as copies of any tern research reports prepared for the Service.

7. Prior to completion and approval of the Comprehensive Conservation Plan (CCP), the Service will continue to provide for: (1) predator management, (2) annual monitoring of the tern and WSPL, (3) preseason site preparation at the Tijuana Slough NWR, Sweetwater Marsh NWR, and South San Diego Bay Unit, and (4) enhancement of tern and Western snowy plover nesting substrate at the South San Diego Bay Unit. The Service, in developing the CCP, agrees to assist in promoting the long-term viability of tern and Western snowy plover populations by preserving the continuity of the above initiatives to the greatest extent possible. This will facilitate a balanced dispersal of nesting opportunities among federal and state agencies and municipalities within San Diego Bay. After completion and approval of the CCP, the Service will incorporate all applicable habitat and species management projects into the Refuge Operations Needs System to request funding.

8. The Service shall work to ensure that other non-Department of the Navy entities that administer areas used by terns, shall manage these areas so that they are sufficiently attractive to terns and provided with a level of management that will result in a level of productivity comparable to that accomplished at Navy sites. This will provide for a more balanced and biologically sound distribution of tern breeding populations in the Bay and surrounding areas. The Service shall provide information on the progress of this effort annually at the October meeting. Other relevant entities include but are not limited to the Service's own Refuges Division, the State of California, County of San Diego, San Diego Unified Port District, and the City of San Diego, as well as all other surrounding municipalities.

9. The Service shall make all reasonable efforts to finalize the tern recovery plan currently under revision, and provide a public review draft within six months of the signature of this document. If the Service forms a tern recovery team, the Service shall include a Navy representative as a full team member.

MISCELLANEOUS PROVISIONS

This MOU is effective when signed by both parties and shall extend for a period of 2 years from that date. The MOU can be updated at any time as an improved database is developed from studies conducted in San Diego Bay and elsewhere. Any amendment to this MOU must be in writing signed by all parties. Nothing in this MOU is intended to abrogate the responsibility of the Navy or the Service to comply with any provision(s) of the Endangered Species Act, Migratory Bird Treaty Act, Clean Water Act, or River and Harbor Act or other applicable federal laws.

While the parties agree that their annual budget submissions will be sufficient to cover the tasks and goals described herein, pursuant to the Anti-Deficiency Act, 31 U.S.C. §1341, *et seq.*, any

requirement for the payment or obligation of funds, including funding for staffing resources, pursuant to this MOU (including any attachment), shall be subject to the availability of funds appropriated by Congress, and no provision herein shall be interpreted to require obligation or payment of funds in advance of an appropriation. Nor shall this MOU be construed to require the violation of any other applicable federal law. In cases where payment or obligation of funds would constitute a violation of the Anti-Deficiency Act, the dates established for targeted tasks under this MOU shall be appropriately adjusted. Nothing in this MOU shall be construed as implying that Congress will, at a later time, appropriate funds sufficient to meet deficiencies. Immediate action, in the form of a written letter, is warranted should either party determine that the payment of obligation of funds pursuant to this MOU could not be fulfilled in a given fiscal year. That party should provide an anticipated schedule when such funds would be available to fulfill the terms of this MOU.

This MOU may be modified only by written agreement of the parties. Modification includes extension of its term. This MOU may be terminated by either party by a procedure that begins with written notification to the other party that such measure is being considered. Within 30 days of such notification the parties will meet to informally address all concerns raised. If resolution of the concerns cannot be negotiated, The MOU may be dissolved upon written notice by the party wanting to terminate the MOU. Said final termination notice must be within 60 days following the meeting and state the reasons for dissolution of the MOU.

Paul Henson

for Mr. Steve Thompson
California/Nevada Operations Manager
U.S. Fish and Wildlife Service

5/19/04
Date

C. Schanze

C. SCHANZE
Captain, CEC, U.S. Navy
By direction of the
Commander, Navy Region Southwest

04 DEC 03
Date

A. Gonzales

A. GONZALES
Captain, U.S. Navy
By direction of the
Commander, Navy Region Southwest

6/14/04
Date

D. R. Landon

D. LANDON
Captain, U.S. Navy
Commanding Officer
Naval Base Coronado

12 Nov 03
Date

ATTACHMENT A

MEMORANDUM OF UNDERSTANDING
BETWEEN
U.S. FISH AND WILDLIFE SERVICE
AND
THE U.S. NAVY
CONCERNING CONSERVATION OF THE ENDANGERED CALIFORNIA LEAST TERN
IN SAN DIEGO BAY, CALIFORNIA

Navy conservation measures ranked in the order that they should be implemented:

1. Prepare tern nesting colony sites on NAS North Island identified as the "MAT" site and NAB Coronado identified as North and South Delta Beaches and Ocean Beach by March 1 of each year. Preparation of the Alternate Site "Ammo Dump" (2B) will not be done until issues of site contamination have been resolved. Site preparation includes grading or mowing or use of Service-approved herbicides to remove annual plant growth, inspection/replacement or reinstallation of the chick barrier around the perimeter of the tern colony, inspection/ repair/replacement of nest site grid poles and placement of chick shelters throughout the nesting colony. Chick shelters, usually consisting of ceramic roofing tiles, should be placed at approximately 15 meter intervals throughout the entire nesting sites.

2. Provide funding for and conduct monitoring at all tern nesting colonies on Navy property adjacent to San Diego Bay including, NAS North Island and NAB Coronado, to determine the breeding status of the colony. A minimum tern monitoring effort of four (4) days a week per individual nesting colony site should occur from May 1 through July 31, and three (3) days a week from April 15-30 August 1-31 or until the terns have departed each nesting colony site. At a minimum, the following information shall be recorded for each nesting site: the number of adult nesting pairs, number and location of nests, number of eggs laid, number of chicks, fledglings produced, level of depredation, and the known causes of depredation. Monitors must be experienced with the identification of the different age classes of terns, vocalizations of terns and other shorebirds that occur in San Diego Bay, and have specific knowledge concerning the breeding and foraging behavior of terns.

3. Provide funding for predator management at all least tern colonies on Navy property in San Diego Bay including, NAS North Island and NAB Coronado. Only professional predator management personnel shall be used. A predator management program shall be developed specifically for feral cats, other mammalian predators (i.e., foxes, skunks, rats, cats and dogs), and avian predators (i.e., ravens, gulls, loggerhead shrikes, herons, owls and American kestrels). A minimum predator management effort of five (5) days a week for an eight (8) month period from January 1 through August 31of each year is required. It may be necessary

to use drugs or poisoned bait to deal with some avian and mammalian species. In these cases, personnel licensed to use such drugs shall be required. The Navy and the Service will develop strategy in advance for the management of known sensitive, but not federally listed, predators such as the Western gull-billed tern (*Sterna nilotica vanrossemi*) and peregrine falcon (*Falco peregrinus*).

4. Maintain annually and replace, as needed, all fences around active tern nesting sites on Navy lands in San Diego Bay. This includes maintaining and replacing Nixalite (an anti-perching material) on the top of the fence, any visual barriers on or attached to the fence, chick movement barriers along the bottom of the fence and the repair or replacement of tern conservation signs. The fence design shall preclude cats and dogs (both feral and domestic) from entering the nesting colony.

5. Develop, implement and maintain an ant control program at all the nesting sites on Navy lands in San Diego Bay as long as ants continue to be documented as a cause of tern egg and chick mortalities.

6. Place tern decoys in appropriate numbers and locations on all active tern nesting sites on Navy lands in San Diego Bay, and at as many alternate nesting sites as decoys will allow, to encourage tern use of a suitable habitat for nesting. The use of decoys shall not discourage nesting efforts of the federally listed Western snowy plover (*Charadrius alexandrinus nivosus).*

7. Initiate appropriate pet control regulations, conduct an installation-wide pet licensing program for dogs and cats, and encourage the spay-neutering of pets on NAS North Island and NAB Coronado to reduce feral dog and cat populations. Information should be provided to all owners of dogs and cats concerning the potential problems their pets can cause to indigenous wildlife, especially to federally listed and sensitive species nesting on Navy land. The pet control regulations shall also reflect the intent of Executive Order 13112, Invasive Species, and Department of the Navy Policy Letter Preventing Feral Cat and Dog Populations on Navy Property dated 10 January 2002, in the prohibition of establishing/maintaining feral cat colonies on Navy land.

8. Provide additional foraging opportunities for terns through one or more of the following: creation/rehabilitation of eelgrass beds and creation/rehabilitation of inter-tidal/sub-tidal bay habitat.

9. Continue to investigate the feasibility of creating a new tern nesting site at the Naval Radio Receiving Facility, Imperial Beach, as compatible with operational and training requirements.

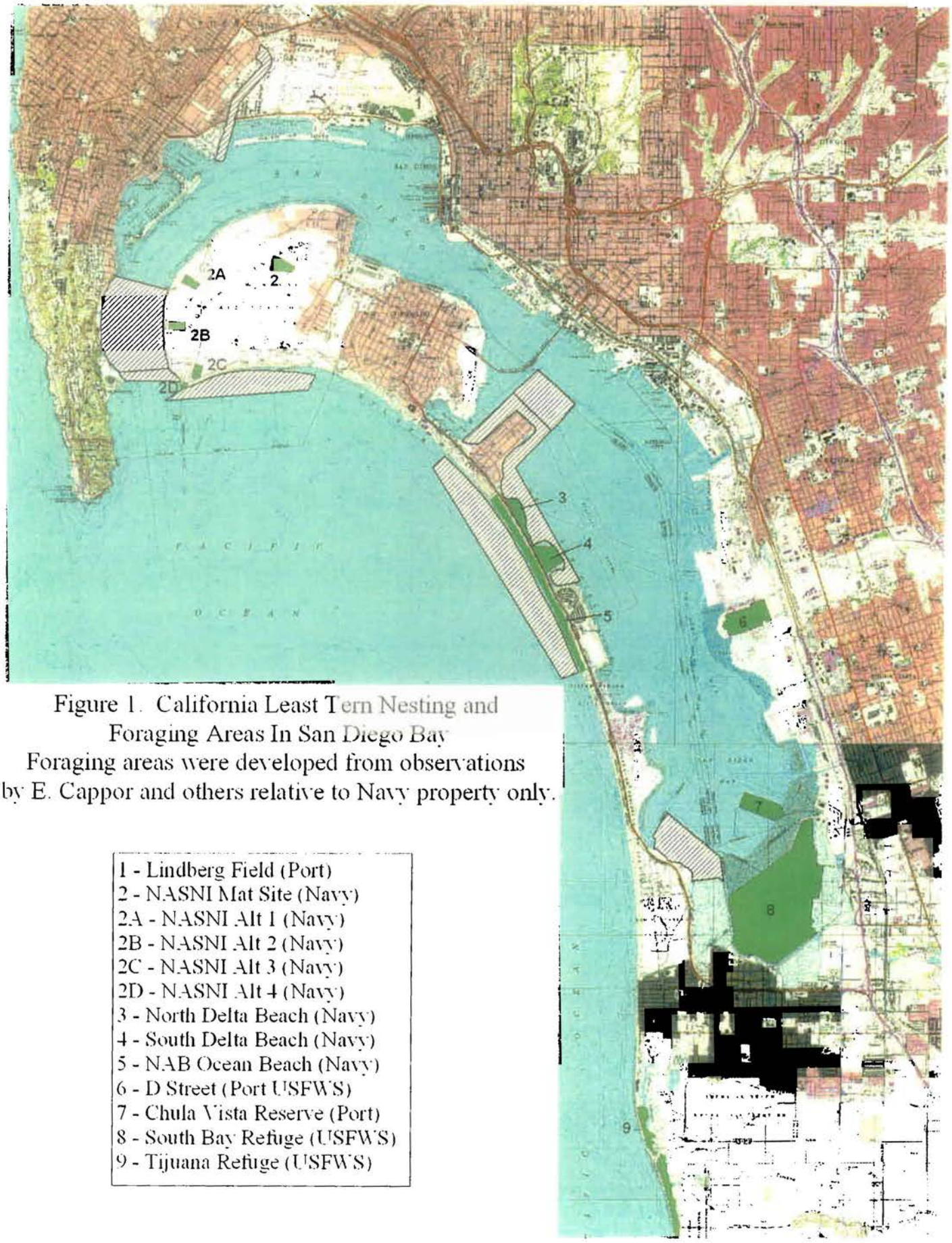


Figure 1. California Least Tern Nesting and Foraging Areas In San Diego Bay
Foraging areas were developed from observations by E. Cappor and others relative to Navy property only.

1 - Lindberg Field (Port)
2 - NASNI Mat Site (Navy)
2A - NASNI Alt 1 (Navy)
2B - NASNI Alt 2 (Navy)
2C - NASNI Alt 3 (Navy)
2D - NASNI Alt 4 (Navy)
3 - North Delta Beach (Navy)
4 - South Delta Beach (Navy)
5 - NAB Ocean Beach (Navy)
6 - D Street (Port USFWS)
7 - Chula Vista Reserve (Port)
8 - South Bay Refuge (USFWS)
9 - Tijuana Refuge (USFWS)

Nesting Sites
Foraging Areas

3 0 3 6 Kilometers

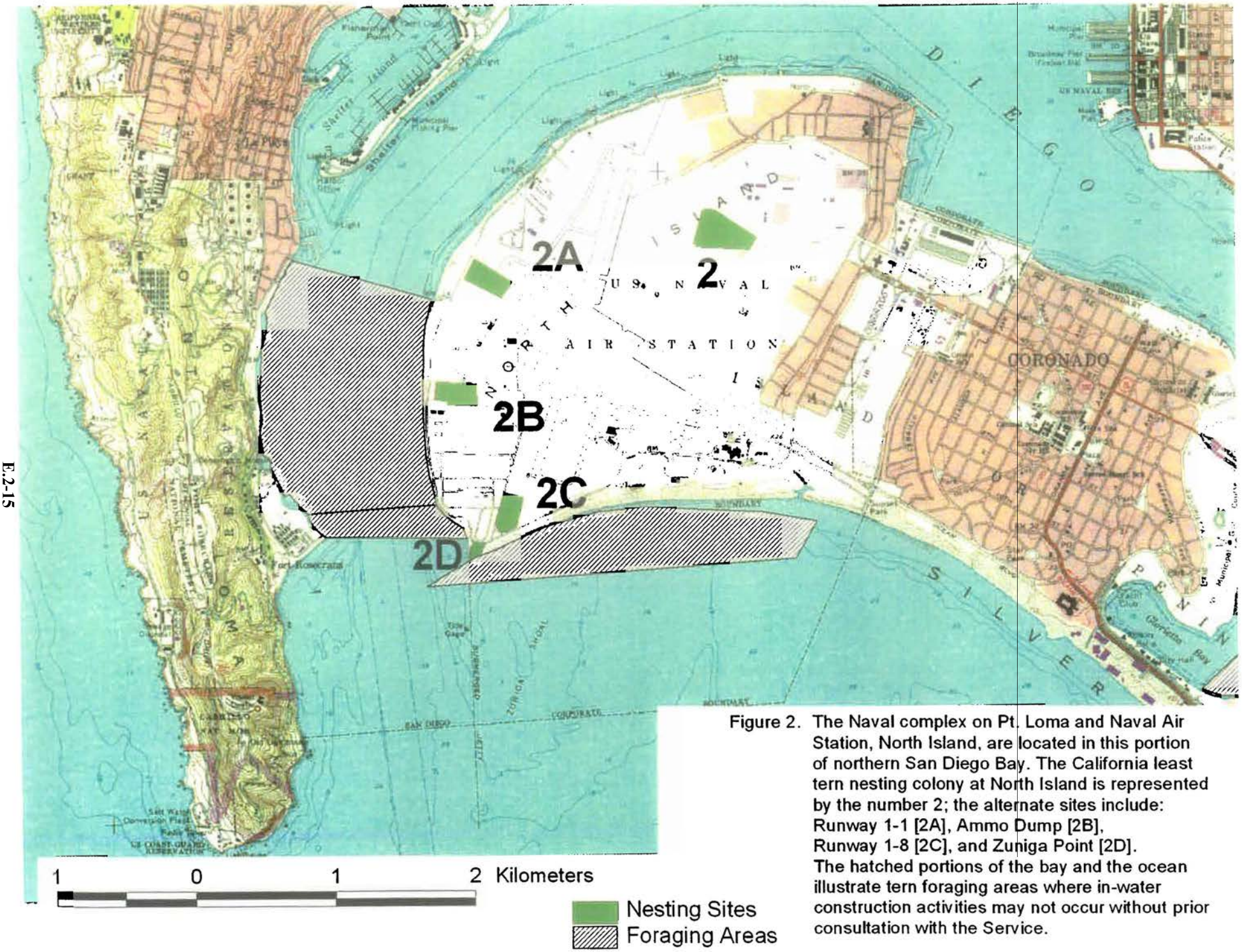


Figure 2. The Naval complex on Pt. Loma and Naval Air Station, North Island, are located in this portion of northern San Diego Bay. The California least tern nesting colony at North Island is represented by the number 2; the alternate sites include: Runway 1-1 [2A], Ammo Dump [2B], Runway 1-8 [2C], and Zuniga Point [2D]. The hatched portions of the bay and the ocean illustrate tern foraging areas where in-water construction activities may not occur without prior consultation with the Service.

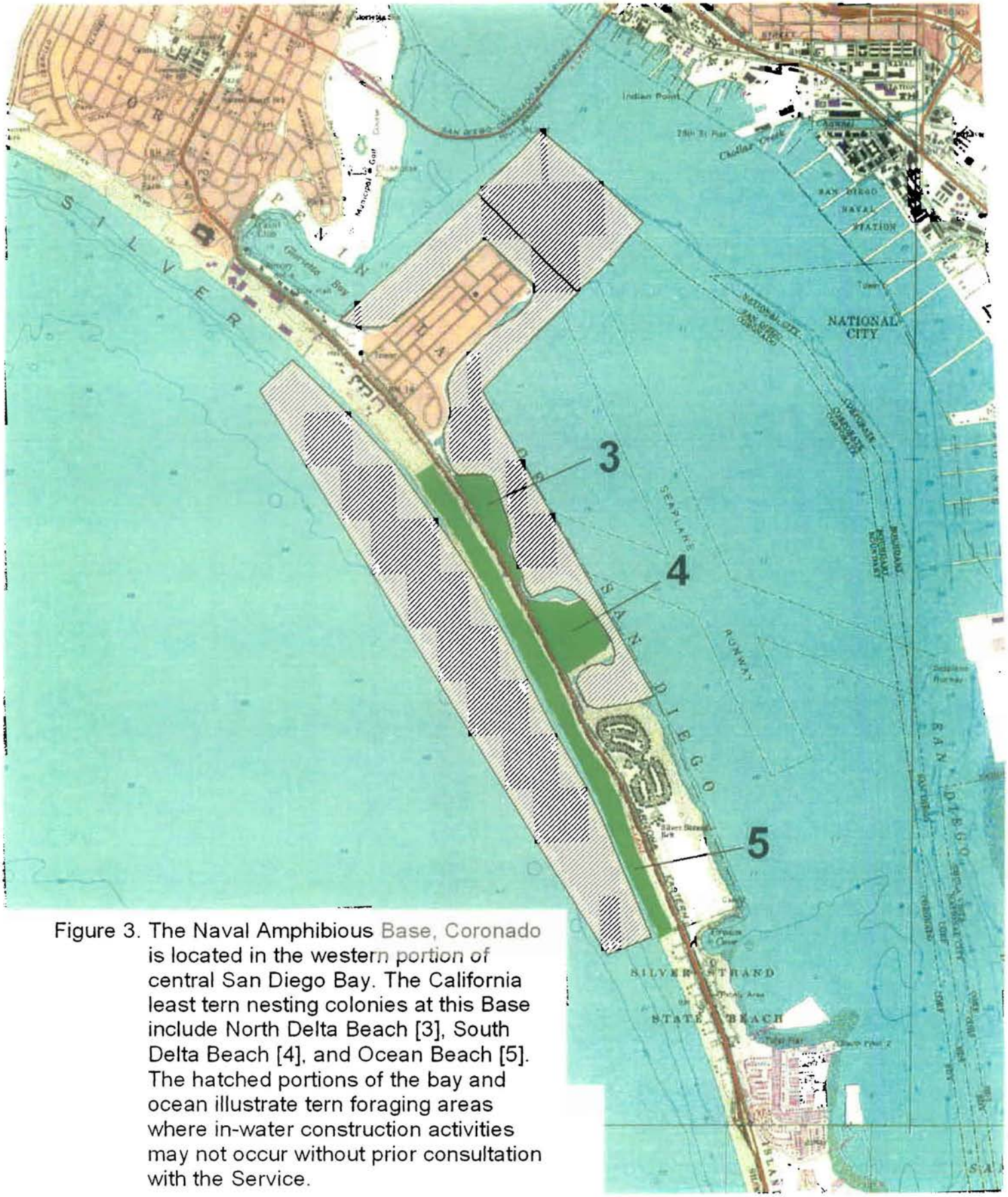


Figure 3. The Naval Amphibious Base, Coronado is located in the western portion of central San Diego Bay. The California least tern nesting colonies at this Base include North Delta Beach [3], South Delta Beach [4], and Ocean Beach [5]. The hatched portions of the bay and ocean illustrate tern foraging areas where in-water construction activities may not occur without prior consultation with the Service.

Nesting Sites
Foraging Areas

1 0 1 2 Kilometers

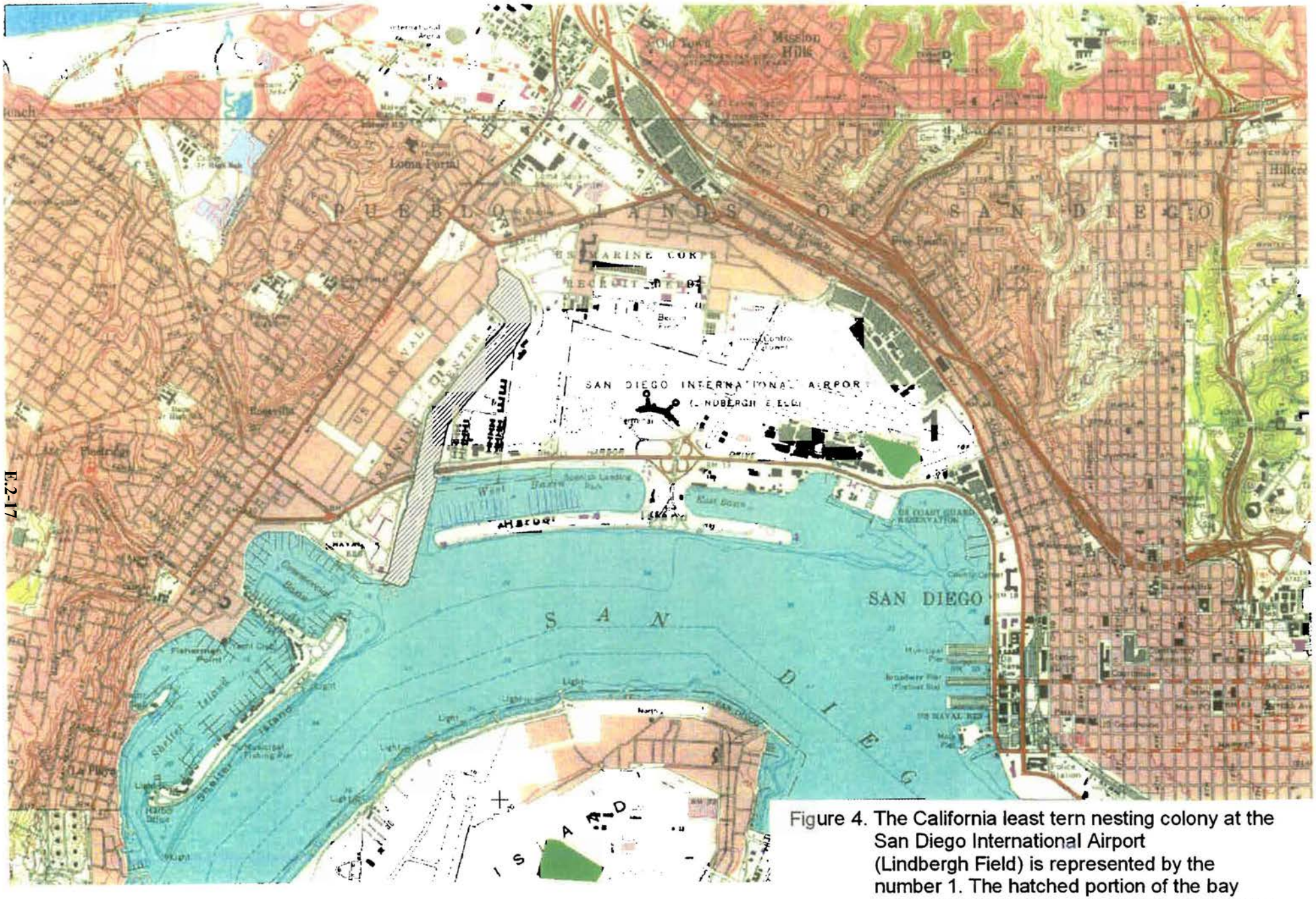


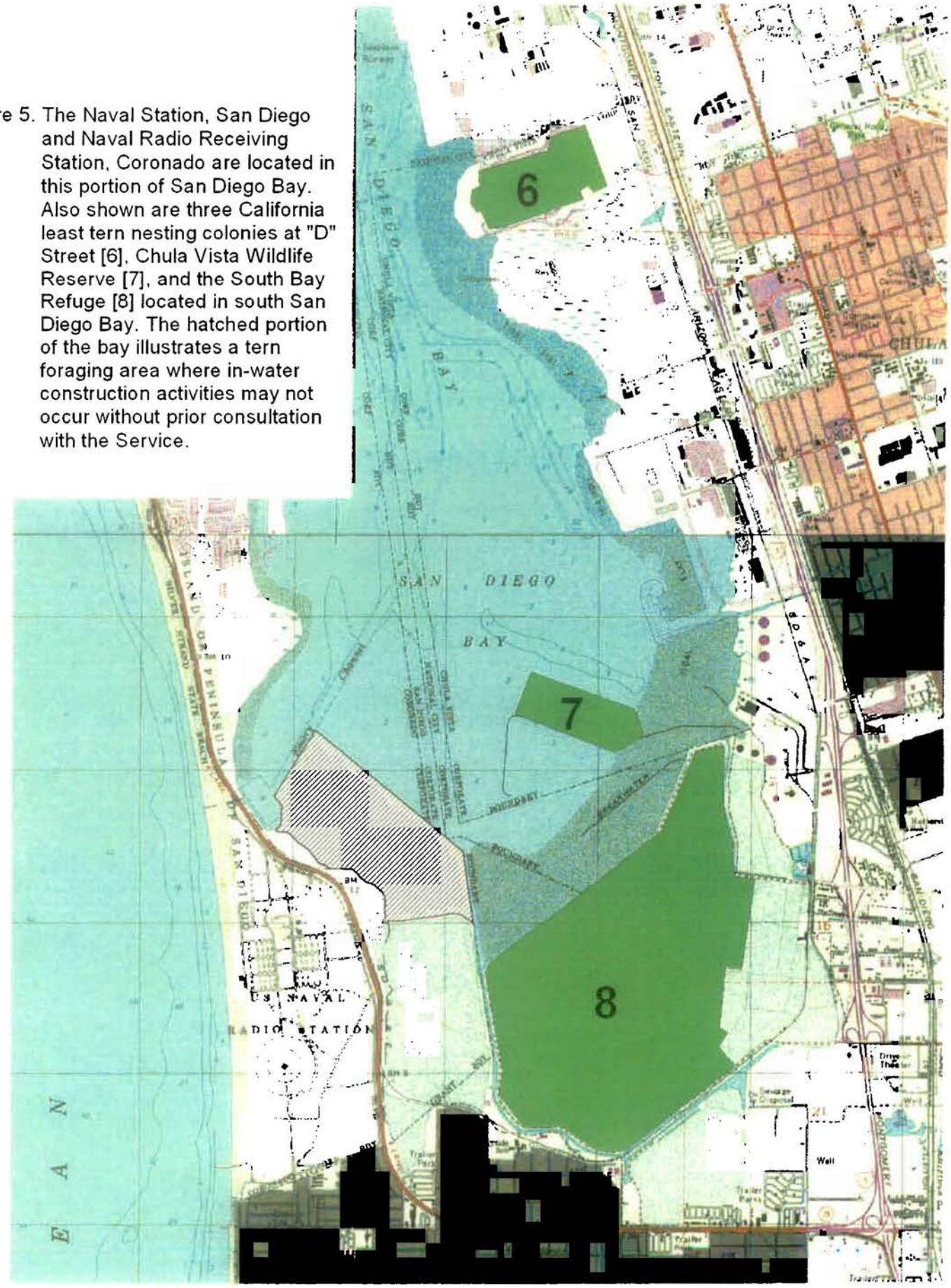
Figure 4. The California least tern nesting colony at the San Diego International Airport (Lindbergh Field) is represented by the number 1. The hatched portion of the bay illustrates a tern foraging area where in-water construction activities may not occur without prior consultation with the Service.

1 0 1 2 Kilometers

Nesting Sites

Foraging Areas

Figure 5. The Naval Station, San Diego and Naval Radio Receiving Station, Coronado are located in this portion of San Diego Bay. Also shown are three California least tern nesting colonies at "D" Street [6], Chula Vista Wildlife Reserve [7], and the South Bay Refuge [8] located in south San Diego Bay. The hatched portion of the bay illustrates a tern foraging area where in-water construction activities may not occur without prior consultation with the Service.



Appendix E.3

Approval for Use of Eelgrass Mitigation Bank Credits

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DEPARTMENT OF THE NAVY
COMMANDER NAVY REGION SOUTHWEST
937 NO. HARBOR DR.
SAN DIEGO, CALIFORNIA 92132-0058

IN REPLY REFER TO:
5090
Ser N40JRR.cs/0006
March 11, 2011

From: Commander Navy Region Southwest
To: Defense Logistics Agency (DLA) Enterprise Support, Installation Management (Attn: Mr. John Davis)

Subj: REQUEST FOR CREDITS FROM CNRSW EELGRASS MITIGATION BANK IN SUPPORT OF MILCON P-151, NAVAL STATION POINT LOMA

Ref: (a) Mitigation Banking Instrument between CNRSW and USACE and NOAA Fisheries for the San Diego Eelgrass Mitigation Bank dated 2 July 2008.

1. CNRSW approves the application of available eelgrass habitat credits in support of the Defense Logistics Agency, Pier 180 (MILCON P-151) project at Naval Station Point Loma.

2. Per reference (a), Eelgrass habitat loss as a result of the construction and maintenance of the new Pier 180 (MILCON P-151) will be mitigated by accessing the available credits from the subject Bank (north and north-central ecoregions).

3. There may be a monitoring fee not to exceed $10,000 to utilize the bank credits. This fee will be used to conduct eelgrass surveys of the Mitigation Bank sites that will be used to provide the offset for the proposed project. The monitoring fee shall be paid from the MILCON project.

4. For questions pertaining to this matter, please feel free to contact Chris Stathos at (619) 532-2308.

C. L. STATHOS
By direction

Appendix E.4

Acoustic Transmission Loss Model for Pile Driving

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Applied Physics Laboratory
University of Washington

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January 25, 2011

To: Mitchell A. Perdue, CRM
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Anurag Kumar
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This memorandum summarizes our results of modeling acoustic transmission loss (TL) for San Diego Bay associated with underwater noise generated by impact pile driving. The TL modeling assumes a nominal pile driving location at position 477888.7 N, 3618101W where the nominal water depth is 14.7 m. A note on the model deliverable in the form of ArcGIS raster data is given at the end of this memorandum.

Our model assumes an average sound speed of 1504 m/s based on historical temperature-salinity data, and location-dependent bathymetry, both provided to us by NAVAC. Note that for purposes of modeling TL we have smoothed this bathymetry over a 100 m smoothing window and removed any features considered artifact. For geoacoustic properties of the sediments we use sound speed[1] and attenuation[2] for sand based a frequency of 500 Hz. Additional assumptions entering into the modeling are summarized as follows:

1. The spectrum of acoustic energy associated with impact pile driving is confined to frequencies less than about 2000 Hz[3]
2. The model is intended to simulate depth-averaged TL, which is specifically applicable to peak pressure emanating from an impact pile driving source, but also applies more generally to SEL and RMS measures.
3. The concept of a Mach cone that emanates from impact pile driving is incorporated in our TL model which causes the acoustic amplitude to decay as $R^{1/2}$ (cylindrical spreading) where R is range from the pile source, out to range of R*, or roughly 3 times the water depth. The Mach cone and precise definition of R* are discussed in ref.[3].
4. Beyond ranges of R* the amplitude decays as $R^{3/2}$. This decay mirrors the so-called practical spreading model (PSM), but our model differs fundamentally from the PSM. The primary differences are (i) model properties associated with R*, and (ii) depth-dependence in our model.
5. Depth-dependence is handled in two ways. For cases in which the depth increases from the source impact pile driving, the sound pressure amplitude decays as $(H/Ho)^{1/2}$ where H is the depth as a function of range from source and Ho is the depth at the source. This behavior applies unless and until the depth reaches a modal cut-off depth, associated with a frequency of 500 Hz. At this point the modal decay coefficient corresponding to the first mode at 500 Hz is applied, which increases TL at a rate significantly greater than $R^{3/2}$.

Numerical results of the model are incorporated into a TIFF file (Dahl_Model.tif) that is attached to this email report. This file can be added as a layer in an ArcGIS map and transects can be drawn and interpolated (using the Interpolate Shape tool). In this way the model associated with any radial transect that originates from the source location can be extracted. Figure 1 displays a summary of the model for San Diego Bay along with two representative transects, with TL versus range for these two transects plotted in Fig. 2.

[1] K. L. Williams, D. R. Jackson, E. I. Thorsos, D. Tang, and S. G. Schock,"Comparison of sound speed and attenuation measured in a sandy sediment to predictions based on the Biot theory of porous media," IEEE J. Ocean. Eng. 27, 413–428 (2002).

[2] J. Zhou, X. Zhang, and D. P. Knobles, "Low-frequency geoacoustic model for the effective properties of sandy bottoms," J. Acoust. Soc. Am. 125, 2847–2866 (2009).

[3] P.G. Reinhall, & P.H. Dahl, "Underwater Mach wave radiation from impact pile driving: Theory and observation", J. Acoust. Soc. Am. 130, 3, 1209-1216 (September 01, 2011).

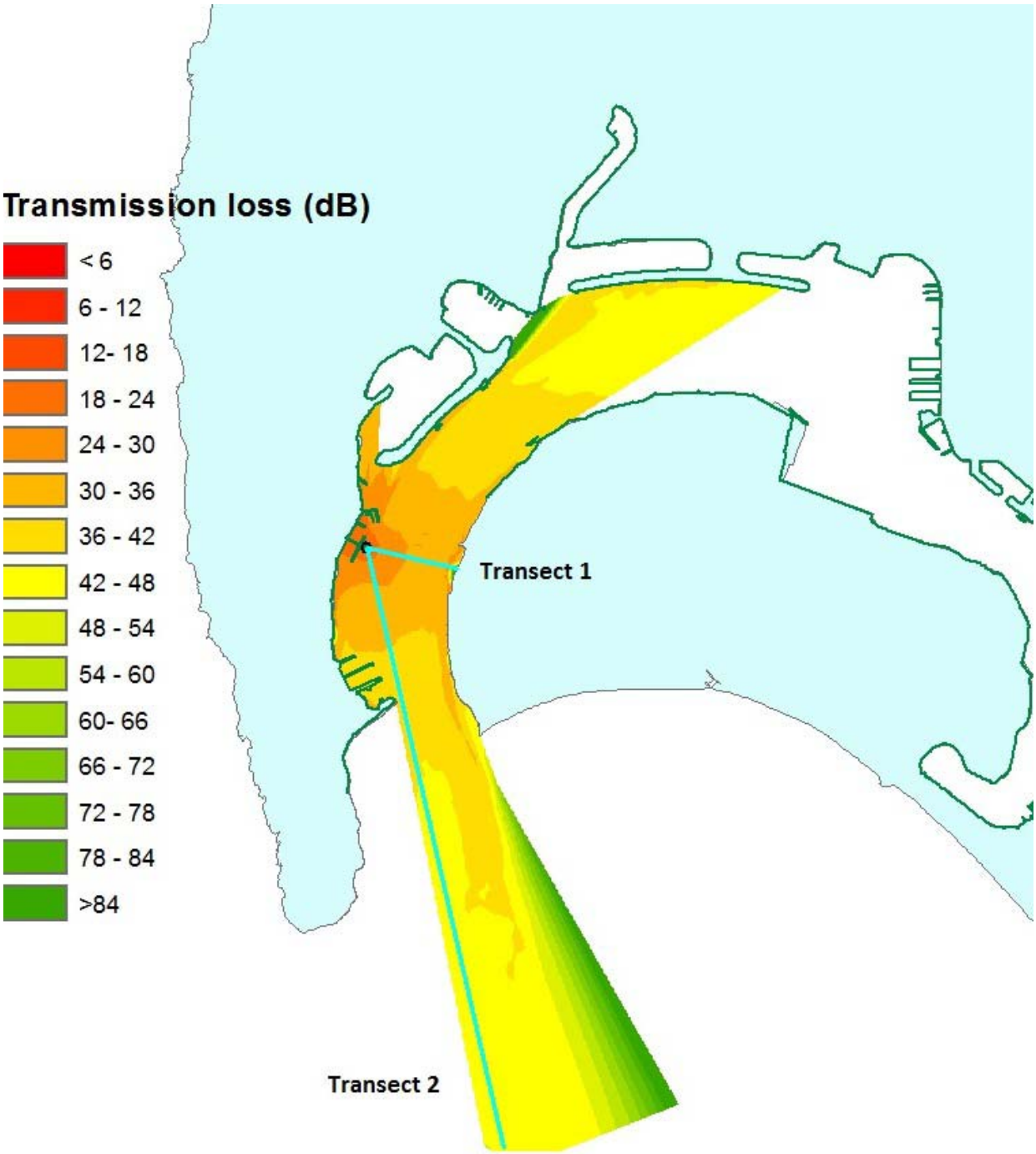


Figure 1. Transmission loss in San Diego associated with impact pile driving source located at 477888.7 N, 3618101W. Two transects that originate from the source are shown.

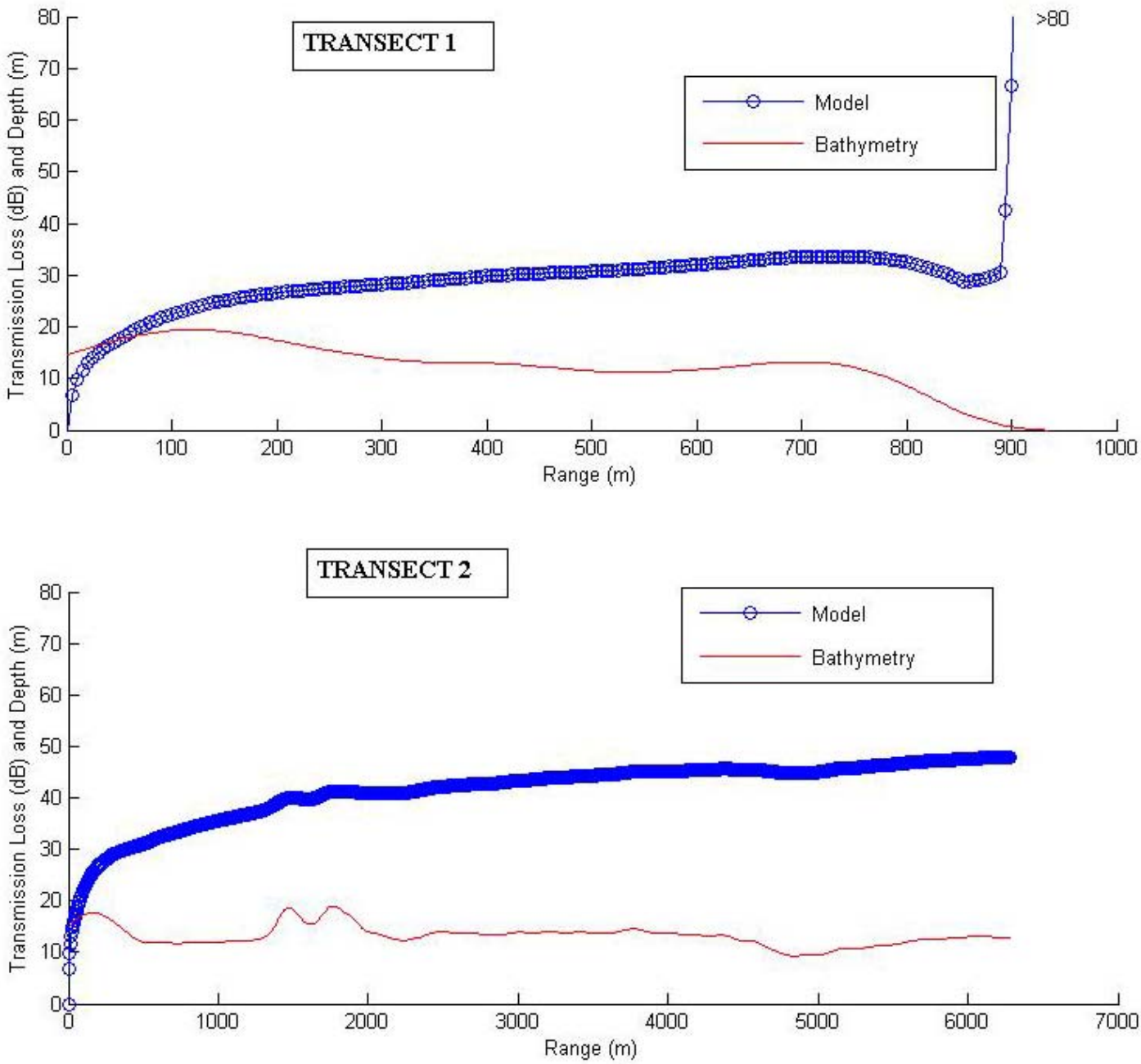
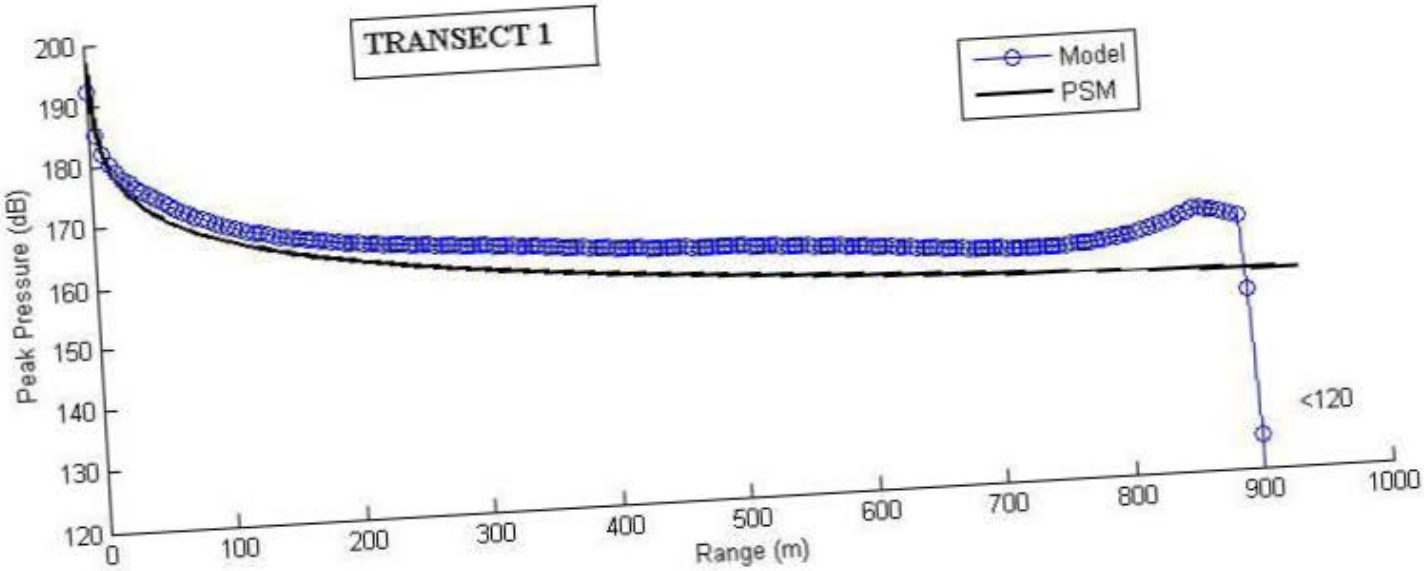


Figure 2. Transmission loss (in dB) and bathymetry (in m) for sample transects in San Diego plotted on the same scale. Note that for transect 1 only the first 80 dB of TL is plotted.

An example of how the model is applied, along with how results from it can differ from results obtained with the PSM is shown in Fig. 3. For this we assume a pile driving peak amplitude of 182 dB re 1 μPa exists at range 10 m for water depth 14.7 m, as given by the Cal Trans Report[4] for 0.6 m (24 inch) AZ steel sheet pile. Current use of the PSM takes this 182 dB value as a 10-m datum, from which estimates at extended range R m from the pile are computed to be equal to 182 – 15log10(R/10). For

[4] California Department of Transportation, "Technical Guidance for the Assessment and Mitigation of the Hydroacoustic Effects of Pile-driving on Fish" (2009).

example, at range 100 m, the estimate for peak level is reduced by 15 dB and is estimated to be 167 dB re 1 μPa. The model provided here gives TL starting from range 1 m (0 dB), and will show a TL at 10 m equal to 10 dB owing to cylindrical spreading and the influence of R*. Thus, to use the Cal Trans value as a 10-m datum, *one must subtract 10 dB from our model TL curve such that at range 10 m TL = 0 dB.* Results of this simple operation are shown in Fig. 3 along with comparable results using the PSM.



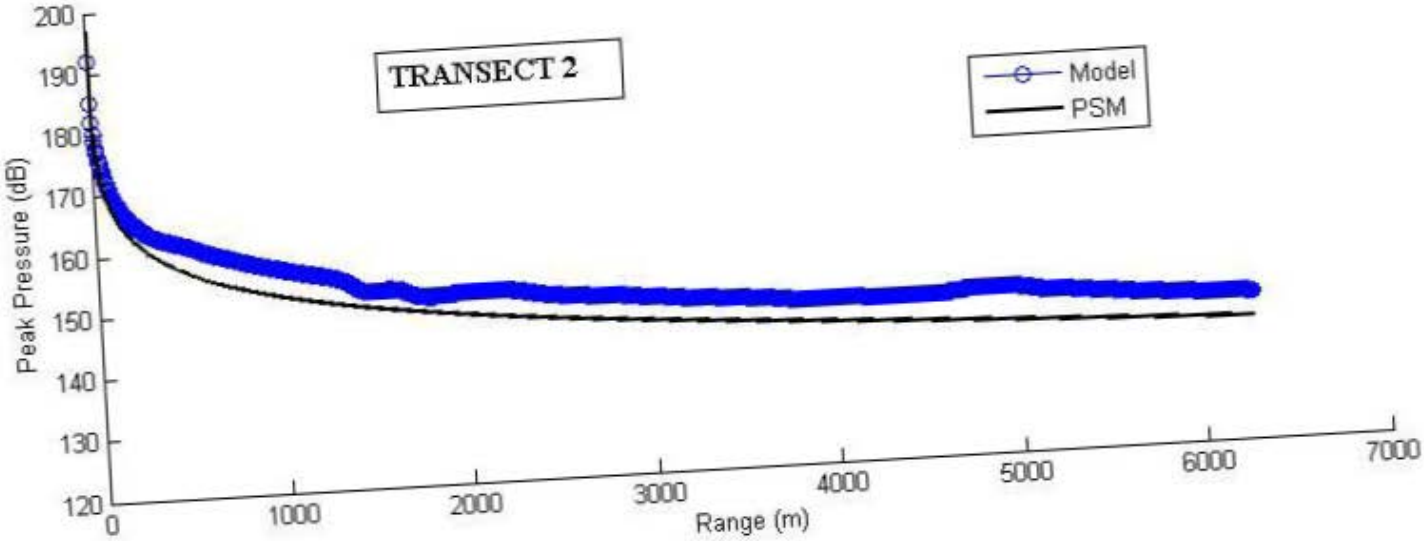


Figure 3. Comparison of peak levels calculated using PSM and Model based on a peak amplitude of 182 dB re 1 μPa, at range 10 m (or 10-m datum) .

A note on ArcGIS raster data

The model incorporated into a map of TL, such as Fig. 1, is provided in .tif format and included in the attached zip file. Note that recovery of the model TL curve associated with a particular transect from the ArcGIS raster data will produce an artifact in that curve for ranges < 10 m as shown in Fig. 4. A simple work-around for this effect is to ensure in subsequent calculations that TL = 0 dB for range = 1 m, and TL = 10 dB for range = 10m; beyond these ranges the accuracy of the recovered TL curve will be sufficient.

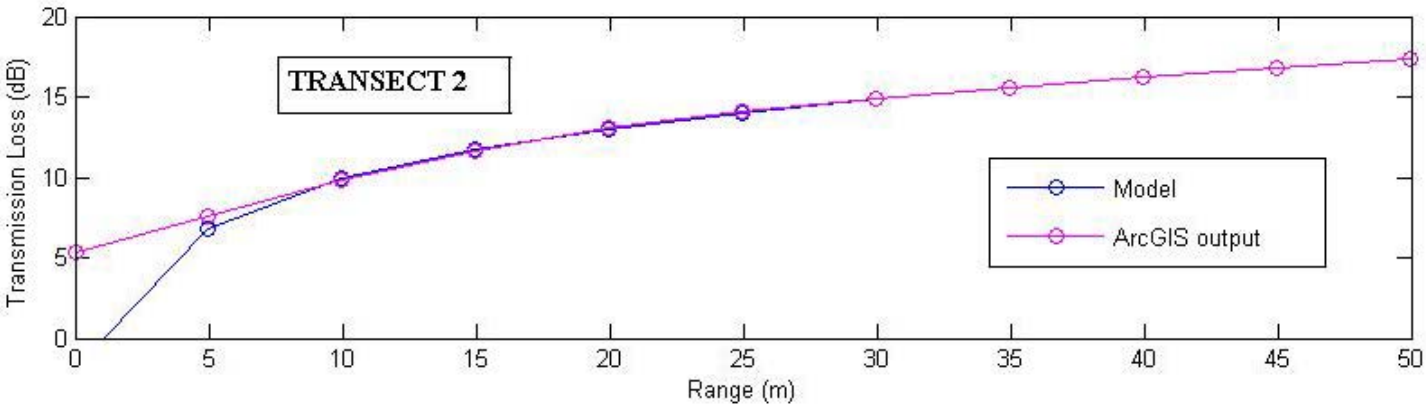


Figure 4. Comparison of ArcGIS output and Matlab model output for Transmission loss (in dB) for transect 2. The first 50 m of range is displayed.

Appendix E.5

Ambient Underwater Sound Measurements in San Diego Bay

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P-151 Fuel Pier MILCON

DRAFT

Ambient Sound Data Acquisition

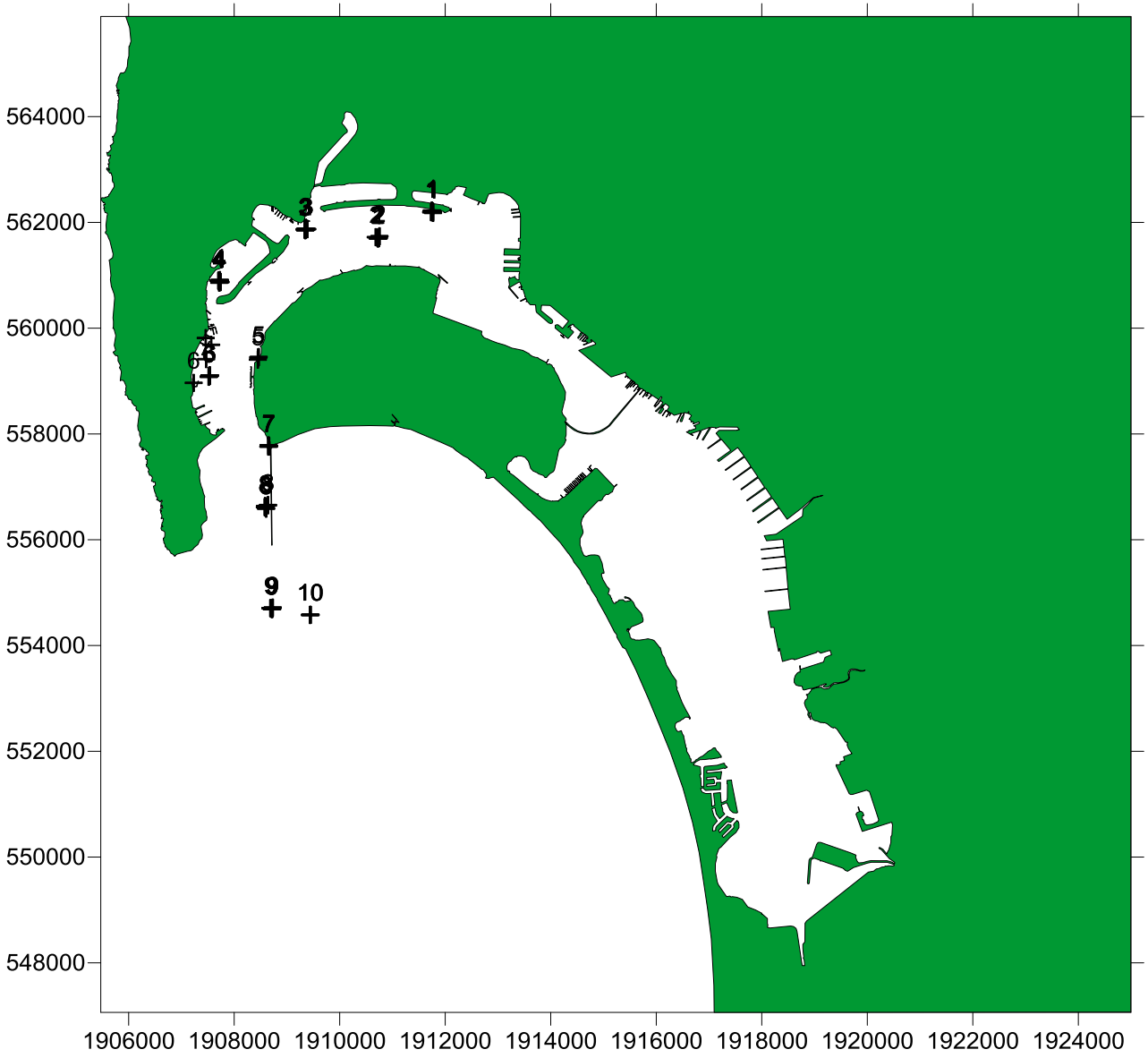
Tierra Data Inc. (TDI) in collaboration with Dr. Ken Richter of SPAWAR Systems continue to collect, process, and analyze ambient acoustic data within the projected zone of influence (ZOI) for both impact driven and vibrator pile driving scheduled to take place during the construction of the P – 151 MILCON within San Diego Bay. Acoustic data is being collected within the ZOI using a Larson Davis 831 sound meter and Rison hydrophone deployed from a 20 ft. Boston Whaler either anchored or tied to a buoy or structure. Existing acoustic data was collected intermittently from February 2012 to the present on or adjacent to the existing fuel pier or within approximately 200 meters. Data acquisition events lasted from 10 to 15 minute intervals when collected from the vessel adrift in the bay to several hours on the fuel pier. Measurement were collected at a rate of 100 measurements per second and averaged over the sampled time period to document the average and maximum sound exposure levels.

Data analysis of the existing data sets was performed by Dr. Ken Richer and presented to the project proponent. Average ambient sound levels varied on marginally and where determined to range between roughly 125 and 132 dB. Acoustic sound modeling of the project footprint and San Diego Bay, performed by Dr. Peter Dahl of the University of Washington, provided sound transition loss contours that approximate the location of defined sound levels from known sound sources. Additional acoustic data acquisition will now focus on documenting the ambient sound levels at the 160 dB RMS for impact pile driving and the 120 dB RMS for vibratory pile driving. Acoustic data logging by the LD 831 sound meter will be reduced to a lower rate to develop averages over longer time periods and extend overnight to capture potential variation in the ambient sound levels within the Bay.

Data collection will begin April 30, 2012 and proceed throughout the week to the maximum extent possible. The LD 831 is currently integrated with n external GPS and collected data files will be downloaded daily and forward to Dr. Ken Richter for processing and the conclusion of each event.

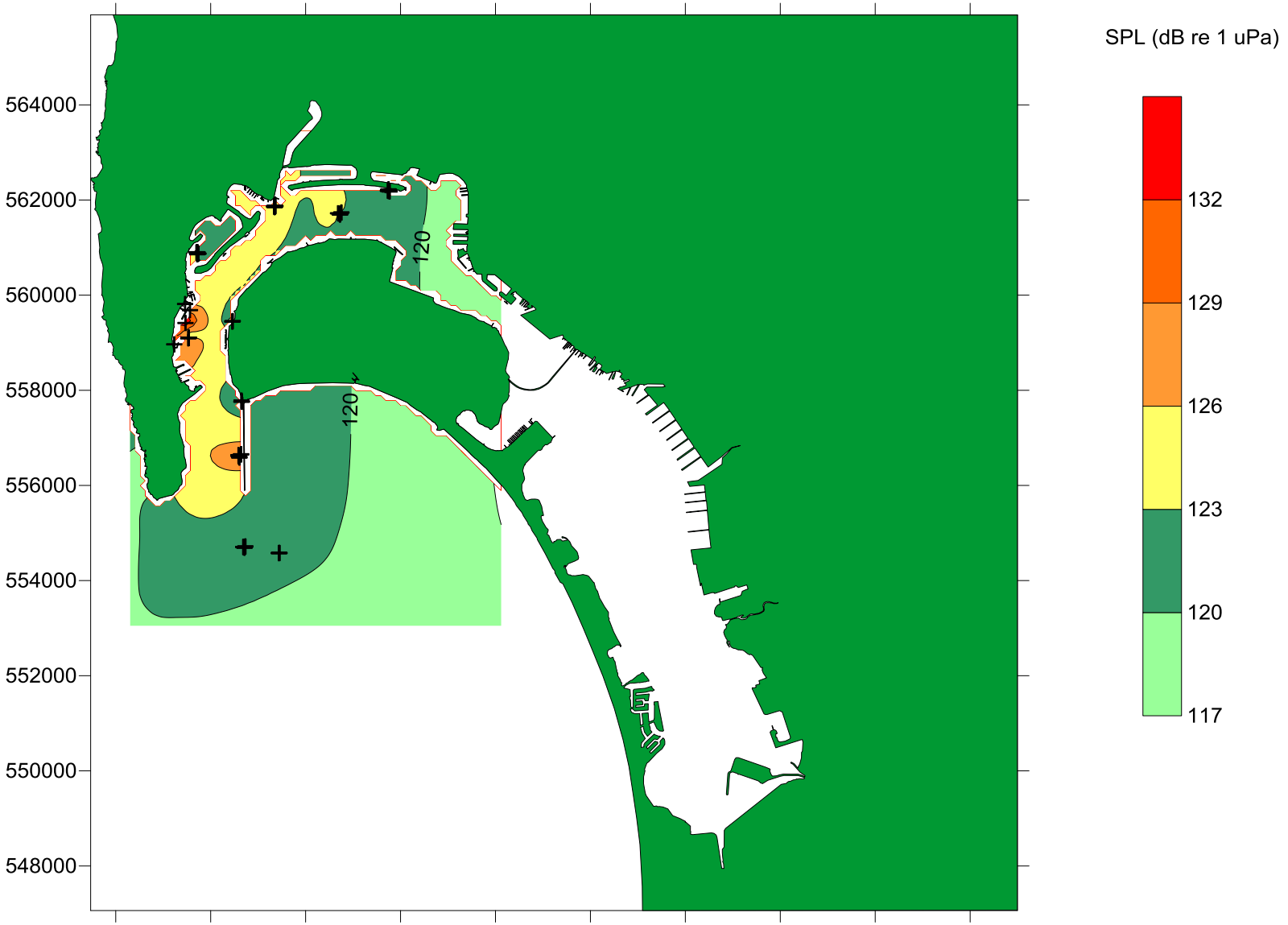
Figure 1. Acoustic footprint and ambient sound sampling locations for the -151 Fuel Pier MILCON.

Station locations

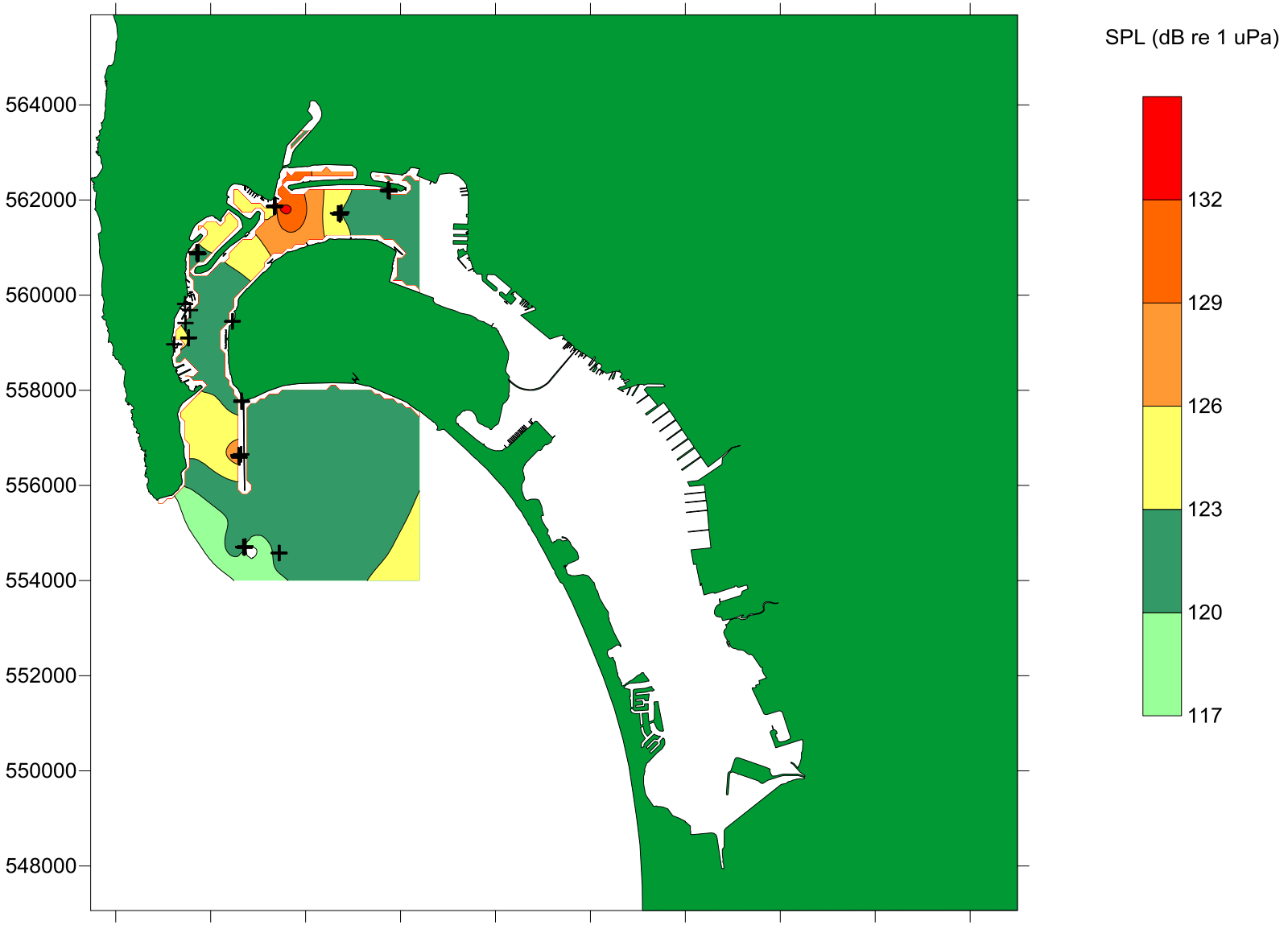


E.5-3

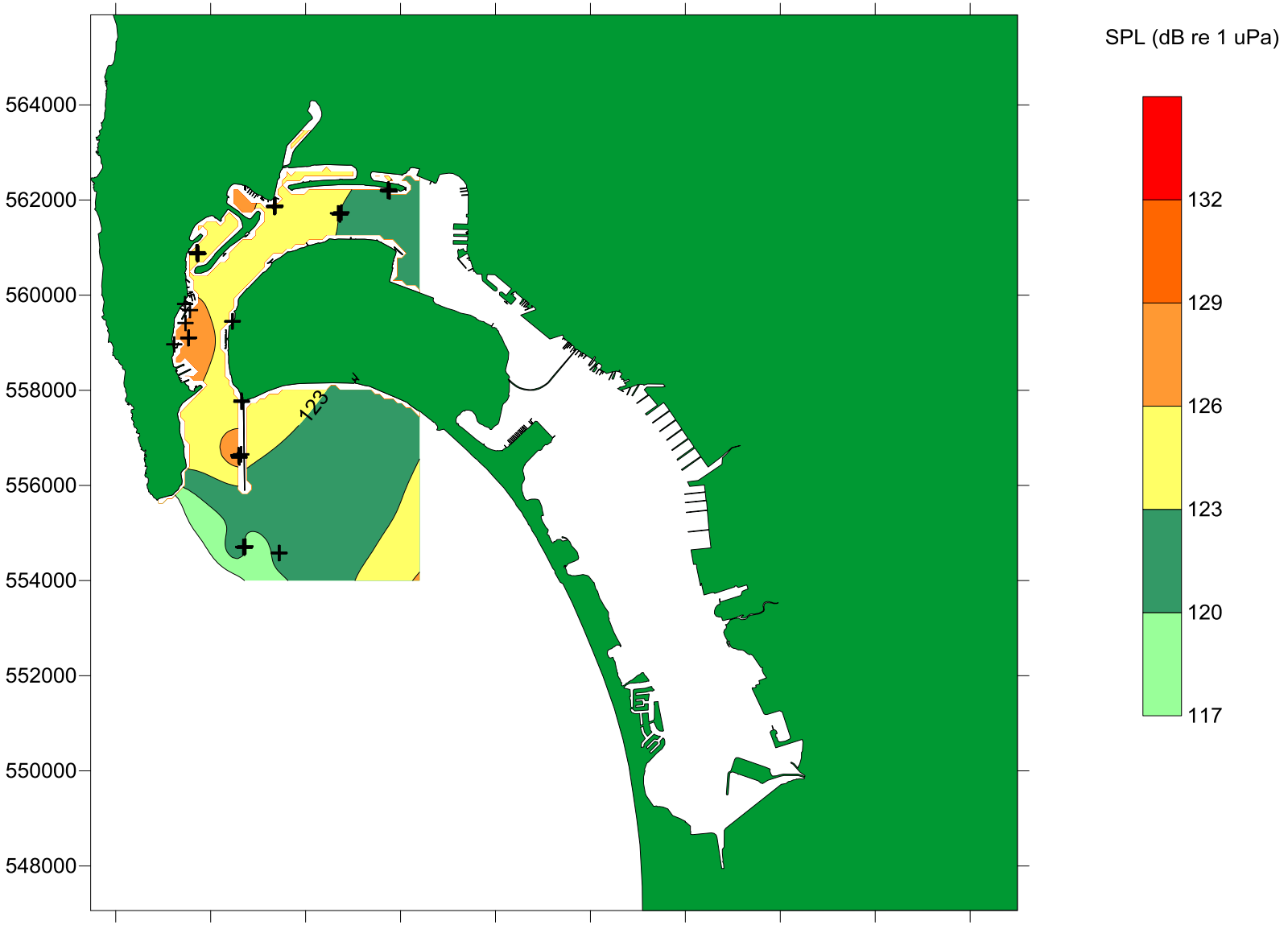
Median ambient rms sound pressure



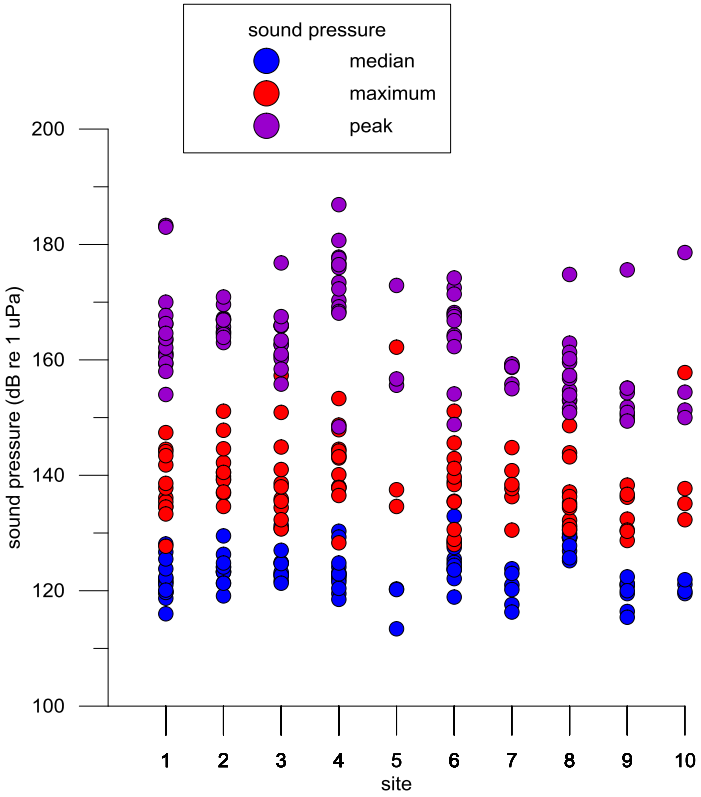
Median ambient rms sound pressure near the surface (~ 1 m)



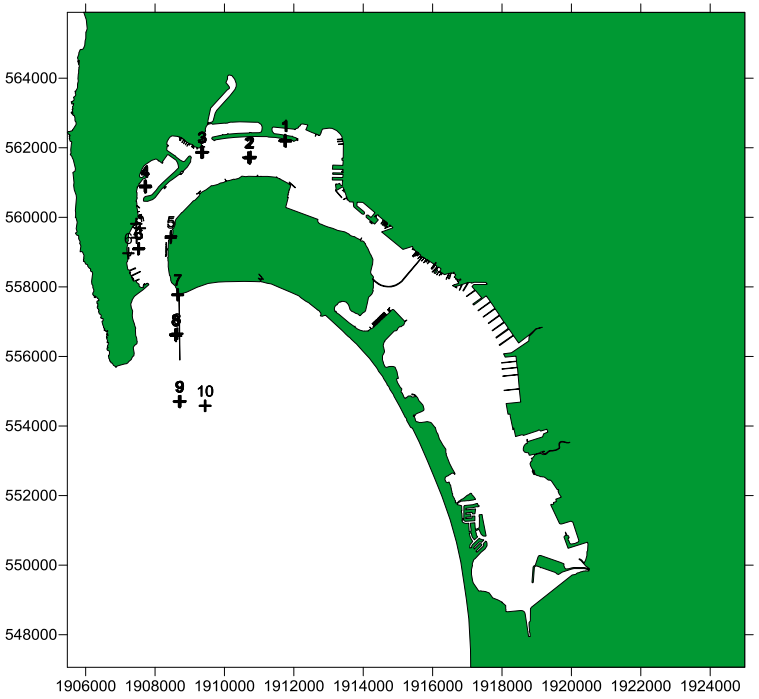
Median ambient rms sound pressure at depth (4-15 m)



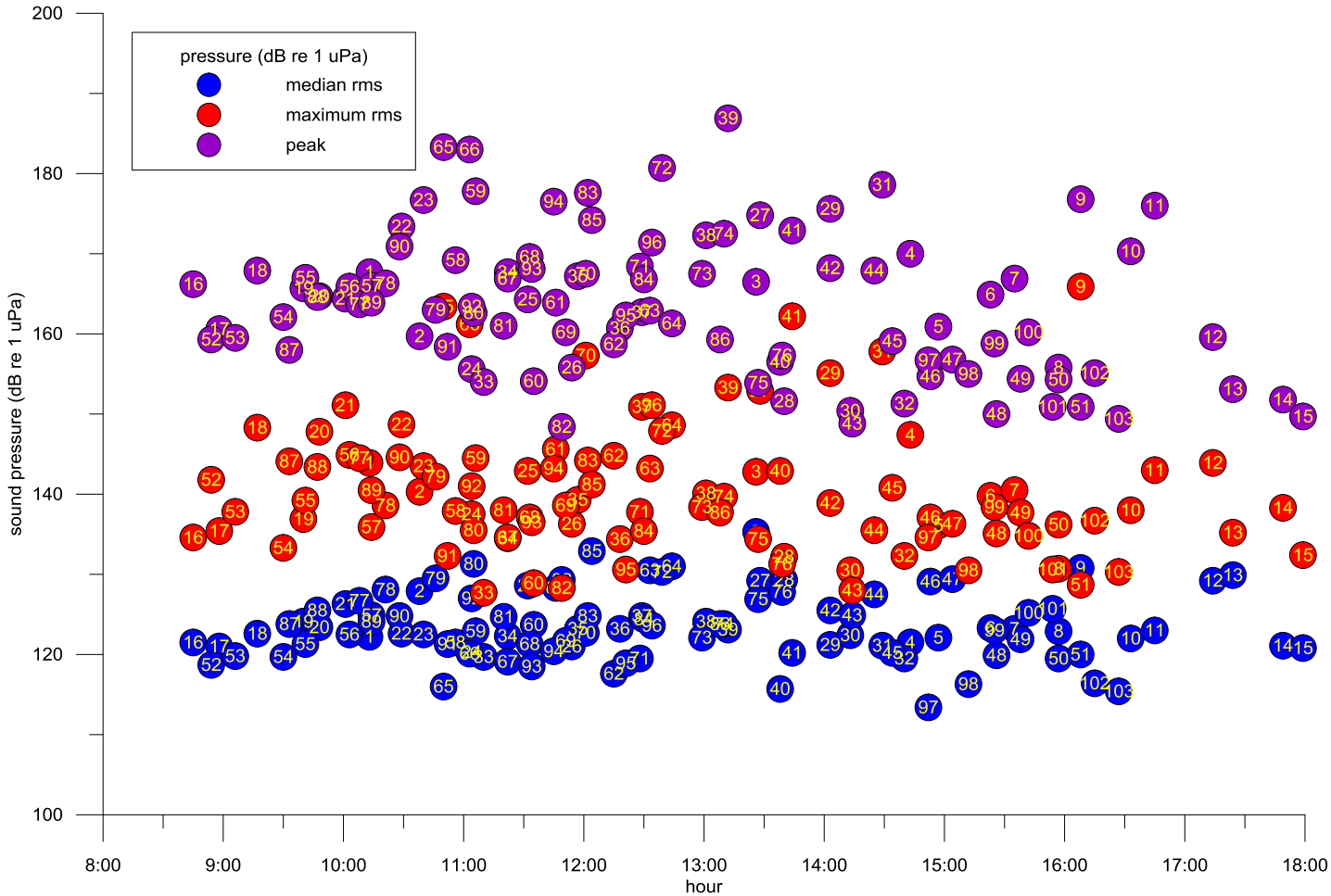
Ambient sound pressure versus location

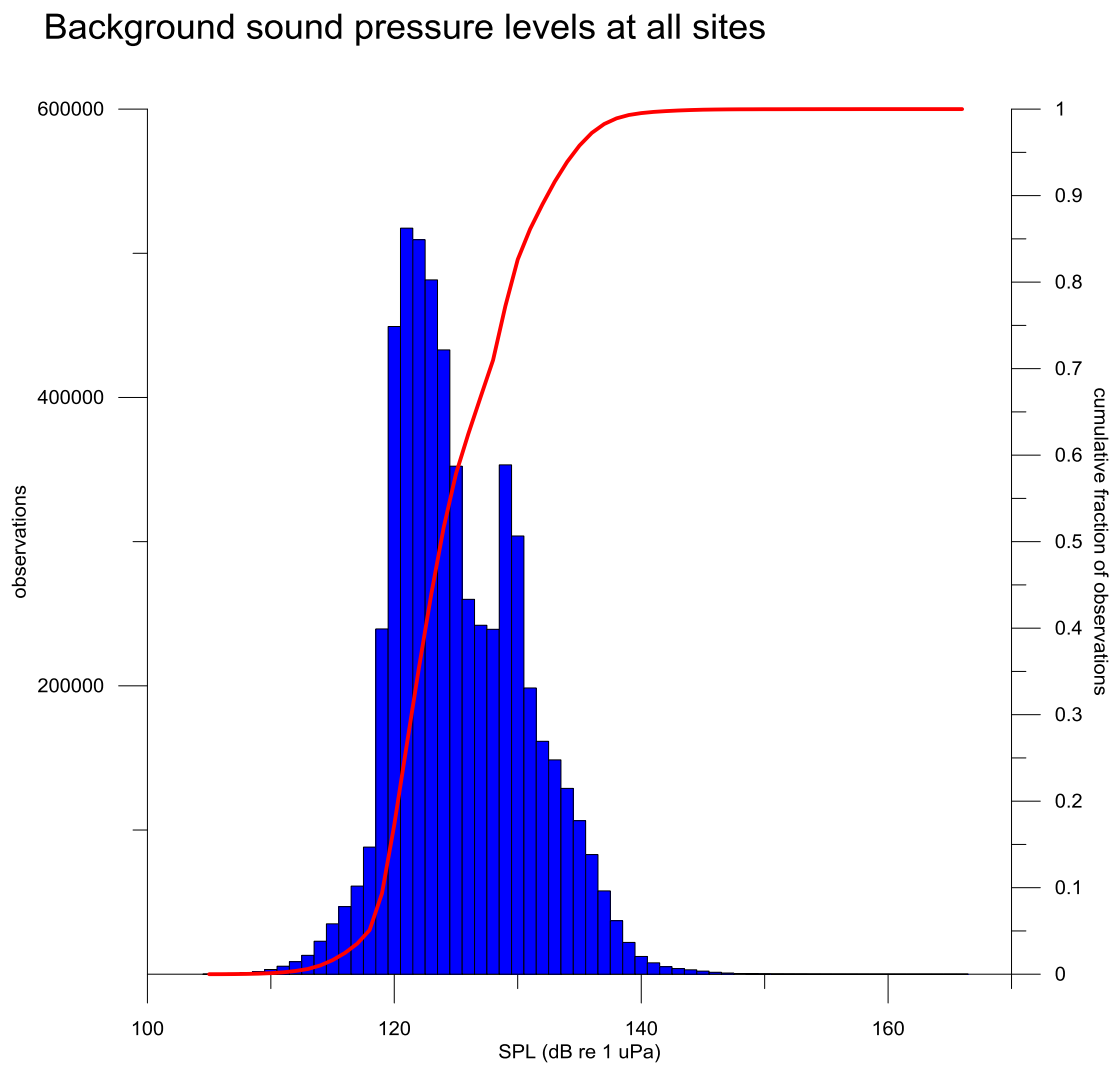


Station locations



Ambient sound levels measred over 10 minutes, labels denote observation # in summary .xls




Background sound pressure levels at all sites
600000
400000
200000
observations
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
cumulative fraction of observations
100
120
140
160
SPL (dB re 1 uPa)

Appendix F

Airborne Noise Modeling Data

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RCNM Background

The Roadway Construction Noise Model (RCNM) is the Federal Highway Administration's (FHWA) national model for the prediction of construction noise. Due to the fact that construction is often conducted in close proximity to residences and businesses, construction noise must be controlled and monitored to avoid impacts on surrounding communities. In addition to community issues, excessive noise can threaten a construction project's progress. Each project needs to balance the community's need for peace and quiet with the contractor's need to progress the work.

The Central Artery/Tunnel (CA/T) project in Boston, Massachusetts, which began in the early 1990s, is the largest urban construction project ever conducted in the United States. Its noise control program developed the Construction Noise Control Specification 721.560, the most comprehensive noise specification ever developed in the United States. As part of the CA/T project noise control program, a construction noise prediction spreadsheet was developed. Because the CA/T prediction tool can benefit other state and local governments, the FHWA developed the RCNM, which is based on the noise prediction calculations and the equipment database used in the CA/T prediction spreadsheet. The RCNM provides a construction noise screening tool to easily predict construction noise levels and to determine compliance with noise limits for a variety of construction noise projects of varying complexity.

Although developed for road construction, RCNM allows for user input of construction equipment that may not necessarily be associated with roadway noise. Much of the default equipment provided in RCNM is construction equipment that can be found on any typical construction project. In the case for the Fuel Pier construction, user inputs include tugboat and workboat noise levels. This functionality makes RCNM a useful tool for noise calculations for any type of construction project and not limited to roadways.

The following noise results tables are the output of RCNM used in this EA.

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Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 05/12/2012
Case Description: NMAWC Pile Driving

**** Receptor #1 ****

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Harbor Island Marina	Commercial	65.0	60.0	50.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Impact Pile Driver	Yes	20		101.3	575.0	0.0
Crane	No	16		80.6	575.0	0.0
Workboat	No	40		80.0	575.0	0.0

Results

	Calculated (dBA)		Noise Limits (dBA) Day		Evening		Night		Noise Limit Exceedance (dBA) Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Impact Pile Driver	80.1	73.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Crane	59.3	51.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Workboat	58.8	54.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	80.1	73.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

**** Receptor #2 ****

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Fun House Preschool	Commercial	65.0	60.0	50.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Impact Pile Driver	Yes	20		101.3	2380.0	0.0
Crane	No	16		80.6	2380.0	0.0
Workboat	No	40		80.0	2380.0	0.0

Results

	Calculated (dBA)		Noise Limits (dBA) Day		Evening		Night		Noise Limit Exceedance (dBA) Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Impact Pile Driver	67.7	60.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Crane	47.0	39.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Workboat	46.4	42.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	67.7	60.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

**** Receptor #3 ****

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Baypoint Preschool	Commercial	65.0	60.0	50.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Impact Pile Driver	Yes	20		101.3	2100.0	0.0
Crane	No	16		80.6	2100.0	0.0
Workboat	No	40		80.0	2100.0	0.0

Results

	Calculated (dBA)		Noise Limits (dBA) Day		Evening		Night		Noise Limit Exceedance (dBA) Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Impact Pile Driver	68.8	61.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Crane	48.1	40.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Workboat	47.5	43.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	68.8	61.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

**** Receptor #4 ****

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
High Tech High School	Commercial	65.0	60.0	50.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Impact Pile Driver	Yes	20		101.3	2600.0	0.0
Crane	No	16		80.6	2600.0	0.0
Workboat	No	40		80.0	2600.0	0.0

Results

	Calculated (dBA)		Noise Limits (dBA) Day		Evening		Night		Noise Limit Exceedance (dBA) Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Impact Pile Driver	66.9	60.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Crane	46.2	38.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Workboat	45.7	41.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Total	66.9	60.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

**** Receptor #5 ****

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Tattnal Way	Residential	65.0	60.0	50.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Impact Pile Driver	Yes	20		101.3	1310.0	0.0
Crane	No	16		80.6	1310.0	0.0
Workboat	No	40		80.0	1310.0	0.0

Results

	Calculated (dBA)		Noise Limits (dBA) Day		Evening		Night		Noise Limit Exceedance (dBA) Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Impact Pile Driver	72.9	65.9	90.0	75.0	N/A	N/A	N/A	N/A	None	None	N/A	N/A	N/A	N/A
Crane	52.2	44.2	85.0	75.0	N/A	N/A	N/A	N/A	None	None	N/A	N/A	N/A	N/A
Workboat	51.6	47.7	85.0	75.0	N/A	N/A	N/A	N/A	None	None	N/A	N/A	N/A	N/A
Total	72.9	66.0	85.0	75.0	N/A	N/A	N/A	N/A	None	None	N/A	N/A	N/A	N/A

**** Receptor #6 ****

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Patrick Wade CDC	Commercial	65.0	60.0	50.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Impact Pile Driver	Yes	20		101.3	2210.0	0.0
Crane	No	16		80.6	2210.0	0.0
Workboat	No	40		80.0	2210.0	0.0

Results

	Calculated (dBA)		Noise Limits (dBA) Day		Evening		Night		Noise Limit Exceedance (dBA) Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Impact Pile Driver	68.4	61.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Crane	47.6	39.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Workboat	47.1	43.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	68.4	61.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

P1 Indicator piles
Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 05/13/2012
Case Description: Phase 1 - Indicator piles and mooring dolphin

**** Receptor #1 ****

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
La Playa	Residential	65.0	60.0	55.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Tug boat	No	100		87.0	2550.0	0.0
Impact Pile Driver	Yes	20		101.3	2550.0	0.0
Workboat	No	40		80.0	2550.0	0.0
Crane	No	16		80.6	2550.0	0.0

Results

	Calculated (dBA)		Noise Limits (dBA) Day		Evening		Night		Noise Limit Exceedance (dBA) Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Tug boat	52.8	52.8	85.0	75.0	N/A	N/A	N/A	N/A	None	None	N/A	N/A	N/A	N/A
Impact Pile Driver	67.1	60.1	90.0	75.0	N/A	N/A	N/A	N/A	None	None	N/A	N/A	N/A	N/A
Workboat	45.8	41.9	85.0	75.0	N/A	N/A	N/A	N/A	None	None	N/A	N/A	N/A	N/A
Crane	46.4	38.4	85.0	75.0	N/A	N/A	N/A	N/A	None	None	N/A	N/A	N/A	N/A
Total	67.1	61.0	85.0	75.0	N/A	N/A	N/A	N/A	None	None	N/A	N/A	N/A	N/A

**** Receptor #2 ****

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
NBPL CDC	Commercial	65.0	60.0	55.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Tug boat	No	100		87.0	2650.0	0.0
Impact Pile Driver	Yes	20		101.3	2650.0	0.0
Workboat	No	40		80.0	2650.0	0.0
Crane	No	16		80.6	2650.0	0.0

Results

	Calculated (dBA)		Noise Limits (dBA) Day	Evening	Night	Noise Limit Exceedance (dBA) Day	Evening	Night

Page 1

P1 Indicator piles

Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Tug boat	52.5	52.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Impact Pile Driver	66.8	59.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Workboat	45.5	41.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Crane	46.1	38.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	66.8	60.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

North Pier Demolition
Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 05/13/2012
Case Description: Phase 1 - North Pier Construction

**** Receptor #1 ****

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
La Playa	Residential	65.0	60.0	55.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Tug boat	No	100		87.0	2500.0	0.0
Front End Loader	No	40		79.1	2500.0	0.0
Workboat	No	40		80.0	2500.0	0.0
Hydra Break Ram	Yes	10	90.0		2500.0	0.0
Concrete Saw	No	20		89.6	2500.0	0.0
Excavator	No	40		80.7	2500.0	0.0
Mounted Impact Hammer (hoe ram)	Yes	20		90.3	2500.0	0.0
Crane	No	16		80.6	2500.0	0.0
Flat Bed Truck	No	40		74.3	2500.0	0.0
Flat Bed Truck	No	40		74.3	2500.0	0.0
Excavator	No	40		80.7	2500.0	0.0
Hydra Break Ram	Yes	10	90.0		2500.0	0.0
Jackhammer	Yes	20		88.9	2500.0	0.0
Jackhammer	Yes	20		88.9	2500.0	0.0

Results

	Calculated (dBA)		Noise Limits (dBA) Day		Evening		Night		Noise Limit Exceedance (dBA) Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Tug boat	53.0	53.0	85.0	75.0	N/A	N/A	N/A	N/A	None	None	N/A	N/A	N/A	N/A
Front End Loader	45.1	41.2	85.0	75.0	N/A	N/A	N/A	N/A	None	None	N/A	N/A	N/A	N/A
Workboat	46.0	42.0	85.0	75.0	N/A	N/A	N/A	N/A	None	None	N/A	N/A	N/A	N/A
Hydra Break Ram	56.0	46.0	90.0	75.0	N/A	N/A	N/A	N/A	None	None	N/A	N/A	N/A	N/A
Concrete Saw	55.6	48.6	85.0	75.0	N/A	N/A	N/A	N/A	None	None	N/A	N/A	N/A	N/A
Excavator	46.7	42.8	85.0	75.0	N/A	N/A	N/A	N/A	None	None	N/A	N/A	N/A	N/A
Mounted Impact Hammer (hoe ram)	56.3	49.3	90.0	75.0	N/A	N/A	N/A	N/A	None	None	N/A	N/A	N/A	N/A
Crane	46.6	38.6	85.0	75.0	N/A	N/A	N/A	N/A	None	None	N/A	N/A	N/A	N/A
Flat Bed Truck	40.3	36.3	85.0	75.0	N/A	N/A	N/A	N/A	None	None	N/A	N/A	N/A	N/A
Flat Bed Truck	40.3	36.3	85.0	75.0	N/A	N/A	N/A	N/A	None	None	N/A	N/A	N/A	N/A
Excavator	46.7	42.8	85.0	75.0	N/A	N/A	N/A	N/A	None	None	N/A	N/A	N/A	N/A
Hydra Break Ram	56.0	46.0	90.0	75.0	N/A	N/A	N/A	N/A	None	None	N/A	N/A	N/A	N/A
Jackhammer	54.9	47.9	90.0	75.0	N/A	N/A	N/A	N/A	None	None	N/A	N/A	N/A	N/A
Jackhammer	54.9	47.9	90.0	75.0	N/A	N/A	N/A	N/A	None	None	N/A	N/A	N/A	N/A
Total	56.3	58.1	85.0	75.0	N/A	N/A	N/A	N/A	None	None	N/A	N/A	N/A	N/A

**** Receptor #2 ****

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
NBPL CDC	Commercial	65.0	60.0	55.0

Equipment

North Pier Demolition

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Tug boat	No	100		87.0	2500.0	0.0
Front End Loader	No	40		79.1	2500.0	0.0
Workboat	No	40		80.0	2500.0	0.0
Hydra Break Ram	Yes	10	90.0		2500.0	0.0
Concrete Saw	No	20		89.6	2500.0	0.0
Excavator	No	40		80.7	2500.0	0.0
Mounted Impact Hammer (hoe ram)	Yes	20		90.3	2500.0	0.0
Crane	No	16		80.6	2500.0	0.0
Flat Bed Truck	No	40		74.3	2500.0	0.0
Flat Bed Truck	No	40		74.3	2500.0	0.0
Excavator	No	40		80.7	2500.0	0.0
Hydra Break Ram	Yes	10	90.0		2500.0	0.0
Jackhammer	Yes	20		88.9	2500.0	0.0
Jackhammer	Yes	20		88.9	2500.0	0.0

Results

	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Tug boat	53.0	53.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	45.1	41.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Workboat	46.0	42.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Hydra Break Ram	56.0	46.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Concrete Saw	55.6	48.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Excavator	46.7	42.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Mounted Impact Hammer (hoe ram)	56.3	49.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Crane	46.6	38.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Flat Bed Truck	40.3	36.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Flat Bed Truck	40.3	36.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Excavator	46.7	42.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Hydra Break Ram	56.0	46.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Jackhammer	54.9	47.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Jackhammer	54.9	47.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	56.3	58.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Approach pier construction with pile driving
Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 05/13/2012
Case Description: Phase 1 - Approach Pier Construction with pile driving

**** Receptor #1 ****

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
La Playa	Residential	65.0	60.0	55.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Tug boat	No	100		87.0	2470.0	0.0
Impact Pile Driver	Yes	20		101.3	2470.0	0.0
Front End Loader	No	40		79.1	2470.0	0.0
Workboat	No	40		80.0	2470.0	0.0
Hydra Break Ram	Yes	10	90.0		2470.0	0.0
Concrete Saw	No	20		89.6	2470.0	0.0
Excavator	No	40		80.7	2470.0	0.0
Mounted Impact Hammer (hoe ram)	Yes	20		90.3	2470.0	0.0
Crane	No	16		80.6	2470.0	0.0
Flat Bed Truck	No	40		74.3	2470.0	0.0
Flat Bed Truck	No	40		74.3	2470.0	0.0
Concrete Mixer Truck	No	40		78.8	2470.0	0.0
Concrete Batch Plant	No	15	83.0		2470.0	0.0
Dump Truck	No	40		76.5	2470.0	0.0
Paver	No	50		77.2	2470.0	0.0
Welder / Torch	No	40		74.0	2470.0	0.0
All Other Equipment > 5 HP	No	50	85.0		2470.0	0.0

Results

	Calculated (dBA)		Noise Limits (dBA) Day		Evening		Night		Noise Limit Exceedance (dBA) Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Tug boat	53.1	53.1	85.0	75.0	N/A	N/A	N/A	N/A	None	None	N/A	N/A	N/A	N/A
Impact Pile Driver	67.4	60.4	90.0	75.0	N/A	N/A	N/A	N/A	None	None	N/A	N/A	N/A	N/A
Front End Loader	45.2	41.3	85.0	75.0	N/A	N/A	N/A	N/A	None	None	N/A	N/A	N/A	N/A
Workboat	46.1	42.1	85.0	75.0	N/A	N/A	N/A	N/A	None	None	N/A	N/A	N/A	N/A
Hydra Break Ram	56.1	46.1	90.0	75.0	N/A	N/A	N/A	N/A	None	None	N/A	N/A	N/A	N/A
Concrete Saw	55.7	48.7	85.0	75.0	N/A	N/A	N/A	N/A	None	None	N/A	N/A	N/A	N/A
Excavator	46.8	42.9	85.0	75.0	N/A	N/A	N/A	N/A	None	None	N/A	N/A	N/A	N/A
Mounted Impact Hammer (hoe ram)	56.4	49.4	90.0	75.0	N/A	N/A	N/A	N/A	None	None	N/A	N/A	N/A	N/A
Crane	46.7	38.7	85.0	75.0	N/A	N/A	N/A	N/A	None	None	N/A	N/A	N/A	N/A
Flat Bed Truck	40.4	36.4	85.0	75.0	N/A	N/A	N/A	N/A	None	None	N/A	N/A	N/A	N/A
Flat Bed Truck	40.4	36.4	85.0	75.0	N/A	N/A	N/A	N/A	None	None	N/A	N/A	N/A	N/A
Concrete Mixer Truck	44.9	40.9	85.0	75.0	N/A	N/A	N/A	N/A	None	None	N/A	N/A	N/A	N/A
Concrete Batch Plant	49.1	40.9	85.0	75.0	N/A	N/A	N/A	N/A	None	None	N/A	N/A	N/A	N/A
Dump Truck	42.6	38.6	85.0	75.0	N/A	N/A	N/A	N/A	None	None	N/A	N/A	N/A	N/A
Paver	43.3	40.3	85.0	75.0	N/A	N/A	N/A	N/A	None	None	N/A	N/A	N/A	N/A
Welder / Torch	40.1	36.1	85.0	75.0	N/A	N/A	N/A	N/A	None	None	N/A	N/A	N/A	N/A
All Other Equipment > 5 HP	51.1	48.1	85.0	75.0	N/A	N/A	N/A	N/A	None	None	N/A	N/A	N/A	N/A
Total	67.4	62.3	85.0	75.0	N/A	N/A	N/A	N/A	None	None	N/A	N/A	N/A	N/A

**** Receptor #2 ****

Approach pier construction with pile driving

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
NBPL CDC	Commercial	65.0	60.0	55.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Tug boat	No	100		87.0	2220.0	0.0
Impact Pile Driver	Yes	20		101.3	2220.0	0.0
Front End Loader	No	40		79.1	2220.0	0.0
Workboat	No	40		80.0	2220.0	0.0
Hydra Break Ram	Yes	10	90.0		2220.0	0.0
Concrete Saw	No	20		89.6	2220.0	0.0
Excavator	No	40		80.7	2220.0	0.0
Mounted Impact Hammer (hoe ram)	Yes	20		90.3	2220.0	0.0
Crane	No	16		80.6	2220.0	0.0
Flat Bed Truck	No	40		74.3	2220.0	0.0
Flat Bed Truck	No	40		74.3	2220.0	0.0
Concrete Mixer Truck	No	40		78.8	2200.0	0.0
Concrete Batch Plant	No	15	83.0		2220.0	0.0
Dump Truck	No	40		76.5	2220.0	0.0
Paver	No	50		77.2	2220.0	0.0
Welder / Torch	No	40		74.0	2220.0	0.0
All Other Equipment > 5 HP	No	50	85.0		2220.0	0.0

Results

	Calculated (dBA)		Noise Limits (dBA) Day		Evening		Night		Noise Limit Exceedance (dBA) Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Tug boat	54.1	54.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Impact Pile Driver	68.3	61.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	46.2	42.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Workboat	47.1	43.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Hydra Break Ram	57.1	47.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Concrete Saw	56.6	49.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Excavator	47.8	43.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Mounted Impact Hammer (hoe ram)	57.3	50.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Crane	47.6	39.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Flat Bed Truck	41.3	37.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Flat Bed Truck	41.3	37.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Concrete Mixer Truck	45.9	42.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Concrete Batch Plant	50.1	41.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dump Truck	43.5	39.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Paver	44.3	41.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Welder / Torch	41.1	37.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
All Other Equipment > 5 HP	52.1	49.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	68.3	63.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Approach pier construction wo pile driving
Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 05/13/2012
Case Description: Phase 1 - Approach Pier Construction

**** Receptor #1 ****

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
La Playa	Residential	65.0	60.0	55.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Tug boat	No	100		87.0	2470.0	0.0
Front End Loader	No	40		79.1	2470.0	0.0
Workboat	No	40		80.0	2470.0	0.0
Hydra Break Ram	Yes	10	90.0		2470.0	0.0
Concrete Saw	No	20		89.6	2470.0	0.0
Excavator	No	40		80.7	2470.0	0.0
Mounted Impact Hammer (hoe ram)	Yes	20		90.3	2470.0	0.0
Crane	No	16		80.6	2470.0	0.0
Flat Bed Truck	No	40		74.3	2470.0	0.0
Flat Bed Truck	No	40		74.3	2470.0	0.0
Concrete Mixer Truck	No	40		78.8	2470.0	0.0
Concrete Batch Plant	No	15	83.0		2470.0	0.0
Dump Truck	No	40		76.5	2470.0	0.0
Paver	No	50		77.2	2470.0	0.0
Welder / Torch	No	40		74.0	2470.0	0.0
All Other Equipment > 5 HP	No	50	85.0		2470.0	0.0

Results

	Calculated (dBA)		Noise Limits (dBA) Day		Evening		Night		Noise Limit Exceedance (dBA) Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Tug boat	53.1	53.1	85.0	75.0	N/A	N/A	N/A	N/A	None	None	N/A	N/A	N/A	N/A
Front End Loader	45.2	41.3	85.0	75.0	N/A	N/A	N/A	N/A	None	None	N/A	N/A	N/A	N/A
Workboat	46.1	42.1	85.0	75.0	N/A	N/A	N/A	N/A	None	None	N/A	N/A	N/A	N/A
Hydra Break Ram	56.1	46.1	90.0	75.0	N/A	N/A	N/A	N/A	None	None	N/A	N/A	N/A	N/A
Concrete Saw	55.7	48.7	85.0	75.0	N/A	N/A	N/A	N/A	None	None	N/A	N/A	N/A	N/A
Excavator	46.8	42.9	85.0	75.0	N/A	N/A	N/A	N/A	None	None	N/A	N/A	N/A	N/A
Mounted Impact Hammer (hoe ram)	56.4	49.4	90.0	75.0	N/A	N/A	N/A	N/A	None	None	N/A	N/A	N/A	N/A
Crane	46.7	38.7	85.0	75.0	N/A	N/A	N/A	N/A	None	None	N/A	N/A	N/A	N/A
Flat Bed Truck	40.4	36.4	85.0	75.0	N/A	N/A	N/A	N/A	None	None	N/A	N/A	N/A	N/A
Flat Bed Truck	40.4	36.4	85.0	75.0	N/A	N/A	N/A	N/A	None	None	N/A	N/A	N/A	N/A
Concrete Mixer Truck	44.9	40.9	85.0	75.0	N/A	N/A	N/A	N/A	None	None	N/A	N/A	N/A	N/A
Concrete Batch Plant	49.1	40.9	85.0	75.0	N/A	N/A	N/A	N/A	None	None	N/A	N/A	N/A	N/A
Dump Truck	42.6	38.6	85.0	75.0	N/A	N/A	N/A	N/A	None	None	N/A	N/A	N/A	N/A
Paver	43.3	40.3	85.0	75.0	N/A	N/A	N/A	N/A	None	None	N/A	N/A	N/A	N/A
Welder / Torch	40.1	36.1	85.0	75.0	N/A	N/A	N/A	N/A	None	None	N/A	N/A	N/A	N/A
All Other Equipment > 5 HP	51.1	48.1	85.0	75.0	N/A	N/A	N/A	N/A	None	None	N/A	N/A	N/A	N/A
Total	56.4	57.7	85.0	75.0	N/A	N/A	N/A	N/A	None	None	N/A	N/A	N/A	N/A

**** Receptor #2 ****

Description	Land Use	Baselines (dBA) Daytime	Evening	Night

Approach pier construction wo pile driving

NBPL CDC	Commercial	65.0	60.0	55.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Tug boat	No	100		87.0	2220.0	0.0
Front End Loader	No	40		79.1	2220.0	0.0
Workboat	No	40		80.0	2220.0	0.0
Hydra Break Ram	Yes	10	90.0		2220.0	0.0
Concrete Saw	No	20		89.6	2220.0	0.0
Excavator	No	40		80.7	2220.0	0.0
Mounted Impact Hammer (hoe ram)	Yes	20		90.3	2220.0	0.0
Crane	No	16		80.6	2220.0	0.0
Flat Bed Truck	No	40		74.3	2220.0	0.0
Flat Bed Truck	No	40		74.3	2220.0	0.0
Concrete Mixer Truck	No	40		78.8	2200.0	0.0
Concrete Batch Plant	No	15	83.0		2220.0	0.0
Dump Truck	No	40		76.5	2220.0	0.0
Paver	No	50		77.2	2220.0	0.0
Welder / Torch	No	40		74.0	2220.0	0.0
All Other Equipment > 5 HP	No	50	85.0		2220.0	0.0

Results

	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Tug boat	54.1	54.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	46.2	42.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Workboat	47.1	43.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Hydra Break Ram	57.1	47.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Concrete Saw	56.6	49.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Excavator	47.8	43.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Mounted Impact Hammer (hoe ram)	57.3	50.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Crane	47.6	39.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Flat Bed Truck	41.3	37.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Flat Bed Truck	41.3	37.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Concrete Mixer Truck	45.9	42.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Concrete Batch Plant	50.1	41.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dump Truck	43.5	39.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Paver	44.3	41.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Welder / Torch	41.1	37.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
All Other Equipment > 5 HP	52.1	49.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	57.3	58.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

P1 North Pier Construction
Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 05/13/2012
Case Description: Phase 1 - North Pier Construction

**** Receptor #1 ****

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
La Playa	Residential	65.0	60.0	55.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Tug boat	No	100		87.0	2550.0	0.0
Impact Pile Driver	Yes	20		101.3	2550.0	0.0
Front End Loader	No	40		79.1	2550.0	0.0
Workboat	No	40		80.0	2550.0	0.0
Hydra Break Ram	Yes	10	90.0		2550.0	0.0
Concrete Saw	No	20		89.6	2550.0	0.0
Excavator	No	40		80.7	2550.0	0.0
Mounted Impact Hammer (hoe ram)	Yes	20		90.3	2550.0	0.0
Crane	No	16		80.6	2550.0	0.0
Flat Bed Truck	No	40		74.3	2550.0	0.0
Flat Bed Truck	No	40		74.3	2550.0	0.0
Crane	No	16		80.6	2550.0	0.0
Workboat	No	40		80.0	2550.0	0.0

Results

	Calculated (dBA)		Noise Limits (dBA) Day		Evening		Night		Noise Limit Exceedance (dBA) Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Tug boat	52.8	52.8	85.0	75.0	N/A	N/A	N/A	N/A	None	None	N/A	N/A	N/A	N/A
Impact Pile Driver	67.1	60.1	90.0	75.0	N/A	N/A	N/A	N/A	None	None	N/A	N/A	N/A	N/A
Front End Loader	45.0	41.0	85.0	75.0	N/A	N/A	N/A	N/A	None	None	N/A	N/A	N/A	N/A
Workboat	45.8	41.9	85.0	75.0	N/A	N/A	N/A	N/A	None	None	N/A	N/A	N/A	N/A
Hydra Break Ram	55.8	45.8	90.0	75.0	N/A	N/A	N/A	N/A	None	None	N/A	N/A	N/A	N/A
Concrete Saw	55.4	48.4	85.0	75.0	N/A	N/A	N/A	N/A	None	None	N/A	N/A	N/A	N/A
Excavator	46.6	42.6	85.0	75.0	N/A	N/A	N/A	N/A	None	None	N/A	N/A	N/A	N/A
Mounted Impact Hammer (hoe ram)	56.1	49.1	90.0	75.0	N/A	N/A	N/A	N/A	None	None	N/A	N/A	N/A	N/A
Crane	46.4	38.4	85.0	75.0	N/A	N/A	N/A	N/A	None	None	N/A	N/A	N/A	N/A
Flat Bed Truck	40.1	36.1	85.0	75.0	N/A	N/A	N/A	N/A	None	None	N/A	N/A	N/A	N/A
Flat Bed Truck	40.1	36.1	85.0	75.0	N/A	N/A	N/A	N/A	None	None	N/A	N/A	N/A	N/A
Crane	46.4	38.4	85.0	75.0	N/A	N/A	N/A	N/A	None	None	N/A	N/A	N/A	N/A
Workboat	45.8	41.9	85.0	75.0	N/A	N/A	N/A	N/A	None	None	N/A	N/A	N/A	N/A
Total	67.1	61.8	85.0	75.0	N/A	N/A	N/A	N/A	None	None	N/A	N/A	N/A	N/A

**** Receptor #2 ****

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
NBPL CDC	Commercial	65.0	60.0	55.0

Equipment

Spec	Actual	Receptor	Estimated

P1 North Pier Construction

Description	Impact Device	Usage (%)	Lmax (dBA)	Lmax (dBA)	Distance (feet)	Shielding (dBA)
Tug boat	No	100		87.0	2650.0	0.0
Impact Pile Driver	Yes	20		101.3	2650.0	0.0
Front End Loader	No	40		79.1	2650.0	0.0
Workboat	No	40		80.0	2650.0	0.0
Hydra Break Ram	Yes	10	90.0		2650.0	0.0
Concrete Saw	No	20		89.6	2650.0	0.0
Excavator	No	40		80.7	2650.0	0.0
Mounted Impact Hammer (hoe ram)	Yes	20		90.3	2650.0	0.0
Crane	No	16		80.6	2650.0	0.0
Flat Bed Truck	No	40		74.3	2650.0	0.0
Flat Bed Truck	No	40		74.3	2650.0	0.0
Crane	No	16		80.6	2650.0	0.0
Workboat	No	40		80.0	2650.0	0.0

Results

	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Tug boat	52.5	52.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Impact Pile Driver	66.8	59.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	44.6	40.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Workboat	45.5	41.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Hydra Break Ram	55.5	45.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Concrete Saw	55.1	48.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Excavator	46.2	42.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Mounted Impact Hammer (hoe ram)	55.8	48.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Crane	46.1	38.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Flat Bed Truck	39.8	35.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Flat Bed Truck	39.8	35.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Crane	46.1	38.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Workboat	45.5	41.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	66.8	61.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

P1 North Pier Construction no pile driving
Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 05/13/2012
Case Description: Phase 1 - North Pier Construction - no pile driving

**** Receptor #1 ****

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
La Playa	Residential	65.0	60.0	55.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Tug boat	No	100		87.0	2550.0	0.0
Front End Loader	No	40		79.1	2550.0	0.0
Workboat	No	40		80.0	2550.0	0.0
Hydra Break Ram	Yes	10	90.0		2550.0	0.0
Concrete Saw	No	20		89.6	2550.0	0.0
Excavator	No	40		80.7	2550.0	0.0
Mounted Impact Hammer (hoe ram)	Yes	20		90.3	2550.0	0.0
Crane	No	16		80.6	2550.0	0.0
Flat Bed Truck	No	40		74.3	2550.0	0.0
Flat Bed Truck	No	40		74.3	2550.0	0.0
Crane	No	16		80.6	2550.0	0.0
Workboat	No	40		80.0	2550.0	0.0

Results

	Calculated (dBA)		Noise Limits (dBA) Day		Evening		Night		Noise Limit Exceedance (dBA) Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Tug boat	52.8	52.8	85.0	75.0	N/A	N/A	N/A	N/A	None	None	N/A	N/A	N/A	N/A
Front End Loader	45.0	41.0	85.0	75.0	N/A	N/A	N/A	N/A	None	None	N/A	N/A	N/A	N/A
Workboat	45.8	41.9	85.0	75.0	N/A	N/A	N/A	N/A	None	None	N/A	N/A	N/A	N/A
Hydra Break Ram	55.8	45.8	90.0	75.0	N/A	N/A	N/A	N/A	None	None	N/A	N/A	N/A	N/A
Concrete Saw	55.4	48.4	85.0	75.0	N/A	N/A	N/A	N/A	None	None	N/A	N/A	N/A	N/A
Excavator	46.6	42.6	85.0	75.0	N/A	N/A	N/A	N/A	None	None	N/A	N/A	N/A	N/A
Mounted Impact Hammer (hoe ram)	56.1	49.1	90.0	75.0	N/A	N/A	N/A	N/A	None	None	N/A	N/A	N/A	N/A
Crane	46.4	38.4	85.0	75.0	N/A	N/A	N/A	N/A	None	None	N/A	N/A	N/A	N/A
Flat Bed Truck	40.1	36.1	85.0	75.0	N/A	N/A	N/A	N/A	None	None	N/A	N/A	N/A	N/A
Flat Bed Truck	40.1	36.1	85.0	75.0	N/A	N/A	N/A	N/A	None	None	N/A	N/A	N/A	N/A
Crane	46.4	38.4	85.0	75.0	N/A	N/A	N/A	N/A	None	None	N/A	N/A	N/A	N/A
Workboat	45.8	41.9	85.0	75.0	N/A	N/A	N/A	N/A	None	None	N/A	N/A	N/A	N/A
Total	56.1	56.7	85.0	75.0	N/A	N/A	N/A	N/A	None	None	N/A	N/A	N/A	N/A

**** Receptor #2 ****

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
NBPL CDC	Commercial	65.0	60.0	55.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)

P1 North Pier Construction no pile driving

Tug boat	No	100		87.0	2650.0	0.0
Front End Loader	No	40		79.1	2650.0	0.0
Workboat	No	40		80.0	2650.0	0.0
Hydra Break Ram	Yes	10	90.0		2650.0	0.0
Concrete Saw	No	20		89.6	2650.0	0.0
Excavator	No	40		80.7	2650.0	0.0
Mounted Impact Hammer (hoe ram)	Yes	20		90.3	2650.0	0.0
Crane	No	16		80.6	2650.0	0.0
Flat Bed Truck	No	40		74.3	2650.0	0.0
Flat Bed Truck	No	40		74.3	2650.0	0.0
Crane	No	16		80.6	2650.0	0.0
Workboat	No	40		80.0	2650.0	0.0

Results

	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Tug boat	52.5	52.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	44.6	40.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Workboat	45.5	41.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Hydra Break Ram	55.5	45.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Concrete Saw	55.1	48.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Excavator	46.2	42.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Mounted Impact Hammer (hoe ram)	55.8	48.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Crane	46.1	38.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Flat Bed Truck	39.8	35.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Flat Bed Truck	39.8	35.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Crane	46.1	38.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Workboat	45.5	41.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	55.8	56.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

P2 South Pier mooring Dolphins
Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 05/13/2012
Case Description: Phase 2 - South Pier Construction mooring dolphins

**** Receptor #1 ****

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
La Playa	Residential	65.0	60.0	55.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Tug boat	No	100		87.0	3170.0	0.0
Impact Pile Driver	Yes	20		101.3	3170.0	0.0
Workboat	No	40		80.0	3170.0	0.0
Crane	No	16		80.6	3170.0	0.0

Results

	Calculated (dBA)		Noise Limits (dBA) Day		Evening		Night		Noise Limit Exceedance (dBA) Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Tug boat	51.0	51.0	85.0	75.0	N/A	N/A	N/A	N/A	None	None	N/A	N/A	N/A	N/A
Impact Pile Driver	65.2	58.2	90.0	75.0	N/A	N/A	N/A	N/A	None	None	N/A	N/A	N/A	N/A
Workboat	44.0	40.0	85.0	75.0	N/A	N/A	N/A	N/A	None	None	N/A	N/A	N/A	N/A
Crane	44.5	36.5	85.0	75.0	N/A	N/A	N/A	N/A	None	None	N/A	N/A	N/A	N/A
Total	65.2	59.1	85.0	75.0	N/A	N/A	N/A	N/A	None	None	N/A	N/A	N/A	N/A

**** Receptor #2 ****

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
NBPL CDC	Commercial	65.0	60.0	55.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Tug boat	No	100		87.0	2300.0	0.0
Impact Pile Driver	Yes	20		101.3	2300.0	0.0
Workboat	No	40		80.0	2300.0	0.0
Crane	No	16		80.6	2300.0	0.0

Results

	Calculated (dBA)		Noise Limits (dBA) Day		Evening		Night		Noise Limit Exceedance (dBA) Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Tug boat	53.7	53.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Impact Pile Driver	68.0	61.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

P2 South Pier mooring Dolphins

Workboat		46.7	42.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Crane		47.3	39.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Total	68.0	61.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

cumulative

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 05/14/2012
Case Description: Cumulative with Scripps Pier

**** Receptor #1 ****

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
La Playa	Residential	65.0	60.0	55.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Tug boat	No	100		87.0	400.0	0.0
Impact Pile Driver	Yes	20		101.3	400.0	0.0
Concrete Batch Plant	No	15	83.0		400.0	0.0
Workboat	No	40		80.0	400.0	0.0
Hydra Break Ram	Yes	10	90.0		400.0	0.0
Concrete Saw	No	20		89.6	400.0	0.0
Excavator	No	40		80.7	400.0	0.0
Mounted Impact Hammer (hoe ram)	Yes	20		90.3	400.0	0.0
All Other Equipment > 5 HP	No	50	85.0		400.0	0.0
All Other Equipment > 5 HP	No	50	85.0		400.0	0.0
Tug boat	No	100		87.0	2470.0	0.0
Impact Pile Driver	Yes	20		101.3	2470.0	0.0
Concrete Batch Plant	No	15	83.0		2470.0	0.0
Workboat	No	40		80.0	2470.0	0.0
Hydra Break Ram	Yes	10	90.0		2470.0	0.0
Concrete Saw	No	20		89.6	2470.0	0.0
Excavator	No	40		80.7	2470.0	0.0
Mounted Impact Hammer (hoe ram)	Yes	20		90.3	2470.0	0.0
All Other Equipment > 5 HP	No	50	85.0		2470.0	0.0
All Other Equipment > 5 HP	No	50	85.0		2470.0	0.0

Results

Equipment	Calculated (dBA) Lmax	Calculated (dBA) Leq	Noise Limits (dBA) Day Lmax	Day Leq	Evening Lmax	Evening Leq	Night Lmax	Night Leq	Noise Limit Exceedance (dBA) Day Lmax	Day Leq	Evening Lmax	Evening Leq	Night Lmax	Night Leq
Tug boat	68.9	68.9	85.0	75.0	N/A	N/A	N/A	N/A	None	None	N/A	N/A	N/A	N/A
Impact Pile Driver	83.2	76.2	90.0	75.0	N/A	N/A	N/A	N/A	None	1.2	N/A	N/A	N/A	N/A
Concrete Batch Plant	64.9	56.7	85.0	75.0	N/A	N/A	N/A	N/A	None	None	N/A	N/A	N/A	N/A
Workboat	61.9	58.0	85.0	75.0	N/A	N/A	N/A	N/A	None	None	N/A	N/A	N/A	N/A
Hydra Break Ram	71.9	61.9	90.0	75.0	N/A	N/A	N/A	N/A	None	None	N/A	N/A	N/A	N/A
Concrete Saw	71.5	64.5	85.0	75.0	N/A	N/A	N/A	N/A	None	None	N/A	N/A	N/A	N/A
Excavator	62.6	58.7	85.0	75.0	N/A	N/A	N/A	N/A	None	None	N/A	N/A	N/A	N/A
Mounted Impact Hammer (hoe ram)	72.2	65.2	90.0	75.0	N/A	N/A	N/A	N/A	None	None	N/A	N/A	N/A	N/A
All Other Equipment > 5 HP	66.9	63.9	85.0	75.0	N/A	N/A	N/A	N/A	None	None	N/A	N/A	N/A	N/A
All Other Equipment > 5 HP	66.9	63.9	85.0	75.0	N/A	N/A	N/A	N/A	None	None	N/A	N/A	N/A	N/A
Tug boat	53.1	53.1	85.0	75.0	N/A	N/A	N/A	N/A	None	None	N/A	N/A	N/A	N/A
Impact Pile Driver	67.4	60.4	90.0	75.0	N/A	N/A	N/A	N/A	None	None	N/A	N/A	N/A	N/A
Concrete Batch Plant	49.1	40.9	85.0	75.0	N/A	N/A	N/A	N/A	None	None	N/A	N/A	N/A	N/A
Workboat	46.1	42.1	85.0	75.0	N/A	N/A	N/A	N/A	None	None	N/A	N/A	N/A	N/A
Hydra Break Ram	56.1	46.1	90.0	75.0	N/A	N/A	N/A	N/A	None	None	N/A	N/A	N/A	N/A
Concrete Saw	55.7	48.7	85.0	75.0	N/A	N/A	N/A	N/A	None	None	N/A	N/A	N/A	N/A
Excavator	46.8	42.9	85.0	75.0	N/A	N/A	N/A	N/A	None	None	N/A	N/A	N/A	N/A
Mounted Impact Hammer (hoe ram)	56.4	49.4	90.0	75.0	N/A	N/A	N/A	N/A	None	None	N/A	N/A	N/A	N/A

					cumulative									
All Other Equipment > 5 HP	51.1	48.1	85.0	75.0	N/A	N/A	N/A	N/A	None	None	N/A	N/A	N/A	N/A
All Other Equipment > 5 HP	51.1	48.1	85.0	75.0	N/A	N/A	N/A	N/A	None	None	N/A	N/A	N/A	N/A
Total	83.2	78.2	85.0	75.0	N/A	N/A	N/A	N/A	None	3.2	N/A	N/A	N/A	N/A

**** Receptor #2 ****

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
CDC (bldg 377)	Commercial	65.0	60.0	55.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Tug boat	No	100		87.0	3600.0	0.0
Impact Pile Driver	Yes	20		101.3	3600.0	0.0
Concrete Batch Plant	No	15	83.0		3600.0	0.0
Workboat	No	40		80.0	3600.0	0.0
Hydra Break Ram	Yes	10	90.0		3600.0	0.0
Concrete Saw	No	20		89.6	3600.0	0.0
Excavator	No	40		80.7	3600.0	0.0
Mounted Impact Hammer (hoe ram)	Yes	20		90.3	3600.0	0.0
All Other Equipment > 5 HP	No	50	85.0		3600.0	0.0
All Other Equipment > 5 HP	No	50	85.0		3600.0	0.0
Tug boat	No	100		87.0	2220.0	0.0
Impact Pile Driver	Yes	20		101.3	2220.0	0.0
Concrete Batch Plant	No	15	83.0		2220.0	0.0
Workboat	No	40		80.0	2220.0	0.0
Hydra Break Ram	Yes	10	90.0		2220.0	0.0
Concrete Saw	No	20		89.6	2220.0	0.0
Excavator	No	40		80.7	2220.0	0.0
Mounted Impact Hammer (hoe ram)	Yes	20		90.3	2220.0	0.0
All Other Equipment > 5 HP	No	50	85.0		2220.0	0.0
All Other Equipment > 5 HP	No	50	85.0		2220.0	0.0

Results

	Calculated (dBA)		Noise Limits (dBA) Day		Evening		Night		Noise Limit Exceedance (dBA) Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Tug boat	49.9	49.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Impact Pile Driver	64.1	57.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Concrete Batch Plant	45.9	37.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Workboat	42.9	38.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Hydra Break Ram	52.9	42.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Concrete Saw	52.4	45.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Excavator	43.6	39.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Mounted Impact Hammer (hoe ram)	53.1	46.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
All Other Equipment > 5 HP	47.9	44.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
All Other Equipment > 5 HP	47.9	44.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tug boat	54.1	54.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Impact Pile Driver	68.3	61.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Concrete Batch Plant	50.1	41.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Workboat	47.1	43.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Hydra Break Ram	57.1	47.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Concrete Saw	56.6	49.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Excavator	47.8	43.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Mounted Impact Hammer (hoe ram)	57.3	50.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
All Other Equipment > 5 HP	52.1	49.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

						cumulative								
All Other Equipment > 5 HP	52.1	49.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	68.3	64.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 05/14/2012
Case Description: Cumulative with Scripps Pier

**** Receptor #1 ****

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
La Playa	Residential	65.0	60.0	55.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Tug boat	No	100		87.0	400.0	0.0
Impact Pile Driver	Yes	20		101.3	400.0	0.0
Concrete Batch Plant	No	15	83.0		400.0	0.0
Workboat	No	40		80.0	400.0	0.0
Hydra Break Ram	Yes	10	90.0		400.0	0.0
Concrete Saw	No	20		89.6	400.0	0.0
Excavator	No	40		80.7	400.0	0.0
Mounted Impact Hammer (hoe ram)	Yes	20		90.3	400.0	0.0
Crane	No	16		80.6	400.0	0.0
All Other Equipment > 5 HP	No	50	85.0		400.0	0.0

Results

	Calculated (dBA)		Noise Limits (dBA) Day		Evening		Night		Noise Limit Exceedance (dBA) Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Tug boat	68.9	68.9	85.0	75.0	N/A	N/A	N/A	N/A	None	None	N/A	N/A	N/A	N/A
Impact Pile Driver	83.2	76.2	90.0	75.0	N/A	N/A	N/A	N/A	None	1.2	N/A	N/A	N/A	N/A
Concrete Batch Plant	64.9	56.7	85.0	75.0	N/A	N/A	N/A	N/A	None	None	N/A	N/A	N/A	N/A
Workboat	61.9	58.0	85.0	75.0	N/A	N/A	N/A	N/A	None	None	N/A	N/A	N/A	N/A
Hydra Break Ram	71.9	61.9	90.0	75.0	N/A	N/A	N/A	N/A	None	None	N/A	N/A	N/A	N/A
Concrete Saw	71.5	64.5	85.0	75.0	N/A	N/A	N/A	N/A	None	None	N/A	N/A	N/A	N/A
Excavator	62.6	58.7	85.0	75.0	N/A	N/A	N/A	N/A	None	None	N/A	N/A	N/A	N/A
Mounted Impact Hammer (hoe ram)	72.2	65.2	90.0	75.0	N/A	N/A	N/A	N/A	None	None	N/A	N/A	N/A	N/A
Crane	62.5	54.5	85.0	75.0	N/A	N/A	N/A	N/A	None	None	N/A	N/A	N/A	N/A
All Other Equipment > 5 HP	66.9	63.9	85.0	75.0	N/A	N/A	N/A	N/A	None	None	N/A	N/A	N/A	N/A
Total	83.2	77.9	85.0	75.0	N/A	N/A	N/A	N/A	None	2.9	N/A	N/A	N/A	N/A

**** Receptor #2 ****

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
CDC (bldg 377)	Commercial	65.0	60.0	55.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Tug boat	No	100		87.0	3600.0	0.0
Impact Pile Driver	Yes	20		101.3	3600.0	0.0
Concrete Batch Plant	No	15	83.0		3600.0	0.0

Cumulative Scripps only

Workboat	No	40	80.0	3600.0	0.0
Hydra Break Ram	Yes	10	90.0	3600.0	0.0
Concrete Saw	No	20	89.6	3600.0	0.0
Excavator	No	40	80.7	3600.0	0.0
Mounted Impact Hammer (hoe ram)	Yes	20	90.3	3600.0	0.0
Crane	No	16	80.6	3600.0	0.0
All Other Equipment > 5 HP	No	50	85.0	3600.0	0.0

Results

	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Tug boat	49.9	49.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Impact Pile Driver	64.1	57.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Concrete Batch Plant	45.9	37.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Workboat	42.9	38.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Hydra Break Ram	52.9	42.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Concrete Saw	52.4	45.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Excavator	43.6	39.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Mounted Impact Hammer (hoe ram)	53.1	46.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Crane	43.4	35.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
All Other Equipment > 5 HP	47.9	44.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	64.1	58.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Cumulative Approach Pier only
Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 05/14/2012
Case Description: Cumulative with Scripps Pier

**** Receptor #1 ****

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
La Playa	Residential	65.0	60.0	55.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Tug boat	No	100		87.0	2470.0	0.0
Impact Pile Driver	Yes	20		101.3	2470.0	0.0
Concrete Batch Plant	No	15	83.0		2470.0	0.0
Workboat	No	40		80.0	2470.0	0.0
Hydra Break Ram	Yes	10	90.0		2470.0	0.0
Concrete Saw	No	20		89.6	2470.0	0.0
Excavator	No	40		80.7	2470.0	0.0
Mounted Impact Hammer (hoe ram)	Yes	20		90.3	2470.0	0.0
All Other Equipment > 5 HP	No	50	85.0		2470.0	0.0
All Other Equipment > 5 HP	No	50	85.0		2470.0	0.0

Results

	Calculated (dBA)		Noise Limits (dBA) Day		Evening		Night		Noise Limit Exceedance (dBA) Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Tug boat	53.1	53.1	85.0	75.0	N/A	N/A	N/A	N/A	None	None	N/A	N/A	N/A	N/A
Impact Pile Driver	67.4	60.4	90.0	75.0	N/A	N/A	N/A	N/A	None	None	N/A	N/A	N/A	N/A
Concrete Batch Plant	49.1	40.9	85.0	75.0	N/A	N/A	N/A	N/A	None	None	N/A	N/A	N/A	N/A
Workboat	46.1	42.1	85.0	75.0	N/A	N/A	N/A	N/A	None	None	N/A	N/A	N/A	N/A
Hydra Break Ram	56.1	46.1	90.0	75.0	N/A	N/A	N/A	N/A	None	None	N/A	N/A	N/A	N/A
Concrete Saw	55.7	48.7	85.0	75.0	N/A	N/A	N/A	N/A	None	None	N/A	N/A	N/A	N/A
Excavator	46.8	42.9	85.0	75.0	N/A	N/A	N/A	N/A	None	None	N/A	N/A	N/A	N/A
Mounted Impact Hammer (hoe ram)	56.4	49.4	90.0	75.0	N/A	N/A	N/A	N/A	None	None	N/A	N/A	N/A	N/A
All Other Equipment > 5 HP	51.1	48.1	85.0	75.0	N/A	N/A	N/A	N/A	None	None	N/A	N/A	N/A	N/A
All Other Equipment > 5 HP	51.1	48.1	85.0	75.0	N/A	N/A	N/A	N/A	None	None	N/A	N/A	N/A	N/A
Total	67.4	62.3	85.0	75.0	N/A	N/A	N/A	N/A	None	None	N/A	N/A	N/A	N/A

**** Receptor #2 ****

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
CDC (bldg 377)	Commercial	65.0	60.0	55.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Tug boat	No	100		87.0	2220.0	0.0
Impact Pile Driver	Yes	20		101.3	2220.0	0.0
Concrete Batch Plant	No	15	83.0		2220.0	0.0

				Cumulative Approach Pier only		
Workboat	No	40		80.0	2220.0	0.0
Hydra Break Ram	Yes	10	90.0		2220.0	0.0
Concrete Saw	No	20		89.6	2220.0	0.0
Excavator	No	40		80.7	2220.0	0.0
Mounted Impact Hammer (hoe ram)	Yes	20		90.3	2220.0	0.0
All Other Equipment > 5 HP	No	50	85.0		2220.0	0.0
All Other Equipment > 5 HP	No	50	85.0		2220.0	0.0

Results

	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Tug boat	54.1	54.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Impact Pile Driver	68.3	61.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Concrete Batch Plant	50.1	41.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Workboat	47.1	43.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Hydra Break Ram	57.1	47.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Concrete Saw	56.6	49.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Excavator	47.8	43.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Mounted Impact Hammer (hoe ram)	57.3	50.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
All Other Equipment > 5 HP	52.1	49.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
All Other Equipment > 5 HP	52.1	49.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	68.3	63.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

P2 South Pier Abutment Piles
Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 05/13/2012
Case Description: Phase 2 - South Pier Abutment Piles

**** Receptor #1 ****

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
La Playa	Residential	65.0	60.0	55.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Tug boat	No	100		87.0	2430.0	0.0
Impact Pile Driver	Yes	20		101.3	2430.0	0.0
Workboat	No	40		80.0	2430.0	0.0
Crane	No	16		80.6	2430.0	0.0

Results

	Calculated (dBA)		Noise Limits (dBA) Day		Evening		Night		Noise Limit Exceedance (dBA) Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Tug boat	53.3	53.3	85.0	75.0	N/A	N/A	N/A	N/A	None	None	N/A	N/A	N/A	N/A
Impact Pile Driver	67.5	60.5	90.0	75.0	N/A	N/A	N/A	N/A	None	None	N/A	N/A	N/A	N/A
Workboat	46.3	42.3	85.0	75.0	N/A	N/A	N/A	N/A	None	None	N/A	N/A	N/A	N/A
Crane	46.8	38.9	85.0	75.0	N/A	N/A	N/A	N/A	None	None	N/A	N/A	N/A	N/A
Total	67.5	61.4	85.0	75.0	N/A	N/A	N/A	N/A	None	None	N/A	N/A	N/A	N/A

**** Receptor #2 ****

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
NBPL CDC	Commercial	65.0	60.0	55.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Tug boat	No	100		87.0	2023.0	0.0
Impact Pile Driver	Yes	20		101.3	2023.0	0.0
Workboat	No	40		80.0	2023.0	0.0
Crane	No	16		80.6	2023.0	0.0

Results

	Calculated (dBA)		Noise Limits (dBA) Day		Evening		Night		Noise Limit Exceedance (dBA) Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Tug boat	54.9	54.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Impact Pile Driver	69.1	62.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

P2 South Pier Abutment Piles

Workboat		47.9	43.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Crane		48.4	40.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Total	69.1	63.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Appendix G

Record of Non-Applicability for Clean Air Act Conformity (RONA) and Air Quality Data

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RECORD OF NON-APPLICABILITY (RONA)
FOR CLEAN AIR ACT CONFORMITY
SAN DIEGO AIR BASIN

This Proposed Action falls under the Record of Non-Applicability (RONA) category and is documented with this RONA.

The U.S. Environmental Protection Agency (USEPA) published *Determining Conformity of General Federal Actions to State or Federal Implementation Plans; Final Rule*, in the 30 November 1993, Federal Register (40 CFR Parts 6, 51, and 93). The U.S. Navy published *Clean Air Act Conformity Guidance* in Appendix F, OPNAVINST 5090.1C, dated 30 October 2007. These publications provide implementing guidance to document Clean Air Act Conformity Determination requirements.

Federal regulations state that no department, agency, or instrumentality of the Federal Government shall engage in, support in any way or provide financial assistance for, license to permit, or approve any activity that does not conform to an applicable implementation plan. It is the responsibility of the Federal Agency to determine whether a Federal action conforms to the applicable implementation plan, before the action is taken (40 CFR Part 1 51.850[a]).

Federal actions may be exempt from conformity determinations if they do not exceed designated *de minimis* levels for criteria pollutants (40 CFR Part 51.853[b]). *De minimis* levels (in tons/year) for the air basin potentially affected by the Proposed Action are listed in Table 1.

Table 1
***De minimis* Levels for Criteria Pollutants in the San Diego Air Basin**

Criteria Pollutant	*De minimis* Level (tons/year)
Carbon Monoxide (CO)	100
Volatile Organic Compounds (VOC)	100
Oxides of Nitrogen (NO_x)	100

PROPOSED ACTION

Action Proponent: U.S. Navy

Location: Naval Base Point Loma

Proposed Action Name: Naval Base Point Loma Fuel Pier Replacement and Dredging

Proposed Action and Emissions Summary: The Proposed Action would involve demolition of the aging and seismically deficient Fuel Pier (Pier 180) at Naval Base Point Loma (NBPL), construction of a new enhanced Fuel Pier with optimum capability to support current and projected fueling needs of the Navy and Department of Homeland Security (DHS), and performance of associated dredging. Project demolition, construction, and dredging would occur simultaneously, and would commence in fiscal year (FY) 2013 and be completed by FY 2015. The Proposed Action would generally allow the future year fueling of newer and larger ships. The Proposed Action would create the infrastructure necessary to support increased berthing capability by providing a facility with additional berthing length, versatility in accommodating a wide variety of ships and additional deep draft berthing capabilities. The Proposed Action would also greatly reduce the time and money associated with berth shifts, i.e., re-positioning ships while in port for refueling, maintenance, and training, etc.

Air Emissions Summary: The Proposed Action would result in air emissions from construction activities. Because no changes in operations are proposed as part of the Proposed Action, operational emissions would not differ from the baseline. The construction required for the Proposed Action was assumed to commence in FY 2013 and be completed by FY 2016. Based on the air quality analysis for the proposed action, the maximum estimated emissions would be below conformity *de minimis* levels (Table 2).

Table 2
Estimated Total Net Project Emissions - Tons per Year

Calendar Year (CY)	Pollutant		
	CO	VOC	NOx
2013	4.73	1.81	13.51
2014	14.14	8.25	33.26
2015	22.84	14.27	44.89
2016	14.24	9.75	35.52
General Conformity *De minimis* Thresholds (Tons per year)	100	100	100
Exceed threshold?	**No**	**No**	**No**

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Emissions Summary
NBPL P-151

2013 Emissions	Emission (tons/year)					
	CO	VOC	NOx	SOx	PM10	PM2.5
Marine Mammal Relocation						
Landside Pipe Installation	0.33	0.08	0.57	0.00	0.03	0.03
Dredge Turning Basin	2.80	0.83	9.50	0.01	0.29	0.26
Truck Trips	0.16	0.78	0.06	0.00	0.01	0.00
Worker Trips	1.13	0.10	0.06	0.00	0.01	0.00
Support Vessels	0.31	0.03	3.30	0.00	0.08	0.08
Subtotal	**4.73**	**1.81**	**13.51**	**0.01**	**0.42**	**0.37**
Total 2013	**4.73**	**1.81**	**13.51**	**0.01**	**0.42**	**0.37**

2014 Emissions	Emission (tons/year)					
	CO	VOC	NOx	SOx	PM10	PM2.5
Marine Mammal Relocation						
Indicator Pile Driving	0.06	0.02	0.12	0.00	0.01	0.00
Drive Piles	0.02	0.00	0.04	0.00	0.00	0.00
Construct Dolphin Mooring	0.18	0.06	0.43	0.00	0.02	0.02
Subtotal	**0.25**	**0.08**	**0.59**	**0.00**	**0.02**	**0.02**
North Segment Demolition						
Piling Removal	0.72	0.23	1.81	0.00	0.07	0.06
Deck Removal	1.24	0.39	3.31	0.00	0.12	0.11
Asphalt Debris Removal	0.78	0.26	1.77	0.00	0.08	0.07
Demo & Material Transport	0.55	0.18	1.58	0.00	0.06	0.05
Truck Trips	0.08	0.38	0.03	0.00	0.00	0.00
Worker Trips	0.37	0.03	0.02	0.00	0.00	0.00
Support Vessels	0.14	0.01	1.49	0.00	0.04	0.04
Subtotal	**3.87**	**1.48**	**10.01**	**0.01**	**0.37**	**0.33**
Access Pier Construction						
Drive Abutment Piles	0.16	0.04	0.36	0.00	0.01	0.01
Construct Abutment	0.40	0.12	0.83	0.00	0.04	0.03
Drive Structural Piles	0.74	0.20	1.66	0.00	0.07	0.06
Truck Trips	0.95	4.58	0.38	0.01	0.05	0.01
Worker Trips	2.27	0.12	0.20	0.00	0.02	0.01
Support Vessels	0.59	0.05	6.34	0.00	0.16	0.16
Subtotal	**5.11**	**5.12**	**9.77**	**0.02**	**0.35**	**0.28**
North Pier Construction						
Drive Structural Piles	0.57	0.15	1.44	0.00	0.05	0.05
Truck Trips	0.16	0.79	0.07	0.00	0.01	0.00
Worker Trips	2.27	0.20	0.12	0.00	0.02	0.01
Support Vessels	0.59	0.05	6.34	0.00	0.16	0.16
Subtotal	**3.59**	**1.20**	**7.97**	**0.01**	**0.24**	**0.21**
Dredging	**1.31**	**0.37**	**4.92**	**0.00**	**0.15**	**0.13**
Total 2014, Preferred Alternative	**14.14**	**8.25**	**33.26**	**0.05**	**1.12**	**0.97**
Total 2014, Delayed Dredging Alternative	**12.83**	**7.88**	**28.34**	**0.05**	**0.98**	**0.84**

2015 Emissions	Emission (tons/year)					
	CO	VOC	NOx	SOx	PM10	PM2.5
Access Pier Construction						
Form and Place 1st Stage Pile Caps	2.11	0.63	3.56	0.00	0.19	0.17
Form/Place Deck Slabs, 2nd Stg Caps, Beams & Curbs	1.78	0.55	3.56	0.00	0.17	0.15
Form and Place CIP Columns & Walls for Ramp	0.31	0.10	0.62	0.00	0.03	0.03
Form and Place Column Girders for Ramp	0.53	0.16	0.89	0.00	0.05	0.04
Form/Place Ramp Deck & Curbs	0.47	0.15	0.95	0.00	0.04	0.04
Access Pier Pipe Installation	1.33	0.41	2.67	0.00	0.13	0.11
Drive Secondary Fender Piles	0.14	0.04	0.37	0.00	0.01	0.01
Install Secondary Fender System	0.41	0.13	0.83	0.00	0.04	0.03
Truck Trips	0.95	4.58	0.38	0.01	0.05	0.01
Worker Trips	2.27	0.20	0.12	0.00	0.02	0.01
Support Vessels	0.59	0.05	6.34	0.00	0.16	0.16
Subtotal	**10.90**	**7.00**	**20.31**	**0.03**	**0.89**	**0.76**
North Pier Construction						
Form and Place 1st Stage Pile Caps	2.11	0.63	3.56	0.00	0.19	0.17
Form/Place Deck Slab/2nd Stg Caps/Beams Lower	1.33	0.41	2.67	0.00	0.13	0.11
Form and Place CIP Columns & Walls	1.33	0.41	2.67	0.00	0.13	0.11
Form and Place Column Girders	1.06	0.31	1.78	0.00	0.10	0.09
Drive Primary Fender Piles	0.43	0.12	1.12	0.00	0.04	0.04
Drive Secondary Fender Piles	0.17	0.05	0.45	0.00	0.02	0.01
Install Primary Fender System	0.39	0.11	0.56	0.00	0.03	0.03
Truck Trips	0.95	4.58	0.38	0.01	0.05	0.01
Worker Trips	2.27	0.20	0.12	0.00	0.02	0.01
Support Vessels	0.59	0.05	6.34	0.00	0.16	0.16
Subtotal	**10.63**	**6.89**	**19.66**	**0.03**	**0.86**	**0.74**
Dredging	**1.31**	**0.37**	**4.92**	**0.00**	**0.15**	**0.13**
Total 2015, Preferred Alternative	**22.84**	**14.27**	**44.89**	**0.07**	**1.90**	**1.63**
Total 2015, Delayed Dredging Alternative	**21.53**	**13.89**	**39.97**	**0.07**	**1.75**	**1.50**

2016 Emissions	Emission (tons/year)					
	CO	VOC	NOx	SOx	PM10	PM2.5
North Pier Construction						
North Pier Pipe Installation	0.94	0.28	1.58	0.00	0.09	0.08
Form/Place Deck Slab 2nd Stg Caps/Beams Upper Level	1.33	0.41	2.67	0.00	0.13	0.11
Install Loading Arm System	0.29	0.09	0.42	0.00	0.03	0.02
Turn On Service to North Pier	0.03	0.01	0.03	0.00	0.00	0.00
Truck Trips	0.95	4.58	0.38	0.01	0.05	0.01
Worker Trips	2.27	0.20	0.12	0.00	0.02	0.01
Support Vessels	0.59	0.05	6.34	0.00	0.16	0.16
Subtotal	**6.40**	**5.63**	**11.56**	**0.02**	**0.47**	**0.39**
South Dolphins Construction						
Drive Mooring Dolphin Piles	0.20	0.06	0.53	0.00	0.02	0.02
Construct Dolphin Superstructure	0.46	0.14	0.91	0.00	0.04	0.04
Install Fender System Framing and Components	0.19	0.06	0.28	0.00	0.02	0.02
Truck Trips	0.23	1.09	0.09	0.00	0.01	0.00
Worker Trips	0.54	0.05	0.03	0.00	0.00	0.00
Support Vessels	0.76	0.07	8.16	0.01	0.20	0.20
Subtotal	**2.38**	**1.46**	**10.00**	**0.01**	**0.30**	**0.28**
South Pier & Access Pier Demolition						
Remove Utilities, Appurtenances, & Fender System	0.89	0.32	1.76	0.00	0.08	0.07
Deck Removal	0.67	0.23	1.28	0.00	0.06	0.05
Piling Removal	0.80	0.29	1.58	0.00	0.07	0.06
Truck Trips	0.14	0.69	0.06	0.00	0.01	0.00
Worker Trips	0.67	0.06	0.04	0.00	0.01	0.00
Support Vessels	0.23	0.02	2.45	0.00	0.06	0.06
Subtotal	**3.41**	**1.61**	**7.16**	**0.01**	**0.27**	**0.24**
Abutment Piles						
Drive Abutment Piles	0.17	0.05	0.44	0.00	0.02	0.01
Form/Place Abutment Cap & Landside Tie-In	0.25	0.07	0.42	0.00	0.02	0.02
Truck Trips	0.11	0.55	0.05	0.00	0.01	0.00
Worker Trips	0.14	0.01	0.01	0.00	0.00	0.00
Support Vessels	0.09	0.01	0.97	0.00	0.02	0.02
Subtotal	**0.75**	**0.69**	**1.89**	**0.00**	**0.07**	**0.06**
Dredging	**1.31**	**0.37**	**4.92**	**0.00**	**0.15**	**0.13**
Total 2016, Preferred Alternative	**14.24**	**9.75**	**35.52**	**0.05**	**1.26**	**1.10**
Total 2016. Delayed Dredging Alternative	**12.94**	**9.38**	**30.60**	**0.05**	**1.11**	**0.97**

Marine Mammal/Pile Program

Emission Factors											Total Emissions (Tons)					
Equipment	FUEL	HP	CO (lb/hr)	VOC (lb/hr)	NOX (lb/hr)	SOX (lb/hr)	PM10 (lb/hr)	No of Equipment	Hours Per Day	Days in Service	CO	VOC	NOX	SOX	PM10	PM2.5
Indicator Pile Driving																
Barge Crane - 150 Ton	DIESEL	250	0.569	0.163	1.533	0.00177	0.057	1	8	17	0.039	0.011	0.104	0.000	0.004	0.003
Delmag D12 Hammer	DIESEL	36.21	0.274	0.084	0.271	0.00036	0.023	1	8	17	0.019	0.006	0.018	0.000	0.002	0.001
Jet Pump	DIESEL	50	0.312	0.105	0.323	0.00044	0.027	1	8	17	0.021	0.007	0.022	0.000	0.002	0.002
											0.06	**0.02**	**0.12**	**0.00**	**0.01**	**0.00**
Landside Pipe Installation																
Scraper	DIESEL	313	1.211	0.319	2.829	0.00315	0.110	1	8	20	0.097	0.025	0.226	0.000	0.009	0.008
Roller	DIESEL	95	0.406	0.099	0.625	0.00069	0.053	1	8	20	0.033	0.008	0.050	0.000	0.004	0.004
Concrete Mixer	DIESEL	125	0.758	0.144	1.030	0.00141	0.060	2	8	20	0.121	0.023	0.165	0.000	0.010	0.009
Paver	DIESEL	100	0.506	0.139	0.836	0.00081	0.073	2	8	20	0.081	0.022	0.134	0.000	0.012	0.010
											0.33	**0.08**	**0.57**	**0.00**	**0.03**	**0.03**
Dredge Turning Basin																
Dredge	DIESEL	100			See Dredging			1	8	90	2.796	0.827	9.505	0.009	0.289	0.257
											2.80	**0.83**	**9.50**	**0.01**	**0.29**	**0.26**
Drive Piles																
Barge Crane - 150 Ton	DIESEL	250	0.569	0.163	1.533	0.00177	0.057	1	8	5	0.011	0.003	0.031	0.000	0.001	0.001
Delmag D12 Hammer	DIESEL	36.21	0.274	0.084	0.271	0.00036	0.023	1	8	5	0.005	0.002	0.005	0.000	0.000	0.000
Jet Pump	DIESEL	50	0.312	0.105	0.323	0.00044	0.027	1	8	5	0.006	0.002	0.006	0.000	0.001	0.000
											0.02	**0.00**	**0.04**	**0.00**	**0.00**	**0.00**
Construct Dolphin Mooring																
Air Compressor	DIESEL	50	0.255	0.092	0.222	0.00029	0.022	2	8	25	0.051	0.018	0.044	0.000	0.004	0.004
Barge Crane - 150 Ton	DIESEL	250	0.529	0.155	1.423	0.00177	0.052	1	8	25	0.053	0.016	0.142	0.000	0.005	0.005
Concrete Truck	DIESEL	210	0.384	0.140	1.237	0.00187	0.041	1	8	25	0.038	0.014	0.124	0.000	0.004	0.004
Concrete Pump Truck	DIESEL	210	0.384	0.140	1.237	0.00187	0.041	1	8	25	0.038	0.014	0.124	0.000	0.004	0.004
20-Ton Forklift	DIESEL	130	0.726	0.135	1.045	0.00141	0.059	1	8	25	0.073	0.014	0.104	0.000	0.006	0.005
Generator	DIESEL	33	0.264	0.087	0.285	0.00040	0.023	2	8	25	0.053	0.017	0.057	0.000	0.005	0.004
Wharf Crane - 150 Ton	DIESEL	250	0.529	0.155	1.423	0.00177	0.052	1	8	25	0.053	0.016	0.142	0.000	0.005	0.005
											0.18	**0.06**	**0.43**	**0.00**	**0.02**	**0.02**
Total											**3.38**	**0.99**	**10.67**	**0.01**	**0.35**	**0.31**

Work Days/Week 5

Heavy Equipment North Segment
Demolition Emissions

Emission Factors											Total Emissions (Metric Tons)					
Equipment	FUEL	HP	CO (lb/hr)	VOC (lb/hr)	NOX (lb/hr)	SOX (lb/hr)	PM10 (lb/hr)	No of Equipment	Hours Per Day	Days in Service	CO	VOC	NOX	SOX	PM10	PM2.5
Piling Removal																
Air Compressor	DIESEL	50	0.255	0.092	0.222	0.00029	0.022	2	4	84	0.086	0.031	0.075	0.000	0.007	0.007
Barge Crane - 250 Ton	DIESEL	399	0.529	0.155	1.423	0.00177	0.052	1	9.5	84	0.211	0.062	0.568	0.001	0.021	0.018
Heavy Truck	DIESEL	489	0.636	0.217	1.787	0.00267	0.063	1	8	84	0.214	0.073	0.600	0.001	0.021	0.019
Wharf Crane - 150 Ton	DIESEL	250	0.529	0.155	1.423	0.00177	0.052	1	9.5	84	0.211	0.062	0.568	0.001	0.021	0.018
											0.72	**0.23**	**1.81**	**0.00**	**0.07**	**0.06**
Deck Removal																
Air Compressor	DIESEL	50	0.255	0.092	0.222	0.00029	0.022	2	4	84	0.086	0.031	0.075	0.000	0.007	0.007
Wheeled Loader	DIESEL	250	0.368	0.126	1.212	0.00168	0.042	1	8	84	0.124	0.042	0.407	0.001	0.014	0.012
Barge Crane - 150 Ton	DIESEL	250	0.529	0.155	1.423	0.00177	0.052	1	9.5	84	0.211	0.062	0.568	0.001	0.021	0.018
Dump Truck	DIESEL	489	0.636	0.217	1.787	0.00267	0.063	1	8	84	0.214	0.073	0.600	0.001	0.021	0.019
Wharf Crane - 150 Ton	DIESEL	250	0.529	0.155	1.423	0.00177	0.052	1	9.5	84	0.211	0.062	0.568	0.001	0.021	0.018
Breakers	DIESEL	320	0.523	0.145	1.519	0.00250	0.049	1	8	84	0.176	0.049	0.510	0.001	0.017	0.015
Concrete Saws	DIESEL	10	0.068	0.020	0.126	0.00021	0.005	4	8	84	0.091	0.027	0.169	0.000	0.007	0.006
Flatbed Truck	DIESEL	210	0.384	0.140	1.237	0.00187	0.041	1	8	84	0.129	0.047	0.416	0.001	0.014	0.012
											1.24	**0.39**	**3.31**	**0.00**	**0.12**	**0.11**
Asphalt Debris Removal																
Air Compressor	DIESEL	50	0.255	0.092	0.222	0.00029	0.022	2	4	84	0.086	0.031	0.075	0.000	0.007	0.007
Dump Truck	DIESEL	489	0.636	0.217	1.787	0.00267	0.063	1	8	84	0.214	0.073	0.600	0.001	0.021	0.019
Barge-Mounted Excavator	DIESEL	320	0.527	0.173	1.476	0.00229	0.052	1	8	84	0.177	0.058	0.496	0.001	0.017	0.015
Generator	DIESEL	45	0.264	0.087	0.285	0.00040	0.023	2	8	84	0.177	0.059	0.191	0.000	0.016	0.014
Wheeled Loader	DIESEL	250	0.368	0.126	1.212	0.00168	0.042	1	8	84	0.124	0.042	0.407	0.001	0.014	0.012
											0.78	**0.26**	**1.77**	**0.00**	**0.08**	**0.07**
Demo & Material Transport																
Wharf Crane - 150 Ton	DIESEL	250	0.529	0.155	1.423	0.00177	0.052	1	9.5	84	0.211	0.062	0.568	0.001	0.021	0.018
Wheeled Loader	DIESEL	250	0.368	0.126	1.212	0.00168	0.042	1	8	84	0.124	0.042	0.407	0.001	0.014	0.012
Dump Truck	DIESEL	489	0.636	0.217	1.787	0.00267	0.063	1	8	84	0.214	0.073	0.600	0.001	0.021	0.019
											0.55	**0.18**	**1.58**	**0.00**	**0.06**	**0.05**
TOTAL											**3.29**	**1.06**	**8.47**	**0.01**	**0.32**	**0.29**

Assumptions:

* Per project schedule, North Segment Demolition occurs in 2012
* Remove utilities, appurtenances, & fenders assumes 42 days.
* Deck Removal assumes 90 days.
* Pier Removal assumes 60 days.

Notes:

(a) Emission factors from http://www.aqmd.gov/ceqa/handbook/offroad/offroad.html, SCAQMD OFFROAD Emission Factors, Years 2012 through 2015

Work Days/Week 5

Access Pier Construction

Emission Factors											Total Emissions (Tons)					
Equipment	FUEL	HP	CO (lb/hr)	VOC (lb/hr)	NOX (lb/hr)	SOX (lb/hr)	PM10 (lb/hr)	No of Equipment	Hours Per Day	Days in Service	CO	VOC	NOX	SOX	PM10	PM2.5
Drive Abutment Piles																
Barge Crane - 150 Ton	DIESEL	250	0.529	0.155	1.423	0.00177	0.052	1	9.5	13	0.033	0.010	0.088	0.000	0.003	0.003
Impact Hammer	DIESEL	250	0.523	0.145	1.519	0.00250	0.049	1	9.5	13	0.032	0.009	0.094	0.000	0.003	0.003
Vibratory Hammer	DIESEL	250	0.523	0.145	1.519	0.00250	0.049	1	9.5	13	0.032	0.009	0.094	0.000	0.003	0.003
Jet Pump	DIESEL	50	0.312	0.105	0.323	0.00044	0.027	1	9.5	13	0.019	0.006	0.020	0.000	0.002	0.002
20-Ton Forklift	DIESEL	130	0.726	0.135	1.045	0.00141	0.059	1	9.5	13	0.045	0.008	0.065	0.000	0.004	0.003
											0.16	**0.04**	**0.36**	**0.00**	**0.01**	**0.01**
Construct Abutment																
Air Compressor	DIESEL	50	0.255	0.092	0.222	0.00029	0.022	2	8	28	0.057	0.021	0.050	0.000	0.005	0.004
Barge Crane - 150 Ton	DIESEL	250	0.529	0.155	1.423	0.00177	0.052	1	8	28	0.059	0.017	0.159	0.000	0.006	0.005
Concrete Truck	DIESEL	210	0.384	0.140	1.237	0.00187	0.041	1	8	28	0.043	0.016	0.139	0.000	0.005	0.004
Concrete Pump Truck	DIESEL	210	0.384	0.140	1.237	0.00187	0.041	1	8	28	0.043	0.016	0.139	0.000	0.005	0.004
20-Ton Forklift	DIESEL	130	0.726	0.135	1.045	0.00141	0.059	1	8	28	0.081	0.015	0.117	0.000	0.007	0.006
Generator	DIESEL	33	0.264	0.087	0.285	0.00040	0.023	2	8	28	0.059	0.020	0.064	0.000	0.005	0.005
Wharf Crane - 150 Ton	DIESEL	250	0.529	0.155	1.423	0.00177	0.052	1	8	28	0.059	0.017	0.159	0.000	0.006	0.005
											0.402	**0.121**	**0.826**	**0.001**	**0.038**	**0.034**
Drive Structural Piles																
Barge Crane - 150 Ton	DIESEL	250	0.529	0.155	1.423	0.00177	0.052	1	9.5	60	0.151	0.044	0.406	0.001	0.015	0.013
Impact Hammer	DIESEL	250	0.523	0.145	1.519	0.00250	0.049	1	9.5	60	0.149	0.041	0.433	0.001	0.014	0.012
Vibratory Hammer	DIESEL	250	0.523	0.145	1.519	0.00250	0.049	1	9.5	60	0.149	0.041	0.433	0.001	0.014	0.012
Jet Pump	DIESEL	50	0.312	0.105	0.323	0.00044	0.027	1	9.5	60	0.089	0.030	0.092	0.000	0.008	0.007
20-Ton Forklift	DIESEL	130	0.726	0.135	1.045	0.00141	0.059	1	9.5	60	0.207	0.039	0.298	0.000	0.017	0.015
											0.74	**0.20**	**1.66**	**0.00**	**0.07**	**0.06**
Form and Place 1st Stage Pile Caps																
Air Compressor	DIESEL	50	0.255	0.092	0.222	0.00029	0.022	2	8	180	0.367	0.133	0.320	0.000	0.032	0.028
Barge Crane - 150 Ton	DIESEL	250	0.529	0.155	1.423	0.00177	0.052	1	8	180	0.381	0.112	1.025	0.001	0.037	0.033
20-Ton Forklift	DIESEL	130	0.726	0.135	1.045	0.00141	0.059	1	8	180	0.522	0.097	0.752	0.001	0.043	0.038
Wheeled Loader	DIESEL	250	0.368	0.126	1.212	0.00168	0.042	1	8	180	0.265	0.091	0.873	0.001	0.030	0.027
Generator	DIESEL	33	0.264	0.087	0.285	0.00040	0.023	2	8	180	0.380	0.126	0.410	0.001	0.034	0.030
Welders	DIESEL	45	0.275	0.098	0.253	0.00034	0.024	1	8	180	0.198	0.070	0.182	0.000	0.017	0.015
											2.11	**0.63**	**3.56**	**0.00**	**0.19**	**0.17**
Form/Place Deck Slabs, 2nd Stg Caps, Beams & Curbs																
Air Compressor	DIESEL	50	0.255	0.092	0.222	0.00029	0.022	2	8	120	0.244	0.088	0.213	0.000	0.021	0.019
Barge Crane - 150 Ton	DIESEL	250	0.529	0.155	1.423	0.00177	0.052	1	8	120	0.254	0.074	0.683	0.001	0.025	0.022
Concrete Truck	DIESEL	210	0.384	0.140	1.237	0.00187	0.041	1	8	120	0.184	0.067	0.594	0.001	0.020	0.018

Concrete Pump Truck	DIESEL	210	0.384	0.140	1.237	0.00187	0.041	1	8	120	0.184	0.067	0.594	0.001	0.020	0.018
20-Ton Forklift	DIESEL	130	0.726	0.135	1.045	0.00141	0.059	1	8	120	0.348	0.065	0.502	0.001	0.028	0.025
Wheeled Loader	DIESEL	250	0.368	0.126	1.212	0.00168	0.042	1	8	120	0.177	0.060	0.582	0.001	0.020	0.018
Generator	DIESEL	33	0.264	0.087	0.285	0.00040	0.023	2	8	120	0.253	0.084	0.273	0.000	0.022	0.020
Welders	DIESEL	45	0.275	0.098	0.253	0.00034	0.024	1	8	120	0.132	0.047	0.122	0.000	0.012	0.010
											1.78	**0.55**	**3.56**	**0.00**	**0.17**	**0.15**
Form and Place CIP Columns & Walls for Ramp																
Air Compressor	DIESEL	50	0.255	0.092	0.222	0.00029	0.022	2	8	21	0.043	0.015	0.037	0.000	0.004	0.003
Barge Crane - 150 Ton	DIESEL	250	0.529	0.155	1.423	0.00177	0.052	1	8	21	0.044	0.013	0.120	0.000	0.004	0.004
Concrete Truck	DIESEL	210	0.384	0.140	1.237	0.00187	0.041	1	8	21	0.032	0.012	0.104	0.000	0.003	0.003
Concrete Pump Truck	DIESEL	210	0.384	0.140	1.237	0.00187	0.041	1	8	21	0.032	0.012	0.104	0.000	0.003	0.003
20-Ton Forklift	DIESEL	130	0.726	0.135	1.045	0.00141	0.059	1	8	21	0.061	0.011	0.088	0.000	0.005	0.004
Wheeled Loader	DIESEL	250	0.368	0.126	1.212	0.00168	0.042	1	8	21	0.031	0.011	0.102	0.000	0.004	0.003
Generator	DIESEL	33	0.264	0.087	0.285	0.00040	0.023	2	8	21	0.044	0.015	0.048	0.000	0.004	0.003
Welders	DIESEL	45	0.275	0.098	0.253	0.00034	0.024	1	8	21	0.023	0.008	0.021	0.000	0.002	0.002
											0.31	**0.10**	**0.62**	**0.00**	**0.03**	**0.03**
Form and Place Column Girders for Ramp																
Air Compressor	DIESEL	50	0.255	0.092	0.222	0.00029	0.022	2	8	45	0.092	0.033	0.080	0.000	0.008	0.007
Barge Crane - 150 Ton	DIESEL	250	0.529	0.155	1.423	0.00177	0.052	1	8	45	0.095	0.028	0.256	0.000	0.009	0.008
20-Ton Forklift	DIESEL	130	0.726	0.135	1.045	0.00141	0.059	1	8	45	0.131	0.024	0.188	0.000	0.011	0.009
Wheeled Loader	DIESEL	250	0.368	0.126	1.212	0.00168	0.042	1	8	45	0.066	0.023	0.218	0.000	0.008	0.007
Generator	DIESEL	33	0.264	0.087	0.285	0.00040	0.023	2	8	45	0.095	0.031	0.102	0.000	0.008	0.007
Welders	DIESEL	45	0.275	0.098	0.253	0.00034	0.024	1	8	45	0.050	0.018	0.046	0.000	0.004	0.004
											0.53	**0.16**	**0.89**	**0.00**	**0.05**	**0.04**
Form/Place Ramp Deck & Curbs																
Air Compressor	DIESEL	50	0.255	0.092	0.222	0.00029	0.022	2	8	32	0.065	0.024	0.057	0.000	0.006	0.005
Barge Crane - 150 Ton	DIESEL	250	0.529	0.155	1.423	0.00177	0.052	1	8	32	0.068	0.020	0.182	0.000	0.007	0.006
Concrete Truck	DIESEL	210	0.384	0.140	1.237	0.00187	0.041	1	8	32	0.049	0.018	0.158	0.000	0.005	0.005
Concrete Pump Truck	DIESEL	210	0.384	0.140	1.237	0.00187	0.041	1	8	32	0.049	0.018	0.158	0.000	0.005	0.005
20-Ton Forklift	DIESEL	130	0.726	0.135	1.045	0.00141	0.059	1	8	32	0.093	0.017	0.134	0.000	0.008	0.007
Wheeled Loader	DIESEL	250	0.368	0.126	1.212	0.00168	0.042	1	8	32	0.047	0.016	0.155	0.000	0.005	0.005
Generator	DIESEL	33	0.264	0.087	0.285	0.00040	0.023	2	8	32	0.068	0.022	0.073	0.000	0.006	0.005
Welders	DIESEL	45	0.275	0.098	0.253	0.00034	0.024	1	8	32	0.035	0.013	0.032	0.000	0.003	0.003
											0.47	**0.15**	**0.95**	**0.00**	**0.04**	**0.04**
Access Pier Pipe Installation																
Air Compressor	DIESEL	50	0.255	0.092	0.222	0.00029	0.022	2	8	90	0.183	0.066	0.160	0.000	0.016	0.014
Barge Crane - 150 Ton	DIESEL	250	0.529	0.155	1.423	0.00177	0.052	1	8	90	0.191	0.056	0.512	0.001	0.019	0.017
Concrete Truck	DIESEL	210	0.384	0.140	1.237	0.00187	0.041	1	8	90	0.138	0.050	0.445	0.001	0.015	0.013

Access Pier Construction

Concrete Pump Truck	DIESEL	210	0.384	0.140	1.237	0.00187	0.041	1	8	90	0.138	0.050	0.445	0.001	0.015	0.013
20-Ton Forklift	DIESEL	130	0.726	0.135	1.045	0.00141	0.059	1	8	90	0.261	0.049	0.376	0.001	0.021	0.019
Wheeled Loader	DIESEL	250	0.368	0.126	1.212	0.00168	0.042	1	8	90	0.133	0.045	0.436	0.001	0.015	0.013
Generator	DIESEL	33	0.264	0.087	0.285	0.00040	0.023	2	8	90	0.190	0.063	0.205	0.000	0.017	0.015
Welders	DIESEL	45	0.275	0.098	0.253	0.00034	0.024	1	8	90	0.099	0.035	0.091	0.000	0.009	0.008
											1.33	**0.41**	**2.67**	**0.00**	**0.13**	**0.11**
Drive Secondary Fender Piles																
Barge Crane - 150 Ton	DIESEL	250	0.529	0.155	1.423	0.00177	0.052	2	9.5	10	0.050	0.015	0.135	0.000	0.005	0.004
Impact Hammer	DIESEL	250	0.523	0.145	1.519	0.00250	0.049	1	9.5	10	0.025	0.007	0.072	0.000	0.002	0.002
20-Ton Forklift	DIESEL	130	0.726	0.135	1.045	0.00141	0.059	1	9.5	10	0.034	0.006	0.050	0.000	0.003	0.003
Wheeled Loader	DIESEL	250	0.368	0.126	1.212	0.00168	0.042	2	9.5	10	0.035	0.012	0.115	0.000	0.004	0.004
											0.145	**0.040**	**0.372**	**0.001**	**0.014**	**0.012**
Install Secondary Fender System																
Air Compressor	DIESEL	50	0.255	0.092	0.222	0.00029	0.022	2	8	28	0.057	0.021	0.050	0.000	0.005	0.004
Barge Crane - 150 Ton	DIESEL	250	0.529	0.155	1.423	0.00177	0.052	1	8	28	0.059	0.017	0.159	0.000	0.006	0.005
Concrete Truck	DIESEL	210	0.384	0.140	1.237	0.00187	0.041	1	8	28	0.043	0.016	0.139	0.000	0.005	0.004
Concrete Pump Truck	DIESEL	210	0.384	0.140	1.237	0.00187	0.041	1	8	28	0.043	0.016	0.139	0.000	0.005	0.004
20-Ton Forklift	DIESEL	130	0.726	0.135	1.045	0.00141	0.059	1	8	28	0.081	0.015	0.117	0.000	0.007	0.006
Wheeled Loader	DIESEL	250	0.368	0.126	1.212	0.00168	0.042	1	8	28	0.041	0.014	0.136	0.000	0.005	0.004
Generator	DIESEL	33	0.264	0.087	0.285	0.00040	0.023	2	8	28	0.059	0.020	0.064	0.000	0.005	0.005
Welders	DIESEL	45	0.275	0.098	0.253	0.00034	0.024	1	8	28	0.031	0.011	0.028	0.000	0.003	0.002
											0.41	**0.13**	**0.83**	**0.00**	**0.04**	**0.03**
Total											**8.40**	**2.53**	**16.31**	**0.02**	**0.78**	**0.70**

Work Days/Week 5

North
Pier Construction

Emission Factors											Total Emissions (Tons)					
Equipment	FUEL	HP	CO (lb/hr)	VOC (lb/hr)	NOX (lb/hr)	SOX (lb/hr)	PM10 (lb/hr)	No of Equipment	Hours Per Day	Days in Service	CO	VOC	NOX	SOX	PM10	PM2.5
Drive Structural Piles																
Barge Crane - 150 Ton	DIESEL	250	0.529	0.155	1.423	0.00177	0.052	1	9.5	45	0.113	0.033	0.304	0.000	0.011	0.010
Impact Hammer	DIESEL	250	0.523	0.145	1.519	0.00250	0.049	1	9.5	45	0.112	0.031	0.325	0.001	0.010	0.009
Vibratory Hammer	DIESEL	250	0.523	0.145	1.519	0.00250	0.049	1	9.5	45	0.112	0.031	0.325	0.001	0.010	0.009
20-Ton Forklift	DIESEL	130	0.726	0.135	1.045	0.00141	0.059	1	9.5	45	0.155	0.029	0.223	0.000	0.013	0.011
Wheeled Loader	DIESEL	250	0.368	0.126	1.212	0.00168	0.042	1	9.5	45	0.079	0.027	0.259	0.000	0.009	0.008
											0.57	**0.15**	**1.44**	**0.00**	**0.05**	**0.05**
Drive Mooring Dolphin Piles																
Barge Crane - 150 Ton	DIESEL	250	0.529	0.155	1.423	0.00177	0.052	1	9.5	12	0.030	0.009	0.081	0.000	0.003	0.003
Impact Hammer	DIESEL	250	0.523	0.145	1.519	0.00250	0.049	1	9.5	12	0.030	0.008	0.087	0.000	0.003	0.002
Vibratory Hammer	DIESEL	250	0.523	0.145	1.519	0.00250	0.049	1	9.5	12	0.030	0.008	0.087	0.000	0.003	0.002
20-Ton Forklift	DIESEL	130	0.726	0.135	1.045	0.00141	0.059	1	9.5	12	0.041	0.008	0.060	0.000	0.003	0.003
Wheeled Loader	DIESEL	250	0.368	0.126	1.212	0.00168	0.042	1	9.5	12	0.021	0.007	0.069	0.000	0.002	0.002
											0.15	**0.04**	**0.38**	**0.00**	**0.01**	**0.01**
Form and Place 1st Stage Pile Caps																
Air Compressor	DIESEL	50	0.255	0.092	0.222	0.00029	0.022	2	8	180	0.367	0.133	0.320	0.000	0.032	0.028
Barge Crane - 150 Ton	DIESEL	250	0.529	0.155	1.423	0.00177	0.052	1	8	180	0.381	0.112	1.025	0.001	0.037	0.033
20-Ton Forklift	DIESEL	130	0.726	0.135	1.045	0.00141	0.059	1	8	180	0.522	0.097	0.752	0.001	0.043	0.038
Wheeled Loader	DIESEL	250	0.368	0.126	1.212	0.00168	0.042	1	8	180	0.265	0.091	0.873	0.001	0.030	0.027
Generator	DIESEL	33	0.264	0.087	0.285	0.00040	0.023	2	8	180	0.380	0.126	0.410	0.001	0.034	0.030
Welders	DIESEL	45	0.275	0.098	0.253	0.00034	0.024	1	8	180	0.198	0.070	0.182	0.000	0.017	0.015
											2.11	**0.63**	**3.56**	**0.00**	**0.19**	**0.17**
Form/Place Deck Slab/2nd Stg Caps/Beams Lower																
Air Compressor	DIESEL	50	0.255	0.092	0.222	0.00029	0.022	2	8	90	0.183	0.066	0.160	0.000	0.016	0.014
Barge Crane - 150 Ton	DIESEL	250	0.529	0.155	1.423	0.00177	0.052	1	8	90	0.191	0.056	0.512	0.001	0.019	0.017
Concrete Truck	DIESEL	210	0.384	0.140	1.237	0.00187	0.041	1	8	90	0.138	0.050	0.445	0.001	0.015	0.013
Concrete Pump Truck	DIESEL	210	0.384	0.140	1.237	0.00187	0.041	1	8	90	0.138	0.050	0.445	0.001	0.015	0.013
20-Ton Forklift	DIESEL	130	0.726	0.135	1.045	0.00141	0.059	1	8	90	0.261	0.049	0.376	0.001	0.021	0.019
Wheeled Loader	DIESEL	250	0.368	0.126	1.212	0.00168	0.042	1	8	90	0.133	0.045	0.436	0.001	0.015	0.013
Generator	DIESEL	33	0.264	0.087	0.285	0.00040	0.023	2	8	90	0.190	0.063	0.205	0.000	0.017	0.015
Welders	DIESEL	45	0.275	0.098	0.253	0.00034	0.024	1	8	90	0.099	0.035	0.091	0.000	0.009	0.008
											1.33	**0.41**	**2.67**	**0.00**	**0.13**	**0.11**
Form and Place CIP Columns & Walls																
Air Compressor	DIESEL	50	0.255	0.092	0.222	0.00029	0.022	2	8	90	0.183	0.066	0.160	0.000	0.016	0.014
Barge Crane - 150 Ton	DIESEL	250	0.529	0.155	1.423	0.00177	0.052	1	8	90	0.191	0.056	0.512	0.001	0.019	0.017
Concrete Truck	DIESEL	210	0.384	0.140	1.237	0.00187	0.041	1	8	90	0.138	0.050	0.445	0.001	0.015	0.013

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Concrete Pump Truck	DIESEL	210	0.384	0.140	1.237	0.00187	0.041	1	8	90	0.138	0.050	0.445	0.001	0.015	0.013
20-Ton Forklift	DIESEL	130	0.726	0.135	1.045	0.00141	0.059	1	8	90	0.261	0.049	0.376	0.001	0.021	0.019
Wheeled Loader	DIESEL	250	0.368	0.126	1.212	0.00168	0.042	1	8	90	0.133	0.045	0.436	0.001	0.015	0.013
Generator	DIESEL	33	0.264	0.087	0.285	0.00040	0.023	2	8	90	0.190	0.063	0.205	0.000	0.017	0.015
Welders	DIESEL	45	0.275	0.098	0.253	0.00034	0.024	1	8	90	0.099	0.035	0.091	0.000	0.009	0.008
											1.33	**0.41**	**2.67**	**0.00**	**0.13**	**0.11**
Form and Place Column Girders																
Air Compressor	DIESEL	50	0.255	0.092	0.222	0.00029	0.022	2	8	90	0.183	0.066	0.160	0.000	0.016	0.014
Barge Crane - 150 Ton	DIESEL	250	0.529	0.155	1.423	0.00177	0.052	1	8	90	0.191	0.056	0.512	0.001	0.019	0.017
20-Ton Forklift	DIESEL	130	0.726	0.135	1.045	0.00141	0.059	1	8	90	0.261	0.049	0.376	0.001	0.021	0.019
Wheeled Loader	DIESEL	250	0.368	0.126	1.212	0.00168	0.042	1	8	90	0.133	0.045	0.436	0.001	0.015	0.013
Generator	DIESEL	33	0.264	0.087	0.285	0.00040	0.023	2	8	90	0.190	0.063	0.205	0.000	0.017	0.015
Welders	DIESEL	45	0.275	0.098	0.253	0.00034	0.024	1	8	90	0.099	0.035	0.091	0.000	0.009	0.008
											1.06	**0.31**	**1.78**	**0.00**	**0.10**	**0.09**
North Pier Pipe Installation																
Air Compressor	DIESEL	50	0.255	0.092	0.222	0.00029	0.022	2	8	80	0.163	0.059	0.142	0.000	0.014	0.013
Barge Crane - 150 Ton	DIESEL	250	0.529	0.155	1.423	0.00177	0.052	1	8	80	0.169	0.050	0.455	0.001	0.017	0.015
20-Ton Forklift	DIESEL	130	0.726	0.135	1.045	0.00141	0.059	1	8	80	0.232	0.043	0.334	0.000	0.019	0.017
Wheeled Loader	DIESEL	250	0.368	0.126	1.212	0.00168	0.042	1	8	80	0.118	0.040	0.388	0.001	0.013	0.012
Generator	DIESEL	33	0.264	0.087	0.285	0.00040	0.023	2	8	80	0.169	0.056	0.182	0.000	0.015	0.013
Welders	DIESEL	45	0.275	0.098	0.253	0.00034	0.024	1	8	80	0.088	0.031	0.081	0.000	0.008	0.007
											0.94	**0.28**	**1.58**	**0.00**	**0.09**	**0.08**
Form/Place Deck Slab 2nd Stg Caps/Beams Upper Level																
Air Compressor	DIESEL	50	0.255	0.092	0.222	0.00029	0.022	2	8	90	0.183	0.066	0.160	0.000	0.016	0.014
Barge Crane - 150 Ton	DIESEL	250	0.529	0.155	1.423	0.00177	0.052	1	8	90	0.191	0.056	0.512	0.001	0.019	0.017
Concrete Truck	DIESEL	210	0.384	0.140	1.237	0.00187	0.041	1	8	90	0.138	0.050	0.445	0.001	0.015	0.013
Concrete Pump Truck	DIESEL	210	0.384	0.140	1.237	0.00187	0.041	1	8	90	0.138	0.050	0.445	0.001	0.015	0.013
20-Ton Forklift	DIESEL	130	0.726	0.135	1.045	0.00141	0.059	1	8	90	0.261	0.049	0.376	0.001	0.021	0.019
Wheeled Loader	DIESEL	250	0.368	0.126	1.212	0.00168	0.042	1	8	90	0.133	0.045	0.436	0.001	0.015	0.013
Generator	DIESEL	33	0.264	0.087	0.285	0.00040	0.023	2	8	90	0.190	0.063	0.205	0.000	0.017	0.015
Welders	DIESEL	45	0.275	0.098	0.253	0.00034	0.024	1	8	90	0.099	0.035	0.091	0.000	0.009	0.008
											1.33	**0.41**	**2.67**	**0.00**	**0.13**	**0.11**
Install Loading Arm System																
Air Compressor	DIESEL	50	0.255	0.092	0.222	0.00029	0.022	2	8	30	0.061	0.022	0.053	0.000	0.005	0.005
20-Ton Forklift	DIESEL	130	0.726	0.135	1.045	0.00141	0.059	1	8	30	0.087	0.016	0.125	0.000	0.007	0.006
Wheeled Loader	DIESEL	250	0.368	0.126	1.212	0.00168	0.042	1	8	30	0.044	0.015	0.145	0.000	0.005	0.004
Generator	DIESEL	33	0.264	0.087	0.285	0.00040	0.023	2	8	30	0.063	0.021	0.068	0.000	0.006	0.005
Welders	DIESEL	45	0.275	0.098	0.253	0.00034	0.024	1	8	30	0.033	0.012	0.030	0.000	0.003	0.003
											0.29	**0.09**	**0.42**	**0.00**	**0.03**	**0.02**

North
Pier Construction

Drive Primary Fender Piles																
Barge Crane - 150 Ton	DIESEL	250	0.529	0.155	1.423	0.00177	0.052	2	9.5	30	0.151	0.044	0.406	0.001	0.015	0.013
Impact Hammer	DIESEL	250	0.523	0.145	1.519	0.00250	0.049	1	9.5	30	0.075	0.021	0.216	0.000	0.007	0.006
20-Ton Forklift	DIESEL	130	0.726	0.135	1.045	0.00141	0.059	1	9.5	30	0.103	0.019	0.149	0.000	0.008	0.008
Wheeled Loader	DIESEL	250	0.368	0.126	1.212	0.00168	0.042	2	9.5	30	0.105	0.036	0.346	0.000	0.012	0.011
											0.43	**0.12**	**1.12**	**0.00**	**0.04**	**0.04**
Drive Secondary Fender Piles																
Barge Crane - 150 Ton	DIESEL	250	0.529	0.155	1.423	0.00177	0.052	2	9.5	12	0.060	0.018	0.162	0.000	0.006	0.005
Impact Hammer	DIESEL	250	0.523	0.145	1.519	0.00250	0.049	1	9.5	12	0.030	0.008	0.087	0.000	0.003	0.002
20-Ton Forklift	DIESEL	130	0.726	0.135	1.045	0.00141	0.059	1	9.5	12	0.041	0.008	0.060	0.000	0.003	0.003
Wheeled Loader	DIESEL	250	0.368	0.126	1.212	0.00168	0.042	2	9.5	12	0.042	0.014	0.138	0.000	0.005	0.004
											0.17	**0.05**	**0.45**	**0.00**	**0.02**	**0.01**
Install Primary Fender System																
Air Compressor	DIESEL	50	0.255	0.092	0.222	0.00029	0.022	2	8	40	0.081	0.029	0.071	0.000	0.007	0.006
20-Ton Forklift	DIESEL	130	0.726	0.135	1.045	0.00141	0.059	1	8	40	0.116	0.022	0.167	0.000	0.009	0.008
Wheeled Loader	DIESEL	250	0.368	0.126	1.212	0.00168	0.042	1	8	40	0.059	0.020	0.194	0.000	0.007	0.006
Generator	DIESEL	33	0.264	0.087	0.285	0.00040	0.023	2	8	40	0.084	0.028	0.091	0.000	0.007	0.007
Welders	DIESEL	45	0.275	0.098	0.253	0.00034	0.024	1	8	40	0.044	0.016	0.041	0.000	0.004	0.003
											0.39	**0.11**	**0.56**	**0.00**	**0.03**	**0.03**
Turn On Service to North Pier																
Generator	DIESEL	33	0.264	0.087	0.285	0.00040	0.023	2	8	14	0.030	0.010	0.032	0.000	0.003	0.002
											0.03	**0.01**	**0.03**	**0.00**	**0.00**	**0.00**
Total											**10.14**	**3.04**	**19.34**	**0.03**	**0.94**	**0.84**

Work Days/Week 5

South
Pier Construction

Emission Factors											Total Emissions (Tons)					
Equipment	FUEL	HP	CO (lb/hr)	VOC (lb/hr)	NOX (lb/hr)	SOX (lb/hr)	PM10 (lb/hr)	No of Equipment	Hours Per Day	Days in Service	CO	VOC	NOX	SOX	PM10	PM2.5
Drive Mooring Dolphin Piles																
Barge Crane - 150 Ton	DIESEL	250	0.529	0.155	1.423	0.00177	0.052	2	9.5	12	0.060	0.018	0.162	0.000	0.006	0.005
Impact Hammer	DIESEL	250	0.523	0.145	1.519	0.00250	0.049	1	9.5	12	0.030	0.008	0.087	0.000	0.003	0.002
Vibratory Hammer	DIESEL	250	0.523	0.145	1.519	0.00250	0.049	1	9.5	12	0.030	0.008	0.087	0.000	0.003	0.002
20-Ton Forklift	DIESEL	130	0.726	0.135	1.045	0.00141	0.059	1	9.5	12	0.041	0.008	0.060	0.000	0.003	0.003
Wheeled Loader	DIESEL	250	0.368	0.126	1.212	0.00168	0.042	2	9.5	12	0.042	0.014	0.138	0.000	0.005	0.004
											0.20	**0.06**	**0.53**	**0.00**	**0.02**	**0.02**
Construct Dolphin Superstructure																
Air Compressor	DIESEL	50	0.255	0.092	0.222	0.00029	0.022	2	8	30	0.061	0.022	0.053	0.000	0.005	0.005
Barge Crane - 150 Ton	DIESEL	250	0.529	0.155	1.423	0.00177	0.052	2	8	30	0.127	0.037	0.342	0.000	0.012	0.011
20-Ton Forklift	DIESEL	130	0.726	0.135	1.045	0.00141	0.059	1	8	30	0.087	0.016	0.125	0.000	0.007	0.006
Wheeled Loader	DIESEL	250	0.368	0.126	1.212	0.00168	0.042	2	8	30	0.088	0.030	0.291	0.000	0.010	0.009
Generator	DIESEL	33	0.264	0.087	0.285	0.00040	0.023	2	8	30	0.063	0.021	0.068	0.000	0.006	0.005
Welders	DIESEL	45	0.275	0.098	0.253	0.00034	0.024	1	8	30	0.033	0.012	0.030	0.000	0.003	0.003
											0.46	**0.14**	**0.91**	**0.00**	**0.04**	**0.04**
Install Fender System Framing and Components																
Air Compressor	DIESEL	50	0.255	0.092	0.222	0.00029	0.022	2	8	20	0.041	0.015	0.036	0.000	0.004	0.003
20-Ton Forklift	DIESEL	130	0.726	0.135	1.045	0.00141	0.059	1	8	20	0.058	0.011	0.084	0.000	0.005	0.004
Wheeled Loader	DIESEL	250	0.368	0.126	1.212	0.00168	0.042	1	8	20	0.029	0.010	0.097	0.000	0.003	0.003
Generator	DIESEL	33	0.264	0.087	0.285	0.00040	0.023	2	8	20	0.042	0.014	0.046	0.000	0.004	0.003
Welders	DIESEL	45	0.275	0.098	0.253	0.00034	0.024	1	8	20	0.022	0.008	0.020	0.000	0.002	0.002
											0.19	**0.06**	**0.28**	**0.00**	**0.02**	**0.02**
Total											**0.86**	**0.25**	**1.73**	**0.00**	**0.08**	**0.07**

Work Days/Week 5

Heavy Equipment North Segment
Demolition Emissions

Emission Factors											Total Emissions (Tons)					
Equipment	FUEL	HP	CO (lb/hr)	VOC (lb/hr)	NOX (lb/hr)	SOX (lb/hr)	PM10 (lb/hr)	No of Equipment	Hours Per Day	Days in Service	CO	VOC	NOX	SOX	PM10	PM2.5
Remove Utilities, Appurtenances, & Fender System																
Barge-Mounted Excavator	DIESEL	320	0.510	0.166	1.313	0.00229	0.046	2	8	60	0.245	0.080	0.630	0.001	0.022	0.020
Generator	DIESEL	45	0.273	0.255	0.273	0.00040	0.021	2	8	60	0.131	0.122	0.131	0.000	0.010	0.009
20-Ton Forklift	DIESEL	130	0.725	0.127	0.975	0.00141	0.053	2	8	60	0.348	0.061	0.468	0.001	0.026	0.023
Wheeled Loader	DIESEL	250	0.355	0.119	1.097	0.00168	0.038	2	8	60	0.171	0.057	0.526	0.001	0.018	0.016
											0.89	**0.32**	**1.76**	**0.00**	**0.08**	**0.07**
Deck Removal																
Air Compressor	DIESEL	50	0.169	0.053	0.177	0.00025	0.014	2	4	40	0.027	0.009	0.028	0.000	0.002	0.002
Concrete Saws	DIESEL	10	0.068	0.020	0.126	0.00021	0.005	4	8	40	0.043	0.013	0.081	0.000	0.003	0.003
Barge-Mounted Excavator	DIESEL	320	0.510	0.166	1.313	0.00229	0.046	2	8	40	0.163	0.053	0.420	0.001	0.015	0.013
Generator	DIESEL	45	0.273	0.255	0.273	0.00040	0.021	2	8	40	0.087	0.081	0.087	0.000	0.007	0.006
20-Ton Forklift	DIESEL	130	0.725	0.127	0.975	0.00141	0.053	2	8	40	0.232	0.040	0.312	0.000	0.017	0.015
Wheeled Loader	DIESEL	250	0.355	0.119	1.097	0.00168	0.038	2	8	40	0.114	0.038	0.351	0.001	0.012	0.011
											0.67	**0.23**	**1.28**	**0.00**	**0.06**	**0.05**
Piling Removal																
Barge-Mounted Excavator	DIESEL	320	0.510	0.166	1.313	0.00229	0.046	2	8	54	0.220	0.072	0.567	0.001	0.020	0.018
Generator	DIESEL	45	0.273	0.255	0.273	0.00040	0.021	2	8	54	0.118	0.110	0.118	0.000	0.009	0.008
20-Ton Forklift	DIESEL	130	0.725	0.127	0.975	0.00141	0.053	2	8	54	0.313	0.055	0.421	0.001	0.023	0.021
Wheeled Loader	DIESEL	250	0.355	0.119	1.097	0.00168	0.038	2	8	54	0.153	0.051	0.474	0.001	0.016	0.014
											0.80	**0.29**	**1.58**	**0.00**	**0.07**	**0.06**
TOTAL											**2.37**	**0.84**	**4.61**	**0.01**	**0.20**	**0.18**

Assumptions:

* Per project schedule, South Pier Demolition occurs in 2014
* Remove utilities, appurtenances, & fenders assumes 84 days.
* Deck Removal assumes 56 days.
* Pier Removal assumes 56 days.

Notes:

(a) Emission factors from http://www.aqmd.gov/ceqa/handbook/offroad/offroad.html, SCAQMD OFFROAD Emission Factors, Years 2012 through 2015

Work Days/Week 5

Abutment Construction

Emission Factors											Total Emissions (Tons)					
Equipment	FUEL	HP	CO (lb/hr)	VOC (lb/hr)	NOX (lb/hr)	SOX (lb/hr)	PM10 (lb/hr)	No of Equipment	Hours Per Day	Days in Service	CO	VOC	NOX	SOX	PM10	PM2.5
Drive Abutment Piles																
Barge Crane - 150 Ton	DIESEL	250	0.529	0.155	1.423	0.00177	0.052	2	9.5	10	0.050	0.015	0.135	0.000	0.005	0.004
Impact Hammer	DIESEL	250	0.523	0.145	1.519	0.00250	0.049	1	9.5	10	0.025	0.007	0.072	0.000	0.002	0.002
Vibratory Hammer	DIESEL	250	0.523	0.145	1.519	0.00250	0.049	1	9.5	10	0.025	0.007	0.072	0.000	0.002	0.002
20-Ton Forklift	DIESEL	130	0.726	0.135	1.045	0.00141	0.059	1	9.5	10	0.034	0.006	0.050	0.000	0.003	0.003
Wheeled Loader	DIESEL	250	0.368	0.126	1.212	0.00168	0.042	2	9.5	10	0.035	0.012	0.115	0.000	0.004	0.004
											0.17	**0.05**	**0.44**	**0.00**	**0.02**	**0.01**
Form/Place Abutment Cap & Landside Tie-In																
Air Compressor	DIESEL	50	0.255	0.092	0.222	0.00029	0.022	2	8	21	0.043	0.015	0.037	0.000	0.004	0.003
Barge Crane - 150 Ton	DIESEL	250	0.529	0.155	1.423	0.00177	0.052	1	8	21	0.044	0.013	0.120	0.000	0.004	0.004
20-Ton Forklift	DIESEL	130	0.726	0.135	1.045	0.00141	0.059	1	8	21	0.061	0.011	0.088	0.000	0.005	0.004
Wheeled Loader	DIESEL	250	0.368	0.126	1.212	0.00168	0.042	1	8	21	0.031	0.011	0.102	0.000	0.004	0.003
Generator	DIESEL	33	0.264	0.087	0.285	0.00040	0.023	2	8	21	0.044	0.015	0.048	0.000	0.004	0.003
Welders	DIESEL	45	0.275	0.098	0.253	0.00034	0.024	1	8	21	0.023	0.008	0.021	0.000	0.002	0.002
											0.25	**0.07**	**0.42**	**0.00**	**0.02**	**0.02**
Total											**0.42**	**0.12**	**0.86**	**0.00**	**0.04**	**0.03**

Work Days/Week 5

Construction Truck Trips

Construction Phase	Vehicle Class	Daily truck trips	Total No. of Vehicle	Speed (mph)	VMT (mi/vehicle-day)	CO Running Exhaust (g/mi)	NO_X Running Exhaust (g/mi)	VOCs Running Exhaust (g/mi)	SOx Running Exhaust (g/mi)	PM10 Running Exhaust (g/mi)	PM10 Tire Wear (g/mi)	PM10 Brake Wear (g/mi)	PM2.5 Running Exhaust (g/mi)	PM2.5 Tire Wear (g/mi)	PM2.5 Brake Wear (g/mi)	Emissions, lbs/day CO	NOx	VOCs	SOx	PM10	PM2.5	Emissions, tons per year CO	NOx	VOCs	SOx	PM10	PM2.5
Demolition																											
Transport Trucks	Heavy-duty truck, diesel	12	2000	15	26	2.69720812	13.036345	1.08537279	0.024	0.14868971	0.035	0.028	0.13679453	0.009	0.012	1.86	8.97	0.75	0.02	0.10	0.02	0.15	0.75	0.06	0.00	0.01	0.01
TOTAL																**1.86**	**8.97**	**0.75**	**0.02**	**0.10**	**0.02**	**0.15**	**0.75**	**0.06**	**0.00**	**0.01**	**0.01**

ASSUMPTIONS:

* Assuming 26 miles round trip per vehicle (distance to Miramar Landfill = 13 miles)
* Assume startup after 8 hours
* Assume 45 minutes run time total
* 2012 Emission Factors from EMFAC2007, average temp 60F

Total truck trips for demolition - 2,000 trips

Construction Phase	Vehicle Class		Total No. of Vehicle	Speed (mph)	VMT (mi/vehicle-day)	CO Running Exhaust (g/mi)	NO_X Running Exhaust (g/mi)	VOCs Running Exhaust (g/mi)	SOx Running Exhaust (g/mi)	PM10 Running Exhaust (g/mi)	PM10 Tire Wear (g/mi)	PM10 Brake Wear (g/mi)	PM2.5 Running Exhaust (g/mi)	PM2.5 Tire Wear (g/mi)	PM2.5 Brake Wear (g/mi)	Emissions, lbs/day CO	NOx	VOCs	SOx	PM10	PM2.5	Emissions, tons per year CO	NOx	VOCs	SOx	PM10	PM2.5
Deliveries																											
Transport Trucks	Heavy-duty truck, diesel		4600	15	40	2.69720812	13.036345	1.08537279	0.024	0.14868971	0.035	0.028	0.13679453	0.009	0.012	7.29	35.25	2.94	0.06	0.40	0.09	0.55	2.64	0.22	0.00	0.04	0.03
TOTAL																**7.29**	**35.25**	**2.94**	**0.06**	**0.40**	**0.09**	**0.55**	**2.64**	**0.22**	**0.00**	**0.04**	**0.03**

ASSUMPTIONS:

* Assuming 40 miles round trip per vehicle
* Assume startup after 8 hours
* Assume 45 minutes run time total
* 2014 Emission Factors from EMFAC2011, average temp 60F

Total truck trips for deliveries - 3,000 trips for materials plus 1,600 trips for piles

Construction Worker Commute Emission Calculations

Construction Phase	Vehicle Class	No. of Workers	Speed	VMT	CO		NO_X		Running Exhaust	Start-Up (g/start)[a]	Hot-Soak (g/trip)	Resting Loss (g/hr)	Running Evaporative (g/mi)	Diurnal Evaporative (g/hr)	SOx		PM10				PM2.5				Emissions, lbs/day							Emissions, tons per phase					
		Per Construction Phase	(mph)	(mi/vehicle-day)	Running Exhaust (g/mi)	Start-Up (g/start)[a]	Running Exhaust (g/mi)	Start-Up (g/start)[a]	(g/mi)						Running Exhaust (g/mi)	Start-Up (g/start)[a]	Running Exhaust (g/mi)	Start-Up (g/start)[a]	Tire Wear (g/mi)	Brake Wear (g/mi)	Running Exhaust (g/mi)	Start-Up (g/start)[a]	Tire Wear (g/mi)	Brake Wear (g/mi)	CO	NOx	VOCs	SOx	PM10	PM2.5	Days/year	CO	NOx	VOCs	SOx	PM10	PM2.5
Marine Mammal Relocation	Light-duty truck, catalyst	30	35	40	2.85109453	8.891	0.27134995	0.429	0.07975433	0.621	0.193	0.024	0.043	0.049	0.004	0.002	0.00369253	0.017	0.008	0.013	0.00337906	0.016	0.002	0.005	8.72	0.77	0.47	0.01	0.07	0.03	260	1.13345	0.100701	0.061426	0.00141	0.008785	0.003845
North Segment Demolition	Light-duty truck, catalyst	30	35	40	2.85109453	8.891	0.27134995	0.429	0.07975433	0.621	0.193	0.024	0.043	0.049	0.004	0.002	0.00369253	0.017	0.008	0.013	0.00337906	0.016	0.002	0.005	8.72	0.77	0.47	0.01	0.07	0.03	84	0.36619	0.032534	0.019845	0.000456	0.002838	0.001242
Access Pier Construction	Light-duty truck, catalyst	60	35	40	2.85109453	8.891	0.27134995	0.429	0.07975433	0.621	0.193	0.024	0.043	0.049	0.004	0.002	0.00369253	0.017	0.008	0.013	0.00337906	0.016	0.002	0.005	17.44	1.55	0.95	0.02	0.14	0.06	260	2.2669	0.201401	0.122852	0.00282	0.017569	0.007689
North Pier Construction	Light-duty truck, catalyst	60	35	40	2.85109453	8.891	0.27134995	0.429	0.07975433	0.621	0.193	0.024	0.043	0.049	0.004	0.002	0.00369253	0.017	0.008	0.013	0.00337906	0.016	0.002	0.005	17.44	1.55	0.95	0.02	0.14	0.06	260	2.2669	0.201401	0.122852	0.00282	0.017569	0.007689
South Pier Construction	Light-duty truck, catalyst	60	35	40	2.85109453	8.891	0.27134995	0.429	0.07975433	0.621	0.193	0.024	0.043	0.049	0.004	0.002	0.00369253	0.017	0.008	0.013	0.00337906	0.016	0.002	0.005	17.44	1.55	0.95	0.02	0.14	0.06	62	0.54057	0.048026	0.029296	0.000673	0.00419	0.001834
South Pier & Access Pier Demolition	Light-duty truck, catalyst	30	35	40	2.85109453	8.891	0.27134995	0.429	0.07975433	0.621	0.193	0.024	0.043	0.049	0.004	0.002	0.00369253	0.017	0.008	0.013	0.00337906	0.016	0.002	0.005	8.72	0.77	0.47	0.01	0.07	0.03	154	0.67135	0.059646	0.036383	0.000835	0.005203	0.002277
Abutment	Light-duty truck, catalyst	30	35	40	2.85109453	8.891	0.27134995	0.429	0.07975433	0.621	0.193	0.024	0.043	0.049	0.004	0.002	0.00369253	0.017	0.008	0.013	0.00337906	0.016	0.002	0.005	8.72	0.77	0.47	0.01	0.07	0.03	31	0.13514	0.012007	0.007324	0.000168	0.001047	0.000458

ASSUMPTIONS:

* Assuming 40 miles round trip per vehicle
* Assuming 30 workers per construction phase for demolition, 60 for pier construction
* Assume startup after 8 hours
* Assume 45 minutes run time total
* 2014 Emission Factors from EMFAC2011, average temp 60F

Work Days/Week 5

Support Vessel Emissions

Marine Mammal Relocation											Emission Factors						Hourly Emission Rates (lb/hr)					Annual Emission Rates (ton/yr)				
Equipment Type	**Operation/Location**	**power rating**	**units**	**Load %**	**No. of units**	**Fuel Type**	**hrs /day**	**Days/ year**	**hrs/ year**	**Fuel Consumption (g/kW-hr)**	**PM10**	**NOx**	**CO**	**SO2**	**VOC ***	**Emission factor units**	**CO**	**VOC**	**NOx**	**SO2**	**PM10**	**CO**	**VOC**	**NOx**	**SO2**	**PM10**
Work Boat	Pile Driving Support	75	kW	85.0%	1	California Diesel	4	8	32	222.33	0.26	10.61	0.99	0.01	0.09	g/kW-hr	0.16	0.01	1.74	0.00	0.04	0.0	0.0	0.0	0.0	0.0
Tugboats	Pile Driving Support	186	kW	85.0%	2	California Diesel	4	8	32	222.33	0.26	10.61	0.99	0.01	0.09	g/kW-hr	0.81	0.07	8.71	0.01	0.22	0.0	0.0	0.1	0.0	0.0
Work Boat	Marine Mammal Pen Move	93	kW	85.0%	4	California Diesel	8	90	720	222.33	0.26	10.61	0.99	0.01	0.09	g/kW-hr	0.81	0.07	8.71	0.01	0.22	0.3	0.0	3.1	0.0	0.1
																MAX Daily:	**1.78**	**0.15**	**19.17**	**0.01**	**0.47**	**0.31**	**0.03**	**3.30**	**0.00**	**0.08**

North Segment Demolition											Emission Factors						Hourly Emission Rates (lb/hr)					Annual Emission Rates (ton/yr)				
Equipment Type	**Operation/Location**	**power rating**	**units**	**Load %**	**No. of units**	**Fuel Type**	**hrs /day**	**Days/ year**	**hrs/ year**	**Fuel Consumption (g/kW-hr)**	**PM10**	**NOx**	**CO**	**SO2**	**VOC ***	**Emission factor units**	**CO**	**VOC**	**NOx**	**SO2**	**PM10**	**CO**	**VOC**	**NOx**	**SO2**	**PM10**
Work Boat	Demolition Support	75	kW	85.0%	2	California Diesel	4	61	244	222.33	0.26	10.61	0.99	0.01	0.09	g/kW-hr	0.32	0.03	3.49	0.00	0.09	0.0	0.0	0.4	0.0	0.0
Tugboats	Construction Support	186	kW	85.0%	2	California Diesel	4	61	244	222.33	0.26	10.61	0.99	0.01	0.09	g/kW-hr	0.81	0.07	8.71	0.01	0.22	0.1	0.0	1.1	0.0	0.0
																MAX Daily:	**1.13**	**0.10**	**12.20**	**0.01**	**0.30**	**0.14**	**0.01**	**1.49**	**0.00**	**0.04**

Access Pier Construction											Emission Factors						Hourly Emission Rates (lb/hr)					Annual Emission Rates (ton/yr)				
Equipment Type	**Operation/Location**	**power rating**	**units**	**Load %**	**No. of units**	**Fuel Type**	**hrs /day**	**Days/ year**	**hrs/ year**	**Fuel Consumption (g/kW-hr)**	**PM10**	**NOx**	**CO**	**SO2**	**VOC ***	**Emission factor units**	**CO**	**VOC**	**NOx**	**SO2**	**PM10**	**CO**	**VOC**	**NOx**	**SO2**	**PM10**
Work Boat	Construction Support	75	kW	85.0%	2	California Diesel	4	260	1040	222.33	0.26	10.61	0.99	0.01	0.09	g/kW-hr	0.32	0.03	3.49	0.00	0.09	0.2	0.0	1.8	0.0	0.0
Tugboats	Construction Support	186	kW	85.0%	2	California Diesel	4	260	1040	222.33	0.26	10.61	0.99	0.01	0.09	g/kW-hr	0.81	0.07	8.71	0.01	0.22	0.4	0.0	4.5	0.0	0.1
																MAX Daily:	**1.13**	**0.10**	**12.20**	**0.01**	**0.30**	**0.59**	**0.05**	**6.34**	**0.00**	**0.16**

North Pier Construction											Emission Factors						Hourly Emission Rates (lb/hr)					Annual Emission Rates (ton/yr)				
Equipment Type	**Operation/Location**	**power rating**	**units**	**Load %**	**No. of units**	**Fuel Type**	**hrs /day**	**Days/ year**	**hrs/ year**	**Fuel Consumption (g/kW-hr)**	**PM10**	**NOx**	**CO**	**SO2**	**VOC ***	**Emission factor units**	**CO**	**VOC**	**NOx**	**SO2**	**PM10**	**CO**	**VOC**	**NOx**	**SO2**	**PM10**
Work Boat	Construction Support	75	kW	85.0%	2	California Diesel	4	260	1040	222.33	0.26	10.61	0.99	0.01	0.09	g/kW-hr	0.32	0.03	3.49	0.00	0.09	0.2	0.0	1.8	0.0	0.0
Tugboats	Construction Support	186	kW	85.0%	2	California Diesel	4	260	1040	222.33	0.26	10.61	0.99	0.01	0.09	g/kW-hr	0.81	0.07	8.71	0.01	0.22	0.4	0.0	4.5	0.0	0.1
																MAX Daily:	**1.13**	**0.10**	**12.20**	**0.01**	**0.30**	**0.59**	**0.05**	**6.34**	**0.00**	**0.16**

South Pier Construction											Emission Factors						Hourly Emission Rates (lb/hr)					Annual Emission Rates (ton/yr)				
Equipment Type	**Operation/Location**	**power rating**	**units**	**Load %**	**No. of units**	**Fuel Type**	**hrs /day**	**Days/ year**	**hrs/ year**	**Fuel Consumption (g/kW-hr)**	**PM10**	**NOx**	**CO**	**SO2**	**VOC ***	**Emission factor units**	**CO**	**VOC**	**NOx**	**SO2**	**PM10**	**CO**	**VOC**	**NOx**	**SO2**	**PM10**
Work Boat	Construction Support	75	kW	85.0%	4	California Diesel	4	260	1040	222.33	0.26	10.61	0.99	0.01	0.09	g/kW-hr	0.65	0.06	6.97	0.01	0.17	0.3	0.0	3.6	0.0	0.1

Support Vessel Emissions

Tugboats	Construction Support	186	kW	85.0%	2	California Diesel	4	260	1040	222.33	0.26	10.61	0.99	0.01	0.09	g/kW-hr	0.81	0.07	8.71	0.01	0.22	0.4	0.0	4.5	0.0	0.1
																MAX Daily:	**1.46**	**0.13**	**15.68**	**0.01**	**0.39**	**0.76**	**0.07**	**8.16**	**0.01**	**0.20**

South Pier and Access Pier Demolition											Emission Factors						Hourly Emission Rates (lb/hr)					Annual Emission Rates (ton/yr)				
Equipment Type	**Operation/Location**	**power rating**	**units**	**Load %**	**No. of units**	**Fuel Type**	**hrs /day**	**Days/ year**	**hrs/ year**	**Fuel Consumption (g/kW-hr)**	**PM10**	**NOx**	**CO**	**SO2**	**VOC ***	**Emission factor units**	**CO**	**VOC**	**NOx**	**SO2**	**PM10**	**CO**	**VOC**	**NOx**	**SO2**	**PM10**
Work Boat	Demolition Support	75	kW	85.0%	4	California Diesel	4	78	312	222.33	0.26	10.61	0.99	0.01	0.09	g/kW-hr	0.65	0.06	6.97	0.01	0.17	0.1	0.0	1.1	0.0	0.0
Tugboats	Construction Support	186	kW	85.0%	2	California Diesel	4	78	312	222.33	0.26	10.61	0.99	0.01	0.09	g/kW-hr	0.81	0.07	8.71	0.01	0.22	0.1	0.0	1.4	0.0	0.0
																MAX Daily:	**1.46**	**0.13**	**15.68**	**0.01**	**0.39**	**0.23**	**0.02**	**2.45**	**0.00**	**0.06**

Abutment											Emission Factors						Hourly Emission Rates (lb/hr)					Annual Emission Rates (ton/yr)				
Equipment Type	**Operation/Location**	**power rating**	**units**	**Load %**	**No. of units**	**Fuel Type**	**hrs /day**	**Days/ year**	**hrs/ year**	**Fuel Consumption (g/kW-hr)**	**PM10**	**NOx**	**CO**	**SO2**	**VOC ***	**Emission factor units**	**CO**	**VOC**	**NOx**	**SO2**	**PM10**	**CO**	**VOC**	**NOx**	**SO2**	**PM10**
Work Boat	Construction Support	75	kW	85.0%	4	California Diesel	4	31	124	222.33	0.26	10.61	0.99	0.01	0.09	g/kW-hr	0.65	0.06	6.97	0.01	0.17	0.0	0.0	0.4	0.0	0.0
Tugboats	Construction Support	186	kW	85.0%	2	California Diesel	4	31	124	222.33	0.26	10.61	0.99	0.01	0.09	g/kW-hr	0.81	0.07	8.71	0.01	0.22	0.1	0.0	0.5	0.0	0.0
																MAX Daily:	**1.46**	**0.13**	**15.68**	**0.01**	**0.39**	**0.09**	**0.01**	**0.97**	**0.00**	**0.02**

Dredging											Emission Factors						Hourly Emission Rates (lb/hr)					Annual Emission Rates (ton/yr)				
Equipment Type	**Operation/Location**	**power rating**	**units**	**Load %**	**No. of units**	**Fuel Type**	**hrs /day**	**Days/ year**	**hrs/ year**	**Fuel Consumption (g/kW-hr)**	**PM10**	**NOx**	**CO**	**SO2**	**VOC ***	**Emission factor units**	**CO**	**VOC**	**NOx**	**SO2**	**PM10**	**CO**	**VOC**	**NOx**	**SO2**	**PM10**
Tugboats	Construction Support	186	kW	85.0%	2	California Diesel	4	40	160	222.33	0.26	10.61	0.99	0.01	0.09	g/kW-hr	0.81	0.07	8.71	0.01	0.22	0.1	0.0	0.7	0.0	0.0
																MAX Daily:	**0.81**	**0.07**	**8.71**	**0.01**	**0.22**	**0.06**	**0.01**	**0.70**	**0.00**	**0.02**

Work Days/Week 5

SOURCE:

Load factors based on recommdations in EPA420-R-00-002, Table 5-2, assumed for maneuvering.

Emission Factors from Analysis of Commercial Marine Vessel Emissions and Fuel Consumption Data, USEPA, Feb 2000, EPA420-R-00-002, page 5-3.

Emission factors from AP-42 1.3 for Fuel Oil Combustion - No 6 Oil Industrial Fired Boilers

* VOC emissions are actuallyTHC for Marine Vessels

0.0015	% Sulfur content of the Fuel Oil used in the boiler and main engines,
0.15	% Nitrogen content of the Fuel Oil used for the boilers
0.0015	% Sulfur content of the Fuel Oil used in the boiler and main engines,
0.944	kg/l density of residual oil, from AP-42 Appendix A

Dredging Emissions

				Emission Factors[a]								Emissions						Emission, tons (total)					
Equipment	FUEL	HP	Load Factor	CO (g/hp-hr)	VOC (g/hp-hr)	NOX (g/hp-hr)	SOX (g/hp-hr)	PM10 (g/hp-hr)	No of Equipment	Hrs Per Day	Days in Service	CO lbs/day	VOC lbs/day	NOX lbs/day	SOX lbs/day	PM10 lbs/day	PM2.5 lbs/day	CO tons (total)	VOC tons (total)	NOX tons (total)	SOX tons (total)	PM10 tons (total)	PM2.5 tons (total)
Dredging Equipment																							
Main genset	DIESEL	2,935	51	1.83E+00	5.30E-01	6.25E+00	6.00E-03	1.84E-01	1	8	40	48.31	13.99	165.00	0.16	4.86	4.32	0.966	0.280	3.300	0.003	0.097	0.086
Aux genset	DIESEL	550	74	1.49E+00	4.60E-01	4.80E+00	3.00E-03	1.64E-01	1	8	40	10.70	3.30	34.46	0.02	1.18	1.05	0.214	0.066	0.689	0.000	0.024	0.021
Spud winch	DIESEL	250	51	1.39E+00	4.80E-01	5.23E+00	6.00E-03	1.72E-01	1	8	40	3.13	1.08	11.76	0.01	0.39	0.34	0.063	0.022	0.235	0.000	0.008	0.007
TOTAL												**62.13**	**18.37**	**211.22**	**0.19**	**6.42**	**5.72**	**1.24**	**0.37**	**4.22**	**0.00**	**0.13**	**0.11**

Assumptions:

Notes:

(a) Emission factors from OFFROAD Model, SDAB, for Dredging Equipment

Work Days/Week 5

Assumptions: Dredge will be similar to the Manson "Valhalla" Clamshell Dredge

Dredge	Engine	Model Year	Max hp	Assumed Hours of Operation per day
Valhalla	Main genset	2000	2,935	18
Valhalla	Aux genset	2000	550	24
Valhalla	Spud winch	2000	250	6

Emission Factors

Commercial Marine Vessel Emissions

Pollutant	Exponent (x)	Intercept (b)	Coefficient (a)
PM	1.5	0.2551	0.0059
NOX	1.5	10.4496	0.1255
NO2	1.5	15.5247	0.18865
SO2	0	0	2.3735
CO	1	0	0.8378
HC	1.5	0	0.0667
CO2	1	648.6	44.1

Emission Factor equation is in the form:
Emissions Rate (g/kW-hr) = a * (Fractional Load of Engine Power)$^{-x}$ + b

For SO2, the equation is:
Emissions Rate (g/kW-hr) = a * (Fuel Sulfur Flow in g/kW-hr) + b = a * (fuel consumption in g/kW-hr) * (% sulfur in fuel/100) + b
Requires an estimate of the % sulfur in the fuel.

Fuel Consumption Estimation equation:
Fuel Consumption (g/kW-hr) = 14.12/(Fractional Load) + 205.717

Emission Factor Source: Analysis of Commercial Marine Vessel Emissions and Fuel Consumption Data,
USEPA, February 2000, EPA420-R-00-002, page 5-3.

Emissions Summary
NBPL P-151

2013 Emissions	Emission (metric tons/year)		
	CO2	CH4	N2O
Marine Mammal Relocation			
Landside Pipe Installation	61.52	0.01	0.05
Dredge Turning Basin	916.22	0.08	10.08
Truck Trips	160.31	0.01	0.00
Worker Trips	105.98	0.01	0.01
Support Vessels	218.15	0.23	0.08
Subtotal	**1462.19**	**0.33**	**10.22**
Total 2013	**1462.19**	**0.33**	**10.22**

2014 Emissions	Emission (metric tons/year)		
	CO2	CH4	N2O
Marine Mammal Relocation			
Indicator Pile Driving	9.53	0.00	0.01
Drive Piles	2.80	0.00	0.00
Construct Dolphin Mooring	48.98	0.01	0.04
Subtotal	**61.31**	**0.01**	**0.06**
North Segment Demolition			
Piling Removal	188.49	0.02	0.17
Deck Removal	402.08	0.03	0.31
Asphalt Debris Removal	248.16	0.02	0.17
Demo & Material Transport	186.31	0.01	0.15
Truck Trips	77.84	0.00	0.04
Worker Trips	105.98	0.01	0.01
Support Vessels	98.26	0.10	0.04
Subtotal	**1307.12**	**0.20**	**0.89**
Access Pier Construction			
Drive Abutment Piles	48.16	0.00	0.03
Construct Abutment	88.27	0.01	0.08
Drive Structural Piles	222.26	0.02	0.16
Truck Trips	947.29	0.04	0.01
Worker Trips	211.97	0.01	0.02
Support Vessels	418.81	0.44	0.16
Subtotal	**1936.76**	**0.52**	**0.45**
North Pier Construction			
Drive Structural Piles	166.70	0.01	0.14
Truck Trips	163.95	0.01	0.00
Worker Trips	211.97	0.01	0.02
Support Vessels	418.81	0.44	0.16
Subtotal	**961.43**	**0.47**	**0.31**
Dredging	**453.23**	**0.08**	**4.50**
Total 2014, Preferred Alternative	**4719.85**	**1.28**	**6.20**
Total 2014, Delayed Dredging Alternative	**4266.62**	**1.20**	**1.70**

2015 Emissions	Emission (metric tons/year)		
	CO2	CH4	N2O
Access Pier Construction			
Form and Place 1st Stage Pile Caps	372.80	0.05	0.34
Form/Place Deck Slabs, 2nd Stg Caps, Beams & Curbs	408.42	0.05	0.34
Form and Place CIP Columns & Walls for Ramp	71.47	0.01	0.06
Form and Place Column Girders for Ramp	93.20	0.01	0.08
Form/Place Ramp Deck & Curbs	108.91	0.01	0.09
Access Pier Pipe Installation	306.31	0.04	0.25
Drive Secondary Fender Piles	42.82	0.00	0.04
Install Secondary Fender System	95.30	0.01	0.08
Truck Trips	947.29	0.04	0.01
Worker Trips	211.97	0.01	0.02
Support Vessels	418.81	0.44	0.16
Subtotal	**3077.31**	**0.68**	**1.46**
North Pier Construction			
Form and Place 1st Stage Pile Caps	372.80	0.05	0.34
Form/Place Deck Slab/2nd Stg Caps/Beams Lower	306.31	0.04	0.25
Form and Place CIP Columns & Walls	306.31	0.04	0.25
Form and Place Column Girders	186.40	0.03	0.17
Drive Primary Fender Piles	108.68	0.01	0.11
Drive Secondary Fender Piles	43.47	0.00	0.04
Install Primary Fender System	64.90	0.01	0.05
Truck Trips	947.29	0.04	0.01
Worker Trips	211.97	0.01	0.02
Support Vessels	418.81	0.44	0.16
Subtotal	**2966.96**	**0.67**	**1.40**
Dredging	**453.23**	**0.08**	**4.50**
Total 2014, Preferred Alternative	**6497.50**	**1.42**	**7.35**
Total 2014, Delayed Dredging Alternative	**6044.26**	**1.34**	**2.86**

2016 Emissions	Emission (metric tons/year)		
	CO2	CH4	N2O
North Pier Construction			
North Pier Pipe Installation	165.69	0.02	0.15
Form/Place Deck Slab 2nd Stg Caps/Beams Upper Level	306.31	0.04	0.25
Install Loading Arm System	48.67	0.01	0.04
Turn On Service to North Pier	3.43	0.00	0.00
Truck Trips	947.29	0.04	0.01
Worker Trips	211.97	0.01	0.02
Support Vessels	418.81	0.44	0.16
Subtotal	**2102.18**	**0.56**	**0.63**
South Dolphins Construction			
Drive Mooring Dolphin Piles	57.96	0.00	0.05
Construct Dolphin Superstructure	93.47	0.01	0.09
Install Fender System Framing and Components	32.45	0.01	0.03
Truck Trips	225.89	0.01	0.00
Worker Trips	211.97	0.01	0.02
Support Vessels	538.47	0.57	0.20
Subtotal	**1160.21**	**0.61**	**0.38**
South Pier & Access Pier Demolition			
Remove Utilities, Appurtenances, & Fender System	258.35	0.02	0.17
Deck Removal	186.34	0.02	0.12
Piling Removal	232.52	0.02	0.15
Truck Trips	142.71	0.01	0.07
Worker Trips	105.98	0.01	0.01
Support Vessels	161.54	0.17	0.06
Subtotal	**1087.45**	**0.25**	**0.57**
Abutment Piles			
Drive Abutment Piles	48.30	0.00	0.04
Form/Place Abutment Cap & Landside Tie-In	43.49	0.01	0.04
Truck Trips	112.95	0.00	0.00
Worker Trips	105.98	0.01	0.01
Support Vessels	64.20	0.07	0.02
Subtotal	**374.93**	**0.09**	**0.12**
Dredging	**453.23**	**0.08**	**4.50**
Total 2016, Preferred Alternative	**5178.00**	**1.58**	**6.20**
Total 2016, Delayed Dredging Alternative	**4724.77**	**1.50**	**1.70**

Marine Mammal/Pile Program

			Emission Factors							Total Emissions (Metric Tons)		
Equipment	FUEL	HP	CO2 (lb/hr)	CH4 (lb/hr)	NOX (lb/hr)	N2O (lb/hr)	No of Equipment	Hours Per Day	Days in Service	CO2	CH4	N2O
Indicator Pile Driving												
Barge Crane - 150 Ton	DIESEL	250	112.159	0.009	1.533	0.14561	1	8	17	7.627	0.001	0.010
Delmag D12 Hammer	DIESEL	36.21	28.0	0.008	0.271	0.02572	1	8	17	1.903	0.001	0.002
Jet Pump	DIESEL	50	34.335	0.009	0.323	0.03067	1	8	17	2.335	0.001	0.002
										9.53	**0.00**	**0.01**
Landside Pipe Installation												
Scraper	DIESEL	313	321.429	0.029	2.829	0.26873	1	8	20	25.714	0.002	0.021
Roller	DIESEL	95	58.989	0.009	0.625	0.05941	1	8	20	4.719	0.001	0.005
Concrete Mixer	DIESEL	125	125.088	0.013	1.030	0.09789	2	8	20	20.014	0.002	0.016
Paver	DIESEL	100	69.196	0.013	0.836	0.07939	2	8	20	11.071	0.002	0.013
										61.52	**0.01**	**0.05**
Dredge Turning Basin												
Dredge	DIESEL	100		See Dredging			1	8	90	916.224	0.077	10.076
										916.22	**0.08**	**10.08**
Drive Piles												
Barge Crane - 150 Ton	DIESEL	250	112.159	0.009	1.533	0.14561	1	8	5	2.243	0.000	0.003
Delmag D12 Hammer	DIESEL	36.21	28.0	0.008	0.271	0.02572	1	8	5	0.560	0.000	0.001
Jet Pump	DIESEL	50	34.335	0.009	0.323	0.03067	1	8	5	0.687	0.000	0.001
										2.80	**0.00**	**0.00**
Construct Dolphin Mooring												
Air Compressor	DIESEL	50	22.271	0.008	0.222	0.02110	2	8	25	4.454	0.002	0.004
Barge Crane - 150 Ton	DIESEL	250	112.159	0.009	1.423	0.13519	1	8	25	11.216	0.001	0.014
Concrete Truck	DIESEL	210	166.545	0.013	1.237	0.11754	1	8	25	16.655	0.001	0.012
Concrete Pump Truck	DIESEL	210	166.545	0.013	1.237	0.11754	1	8	25	16.655	0.001	0.012
20-Ton Forklift	DIESEL	130	124.900	0.012	1.045	0.09926	1	8	25	12.490	0.001	0.010
Generator	DIESEL	33	30.623	0.008	0.285	0.02704	2	8	25	6.125	0.002	0.005
Wharf Crane - 150 Ton	DIESEL	250	112.159	0.009	1.423	0.13519	1	8	25	11.216	0.001	0.014
										48.98	**0.01**	**0.04**
Total										**1039.05**	**0.09**	**10.19**

Work Days/Week 5

Heavy Equipment North Segment
Demolition Emissions

Emission Factors										Total Emissions (Metric Tons)		
Equipment	FUEL	HP	CO2 (lb/hr)	CH4 (lb/hr)	NOX (lb/hr)	N2O (lb/hr)	No of Equipment	Hours Per Day	Days in Service	CO2	CH4	N2O
Piling Removal												
Air Compressor	DIESEL	50	22.271	0.008	0.222	0.02110	2	4	84	7.483	0.003	0.007
Barge Crane - 250 Ton	DIESEL	399	112.159	0.009	1.423	0.13519	1	9.5	84	44.751	0.004	0.054
Heavy Truck	DIESEL	489	272.334	0.020	1.787	0.16972	1	8	84	91.504	0.007	0.057
Wharf Crane - 150 Ton	DIESEL	250	112.159	0.009	1.423	0.13519	1	9.5	84	44.751	0.004	0.054
										188.49	**0.02**	**0.17**
Deck Removal												
Air Compressor	DIESEL	50	22.271	0.008	0.222	0.02110	2	4	84	7.483	0.003	0.007
Wheeled Loader	DIESEL	250	148.977	0.011	1.212	0.11519	1	8	84	50.056	0.004	0.039
Barge Crane - 150 Ton	DIESEL	250	112.159	0.009	1.423	0.13519	1	9.5	84	44.751	0.004	0.054
Dump Truck	DIESEL	489	272.334	0.020	1.787	0.16972	1	8	84	91.504	0.007	0.057
Wharf Crane - 150 Ton	DIESEL	250	112.159	0.009	1.423	0.13519	1	9.5	84	44.751	0.004	0.054
Breakers	DIESEL	320	254.239	0.013	1.519	0.14427	1	8	84	85.424	0.004	0.048
Concrete Saws	DIESEL	10	16.478	0.002	0.126	0.01198	4	8	84	22.146	0.002	0.016
Flatbed Truck	DIESEL	210	166.545	0.013	1.237	0.11754	1	8	84	55.959	0.004	0.039
										402.08	**0.03**	**0.31**
Asphalt Debris Removal												
Air Compressor	DIESEL	50	22.271	0.008	0.222	0.02110	2	4	84	7.483	0.003	0.007
Dump Truck	DIESEL	489	272.334	0.020	1.787	0.16972	1	8	84	91.504	0.007	0.057
Barge-Mounted Excavator	DIESEL	320	233.735	0.016	1.476	0.14025	1	8	84	78.535	0.005	0.047
Generator	DIESEL	45	30.623	0.008	0.285	0.02704	2	8	84	20.579	0.005	0.018
Wheeled Loader	DIESEL	250	148.977	0.011	1.212	0.11519	1	8	84	50.056	0.004	0.039
										248.16	**0.02**	**0.17**
Demo & Material Transport												
Wharf Crane - 150 Ton	DIESEL	250	112.159	0.009	1.423	0.13519	1	9.5	84	44.751	0.004	0.054
Wheeled Loader	DIESEL	250	148.977	0.011	1.212	0.11519	1	8	84	50.056	0.004	0.039
Dump Truck	DIESEL	489	272.334	0.020	1.787	0.16972	1	8	84	91.504	0.007	0.057
										186.31	**0.01**	**0.15**
TOTAL										**1025.03**	**0.09**	**0.80**

Assumptions:

* Per project schedule, North Segment Demolition occurs in 2012
* Remove utilities, appurtenances, & fenders assumes 42 days.
* Deck Removal assumes 90 days.
* Pier Removal assumes 60 days.

Notes:

(a) Emission factors from http://www.aqmd.gov/ceqa/handbook/offroad/offroad.html, SCAQMD OFFROAD Emission Factors, Years 2012 through 2015

Work Days/Week 5

Access Pier Construction

Emission Factors										Total Emissions (Tons)		
Equipment	FUEL	HP	CO2 (lb/hr)	CH4 (lb/hr)	NOX (lb/hr)	N2O (lb/hr)	No of Equipment	Hours Per Day	Days in Service	CO2	CH4	N2O
Drive Abutment Piles												
Barge Crane - 150 Ton	DIESEL	250	112.159	0.009	1.423	0.13519	1	9.5	13	6.926	0.001	0.008
Impact Hammer	DIESEL	250	254.239	0.013	1.519	0.14427	1	9.5	13	15.699	0.001	0.009
Vibratory Hammer	DIESEL	250	254.239	0.013	1.519	0.14427	1	9.5	13	15.699	0.001	0.009
Jet Pump	DIESEL	50	34.335	0.009	0.323	0.03067	1	9.5	13	2.120	0.001	0.002
20-Ton Forklift	DIESEL	130	124.900	0.012	1.045	0.09926	1	9.5	13	7.713	0.001	0.006
										48.16	**0.00**	**0.03**
Construct Abutment												
Air Compressor	DIESEL	50	22.271	0.008	0.222	0.02110	2	8	28	4.989	0.002	0.005
Barge Crane - 150 Ton	DIESEL	250	112.159	0.009	1.423	0.13519	1	8	28	12.562	0.001	0.015
Concrete Truck	DIESEL	210	166.545	0.013	1.237	0.11754	1	8	28	18.653	0.001	0.013
Concrete Pump Truck	DIESEL	210	166.545	0.013	1.237	0.11754	1	8	28	18.653	0.001	0.013
20-Ton Forklift	DIESEL	130	124.900	0.012	1.045	0.09926	1	8	28	13.989	0.001	0.011
Generator	DIESEL	33	30.623	0.008	0.285	0.02704	2	8	28	6.860	0.002	0.006
Wharf Crane - 150 Ton	DIESEL	250	112.159	0.009	1.423	0.13519	1	8	28	12.562	0.001	0.015
										88.267	**0.010**	**0.079**
Drive Structural Piles												
Barge Crane - 150 Ton	DIESEL	250	112.159	0.009	1.423	0.13519	1	9.5	60	31.965	0.003	0.039
Impact Hammer	DIESEL	250	254.239	0.013	1.519	0.14427	1	9.5	60	72.458	0.004	0.041
Vibratory Hammer	DIESEL	250	254.239	0.013	1.519	0.14427	1	9.5	60	72.458	0.004	0.041
Jet Pump	DIESEL	50	34.335	0.009	0.323	0.03067	1	9.5	60	9.785	0.003	0.009
20-Ton Forklift	DIESEL	130	124.900	0.012	1.045	0.09926	1	9.5	60	35.596	0.003	0.028
										222.26	**0.02**	**0.16**
Form and Place 1st Stage Pile Caps												
Air Compressor	DIESEL	50	22.271	0.008	0.222	0.02110	2	8	180	32.071	0.012	0.030
Barge Crane - 150 Ton	DIESEL	250	112.159	0.009	1.423	0.13519	1	8	180	80.754	0.007	0.097
20-Ton Forklift	DIESEL	130	124.900	0.012	1.045	0.09926	1	8	180	89.928	0.009	0.071
Wheeled Loader	DIESEL	250	148.977	0.011	1.212	0.11519	1	8	180	107.263	0.008	0.083
Generator	DIESEL	33	30.623	0.008	0.285	0.02704	2	8	180	44.097	0.011	0.039
Welders	DIESEL	45	25.958	0.009	0.253	0.02408	1	8	180	18.690	0.006	0.017
										372.80	**0.05**	**0.34**
Form/Place Deck Slabs, 2nd Stg Caps, Beams & Curbs												
Air Compressor	DIESEL	50	22.271	0.008	0.222	0.02110	2	8	120	21.380	0.008	0.020
Barge Crane - 150 Ton	DIESEL	250	112.159	0.009	1.423	0.13519	1	8	120	53.836	0.005	0.065
Concrete Truck	DIESEL	210	166.545	0.013	1.237	0.11754	1	8	120	79.942	0.006	0.056

Concrete Pump Truck	DIESEL	210	166.545	0.013	1.237	0.11754	1	8	120	79.942	0.006	0.056
20-Ton Forklift	DIESEL	130	124.900	0.012	1.045	0.09926	1	8	120	59.952	0.006	0.048
Wheeled Loader	DIESEL	250	148.977	0.011	1.212	0.11519	1	8	120	71.509	0.005	0.055
Generator	DIESEL	33	30.623	0.008	0.285	0.02704	2	8	120	29.398	0.008	0.026
Welders	DIESEL	45	25.958	0.009	0.253	0.02408	1	8	120	12.460	0.004	0.012
										408.42	**0.05**	**0.34**
Form and Place CIP Columns & Walls for Ramp												
Air Compressor	DIESEL	50	22.271	0.008	0.222	0.02110	2	8	21	3.742	0.001	0.004
Barge Crane - 150 Ton	DIESEL	250	112.159	0.009	1.423	0.13519	1	8	21	9.421	0.001	0.011
Concrete Truck	DIESEL	210	166.545	0.013	1.237	0.11754	1	8	21	13.990	0.001	0.010
Concrete Pump Truck	DIESEL	210	166.545	0.013	1.237	0.11754	1	8	21	13.990	0.001	0.010
20-Ton Forklift	DIESEL	130	124.900	0.012	1.045	0.09926	1	8	21	10.492	0.001	0.008
Wheeled Loader	DIESEL	250	148.977	0.011	1.212	0.11519	1	8	21	12.514	0.001	0.010
Generator	DIESEL	33	30.623	0.008	0.285	0.02704	2	8	21	5.145	0.001	0.005
Welders	DIESEL	45	25.958	0.009	0.253	0.02408	1	8	21	2.180	0.001	0.002
										71.47	**0.01**	**0.06**
Form and Place Column Girders for Ramp												
Air Compressor	DIESEL	50	22.271	0.008	0.222	0.02110	2	8	45	8.018	0.003	0.008
Barge Crane - 150 Ton	DIESEL	250	112.159	0.009	1.423	0.13519	1	8	45	20.189	0.002	0.024
20-Ton Forklift	DIESEL	130	124.900	0.012	1.045	0.09926	1	8	45	22.482	0.002	0.018
Wheeled Loader	DIESEL	250	148.977	0.011	1.212	0.11519	1	8	45	26.816	0.002	0.021
Generator	DIESEL	33	30.623	0.008	0.285	0.02704	2	8	45	11.024	0.003	0.010
Welders	DIESEL	45	25.958	0.009	0.253	0.02408	1	8	45	4.672	0.002	0.004
										93.20	**0.01**	**0.08**
Form/Place Ramp Deck & Curbs												
Air Compressor	DIESEL	50	22.271	0.008	0.222	0.02110	2	8	32	5.701	0.002	0.005
Barge Crane - 150 Ton	DIESEL	250	112.159	0.009	1.423	0.13519	1	8	32	14.356	0.001	0.017
Concrete Truck	DIESEL	210	166.545	0.013	1.237	0.11754	1	8	32	21.318	0.002	0.015
Concrete Pump Truck	DIESEL	210	166.545	0.013	1.237	0.11754	1	8	32	21.318	0.002	0.015
20-Ton Forklift	DIESEL	130	124.900	0.012	1.045	0.09926	1	8	32	15.987	0.002	0.013
Wheeled Loader	DIESEL	250	148.977	0.011	1.212	0.11519	1	8	32	19.069	0.001	0.015
Generator	DIESEL	33	30.623	0.008	0.285	0.02704	2	8	32	7.839	0.002	0.007
Welders	DIESEL	45	25.958	0.009	0.253	0.02408	1	8	32	3.323	0.001	0.003
										108.91	**0.01**	**0.09**
Access Pier Pipe Installation												
Air Compressor	DIESEL	50	22.271	0.008	0.222	0.02110	2	8	90	16.035	0.006	0.015
Barge Crane - 150 Ton	DIESEL	250	112.159	0.009	1.423	0.13519	1	8	90	40.377	0.003	0.049
Concrete Truck	DIESEL	210	166.545	0.013	1.237	0.11754	1	8	90	59.956	0.005	0.042

Access Pier Construction

Concrete Pump Truck	DIESEL	210	166.545	0.013	1.237	0.11754	1	8	90	59.956	0.005	0.042
20-Ton Forklift	DIESEL	130	124.900	0.012	1.045	0.09926	1	8	90	44.964	0.004	0.036
Wheeled Loader	DIESEL	250	148.977	0.011	1.212	0.11519	1	8	90	53.632	0.004	0.041
Generator	DIESEL	33	30.623	0.008	0.285	0.02704	2	8	90	22.049	0.006	0.019
Welders	DIESEL	45	25.958	0.009	0.253	0.02408	1	8	90	9.345	0.003	0.009
										306.31	**0.04**	**0.25**
Drive Secondary Fender Piles												
Barge Crane - 150 Ton	DIESEL	250	112.159	0.009	1.423	0.13519	2	9.5	10	10.655	0.001	0.013
Impact Hammer	DIESEL	250	254.239	0.013	1.519	0.14427	1	9.5	10	12.076	0.001	0.007
20-Ton Forklift	DIESEL	130	124.900	0.012	1.045	0.09926	1	9.5	10	5.933	0.001	0.005
Wheeled Loader	DIESEL	250	148.977	0.011	1.212	0.11519	2	9.5	10	14.153	0.001	0.011
										42.817	**0.003**	**0.035**
Install Secondary Fender System												
Air Compressor	DIESEL	50	22.271	0.008	0.222	0.02110	2	8	28	4.989	0.002	0.005
Barge Crane - 150 Ton	DIESEL	250	112.159	0.009	1.423	0.13519	1	8	28	12.562	0.001	0.015
Concrete Truck	DIESEL	210	166.545	0.013	1.237	0.11754	1	8	28	18.653	0.001	0.013
Concrete Pump Truck	DIESEL	210	166.545	0.013	1.237	0.11754	1	8	28	18.653	0.001	0.013
20-Ton Forklift	DIESEL	130	124.900	0.012	1.045	0.09926	1	8	28	13.989	0.001	0.011
Wheeled Loader	DIESEL	250	148.977	0.011	1.212	0.11519	1	8	28	16.685	0.001	0.013
Generator	DIESEL	33	30.623	0.008	0.285	0.02704	2	8	28	6.860	0.002	0.006
Welders	DIESEL	45	25.958	0.009	0.253	0.02408	1	8	28	2.907	0.001	0.003
										95.30	**0.01**	**0.08**
Total										**1857.92**	**0.22**	**1.55**

Work Days/Week 5

North
Pier Construction

Emission Factors										Total Emissions (Tons)		
Equipment	FUEL	HP	CO2 (lb/hr)	CH4 (lb/hr)	NOX (lb/hr)	N2O (lb/hr)	No of Equipment	Hours Per Day	Days in Service	CO2	CH4	N2O
Drive Structural Piles												
Barge Crane - 150 Ton	DIESEL	250	112.159	0.009	1.423	0.13519	1	9.5	45	23.974	0.002	0.029
Impact Hammer	DIESEL	250	254.239	0.013	1.519	0.14427	1	9.5	45	54.343	0.003	0.031
Vibratory Hammer	DIESEL	250	254.239	0.013	1.519	0.14427	1	9.5	45	54.343	0.003	0.031
20-Ton Forklift	DIESEL	130	34.335	0.009	1.045	0.09926	1	9.5	45	7.339	0.002	0.021
Wheeled Loader	DIESEL	250	124.900	0.012	1.212	0.11519	1	9.5	45	26.697	0.003	0.025
										166.70	**0.01**	**0.14**
Drive Mooring Dolphin Piles												
Barge Crane - 150 Ton	DIESEL	250	112.159	0.009	1.423	0.13519	1	9.5	12	6.393	0.001	0.008
Impact Hammer	DIESEL	250	254.239	0.013	1.519	0.14427	1	9.5	12	14.492	0.001	0.008
Vibratory Hammer	DIESEL	250	254.239	0.013	1.519	0.14427	1	9.5	12	14.492	0.001	0.008
20-Ton Forklift	DIESEL	130	34.335	0.009	1.045	0.09926	1	9.5	12	1.957	0.001	0.006
Wheeled Loader	DIESEL	250	124.900	0.012	1.212	0.11519	1	9.5	12	7.119	0.001	0.007
										44.45	**0.00**	**0.04**
Form and Place 1st Stage Pile Caps												
Air Compressor	DIESEL	50	22.271	0.008	0.222	0.02110	2	8	180	32.071	0.012	0.030
Barge Crane - 150 Ton	DIESEL	250	112.159	0.009	1.423	0.13519	1	8	180	80.754	0.007	0.097
20-Ton Forklift	DIESEL	130	124.900	0.012	1.045	0.09926	1	8	180	89.928	0.009	0.071
Wheeled Loader	DIESEL	250	148.977	0.011	1.212	0.11519	1	8	180	107.263	0.008	0.083
Generator	DIESEL	33	30.623	0.008	0.285	0.02704	2	8	180	44.097	0.011	0.039
Welders	DIESEL	45	25.958	0.009	0.253	0.02408	1	8	180	18.690	0.006	0.017
										372.80	**0.05**	**0.34**
Form/Place Deck Slab/2nd Stg Caps/Beams Lower												
Air Compressor	DIESEL	50	22.271	0.008	0.222	0.02110	2	8	90	16.035	0.006	0.015
Barge Crane - 150 Ton	DIESEL	250	112.159	0.009	1.423	0.13519	1	8	90	40.377	0.003	0.049
Concrete Truck	DIESEL	210	166.545	0.013	1.237	0.11754	1	8	90	59.956	0.005	0.042
Concrete Pump Truck	DIESEL	210	166.545	0.013	1.237	0.11754	1	8	90	59.956	0.005	0.042
20-Ton Forklift	DIESEL	130	124.900	0.012	1.045	0.09926	1	8	90	44.964	0.004	0.036
Wheeled Loader	DIESEL	250	148.977	0.011	1.212	0.11519	1	8	90	53.632	0.004	0.041
Generator	DIESEL	33	30.623	0.008	0.285	0.02704	2	8	90	22.049	0.006	0.019
Welders	DIESEL	45	25.958	0.009	0.253	0.02408	1	8	90	9.345	0.003	0.009
										306.31	**0.04**	**0.25**
Form and Place CIP Columns & Walls												
Air Compressor	DIESEL	50	22.271	0.008	0.222	0.02110	2	8	90	16.035	0.006	0.015
Barge Crane - 150 Ton	DIESEL	250	112.159	0.009	1.423	0.13519	1	8	90	40.377	0.003	0.049

Concrete Truck	DIESEL	210	166.545	0.013	1.237	0.11754	1	8	90	59.956	0.005	0.042
Concrete Pump Truck	DIESEL	210	166.545	0.013	1.237	0.11754	1	8	90	59.956	0.005	0.042
20-Ton Forklift	DIESEL	130	124.900	0.012	1.045	0.09926	1	8	90	44.964	0.004	0.036
Wheeled Loader	DIESEL	250	148.977	0.011	1.212	0.11519	1	8	90	53.632	0.004	0.041
Generator	DIESEL	33	30.623	0.008	0.285	0.02704	2	8	90	22.049	0.006	0.019
Welders	DIESEL	45	25.958	0.009	0.253	0.02408	1	8	90	9.345	0.003	0.009
										306.31	**0.04**	**0.25**
Form and Place Column Girders												
Air Compressor	DIESEL	50	22.271	0.008	0.222	0.02110	2	8	90	16.035	0.006	0.015
Barge Crane - 150 Ton	DIESEL	250	112.159	0.009	1.423	0.13519	1	8	90	40.377	0.003	0.049
20-Ton Forklift	DIESEL	130	124.900	0.012	1.045	0.09926	1	8	90	44.964	0.004	0.036
Wheeled Loader	DIESEL	250	148.977	0.011	1.212	0.11519	1	8	90	53.632	0.004	0.041
Generator	DIESEL	33	30.623	0.008	0.285	0.02704	2	8	90	22.049	0.006	0.019
Welders	DIESEL	45	25.958	0.009	0.253	0.02408	1	8	90	9.345	0.003	0.009
										186.40	**0.03**	**0.17**
North Pier Pipe Installation												
Air Compressor	DIESEL	50	22.271	0.008	0.222	0.02110	2	8	80	14.254	0.005	0.014
Barge Crane - 150 Ton	DIESEL	250	112.159	0.009	1.423	0.13519	1	8	80	35.891	0.003	0.043
20-Ton Forklift	DIESEL	130	124.900	0.012	1.045	0.09926	1	8	80	39.968	0.004	0.032
Wheeled Loader	DIESEL	250	148.977	0.011	1.212	0.11519	1	8	80	47.673	0.004	0.037
Generator	DIESEL	33	30.623	0.008	0.285	0.02704	2	8	80	19.599	0.005	0.017
Welders	DIESEL	45	25.958	0.009	0.253	0.02408	1	8	80	8.307	0.003	0.008
										165.69	**0.02**	**0.15**
Form/Place Deck Slab 2nd Stg Caps/Beams Upper Level												
Air Compressor	DIESEL	50	22.271	0.008	0.222	0.02110	2	8	90	16.035	0.006	0.015
Barge Crane - 150 Ton	DIESEL	250	112.159	0.009	1.423	0.13519	1	8	90	40.377	0.003	0.049
Concrete Truck	DIESEL	210	166.545	0.013	1.237	0.11754	1	8	90	59.956	0.005	0.042
Concrete Pump Truck	DIESEL	210	166.545	0.013	1.237	0.11754	1	8	90	59.956	0.005	0.042
20-Ton Forklift	DIESEL	130	124.900	0.012	1.045	0.09926	1	8	90	44.964	0.004	0.036
Wheeled Loader	DIESEL	250	148.977	0.011	1.212	0.11519	1	8	90	53.632	0.004	0.041
Generator	DIESEL	33	30.623	0.008	0.285	0.02704	2	8	90	22.049	0.006	0.019
Welders	DIESEL	45	25.958	0.009	0.253	0.02408	1	8	90	9.345	0.003	0.009
										306.31	**0.04**	**0.25**
Install Loading Arm System												
Air Compressor	DIESEL	50	22.271	0.008	0.222	0.02110	2	8	30	5.345	0.002	0.005
20-Ton Forklift	DIESEL	130	124.900	0.012	1.045	0.09926	1	8	30	14.988	0.001	0.012
Wheeled Loader	DIESEL	250	148.977	0.011	1.212	0.11519	1	8	30	17.877	0.001	0.014
Generator	DIESEL	33	30.623	0.008	0.285	0.02704	2	8	30	7.350	0.002	0.006

North
Pier Construction

Welders	DIESEL	45	25.958	0.009	0.253	0.02408	1	8	30	3.115	0.001	0.003
										48.67	**0.01**	**0.04**
Drive Primary Fender Piles												
Barge Crane - 150 Ton	DIESEL	250	112.159	0.009	1.423	0.13519	2	9.5	30	31.965	0.003	0.039
Impact Hammer	DIESEL	250	254.239	0.013	1.519	0.14427	1	9.5	30	36.229	0.002	0.021
20-Ton Forklift	DIESEL	130	34.335	0.009	1.045	0.09926	1	9.5	30	4.893	0.001	0.014
Wheeled Loader	DIESEL	250	124.900	0.012	1.212	0.11519	2	9.5	30	35.596	0.003	0.033
										108.68	**0.01**	**0.11**
Drive Secondary Fender Piles												
Barge Crane - 150 Ton	DIESEL	250	112.159	0.009	1.423	0.13519	2	9.5	12	12.786	0.001	0.015
Impact Hammer	DIESEL	250	254.239	0.013	1.519	0.14427	1	9.5	12	14.492	0.001	0.008
20-Ton Forklift	DIESEL	130	34.335	0.009	1.045	0.09926	1	9.5	12	1.957	0.001	0.006
Wheeled Loader	DIESEL	250	124.900	0.012	1.212	0.11519	2	9.5	12	14.239	0.001	0.013
										43.47	**0.00**	**0.04**
Install Primary Fender System												
Air Compressor	DIESEL	50	22.271	0.008	0.222	0.02110	2	8	40	7.127	0.003	0.007
20-Ton Forklift	DIESEL	130	124.900	0.012	1.045	0.09926	1	8	40	19.984	0.002	0.016
Wheeled Loader	DIESEL	250	148.977	0.011	1.212	0.11519	1	8	40	23.836	0.002	0.018
Generator	DIESEL	33	30.623	0.008	0.285	0.02704	2	8	40	9.799	0.003	0.009
Welders	DIESEL	45	25.958	0.009	0.253	0.02408	1	8	40	4.153	0.001	0.004
										64.90	**0.01**	**0.05**
Turn On Service to North Pier												
Generator	DIESEL	33	30.623	0.008	0.285	0.02704	2	8	14	3.430	0.001	0.003
										3.43	**0.00**	**0.00**
Total										**2124.15**	**0.26**	**1.84**

Work Days/Week 5

South
Pier Construction

Emission Factors										Total Emissions (Tons)		
Equipment	FUEL	HP	CO2 (lb/hr)	CH4 (lb/hr)	NOX (lb/hr)	N2O (lb/hr)	No of Equipment	Hours Per Day	Days in Service	CO2	CH4	N2O
Drive Mooring Dolphin Piles												
Barge Crane - 150 Ton	DIESEL	250	112.159	0.009	1.423	0.13519	2	9.5	12	12.786	0.001	0.015
Impact Hammer	DIESEL	250	254.239	0.013	1.519	0.14427	1	9.5	12	14.492	0.001	0.008
Vibratory Hammer	DIESEL	250	254.239	0.013	1.519	0.14427	1	9.5	12	14.492	0.001	0.008
20-Ton Forklift	DIESEL	130	34.335	0.009	1.045	0.09926	1	9.5	12	1.957	0.001	0.006
Wheeled Loader	DIESEL	250	124.900	0.012	1.212	0.11519	2	9.5	12	14.239	0.001	0.013
										57.96	**0.00**	**0.05**
Construct Dolphin Superstructure												
Air Compressor	DIESEL	50	22.271	0.008	0.222	0.02110	2	8	30	5.345	0.002	0.005
Barge Crane - 150 Ton	DIESEL	250	112.159	0.009	1.423	0.13519	2	8	30	26.918	0.002	0.032
20-Ton Forklift	DIESEL	130	124.900	0.012	1.045	0.09926	1	8	30	14.988	0.001	0.012
Wheeled Loader	DIESEL	250	148.977	0.011	1.212	0.11519	2	8	30	35.754	0.003	0.028
Generator	DIESEL	33	30.623	0.008	0.285	0.02704	2	8	30	7.350	0.002	0.006
Welders	DIESEL	45	25.958	0.009	0.253	0.02408	1	8	30	3.115	0.001	0.003
										93.47	**0.01**	**0.09**
Install Fender System Framing and Components												
Air Compressor	DIESEL	50	22.271	0.008	0.222	0.02110	2	8	20	3.563	0.001	0.003
20-Ton Forklift	DIESEL	130	124.900	0.012	1.045	0.09926	1	8	20	9.992	0.001	0.008
Wheeled Loader	DIESEL	250	148.977	0.011	1.212	0.11519	1	8	20	11.918	0.001	0.009
Generator	DIESEL	33	30.623	0.008	0.285	0.02704	2	8	20	4.900	0.001	0.004
Welders	DIESEL	45	25.958	0.009	0.253	0.02408	1	8	20	2.077	0.001	0.002
										32.45	**0.01**	**0.03**
Total										**183.88**	**0.02**	**0.16**

Work Days/Week 5

Heavy Equipment North Segment
Demolition Emissions

Emission Factors										Total Emissions (Metric Tons)		
Equipment	FUEL	HP	CO2 (lb/hr)	CH4 (lb/hr)	NOX (lb/hr)	N2O (lb/hr)	No of Equipment	Hours Per Day	Days in Service	CO2	CH4	N2O
Remove Utilities, Appurtenances, & Fender System												
Barge-Mounted Excavator	DIESEL	320	233.735	0.016	1.313	0.12470	2	8	60	112.193	0.008	0.060
Generator	DIESEL	45	30.623	0.008	0.273	0.02594	2	8	60	14.699	0.004	0.012
20-Ton Forklift	DIESEL	130	124.900	0.012	0.975	0.09263	2	8	60	59.952	0.006	0.044
Wheeled Loader	DIESEL	250	148.977	0.011	1.097	0.10418	2	8	60	71.509	0.005	0.050
										258.35	**0.02**	**0.17**
Deck Removal												
Air Compressor	DIESEL	50	22.271	0.008	0.177	0.01677	2	4	40	3.563	0.001	0.003
Concrete Saws	DIESEL	10	16.478	0.002	0.126	0.01198	4	8	40	10.546	0.001	0.008
Barge-Mounted Excavator	DIESEL	320	233.735	0.016	1.313	0.12470	2	8	40	74.795	0.005	0.040
Generator	DIESEL	45	30.623	0.008	0.273	0.02594	2	8	40	9.799	0.003	0.008
20-Ton Forklift	DIESEL	130	124.900	0.012	0.975	0.09263	2	8	40	39.968	0.004	0.030
Wheeled Loader	DIESEL	250	148.977	0.011	1.097	0.10418	2	8	40	47.673	0.004	0.033
										186.34	**0.02**	**0.12**
Piling Removal												
Barge-Mounted Excavator	DIESEL	320	233.735	0.016	1.313	0.12470	2	8	54	100.974	0.007	0.054
Generator	DIESEL	45	30.623	0.008	0.273	0.02594	2	8	54	13.229	0.003	0.011
20-Ton Forklift	DIESEL	130	124.900	0.012	0.975	0.09263	2	8	54	53.957	0.005	0.040
Wheeled Loader	DIESEL	250	148.977	0.011	1.097	0.10418	2	8	54	64.358	0.005	0.045
										232.52	**0.02**	**0.15**
TOTAL										**677.21**	**0.06**	**0.44**

Assumptions:

* Per project schedule, South Pier Demolition occurs in 2014
* Remove utilities, appurtenances, & fenders assumes 84 days.
* Deck Removal assumes 56 days.
* Pier Removal assumes 56 days.

Notes:

(a) Emission factors from http://www.aqmd.gov/ceqa/handbook/offroad/offroad.html, SCAQMD OFFROAD Emission Factors, Years 2012 through 2015

Work Days/Week 5

Abutment

Emission Factors										Total Emissions (Tons)		
Equipment	FUEL	HP	CO2 (lb/hr)	CH4 (lb/hr)	NOX (lb/hr)	N2O (lb/hr)	No of Equip ment	Hours Per Day	Days in Service	CO2	CH4	N2O
Drive Abutment Piles												
Barge Crane - 150 Ton	DIESEL	250	112.159	0.009	1.423	0.13519	2	9.5	10	10.655	0.001	0.013
Impact Hammer	DIESEL	250	254.239	0.013	1.519	0.14427	1	9.5	10	12.076	0.001	0.007
Vibratory Hammer	DIESEL	250	254.239	0.013	1.519	0.14427	1	9.5	10	12.076	0.001	0.007
20-Ton Forklift	DIESEL	130	34.335	0.009	1.045	0.09926	1	9.5	10	1.631	0.000	0.005
Wheeled Loader	DIESEL	250	124.900	0.012	1.212	0.11519	2	9.5	10	11.865	0.001	0.011
										48.30	**0.00**	**0.04**
Form/Place Abutment Cap & Landside Tie-In												
Air Compressor	DIESEL	50	22.271	0.008	0.222	0.02110	2	8	21	3.742	0.001	0.004
Barge Crane - 150 Ton	DIESEL	250	112.159	0.009	1.423	0.13519	1	8	21	9.421	0.001	0.011
20-Ton Forklift	DIESEL	130	124.900	0.012	1.045	0.09926	1	8	21	10.492	0.001	0.008
Wheeled Loader	DIESEL	250	148.977	0.011	1.212	0.11519	1	8	21	12.514	0.001	0.010
Generator	DIESEL	33	30.623	0.008	0.285	0.02704	2	8	21	5.145	0.001	0.005
Welders	DIESEL	45	25.958	0.009	0.253	0.02408	1	8	21	2.180	0.001	0.002
										43.49	**0.01**	**0.04**
Total										**91.80**	**0.01**	**0.08**

Work Days/Week 5

Construction Truck Trips

Construction Phase	Vehicle Class	Daily truck trips	Total No. of Vehicle	Speed (mph)	VMT (mi/vehicle-day)	CO2 Running Exhaust (g/mi)	NO_X Running Exhaust (g/mi)	CH4 Running Exhaust (g/mi)	N2O Running Exhaust (g/mi)	Emissions, lbs/day CO2	Emissions, lbs/day CH4	Emissions, lbs/day N2O	Emissions, metric tons per year CO2	Emissions, metric tons per year CH4	Emissions, metric tons per year N2O
Demolition															
Transport Trucks	Heavy-duty truck, diesel	12	2000	15	26	2694.49929	13.036345	0.114	1.238452779	1853.40	0.08	0.85	140.12	0.01	0.06
TOTAL										**1853.40**	**0.08**	**0.85**	**140.12**	**0.01**	**0.06**

ASSUMPTIONS:

* Assuming 26 miles round trip per vehicle (distance to Miramar Landfill = 13 miles)
* Assume startup after 8 hours
* Assume 45 minutes run time total
* 2012 Emission Factors from EMFAC2007, average temp 60F

Total truck trips for demolition - 2,000 trips

Construction Phase	Vehicle Class		Total No. of Vehicle	Speed (mph)	VMT (mi/vehicle-day)	CO2 Running Exhaust (g/mi)	NO_X Running Exhaust (g/mi)	CH4 Running Exhaust (g/mi)	N2O Running Exhaust (g/mi)	Emissions, lbs/day CO2	Emissions, lbs/day CH4	Emissions, lbs/day N2O	Emissions, metric tons per year CO2	Emissions, metric tons per year CH4	Emissions, metric tons per year N2O
Deliveries															
Transport Trucks	Heavy-duty truck, diesel		4600	15	40	2694.49929	13.036345	0.114	0.024	7286.87	0.31	0.06	495.80	0.02	0.00
TOTAL										**7286.87**	**0.31**	**0.06**	**495.80**	**0.02**	**0.00**

ASSUMPTIONS:

* Assuming 40 miles round trip per vehicle
* Assume startup after 8 hours
* Assume 45 minutes run time total
* 2014 Emission Factors from EMFAC2011, average temp 60F

Total truck trips for deliveries - 3,000 trips for materials plus 1,600 trips for piles

Construction Worker Commute Emission Calculations

Construction Phase	Vehicle Class	No. of Workers Per Construction Phase	Speed (mph)	VMT (mi/vehicle-day)	CO2		NOx		CH4		N2O		Emissions, lbs/day				Emissions, metric tons per year		
					Running Exhaust (g/mi)	Start-Up (g/start)[a]	Running Exhaust (g/mi)	Start-Up (g/start)[a]	Running Exhaust (g/mi)	Start-Up (g/start)[a]	Running Exhaust (g/mi)	Start-Up (g/start)[a]	CO2	CH4	N2O	Days/year	CO2	CH4	N2O
Marine Mammal Relocation	Light-duty truck, catalyst	30	35	40	329.567233	202.414	0.27134995	0.429	0.02	0.035	0.025778246	0.040755	898.67	0.07	0.07	260	105.984	0.007917	0.00868
North Segment Demolition	Light-duty truck, catalyst	30	35	40	329.567233	202.414	0.27134995	0.429	0.02	0.035	0.025778246	0.040755	898.67	0.07	0.07	84	105.984	0.007917	0.00868
Access Pier Construction	Light-duty truck, catalyst	60	35	40	329.567233	202.414	0.27134995	0.429	0.02	0.035	0.025778246	0.040755	1797.33	0.07	0.15	260	211.969	0.007917	0.01736
North Pier Construction	Light-duty truck, catalyst	60	35	40	329.567233	202.414	0.27134995	0.429	0.02	0.035	0.025778246	0.040755	1797.33	0.07	0.15	260	211.969	0.007917	0.01736
South Pier Construction	Light-duty truck, catalyst	60	35	40	329.567233	202.414	0.27134995	0.429	0.02	0.035	0.025778246	0.040755	1797.33	0.07	0.15	62	211.969	0.007917	0.01736
South Pier & Access Pier Demolition	Light-duty truck, catalyst	30	35	40	329.567233	202.414	0.27134995	0.429	0.02	0.035	0.025778246	0.040755	898.67	0.07	0.07	154	105.984	0.007917	0.00868
Abutment	Light-duty truck, catalyst	30	35	40	329.567233	202.414	0.27134995	0.429	0.02	0.035	0.025778246	0.040755	898.67	0.07	0.07	31	105.984	0.007917	0.00868

ASSUMPTIONS:

* Assuming 40 miles round trip per vehicle
* Assuming 30 workers per construction phase for demolition, 60 for pier construction
* Assume startup after 8 hours
* Assume 45 minutes run time total
* 2014 Emission Factors from EMFAC2011, average temp 60F

Work Days/Week 5

Support Vessel Emissions

Marine Mammal Relocation											Emission Factors				Hourly Emission Rates (lb/hr)			Annual Emission Rates (ton/yr)		
Equipment Type	**Operation/Location**	**power rating**	**units**	**Load %**	**No. of units**	**Fuel Type**	**hrs /day**	**Days/ year**	**hrs/ year**	**Fuel Consumption (g/kW-hr)**	**CO2**	**CH4**	**N2O**	**Emission factor units**	**CO2**	**CH4**	**N2O**	**CO2**	**CH4**	**N2O**
Work Boat	Pile Driving Support	75	kW	85.0%	1	California Diesel	4	8	32	222.33	700.48	0.74	0.26	g/kW-hr	115.06	0.12	0.04	1.8	0.0	0.0
Tugboats	Pile Driving Support	186	kW	85.0%	2	California Diesel	4	8	32	222.33	700.48	0.74	0.26	g/kW-hr	575.28	0.61	0.21	9.2	0.0	0.0
Work Boat	Marine Mammal Pen Move	93	kW	85.0%	4	California Diesel	8	90	720	222.33	700.48	0.74	0.26	g/kW-hr	575.28	0.61	0.21	207.1	0.2	0.1
														MAX Daily:	**1265.63**	**1.34**	**0.47**	**218.15**	**0.23**	**0.08**

North Segment Demolition											Emission Factors				Hourly Emission Rates (lb/hr)			Annual Emission Rates (ton/yr)		
Equipment Type	**Operation/Location**	**power rating**	**units**	**Load %**	**No. of units**	**Fuel Type**	**hrs /day**	**Days/ year**	**hrs/ year**	**Fuel Consumption (g/kW-hr)**	**CO2**	**CH4**	**N2O**	**Emission factor units**	**CO2**	**CH4**	**N2O**	**CO2**	**CH4**	**N2O**
Work Boat	Demolition Support	75	kW	85.0%	2	California Diesel	4	61	244	222.33	700.48	0.74	0.26	g/kW-hr	230.11	0.24	0.09	28.1	0.0	0.0
Tugboats	Construction Support	186	kW	85.0%	2	California Diesel	4	61	244	222.33	700.48	0.74	0.26	g/kW-hr	575.28	0.61	0.21	70.2	0.1	0.0
														MAX Daily:	**805.40**	**0.85**	**0.30**	**98.26**	**0.10**	**0.04**

Access Pier Construction											Emission Factors				Hourly Emission Rates (lb/hr)			Annual Emission Rates (ton/yr)		
Equipment Type	**Operation/Location**	**power rating**	**units**	**Load %**	**No. of units**	**Fuel Type**	**hrs /day**	**Days/ year**	**hrs/ year**	**Fuel Consumption (g/kW-hr)**	**CO2**	**CH4**	**N2O**	**Emission factor units**	**CO2**	**CH4**	**N2O**	**CO2**	**CH4**	**N2O**
Work Boat	Construction Support	75	kW	85.0%	2	California Diesel	4	260	1040	222.33	700.48	0.74	0.26	g/kW-hr	230.11	0.24	0.09	119.7	0.1	0.0
Tugboats	Construction Support	186	kW	85.0%	2	California Diesel	4	260	1040	222.33	700.48	0.74	0.26	g/kW-hr	575.28	0.61	0.21	299.1	0.3	0.1
														MAX Daily:	**805.40**	**0.85**	**0.30**	**418.81**	**0.44**	**0.16**

North Pier Construction											Emission Factors				Hourly Emission Rates (lb/hr)			Annual Emission Rates (ton/yr)		
Equipment Type	**Operation/Location**	**power rating**	**units**	**Load %**	**No. of units**	**Fuel Type**	**hrs /day**	**Days/ year**	**hrs/ year**	**Fuel Consumption (g/kW-hr)**	**CO2**	**CH4**	**N2O**	**Emission factor units**	**CO2**	**CH4**	**N2O**	**CO2**	**CH4**	**N2O**
Work Boat	Construction Support	75	kW	85.0%	2	California Diesel	4	260	1040	222.33	700.48	0.74	0.26	g/kW-hr	230.11	0.24	0.09	119.7	0.1	0.0
Tugboats	Construction Support	186	kW	85.0%	2	California Diesel	4	260	1040	222.33	700.48	0.74	0.26	g/kW-hr	575.28	0.61	0.21	299.1	0.3	0.1
														MAX Daily:	**805.40**	**0.85**	**0.30**	**418.81**	**0.44**	**0.16**

South Pier Construction											Emission Factors				Hourly Emission Rates (lb/hr)			Annual Emission Rates (ton/yr)		
Equipment Type	**Operation/Location**	**power rating**	**units**	**Load %**	**No. of units**	**Fuel Type**	**hrs /day**	**Days/ year**	**hrs/ year**	**Fuel Consumption (g/kW-hr)**	**CO2**	**CH4**	**N2O**	**Emission factor units**	**CO2**	**CH4**	**N2O**	**CO2**	**CH4**	**N2O**
Work Boat	Construction Support	75	kW	85.0%	4	California Diesel	4	260	1040	222.33	700.48	0.74	0.26	g/kW-hr	460.23	0.49	0.17	239.3	0.3	0.1

Support Vessel Emissions

Tugboats	Construction Support	186	kW	85.0%	2	California Diesel	4	260	1040	222.33	700.48	0.74	0.26	g/kW-hr	575.28	0.61	0.21	299.1	0.3	0.1
														MAX Daily:	**1035.51**	**1.09**	**0.38**	**538.47**	**0.57**	**0.20**

South Pier and Access Pier Demolition											Emission Factors				Hourly Emission Rates (lb/hr)			Annual Emission Rates (ton/yr)		
Equipment Type	**Operation/Location**	**power rating**	**units**	**Load %**	**No. of units**	**Fuel Type**	**hrs /day**	**Days/ year**	**hrs/ year**	**Fuel Consumption (g/kW-hr)**	**CO2**	**CH4**	**N2O**	**Emission factor units**	**CO2**	**CH4**	**N2O**	**CO2**	**CH4**	**N2O**
Work Boat	Demolition Support	75	kW	85.0%	4	California Diesel	4	78	312	222.33	700.48	0.74	0.26	g/kW-hr	460.23	0.49	0.17	71.8	0.1	0.0
Tugboats	Construction Support	186	kW	85.0%	2	California Diesel	4	78	312	222.33	700.48	0.74	0.26	g/kW-hr	575.28	0.61	0.21	89.7	0.1	0.0
														MAX Daily:	**1035.51**	**1.09**	**0.38**	**161.54**	**0.17**	**0.06**

Abutment											Emission Factors				Hourly Emission Rates (lb/hr)			Annual Emission Rates (ton/yr)		
Equipment Type	**Operation/Location**	**power rating**	**units**	**Load %**	**No. of units**	**Fuel Type**	**hrs /day**	**Days/ year**	**hrs/ year**	**Fuel Consumption (g/kW-hr)**	**CO2**	**CH4**	**N2O**	**Emission factor units**	**CO2**	**CH4**	**N2O**	**CO2**	**CH4**	**N2O**
Work Boat	Construction Support	75	kW	85.0%	4	California Diesel	4	31	124	222.33	700.48	0.74	0.26	g/kW-hr	460.23	0.49	0.17	28.5	0.0	0.0
Tugboats	Construction Support	186	kW	85.0%	2	California Diesel	4	31	124	222.33	700.48	0.74	0.26	g/kW-hr	575.28	0.61	0.21	35.7	0.0	0.0
														MAX Daily:	**1035.51**	**1.09**	**0.38**	**64.20**	**0.07**	**0.02**

Dredging											Emission Factors				Hourly Emission Rates (lb/hr)			Annual Emission Rates (ton/yr)		
Equipment Type	**Operation/Location**	**power rating**	**units**	**Load %**	**No. of units**	**Fuel Type**	**hrs /day**	**Days/ year**	**hrs/ year**	**Fuel Consumption (g/kW-hr)**	**CO2**	**CH4**	**N2O**	**Emission factor units**	**CO2**	**CH4**	**N2O**	**CO2**	**CH4**	**N2O**
Tugboats	Construction Support	186	kW	85.0%	2	California Diesel	4	40	160	222.33	700.48	0.74	0.26	g/kW-hr	575.28	0.61	0.21	46.0	0.0	0.0
														MAX Daily:	**575.28**	**0.61**	**0.21**	**46.02**	**0.05**	**0.02**

Work Days/Week 5

SOURCE:

Load factors based on recommdations in EPA420-R-00-002, Table 5-2, assumed for maneuvering.

Emission Factors from Analysis of Commercial Marine Vessel Emissions and Fuel Consumption Data, USEPA, Feb 2000, EPA420-R-00-002, page 5-3.

Emission factors from AP-42 1.3 for Fuel Oil Combustion - No 6 Oil Industrial Fired Boilers

* VOC emissions are actuallyTHC for Marine Vessels

0.0015	% Sulfur content of the Fuel Oil used in the boiler and main engines,
0.15	% Nitrogen content of the Fuel Oil used for the boilers
0.0015	% Sulfur content of the Fuel Oil used in the boiler and main engines,
0.944	kg/l density of residual oil, from AP-42 Appendix A

Dredging Emissions

				Emission Factors[a]							Emissions			Emission, tons (total)		
Equipment	FUEL	HP	Load Factor	CO2 (g/hp-hr)	CH4 (g/hp-hr)	NOX (g/hp-hr)	N2O (g/hp-hr)	No of Equipment	Hrs Per Day	Days in Service	CO2 lbs/day	CH4 lbs/day	N2O lbs/day	CO2 tons (total)	CH4 tons (total)	N2O tons (total)
Dredging Equipment																
Main genset	DIESEL	2,935	51	5.68E+02	4.80E-02	6.25E+00	5.94E-01	1	8	40	15003.15	1.27	165.00	300.063	0.025	3.300
Aux genset	DIESEL	550	74	5.68E+02	4.80E-02	6.25E+00	5.94E-01	1	8	40	4079.42	0.34	44.86	81.588	0.007	0.897
Spud winch	DIESEL	250	51	5.68E+02	4.80E-02	6.25E+00	5.94E-01	1	8	40	1277.95	0.11	14.05	25.559	0.002	0.281
									TOTAL =		**20360.52**	**1.72**	**223.92**	**407.21**	**0.03**	**4.48**

Assumptions:

Notes:

(a) Emission factors from OFFROAD Model, SDAB, for Dredging Equipment

Work Days/Week 5

Assumptions: Dredge will be similar to the Manson "Valhalla" Clamshell Dredge

Dredge	Engine	Model Year	Max hp	Assumed Hours of Operation per day
Valhalla	Main genset	2000	2,935	18
Valhalla	Aux genset	2000	550	24
Valhalla	Spud winch	2000	250	6

Emissions Summary
Scripps Pier

2014 Emissions	Emission (tons/year)					
	CO	VOC	NOx	SOx	PM10	PM2.5
Scripps Pier Demolition						
Piling Removal	1.32	0.42	3.32	0.00	0.13	0.11
Deck Removal	2.28	0.72	6.07	0.01	0.22	0.20
Asphalt Debris Removal	1.43	0.48	3.24	0.00	0.14	0.12
Demo & Material Transport	1.01	0.32	2.89	0.00	0.10	0.09
Truck Trips	0.08	0.38	0.03	0.00	0.00	0.00
Worker Trips	0.67	0.06	0.04	0.00	0.01	0.00
Support Vessels	0.30	0.03	3.22	0.00	0.08	0.08
Subtotal	**7.08**	**2.41**	**18.81**	**0.03**	**0.68**	**0.61**
Dredging	**1.31**	**0.37**	**4.92**	**0.00**	**0.15**	**0.13**
Total 2014	**8.39**	**2.78**	**23.74**	**0.03**	**0.83**	**0.74**

2015 Emissions	Emission (tons/year)					
	CO	VOC	NOx	SOx	PM10	PM2.5
Scripps Pier Construction						
Piling Installation	0.58	0.17	1.40	0.00	0.05	0.05
Deck Installation	2.86	0.88	6.20	0.01	0.27	0.24
Truck Trips	0.06	0.30	0.03	0.00	0.00	0.00
Worker Trips	1.13	0.10	0.06	0.00	0.01	0.00
Support Vessels	0.59	0.05	6.34	0.00	0.16	0.16
Subtotal	**5.23**	**1.51**	**14.03**	**0.02**	**0.50**	**0.45**
Dredging	**1.31**	**0.37**	**4.92**	**0.00**	**0.15**	**0.13**
Total 2014	**6.54**	**1.88**	**18.95**	**0.02**	**0.64**	**0.59**

2016 Emissions	Emission (tons/year)					
	CO	VOC	NOx	SOx	PM10	PM2.5
Scripps Pier Construction						
Shoreside Excavation	1.23	0.42	2.63	0.00	0.12	0.11
Truck Trips	0.04	0.20	0.02	0.00	0.00	0.00
Worker Trips	0.52	0.05	0.03	0.00	0.00	0.00
Subtotal	**1.80**	**0.66**	**2.68**	**0.00**	**0.13**	**0.11**
Total 2014	**1.80**	**0.66**	**2.68**	**0.00**	**0.13**	**0.11**

Heavy Equipment Pier
Demolition Emissions

Emission Factors											Total Emissions (Metric Tons)					
Equipment	FUEL	HP	CO (lb/hr)	VOC (lb/hr)	NOX (lb/hr)	SOX (lb/hr)	PM10 (lb/hr)	No of Equipment	Hours Per Day	Days in Service	CO	VOC	NOX	SOX	PM10	PM2.5
Piling Removal																
Air Compressor	DIESEL	50	0.255	0.092	0.222	0.00029	0.022	2	4	154	0.157	0.057	0.137	0.000	0.014	0.012
Barge Crane - 250 Ton	DIESEL	399	0.529	0.155	1.423	0.00177	0.052	1	9.5	154	0.387	0.113	1.041	0.001	0.038	0.034
Heavy Truck	DIESEL	489	0.636	0.217	1.787	0.00267	0.063	1	8	154	0.392	0.134	1.100	0.002	0.039	0.035
Wharf Crane - 150 Ton	DIESEL	250	0.529	0.155	1.423	0.00177	0.052	1	9.5	154	0.387	0.113	1.041	0.001	0.038	0.034
											1.32	**0.42**	**3.32**	**0.00**	**0.13**	**0.11**
Deck Removal																
Air Compressor	DIESEL	50	0.255	0.092	0.222	0.00029	0.022	2	4	154	0.157	0.057	0.137	0.000	0.014	0.012
Wheeled Loader	DIESEL	250	0.368	0.126	1.212	0.00168	0.042	1	8	154	0.227	0.078	0.747	0.001	0.026	0.023
Barge Crane - 150 Ton	DIESEL	250	0.529	0.155	1.423	0.00177	0.052	1	9.5	154	0.387	0.113	1.041	0.001	0.038	0.034
Dump Truck	DIESEL	489	0.636	0.217	1.787	0.00267	0.063	1	8	154	0.392	0.134	1.100	0.002	0.039	0.035
Wharf Crane - 150 Ton	DIESEL	250	0.529	0.155	1.423	0.00177	0.052	1	9.5	154	0.387	0.113	1.041	0.001	0.038	0.034
Breakers	DIESEL	320	0.523	0.145	1.519	0.00250	0.049	1	8	154	0.322	0.089	0.935	0.002	0.030	0.027
Concrete Saws	DIESEL	10	0.068	0.020	0.126	0.00021	0.005	4	8	154	0.167	0.049	0.311	0.001	0.012	0.011
Flatbed Truck	DIESEL	210	0.384	0.140	1.237	0.00187	0.041	1	8	154	0.236	0.086	0.762	0.001	0.025	0.023
											2.28	**0.72**	**6.07**	**0.01**	**0.22**	**0.20**
Asphalt Debris Removal																
Air Compressor	DIESEL	50	0.255	0.092	0.222	0.00029	0.022	2	4	154	0.157	0.057	0.137	0.000	0.014	0.012
Dump Truck	DIESEL	489	0.636	0.217	1.787	0.00267	0.063	1	8	154	0.392	0.134	1.100	0.002	0.039	0.035
Barge-Mounted Excavator	DIESEL	320	0.527	0.173	1.476	0.00229	0.052	1	8	154	0.325	0.107	0.909	0.001	0.032	0.028
Generator	DIESEL	45	0.264	0.087	0.285	0.00040	0.023	2	8	154	0.325	0.107	0.351	0.000	0.029	0.026
Wheeled Loader	DIESEL	250	0.368	0.126	1.212	0.00168	0.042	1	8	154	0.227	0.078	0.747	0.001	0.026	0.023
											1.43	**0.48**	**3.24**	**0.00**	**0.14**	**0.12**
Demo & Material Transport																
Wharf Crane - 150 Ton	DIESEL	250	0.529	0.155	1.423	0.00177	0.052	1	9.5	154	0.387	0.113	1.041	0.001	0.038	0.034
Wheeled Loader	DIESEL	250	0.368	0.126	1.212	0.00168	0.042	1	8	154	0.227	0.078	0.747	0.001	0.026	0.023
Dump Truck	DIESEL	489	0.636	0.217	1.787	0.00267	0.063	1	8	154	0.392	0.134	1.100	0.002	0.039	0.035
											1.01	**0.32**	**2.89**	**0.00**	**0.10**	**0.09**
TOTAL											**6.03**	**1.94**	**15.53**	**0.02**	**0.59**	**0.53**

Assumptions:

* Per project schedule, North Segment Demolition occurs in 2012
* Remove utilities, appurtenances, & fenders assumes 42 days.
* Deck Removal assumes 90 days.
* Pier Removal assumes 60 days.

Notes:

(a) Emission factors from http://www.aqmd.gov/ceqa/handbook/offroad/offroad.html, SCAQMD OFFROAD Emission Factors, Years 2012 through 2015

Work Days/Week 5

Access Pier Construction

			Emission Factors								Total Emissions (Tons)					
Equipment	FUEL	HP	CO (lb/hr)	VOC (lb/hr)	NOX (lb/hr)	SOX (lb/hr)	PM10 (lb/hr)	No of Equipment	Hours Per Day	Days in Service	CO	VOC	NOX	SOX	PM10	PM2.5
Piling Installation																
Barge Crane - 150 Ton	DIESEL	250	0.529	0.155	1.423	0.00177	0.052	1	9.5	90	0.226	0.066	0.608	0.001	0.022	0.020
Impact Hammer	DIESEL	250	0.523	0.145	1.519	0.00250	0.049	1	9.5	90	0.224	0.062	0.649	0.001	0.021	0.019
Jet Pump	DIESEL	50	0.312	0.105	0.323	0.00044	0.027	1	9.5	90	0.133	0.045	0.138	0.000	0.012	0.010
											0.58	**0.17**	**1.40**	**0.00**	**0.05**	**0.05**
Deck Installation																
Air Compressor	DIESEL	50	0.255	0.092	0.222	0.00029	0.022	2	8	180	0.367	0.133	0.320	0.000	0.032	0.028
Barge Crane - 150 Ton	DIESEL	250	0.529	0.155	1.423	0.00177	0.052	1	8	180	0.381	0.112	1.025	0.001	0.037	0.033
Concrete Truck	DIESEL	210	0.384	0.140	1.237	0.00187	0.041	1	8	180	0.276	0.101	0.891	0.001	0.030	0.026
Concrete Pump Truck	DIESEL	210	0.384	0.140	1.237	0.00187	0.041	1	8	180	0.276	0.101	0.891	0.001	0.030	0.026
20-Ton Forklift	DIESEL	130	0.726	0.135	1.045	0.00141	0.059	1	8	180	0.522	0.097	0.752	0.001	0.043	0.038
Utility Truck	DIESEL	210	0.384	0.140	1.237	0.00187	0.041	1	8	180	0.276	0.101	0.891	0.001	0.030	0.026
Generator	DIESEL	33	0.264	0.087	0.285	0.00040	0.023	2	8	180	0.380	0.126	0.410	0.001	0.034	0.030
Wharf Crane - 150 Ton	DIESEL	250	0.529	0.155	1.423	0.00177	0.052	1	8	180	0.381	0.112	1.025	0.001	0.037	0.033
											2.86	**0.88**	**6.20**	**0.01**	**0.27**	**0.24**
Shoreside Excavation																
Air Compressor	DIESEL	50	0.255	0.092	0.222	0.00029	0.022	2	8	120	0.244	0.088	0.213	0.000	0.021	0.019
Dump Truck	DIESEL	489	0.636	0.217	1.787	0.00267	0.063	1	8	120	0.305	0.104	0.858	0.001	0.030	0.027
Excavator	DIESEL	320	0.527	0.173	1.476	0.00229	0.052	1	8	120	0.253	0.083	0.709	0.001	0.025	0.022
Wheeled Loader	DIESEL	250	0.368	0.126	1.212	0.00168	0.042	1	8	120	0.177	0.060	0.582	0.001	0.020	0.018
Generator	DIESEL	33	0.264	0.087	0.285	0.00040	0.023	2	8	120	0.253	0.084	0.273	0.000	0.022	0.020
											1.23	**0.42**	**2.63**	**0.00**	**0.12**	**0.11**
Total											**4.68**	**1.47**	**10.23**	**0.01**	**0.45**	**0.40**

Work Days/Week 5

Construction Truck Trips

Construction Phase	Vehicle Class	Daily truck trips	Total No. of Vehicle	Speed (mph)	VMT (mi/vehicle-day)	CO Running Exhaust (g/mi)	NO_X Running Exhaust (g/mi)	VOCs Running Exhaust (g/mi)	SOx Running Exhaust (g/mi)	PM10 Running Exhaust (g/mi)	PM10 Tire Wear (g/mi)	PM10 Brake Wear (g/mi)	PM2.5 Running Exhaust (g/mi)	PM2.5 Tire Wear (g/mi)	PM2.5 Brake Wear (g/mi)	Emissions, lbs/day CO	NOx	VOCs	SOx	PM10	PM2.5	Emissions, tons per year CO	NOx	VOCs	SOx	PM10	PM2.5
Demolition																											
Transport Trucks	Heavy-duty truck, diesel	12	525	15	26	2.69720812	13.036345	1.08537279	0.024	0.14868971	0.035	0.028	0.13679453	0.009	0.012	1.86	8.97	0.75	0.02	0.10	0.02	0.04	0.20	0.02	0.00	0.00	0.00
TOTAL																**1.86**	**8.97**	**0.75**	**0.02**	**0.10**	**0.02**	**0.04**	**0.20**	**0.02**	**0.00**	**0.00**	**0.00**

ASSUMPTIONS:

* Assuming 26 miles round trip per vehicle (distance to Miramar Landfill = 13 miles)
* Assume startup after 8 hours
* Assume 45 minutes run time total
* 2012 Emission Factors from EMFAC2007, average temp 60F

Total truck trips for demolition - 2,000 trips

Construction Phase	Vehicle Class	Daily truck trips	Total No. of Vehicle	Speed (mph)	VMT (mi/vehicle-day)	CO Running Exhaust (g/mi)	NO_X Running Exhaust (g/mi)	VOCs Running Exhaust (g/mi)	SOx Running Exhaust (g/mi)	PM10 Running Exhaust (g/mi)	PM10 Tire Wear (g/mi)	PM10 Brake Wear (g/mi)	PM2.5 Running Exhaust (g/mi)	PM2.5 Tire Wear (g/mi)	PM2.5 Brake Wear (g/mi)	Emissions, lbs/day CO	NOx	VOCs	SOx	PM10	PM2.5	Emissions, tons per year CO	NOx	VOCs	SOx	PM10	PM2.5
Deliveries																											
Transport Trucks	Heavy-duty truck, diesel	12	525	15	40	2.69720812	13.036345	1.08537279	0.024	0.14868971	0.035	0.028	0.13679453	0.009	0.012	0.83	4.02	0.33	0.01	0.05	0.01	0.06	0.30	0.03	0.00	0.00	0.00
TOTAL																**0.83**	**4.02**	**0.33**	**0.01**	**0.05**	**0.01**	**0.06**	**0.30**	**0.03**	**0.00**	**0.00**	**0.00**

ASSUMPTIONS:

* Assuming 40 miles round trip per vehicle
* Assume startup after 8 hours
* Assume 45 minutes run time total
* 2014 Emission Factors from EMFAC2011, average temp 60F

Construction Worker Commute Emission Calculations

Construction Phase	Vehicle Class	No. of Workers Per Construction Phase	Speed (mph)	VMT (mi/vehicle-day)	CO Running Exhaust (g/mi)	CO Start-Up (g/start)*	NO_x Running Exhaust (g/mi)	NO_x Start-Up (g/start)*	VOCs Running Exhaust (g/mi)	Start-Up (g/start)*	Hot-Soak (g/trip)	Resting Loss (g/hr)	Running Evaporative (g/mi)	Diurnal Evaporative (g/hr)	SOx Running Exhaust (g/mi)	SOx Start-Up (g/start)*	PM10 Running Exhaust (g/mi)	PM10 Start-Up (g/start)*	PM10 Tire Wear (g/mi)	PM10 Brake Wear (g/mi)	PM2.5 Running Exhaust (g/mi)	PM2.5 Start-Up (g/start)*	PM2.5 Tire Wear (g/mi)	PM2.5 Brake Wear (g/mi)	Emissions, lbs/day CO	NOx	VOCs	SOx	PM10	PM2.5	Days/year	Emissions, tons per phase CO	NOx	VOCs	SOx	PM10	PM2.5
Scripps Pier Demolition	Light-duty truck, catalyst	30	35	40	2.85109453	8.891	0.27134995	0.429	0.07975433	0.621	0.193	0.024	0.043	0.049	0.004	0.002	0.00369253	0.017	0.008	0.013	0.00337906	0.016	0.002	0.005	8.72	0.77	0.47	0.01	0.07	0.03	154	0.67135	0.059646	0.036383	0.000835	0.005203	0.002277
Pier Construction	Light-duty truck, catalyst	30	35	40	2.85109453	8.891	0.27134995	0.429	0.07975433	0.621	0.193	0.024	0.043	0.049	0.004	0.002	0.00369253	0.017	0.008	0.013	0.00337906	0.016	0.002	0.005	8.72	0.77	0.47	0.01	0.07	0.03	260	1.13345	0.100701	0.061426	0.00141	0.008785	0.003845
Shoreside Excavation	Light-duty truck, catalyst	30	35	40	2.85109453	8.891	0.27134995	0.429	0.07975433	0.621	0.193	0.024	0.043	0.049	0.004	0.002	0.00369253	0.017	0.008	0.013	0.00337906	0.016	0.002	0.005	8.72	0.77	0.47	0.01	0.07	0.03	120	0.52313	0.046477	0.028351	0.000651	0.004054	0.001774

ASSUMPTIONS:

* Assuming 40 miles round trip per vehicle
* Assuming 30 workers per construction phase for
* Assume startup after 8 hours
* Assume 45 minutes run time total
* 2014 Emission Factors from EMFAC2011, average temp 60F

Work Days/Week 5

Support Vessel Emissions

Scripps Pier Demolition											Emission Factors						Hourly Emission Rates (lb/hr)					Annual Emission Rates (ton/yr)				
Equipment Type	**Operation/Location**	**power rating**	**units**	**Load %**	**No. of units**	**Fuel Type**	**hrs /day**	**Days/ year**	**hrs/ year**	**Fuel Consumption (g/kW-hr)**	**PM10**	**NOx**	**CO**	**SO2**	**VOC ***	**Emission factor units**	**CO**	**VOC**	**NOx**	**SO2**	**PM10**	**CO**	**VOC**	**NOx**	**SO2**	**PM10**
Work Boat	Demolition Support	75	kW	85.0%	1	California Diesel	4	154	616	222.33	0.26	10.61	0.99	0.01	0.09	g/kW-hr	0.16	0.01	1.74	0.00	0.04	0.0	0.0	0.5	0.0	0.0
Tugboats	Demolition Support	186	kW	85.0%	2	California Diesel	4	154	616	222.33	0.26	10.61	0.99	0.01	0.09	g/kW-hr	0.81	0.07	8.71	0.01	0.22	0.2	0.0	2.7	0.0	0.1
																MAX Daily:	**0.97**	**0.08**	**10.46**	**0.01**	**0.26**	**0.30**	**0.03**	**3.22**	**0.00**	**0.08**

Scripps Pier Construction											Emission Factors						Hourly Emission Rates (lb/hr)					Annual Emission Rates (ton/yr)				
Equipment Type	**Operation/Location**	**power rating**	**units**	**Load %**	**No. of units**	**Fuel Type**	**hrs /day**	**Days/ year**	**hrs/ year**	**Fuel Consumption (g/kW-hr)**	**PM10**	**NOx**	**CO**	**SO2**	**VOC ***	**Emission factor units**	**CO**	**VOC**	**NOx**	**SO2**	**PM10**	**CO**	**VOC**	**NOx**	**SO2**	**PM10**
Work Boat	Construction Support	75	kW	85.0%	2	California Diesel	4	260	1040	222.33	0.26	10.61	0.99	0.01	0.09	g/kW-hr	0.32	0.03	3.49	0.00	0.09	0.2	0.0	1.8	0.0	0.0
Tugboats	Construction Support	186	kW	85.0%	2	California Diesel	4	260	1040	222.33	0.26	10.61	0.99	0.01	0.09	g/kW-hr	0.81	0.07	8.71	0.01	0.22	0.4	0.0	4.5	0.0	0.1
																MAX Daily:	**1.13**	**0.10**	**12.20**	**0.01**	**0.30**	**0.59**	**0.05**	**6.34**	**0.00**	**0.16**

Dredging											Emission Factors						Hourly Emission Rates (lb/hr)					Annual Emission Rates (ton/yr)				
Equipment Type	**Operation/Location**	**power rating**	**units**	**Load %**	**No. of units**	**Fuel Type**	**hrs /day**	**Days/ year**	**hrs/ year**	**Fuel Consumption (g/kW-hr)**	**PM10**	**NOx**	**CO**	**SO2**	**VOC ***	**Emission factor units**	**CO**	**VOC**	**NOx**	**SO2**	**PM10**	**CO**	**VOC**	**NOx**	**SO2**	**PM10**
Tugboats	Construction Support	186	kW	85.0%	2	California Diesel	4	40	160	222.33	0.26	10.61	0.99	0.01	0.09	g/kW-hr	0.81	0.07	8.71	0.01	0.22	0.1	0.0	0.7	0.0	0.0
																MAX Daily:	**0.81**	**0.07**	**8.71**	**0.01**	**0.22**	**0.06**	**0.01**	**0.70**	**0.00**	**0.02**

Work Days/Week 5

SOURCE:

Load factors based on recommdations in EPA420-R-00-002, Table 5-2, assumed for maneuvering.
Emission Factors from Analysis of Commercial Marine Vessel Emissions and Fuel Consumption Data, USEPA, Feb 2000, EPA420-R-00-002, page 5-3.
Emission factors from AP-42 1.3 for Fuel Oil Combustion - No 6 Oil Industrial Fired Boilers
* VOC emissions are actuallyTHC for Marine Vessels

0.0015	% Sulfur content of the Fuel Oil used in the boiler and main engines,
0.15	% Nitrogen content of the Fuel Oil used for the boilers
0.0015	% Sulfur content of the Fuel Oil used in the boiler and main engines,
0.944	kg/l density of residual oil, from AP-42 Appendix A

Dredging Emissions

				Emission Factors[a]								Emissions						Emission, tons (total)					
Equipment	FUEL	HP	Load Factor	CO (g/hp-hr)	VOC (g/hp-hr)	NOX (g/hp-hr)	SOX (g/hp-hr)	PM10 (g/hp-hr)	No of Equipment	Hrs Per Day	Days in Service	CO lbs/day	VOC lbs/day	NOX lbs/day	SOX lbs/day	PM10 lbs/day	PM2.5 lbs/day	CO tons (total)	VOC tons (total)	NOX tons (total)	SOX tons (total)	PM10 tons (total)	PM2.5 tons (total)
Dredging Equipment																							
Main genset	DIESEL	2,935	51	1.83E+00	5.30E-01	6.25E+00	6.00E-03	1.84E-01	1	8	40	48.31	13.99	165.00	0.16	4.86	4.32	0.966	0.280	3.300	0.003	0.097	0.086
Aux genset	DIESEL	550	74	1.49E+00	4.60E-01	4.80E+00	3.00E-03	1.64E-01	1	8	40	10.70	3.30	34.46	0.02	1.18	1.05	0.214	0.066	0.689	0.000	0.024	0.021
Spud winch	DIESEL	250	51	1.39E+00	4.80E-01	5.23E+00	6.00E-03	1.72E-01	1	8	40	3.13	1.08	11.76	0.01	0.39	0.34	0.063	0.022	0.235	0.000	0.008	0.007
												62.13	**18.37**	**211.22**	**0.19**	**6.42**	**5.72**	**1.24**	**0.37**	**4.22**	**0.00**	**0.13**	**0.11**

Assumptions:

Notes:

(a) Emission factors from OFFROAD Model, SDAB, for Dredging Equipment

Work Days/Week 5

Assumptions: Dredge will be similar to the Manson "Valhalla" Clamshell Dredge

Dredge	Engine	Model Year	Max hp	Assumed Hours of Operation per day
Valhalla	Main genset	2000	2,935	18
Valhalla	Aux genset	2000	550	24
Valhalla	Spud winch	2000	250	6

Emissions Summary
Scripps Pier

2014 Emissions	Emission (metric tons/year)		
	CO2	CH4	N2O
Scripps Pier Demolition			
Piling Removal	345.57	0.03	0.32
Deck Removal	737.14	0.06	0.58
Asphalt Debris Removal	454.95	0.04	0.31
Demo & Material Transport	341.57	0.03	0.27
Truck Trips	40.54	0.00	0.00
Worker Trips	62.78	0.00	0.01
Support Vessels	212.63	0.22	0.08
Subtotal	**2195.17**	**0.39**	**1.56**
Dredging	**407.21**	**0.03**	**4.48**
Total 2014	**2602.38**	**0.42**	**6.04**

2015 Emissions	Emission (metric tons/year)		
	CO2	CH4	N2O
Scripps Pier Construction			
Piling Installation	171.31	0.01	0.13
Deck Installation	687.34	0.07	0.59
Truck Trips	62.37	0.00	0.00
Worker Trips	105.98	0.01	0.01
Support Vessels	418.81	0.44	0.16
Subtotal	**1445.82**	**0.54**	**0.89**
Dredging	**407.21**	**0.03**	**4.48**
Total 2014	**1853.03**	**0.57**	**5.37**

2016 Emissions	Emission (metric tons/year)		
	CO2	CH4	N2O
Scripps Pier Construction			
Shoreside Excavation	365.20	0.04	0.25
Truck Trips	40.54	0.00	0.00
Worker Trips	48.92	0.00	0.00
Subtotal	**454.66**	**0.04**	**0.25**
Total 2014	**454.66**	**0.04**	**0.25**

Heavy Equipment Scripps Pier
Demolition Emissions

Emission Factors										Total Emissions (Metric Tons)		
Equipment	FUEL	HP	CO2 (lb/hr)	CH4 (lb/hr)	NOX (lb/hr)	N2O (lb/hr)	No of Equip ment	Hours Per Day	Days in Service	CO2	CH4	N2O
Piling Removal												
Air Compressor	DIESEL	50	22.271	0.008	0.222	0.02110	2	4	154	13.719	0.005	0.013
Barge Crane - 250 Ton	DIESEL	399	112.159	0.009	1.423	0.13519	1	9.5	154	82.044	0.007	0.099
Heavy Truck	DIESEL	489	272.334	0.020	1.787	0.16972	1	8	154	167.758	0.012	0.105
Wharf Crane - 150 Ton	DIESEL	250	112.159	0.009	1.423	0.13519	1	9.5	154	82.044	0.007	0.099
										345.57	**0.03**	**0.32**
Deck Removal												
Air Compressor	DIESEL	50	22.271	0.008	0.222	0.02110	2	4	154	13.719	0.005	0.013
Wheeled Loader	DIESEL	250	148.977	0.011	1.212	0.11519	1	8	154	91.770	0.007	0.071
Barge Crane - 150 Ton	DIESEL	250	112.159	0.009	1.423	0.13519	1	9.5	154	82.044	0.007	0.099
Dump Truck	DIESEL	489	272.334	0.020	1.787	0.16972	1	8	154	167.758	0.012	0.105
Wharf Crane - 150 Ton	DIESEL	250	112.159	0.009	1.423	0.13519	1	9.5	154	82.044	0.007	0.099
Breakers	DIESEL	320	254.239	0.013	1.519	0.14427	1	8	154	156.611	0.008	0.089
Concrete Saws	DIESEL	10	16.478	0.002	0.126	0.01198	4	8	154	40.601	0.004	0.030
Flatbed Truck	DIESEL	210	166.545	0.013	1.237	0.11754	1	8	154	102.592	0.008	0.072
										737.14	**0.06**	**0.58**
Asphalt Debris Removal												
Air Compressor	DIESEL	50	22.271	0.008	0.222	0.02110	2	4	154	13.719	0.005	0.013
Dump Truck	DIESEL	489	272.334	0.020	1.787	0.16972	1	8	154	167.758	0.012	0.105
Barge-Mounted Excavator	DIESEL	320	233.735	0.016	1.476	0.14025	1	8	154	143.981	0.010	0.086
Generator	DIESEL	45	30.623	0.008	0.285	0.02704	2	8	154	37.728	0.010	0.033
Wheeled Loader	DIESEL	250	148.977	0.011	1.212	0.11519	1	8	154	91.770	0.007	0.071
										454.95	**0.04**	**0.31**
Demo & Material Transport												
Wharf Crane - 150 Ton	DIESEL	250	112.159	0.009	1.423	0.13519	1	9.5	154	82.044	0.007	0.099
Wheeled Loader	DIESEL	250	148.977	0.011	1.212	0.11519	1	8	154	91.770	0.007	0.071
Dump Truck	DIESEL	489	272.334	0.020	1.787	0.16972	1	8	154	167.758	0.012	0.105
										341.57	**0.03**	**0.27**
TOTAL										**1879.23**	**0.16**	**1.47**

Assumptions:

* Per project schedule, North Segment Demolition occurs in 2012
* Remove utilities, appurtenances, & fenders assumes 42 days.
* Deck Removal assumes 90 days.
* Pier Removal assumes 60 days.

Notes:

(a) Emission factors from http://www.aqmd.gov/ceqa/handbook/offroad/offroad.html, SCAQMD OFFROAD Emission Factors, Years 2012 through 2015

Work Days/Week 5

Scripps Pier Construction

Emission Factors										Total Emissions (Tons)		
Equipment	FUEL	HP	CO2 (lb/hr)	CH4 (lb/hr)	NOX (lb/hr)	N2O (lb/hr)	No of Equipment	Hours Per Day	Days in Service	CO2	CH4	N2O
Piling Installation												
Barge Crane - 150 Ton	DIESEL	250	112.159	0.009	1.423	0.13519	1	9.5	90	47.948	0.004	0.058
Impact Hammer	DIESEL	250	254.239	0.013	1.519	0.14427	1	9.5	90	108.687	0.006	0.062
Jet Pump	DIESEL	50	34.335	0.009	0.323	0.03067	1	9.5	90	14.678	0.004	0.013
										171.31	**0.01**	**0.13**
Deck Installation												
Air Compressor	DIESEL	50	22.271	0.008	0.222	0.02110	2	8	180	32.071	0.012	0.030
Barge Crane - 150 Ton	DIESEL	250	112.159	0.009	1.423	0.13519	1	8	180	80.754	0.007	0.097
Concrete Truck	DIESEL	210	166.545	0.013	1.237	0.11754	1	8	180	119.913	0.009	0.085
Concrete Pump Truck	DIESEL	210	166.545	0.013	1.237	0.11754	1	8	180	119.913	0.009	0.085
20-Ton Forklift	DIESEL	130	124.900	0.012	1.045	0.09926	1	8	180	89.928	0.009	0.071
Utility Truck	DIESEL	210	166.545	0.013	1.237	0.11754	1	8	180	119.913	0.009	0.085
Generator	DIESEL	33	30.623	0.008	0.285	0.02704	2	8	180	44.097	0.011	0.039
Wharf Crane - 150 Ton	DIESEL	250	112.159	0.009	1.423	0.13519	1	8	180	80.754	0.007	0.097
										687.34	**0.07**	**0.59**
Shoreside Excavation												
Air Compressor	DIESEL	50	22.271	0.008	0.222	0.02110	2	8	120	21.380	0.008	0.020
Dump Truck	DIESEL	489	272.334	0.020	1.787	0.16972	1	8	120	130.720	0.009	0.081
Excavator	DIESEL	320	233.735	0.016	1.476	0.14025	1	8	120	112.193	0.008	0.067
Wheeled Loader	DIESEL	250	148.977	0.011	1.212	0.11519	1	8	120	71.509	0.005	0.055
Generator	DIESEL	33	30.623	0.008	0.285	0.02704	2	8	120	29.398	0.008	0.026
										365.20	**0.04**	**0.25**
Total										**1223.86**	**0.12**	**0.97**

Work Days/Week 5

Scripps Pier Construction Truck Trips

Construction Phase	Vehicle Class	Daily truck trips	Total No. of Vehicle	Speed (mph)	VMT (mi/vehicle-day)	CO2 Running Exhaust (g/mi)	NO_X Running Exhaust (g/mi)	CH4 Running Exhaust (g/mi)	N2O Running Exhaust (g/mi)	Emissions, lbs/day CO2	Emissions, lbs/day CH4	Emissions, lbs/day N2O	Emissions, metric tons per year CO2	Emissions, metric tons per year CH4	Emissions, metric tons per year N2O
Demolition															
Transport Trucks	Heavy-duty truck, diesel	12	525	15	26	2694.49929	13.036345	0.114	0.024	1853.40	0.08	0.02	40.54	0.00	0.00
TOTAL										**1853.40**	**0.08**	**0.02**	**40.54**	**0.00**	**0.00**

ASSUMPTIONS:

* Assuming 26 miles round trip per vehicle (distance to Miramar Landfill = 13 miles)
* Assume startup after 8 hours
* Assume 45 minutes run time total
* 2012 Emission Factors from EMFAC2007, average temp 60F

Total truck trips for demolition - 2,000 trips

Construction Phase	Vehicle Class	Daily truck trips	Total No. of Vehicle	Speed (mph)	VMT (mi/vehicle-day)	CO2 Running Exhaust (g/mi)	NO_X Running Exhaust (g/mi)	CH4 Running Exhaust (g/mi)	N2O Running Exhaust (g/mi)	Emissions, lbs/day CO2	Emissions, lbs/day CH4	Emissions, lbs/day N2O	Emissions, metric tons per year CO2	Emissions, metric tons per year CH4	Emissions, metric tons per year N2O
Deliveries															
Transport Trucks	Heavy-duty truck, diesel	12	525	15	40	2694.49929	13.036345	0.114	0.024	831.65	0.04	0.01	62.37	0.00	0.00
TOTAL										**831.65**	**0.04**	**0.01**	**62.37**	**0.00**	**0.00**

ASSUMPTIONS:

* Assuming 40 miles round trip per vehicle
* Assume startup after 8 hours
* Assume 45 minutes run time total

Scripps Pier

Construction Worker Commute Emission Calculations

Construction Phase	Vehicle Class	No. of Workers	Speed	VMT	CO2		NOx		CH4		N2O		Emissions, lbs/day				Emissions, tons per phase		
		Per Construction Phase	(mph)	(mi/vehicle-day)	Running Exhaust (g/mi)	Start-Up (g/start)[a]	Running Exhaust (g/mi)	Start-Up (g/start)[a]	Running Exhaust (g/mi)	Start-Up (g/start)[a]	Running Exhaust (g/mi)	Start-Up (g/start)[a]	CO2	CH4	N2O	Days/year	CO2	CH4	N2O
Scripps Pier Demolition	Light-duty truck, catalyst	30	35	40	329.567233	202.414	0.27134995	0.429	0.02	0.035	0.02577825	0.040755	898.67	0.06	0.07	154	62.7753	0.00402	0.00514
Pier Construction	Light-duty truck, catalyst	30	35	40	329.567233	202.414	0.27134995	0.429	0.02	0.035	0.02577825	0.040755	898.67	0.06	0.07	260	105.984	0.00679	0.008679
Shoreside Excavation	Light-duty truck, catalyst	30	35	40	329.567233	202.414	0.27134995	0.429	0.02	0.035	0.02577825	0.040755	898.67	0.06	0.07	120	48.9158	0.00313	0.004006

ASSUMPTIONS:

* Assuming 40 miles round trip per vehicle
* Assuming 30 workers per construction phase for demolition, 60 for pier construction
* Assume startup after 8 hours
* Assume 45 minutes run time total
* 2014 Emission Factors from EMFAC2011, average temp 60F

Work Days/Week 5

Scripps Pier Support Vessel Emissions

Scripps Pier Demolition											Emission Factors				Hourly Emission Rates (lb/hr)			Annual Emission Rates (ton/yr)		
Equipment Type	**Operation/Location**	**power rating**	**units**	**Load %**	**No. of units**	**Fuel Type**	**hrs /day**	**Days/ year**	**hrs/ year**	**Fuel Consumption (g/kW-hr)**	**CO2**	**CH4**	**N2O**	**Emission factor units**	**CO2**	**CH4**	**N2O**	**CO2**	**CH4**	**N2O**
Work Boat	Demolition Support	75	kW	85.0%	1	California Diesel	4	154	616	222.33	700.48	0.74	0.26	g/kW-hr	115.06	0.12	0.04	35.4	0.0	0.0
Tugboats	Demolition Support	186	kW	85.0%	2	California Diesel	4	154	616	222.33	700.48	0.74	0.26	g/kW-hr	575.28	0.61	0.21	177.2	0.2	0.1
														MAX Daily:	**690.34**	**0.73**	**0.26**	**212.63**	**0.22**	**0.08**

Scripps Pier Construction											Emission Factors				Hourly Emission Rates (lb/hr)			Annual Emission Rates (ton/yr)		
Equipment Type	**Operation/Location**	**power rating**	**units**	**Load %**	**No. of units**	**Fuel Type**	**hrs /day**	**Days/ year**	**hrs/ year**	**Fuel Consumption (g/kW-hr)**	**CO2**	**CH4**	**N2O**	**Emission factor units**	**CO2**	**CH4**	**N2O**	**CO2**	**CH4**	**N2O**
Work Boat	Construction Support	75	kW	85.0%	2	California Diesel	4	260	1040	222.33	700.48	0.74	0.26	g/kW-hr	230.11	0.24	0.09	119.7	0.1	0.0
Tugboats	Construction Support	186	kW	85.0%	2	California Diesel	4	260	1040	222.33	700.48	0.74	0.26	g/kW-hr	575.28	0.61	0.21	299.1	0.3	0.1
														MAX Daily:	**805.40**	**0.85**	**0.30**	**418.81**	**0.44**	**0.16**

Dredging											Emission Factors				Hourly Emission Rates (lb/hr)			Annual Emission Rates (ton/yr)		
Equipment Type	**Operation/Location**	**power rating**	**units**	**Load %**	**No. of units**	**Fuel Type**	**hrs /day**	**Days/ year**	**hrs/ year**	**Fuel Consumption (g/kW-hr)**	**CO2**	**CH4**	**N2O**	**Emission factor units**	**CO2**	**CH4**	**N2O**	**CO2**	**CH4**	**N2O**
Tugboats	Construction Support	186	kW	85.0%	2	California Diesel	4	40	160	222.33	700.48	0.74	0.26	g/kW-hr	575.28	0.61	0.21	46.0	0.0	0.0
														MAX Daily:	**575.28**	**0.61**	**0.21**	**46.02**	**0.05**	**0.02**

Work Days/Week 5

SOURCE:

Load factors based on recommdations in EPA420-R-00-002, Table 5-2, assumed for maneuvering.
Emission Factors from Analysis of Commercial Marine Vessel Emissions and Fuel Consumption Data, USEPA, Feb 2000, EPA420-R-00-002, page 5-3.
Emission factors from AP-42 1.3 for Fuel Oil Combustion - No 6 Oil Industrial Fired Boilers
* VOC emissions are actuallyTHC for Marine Vessels

0.0015	% Sulfur content of the Fuel Oil used in the boiler and main engines,
0.15	% Nitrogen content of the Fuel Oil used for the boilers
0.0015	% Sulfur content of the Fuel Oil used in the boiler and main engines,
0.944	kg/l density of residual oil, from AP-42 Appendix A

Scripps Pier Dredging Emissions

				Emission Factors[a]							Emissions			Emission, tons (total)		
Equipment	FUEL	HP	Load Factor	CO2 (g/hp-hr)	CH4 (g/hp-hr)	NOX (g/hp-hr)	N2O (g/hp-hr)	No of Equipment	Hrs Per Day	Days in Service	CO2 lbs/day	CH4 lbs/day	N2O lbs/day	CO2 tons (total)	CH4 tons (total)	N2O tons (total)
Dredging Equipment																
Main genset	DIESEL	2,935	51	5.68E+02	4.80E-02	6.25E+00	5.94E-01	1	8	40	15003.15	1.27	165.00	300.063	0.025	3.300
Aux genset	DIESEL	550	74	5.68E+02	4.80E-02	6.25E+00	5.94E-01	1	8	40	4079.42	0.34	44.86	81.588	0.007	0.897
Spud winch	DIESEL	250	51	5.68E+02	4.80E-02	6.25E+00	5.94E-01	1	8	40	1277.95	0.11	14.05	25.559	0.002	0.281
											20360.52	**1.72**	**223.92**	**407.21**	**0.03**	**4.48**

Assumptions:

Notes:

(a) Emission factors from OFFROAD Model, SDAB, for Dredging Equipment

Work Days/Week 5

Assumptions: Dredge will be similar to the Manson "Valhalla" Clamshell Dredge

Dredge	Engine	Model Year	Max hp	Assumed Hours of Operation per day
Valhalla	Main genset	2000	2,935	18
Valhalla	Aux genset	2000	550	24
Valhalla	Spud winch	2000	250	6

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Appendix H

Traffic Count Data

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Prepared by NDS/ATD

VOLUME

Catalina Blvd S/o Dow St

Day: Tuesday
Date: 5/8/2012

City: San Diego
Project #: CA12_4160_002

DAILY TOTALS	NB	SB	EB	WB	Total
	4,367	3,936	0	0	8,303

AM Period	NB		SB		EB		WB		TOTAL		PM Period	NB		SB		EB		WB		TOTAL	
00:00	0		0						0		12:00	98		83						181	
00:15	1		0						1		12:15	94		92						186	
00:30	1		0						1		12:30	81		105						186	
00:45	0	2	0						0	2	12:45	84	357	94	374					178	731
01:00	0		0						0		13:00	77		73						150	
01:15	0		0						0		13:15	76		78						154	
01:30	0		1						1		13:30	103		76						179	
01:45	1	1	1	2					2	3	13:45	77	333	71	298					148	631
02:00	1		0						1		14:00	94		78						172	
02:15	0		1						1		14:15	98		64						162	
02:30	0		1						1		14:30	122		55						177	
02:45	0	1	0	2					0	3	14:45	85	399	57	254					142	653
03:00	0		0						0		15:00	143		51						194	
03:15	0		2						2		15:15	138		31						169	
03:30	1		0						1		15:30	181		34						215	
03:45	1	2	8	10					9	12	15:45	130	592	44	160					174	752
04:00	1		3						4		16:00	176		42						218	
04:15	1		2						3		16:15	144		25						169	
04:30	3		4						7		16:30	184		39						223	
04:45	1	6	5	14					6	20	16:45	166	670	25	131					191	801
05:00	1		25						26		17:00	152		21						173	
05:15	3		31						34		17:15	104		19						123	
05:30	11		64						75		17:30	86		17						103	
05:45	13	28	106	226					119	254	17:45	87	429	9	66					96	495
06:00	26		83						109		18:00	55		13						68	
06:15	34		121						155		18:15	46		4						50	
06:30	35		135						170		18:30	28		5						33	
06:45	49	144	173	512					222	656	18:45	13	142	7	29					20	171
07:00	39		150						189		19:00	25		2						27	
07:15	67		181						248		19:15	5		2						7	
07:30	62		121						183		19:30	11		0						11	
07:45	56	224	113	565					169	789	19:45	6	47	3	7					9	54
08:00	37		131						168		20:00	7		3						10	
08:15	34		99						133		20:15	2		0						2	
08:30	18		119						137		20:30	7		0						7	
08:45	32	121	79	428					111	549	20:45	5	21	0	3					5	24
09:00	30		92						122		21:00	8		0						8	
09:15	34		74						108		21:15	1		0						1	
09:30	39		58						97		21:30	1		0						1	
09:45	36	139	57	281					93	420	21:45	0	10	1	1					1	11
10:00	47		61						108		22:00	0		1						1	
10:15	60		65						125		22:15	0		1						1	
10:30	73		50						123		22:30	0		0						0	
10:45	64	244	70	246					134	490	22:45	0		1	3					1	3
11:00	122		90						212		23:00	1		0						1	
11:15	106		89						195		23:15	1		0						1	
11:30	111		61						172		23:30	1		0						1	
11:45	113	452	83	323					196	775	23:45	0	3	1	1					1	4
TOTALS		1364		2609						3973	TOTALS		3003		1327						4330
SPLIT %		34.3%		65.7%						47.9%	SPLIT %		69.4%		30.6%						52.1%

DAILY TOTALS	NB	SB	EB	WB	Total
	4,367	3,936	0	0	8,303

AM Peak Hour	11:00	06:30			06:45	PM Peak Hour	16:00	12:00			16:00
AM Pk Volume	452	639			842	PM Pk Volume	670	374			801
Pk Hr Factor	0.926	0.883			0.849	Pk Hr Factor	0.910	0.890			0.898
7 - 9 Volume	345	993	0	0	1338	4 - 6 Volume	1099	197	0	0	1296
7 - 9 Peak Hour	07:00	07:00			07:00	4 - 6 Peak Hour	16:00	16:00			16:00
7 - 9 Pk Volume	224	565	0	0	789	4 - 6 Pk Volume	670	131	0	0	801
Pk Hr Factor	0.836	0.780	0.000	0.000	0.795	Pk Hr Factor	0.910	0.780	0.000	0.000	0.898

Prepared by NDS/ATD

VOLUME

Laning Rd N/o Cushing Rd

Day: Tuesday
Date: 5/8/2012

City: San Diego
Project #: CA12_4160_001

DAILY TOTALS	NB	SB	EB	WB	Total
	3,341	3,191	0	0	6,532

AM Period	NB		SB		EB		WB		TOTAL		PM Period	NB		SB		EB		WB		TOTAL	
00:00	8		2						10		12:00	66		66						132	
00:15	2		3						5		12:15	65		64						129	
00:30	2		1						3		12:30	74		66						140	
00:45	4	16	2	8					6	24	12:45	51	256	52	248					103	504
01:00	3		1						4		13:00	52		51						103	
01:15	1		5						6		13:15	58		36						94	
01:30	1		1						2		13:30	48		47						95	
01:45	3	8	2	9					5	17	13:45	54	212	49	183					103	395
02:00	2		2						4		14:00	54		39						93	
02:15	0		0						0		14:15	60		48						108	
02:30	1		1						2		14:30	67		31						98	
02:45	0	3	1	4					1	7	14:45	81	262	36	154					117	416
03:00	4		2						6		15:00	127		32						159	
03:15	2		1						3		15:15	87		32						119	
03:30	1		3						4		15:30	90		48						138	
03:45	1	8	6	12					7	20	15:45	75	379	41	153					116	532
04:00	3		5						8		16:00	87		42						129	
04:15	2		6						8		16:15	89		43						132	
04:30	1		10						11		16:30	90		42						132	
04:45	5	11	13	34					18	45	16:45	85	351	38	165					123	516
05:00	5		14						19		17:00	71		38						109	
05:15	9		21						30		17:15	66		48						114	
05:30	11		24						35		17:30	70		49						119	
05:45	12	37	52	111					64	148	17:45	54	261	53	188					107	449
06:00	13		71						84		18:00	63		40						103	
06:15	17		77						94		18:15	41		32						73	
06:30	19		81						100		18:30	52		40						92	
06:45	21	70	106	335					127	405	18:45	36	192	40	152					76	344
07:00	25		110						135		19:00	39		20						59	
07:15	23		103						126		19:15	26		32						58	
07:30	35		113						148		19:30	23		23						46	
07:45	34	117	72	398					106	515	19:45	35	123	27	102					62	225
08:00	47		59						106		20:00	37		27						64	
08:15	53		41						94		20:15	21		19						40	
08:30	45		64						109		20:30	21		18						39	
08:45	30	175	54	218					84	393	20:45	16	95	17	81					33	176
09:00	52		42						94		21:00	29		19						48	
09:15	31		34						65		21:15	24		17						41	
09:30	41		42						83		21:30	16		13						29	
09:45	35	159	42	160					77	319	21:45	15	84	14	63					29	147
10:00	37		44						81		22:00	14		8						22	
10:15	28		45						73		22:15	12		14						26	
10:30	38		42						80		22:30	21		13						34	
10:45	48	151	34	165					82	316	22:45	14	61	6	41					20	102
11:00	65		38						103		23:00	13		4						17	
11:15	70		49						119		23:15	20		7						27	
11:30	61		46						107		23:30	8		4						12	
11:45	64	260	54	187					118	447	23:45	9	50	5	20					14	70
TOTALS		1015		1641						2656	TOTALS		2326		1550						3876
SPLIT %		38.2%		61.8%						40.7%	SPLIT %		60.0%		40.0%						59.3%

DAILY TOTALS	NB	SB	EB	WB	Total
	3,341	3,191	0	0	6,532

AM Peak Hour	11:45	06:45			06:45	PM Peak Hour	14:45	12:00			14:45
AM Pk Volume	269	432			536	PM Pk Volume	385	248			533
Pk Hr Factor	0.909	0.956			0.905	Pk Hr Factor	0.758	0.939			0.838
7 - 9 Volume	292	616	0	0	908	4 - 6 Volume	612	353	0	0	965
7 - 9 Peak Hour	07:45	07:00			07:00	4 - 6 Peak Hour	16:00	17:00			16:00
7 - 9 Pk Volume	179	398	0	0	515	4 - 6 Pk Volume	351	188	0	0	516
Pk Hr Factor	0.844	0.881	0.000	0.000	0.870	Pk Hr Factor	0.975	0.887	0.000	0.000	0.977