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ENVIRONMENTAL IMPACT STATEMENT FOR THE MODERNIZATION AND REPAIR OF PIERS 2 AND 3 AT MILITARY OCEAN TERMINAL CONCORD, CA

NOVEMBER 2013

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Draft Environmental Impact Statement for the Modernization and Repair of Piers 2 and 3 at Military Ocean Terminal Concord, CA

Lead Agency for this EIS: Department of the Army, Office of the Secretary of the Army, Washington, D.C.

Title of Proposed Action: Modernization and Repair of Piers 2 and 3 at Military Ocean Terminal Concord (MOTCO)

Proposed Action: To modernize and repair Pier 2 and repair Pier 3 in order to fully meet current and future mission requirements

Designation: Draft Environmental Impact Statement (EIS)

Abstract: The proposed action is to modernize and repair Pier 2 and repair Pier 3 at MOTCO to meet current and future mission requirements. Piers 2 and 3 are past their structural and design life and lack modern operational efficiencies. Based on the analysis described in the EIS, all impacts are anticipated to be less than significant. The proposed action, however, will include implementation of avoidance and minimization measures for potential impacts to federally listed species and critical habitat within the proposed action area. These measures will be further refined during ongoing consultations with the National Marine Fisheries Service and U.S. Fish and Wildlife Service.

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EXECUTIVE SUMMARY

The Army has prepared this Environmental Impact Statement (EIS) to assess the potential environmental and socioeconomic impacts associated with those actions necessary to modernize and repair Pier 2 and repair Pier 3 at Military Ocean Terminal Concord (MOTCO) to support fully MOTCO's current and future mission requirements through 2019. This EIS was prepared in accordance with the National Environmental Policy Act (NEPA) (42 United States Code 4321 *et seq.*); its implementing regulations (40 Code of Federal Regulations [CFR] Parts 1500–1508), the Army's regulations implementing NEPA (32 CFR Part 651 as published in *Federal Register*, Volume 67, Pages 15290–15332), and, to the extent applicable, the California Environmental Quality Act (California Public Resources Code, Section 21000 *et seq*). The Army is the lead agency for the proposed action; there is no cooperating agency (per 40 CFR Section 1501.6) for the EIS.

MOTCO is an Army Military Surface Deployment and Distribution Command (SDDC) munitions and general cargo transshipment facility located at a strategic site in north central Contra Costa County, California (Figure ES-1). This Department of Defense (DOD) installation is the primary West Coast common-user ammunition terminal and is home to the SDDC's 834th Transportation Battalion. MOTCO is in the East San Francisco Bay region, approximately 10 nautical miles inland past the Carquinez Strait that connects Suisun Bay to San Pablo Bay. San Francisco is 30 miles to the southwest, Oakland is 20 miles to the southwest, Sacramento is 65 miles to the northeast, and the City of Concord is located approximately 5 miles south.

As an installation, MOTCO represents 72 percent of all DOD West Coast ammunition handling ability. To fulfill its mission, it utilizes three wharves (known as Piers 2, 3, and 4) (Figure ES-2). Together, these piers have 13.9 million (M) pounds (lbs) of net explosive weight handling capability. The piers are timber structures that were built between 1944 and 1945 to support ammunition movements to the Pacific theater during World War II (1939–1945; WWII). Each of the piers was constructed with a main deck plus raised platform along the waterside length of the pier. This dual-level pier design and the rail track layout at the piers were originally designed for a non-containerized handling operation. Since MOTCO primarily accommodates containerized cargo (system of transport using containers), the current configuration is suboptimal in terms of usable space for forklifts and container handling equipment to move about; this decreases the efficiency of the baseline cargo handling operations. Timber waterfront structures typically have a design life on average of 25 to 30 years and a practical service life of 50 years or more with routine maintenance, repairs, and upgrades. Both Piers 2 and 3 are almost 70 years old and have exceeded both the design life and practical service life of a typical waterfront timber structure.

Figure ES-1. Regional Location

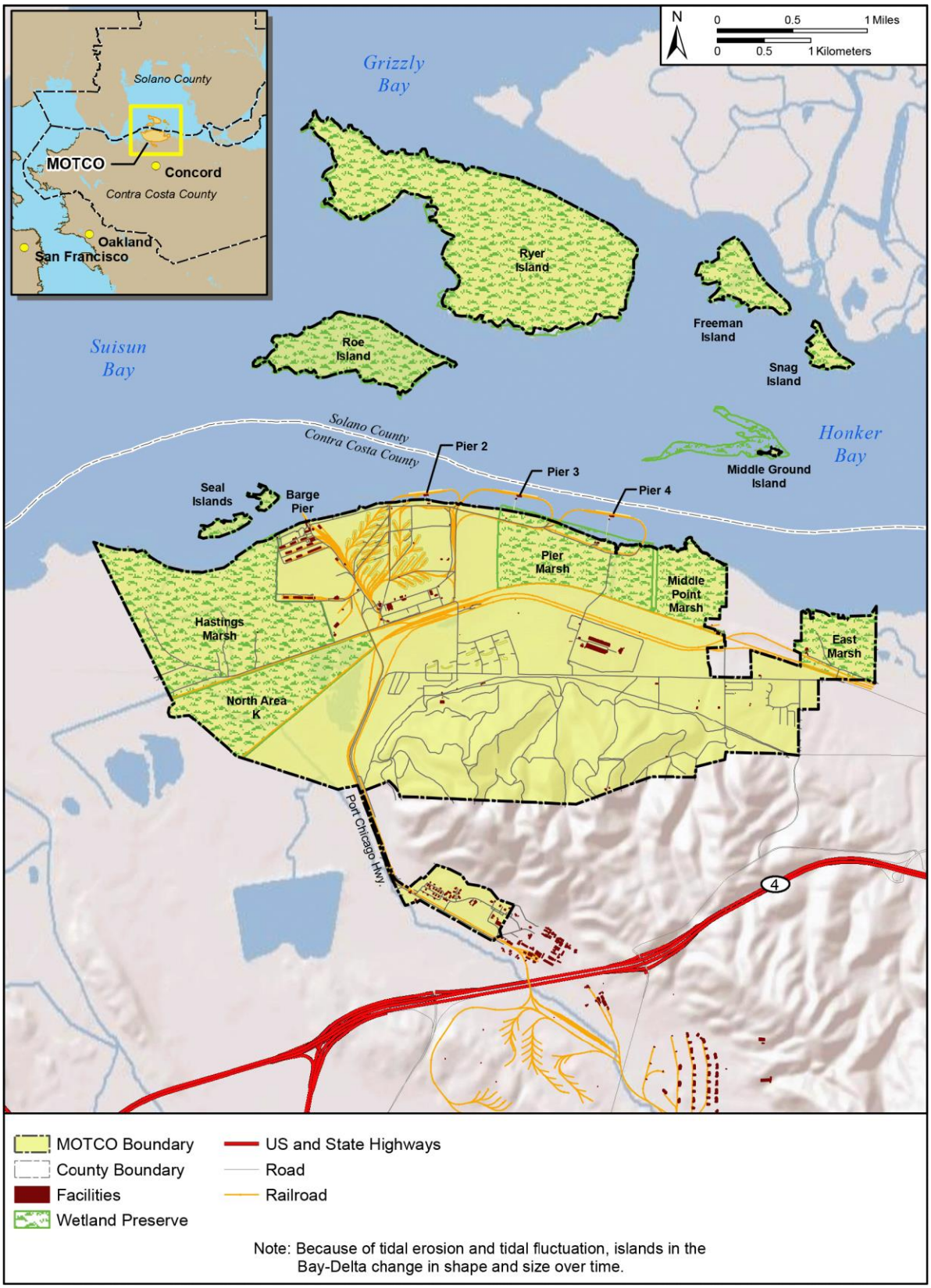

Figure ES-2. MOTCO Property

Pier 2 is the westernmost of three main piers and has a total net explosive weight capability of 8.2M lbs. At Pier 2, cargo is loaded and unloaded using ship's gear. The productivity of each vessel varies, but ships gear is typically less efficient than ship-to-shore gantry cranes (specialized pier cranes for handling intermodal containers). Extensive study has documented deterioration due to a combination of marine borer damage, fungal decay, and overloading. Pier 2 is in poor condition, is currently inoperable, and requires major rehabilitation and modernization in order to function to current containerization standards. In addition, the existing Pier 2 exit has a sharp turn and vehicles must travel at slower speeds than typically needed to ensure safe operations.

Pier 3 is currently the primary operational pier at MOTCO. Pier 3 is equipped with two gantry cranes that were installed in 1999. These cranes have a lifting capacity of 40 long tons (89,600 lbs) with the use of a spreader bar and 50 long tons (112,000 lbs) with the use of slings. Each crane is limited to approximately 12–15 lifts per hour. Pier 3 has a net explosive weight capability of 4.6M lbs. The pier is in fair condition overall but with localized areas of severe deterioration, wide-spread marine borer damage, and fungal decay. Work at the pier is subject to loading restrictions. Recent engineering assessments estimate that it has approximately 6 years of practical service life remaining.

ES.1 Purpose and Need

The purpose of the proposed action is to modernize and repair Piers 2 and 3 so the Army can maintain its ability to meet documented DOD mission requirements in support of wartime and contingency operations. Piers 2 and 3 are past their structural and design life and lack modern operational efficiencies. In its current degraded and nonoperational condition, Pier 2, the optimum operational pier for mission capability, cannot be utilized and Pier 3, currently the primary operational pier at MOTCO, requires some level of repair to maintain even its limited operational capability through 2019. The proposed action is therefore needed to modernize and repair pier infrastructure at MOTCO to ensure that this vital West Coast port can continue to meet its designated mission. Without these actions, the DOD's ability to perform its current and future contingency operations in the Pacific theater would be impacted.

ES.2 Proposed Action and Alternatives

The proposed action is to modernize and repair Piers 2 and 3 to meet current and future mission requirements at MOTCO. The intent of the proposed action is to provide the installation with safe, functional, and efficient facilities. The proposed action has five distinct components.

1. Partially demolish existing Pier 2 and rebuild structural elements.
2. Replace pier-side infrastructure and supporting facilities at Pier 2.
3. Upgrades shore-side roads and electrical infrastructure in the immediate vicinity of Piers 2 and 3.
4. Remove and replace/repair piles and selected structural elements at Pier 3.

5. Conduct maintenance dredging to -32 feet mean lower low water (MLLW) plus 2 feet overdepth dredging to compensate for inaccuracies in the dredging operation.

The EIS addresses the following alternatives.

- **Alternative 1**: Fully implement repairs to Piers 2 and 3 with Pier 2 re-oriented to align the west end with the existing shipping channel to create a more modernized configuration.
- **Alternative 2**: Fully implement repairs to Piers 2 and 3 leaving the Pier 2 footprint in its present location. Alternative 2 would use the same structural system as Alternative 1.
- **Alternative 3**: Fully implement repairs to Piers 2 and 3, reorienting Pier 2 to create a more modernized configuration but with a larger deck surface and heavier load-carrying capacity than that proposed under Alternative 1.
- **No Action Alternative**: Make no repairs to Pier 2 or 3 and continue to utilize Pier 3 with loading restrictions for the remainder of its service life.

In an effort to document what would be involved with the proposed action, the Army prepared constructability memoranda for Piers 2 and 3, as well as a concept design report for Pier 2. A summary of the results of these efforts is provided in the following sections for Piers 2 and 3, respectively. These are elements of the proposed action that are common to all the action alternatives.

ES.2.1 Overview of Piers 2 Repairs and Modernization

Pier 2 was built using creosote-treated timber in 1944 and has a footprint of approximately 211,065 square feet (SF). A 15-foot wide concrete apron (the area from which cargo is lifted) was added to the waterside of the main deck in 1966. This portion of the deck has twin 18-inch piles every 24 feet, with a concrete pile cap beam and a concrete slab on top. In 1966, a concrete approach trestle was added to the east side of Pier 2. The fender system along the north end of the main pier structure at Pier 2 was upgraded in 2002. The upgrade involved removing the timber fender and driving new 16-inch square concrete piles every 8 feet for the length of the pier. There are 118 fender piles and each pile is approximately 70 feet long.

The existing pier has two levels, including a main deck and a platform level, which interferes with efficient container handling. Modernization of Pier 2 would require the replacement of the existing dual-level deck and fender system with a single-level deck, replacement of existing wooden piles with pre-stressed concrete piles, installation of new crane rails, and the addition of two 80-long-ton container cranes. The west trestle approach would be demolished and extended and the east trestle would be extended, repaired, and upgraded. A third access trestle would be used to accommodate forklifts and provide pedestrian access to a new Operations Building / Breakroom after the existing Operations Building / Breakroom is demolished. Pier-side supporting facilities including mooring hardware, office space, removable bull-rail, potable water,

sanitary sewer, fire protection, lightning protection, and high mast lighting would be repaired or replaced. Existing antiterrorism/force protection (AT/FP) measures would be reinstalled or replaced. A drainage system and treatment device would be added to the pier to remove contaminants from surface runoff before it enters Suisun Bay. Refer to Figure ES-3 for a general Pier 2 site plan.

ES.2.2 Demolition of Pier 2 and Two Buildings

The total estimated area for demolition is 159,000 SF of pier structure, which includes the removal of approximately 4,500 creosote-treated timber piles ranging from 55 to 75 feet long and 254 concrete square piles (136 18-inch square piles from the concrete apron and 118 16-inch square piles from the fender system) approximately 70 feet long. (It is anticipated many of the concrete piles could be reused.) In addition to pile removal, demolition would include removing 1,300 cubic yards (CY) of concrete slab; 200 tons of reinforcing steel; 1,550 timber pile cap beams; 112,500 feet of stringers; 13,500 decking boards; and 1,895 CY of asphalt. In addition to these items, there are various utility hangers, steel fasteners, sprinklers, risers, fender frames and camels, hose connections, circuit breakers, electrical cables, and other miscellaneous components that would be removed.

As part of the proposed action, Buildings A-21 and 160, totaling 6,358 SF, would be demolished. Building A-21 is a 5,782 SF structure built in 1944 and used as an office / battery charging area. Building 160 is a 576 SF structure built in 1965 and used as a steam plant. Prior to demolition, an inspection would be conducted by a qualified inspector to determine the presence of any toxic materials. These materials would be removed prior to demolition in accordance with federal and state law. Following the removal of any toxic materials, the structures would be demolished. The materials would be transported to a previously identified staging/stockpile area where the pieces would be stockpiled and processed for recycling, salvage, or landfill disposal; or, if more appropriate, the semi-truck would transport the pieces directly to an appropriate recycling, salvage, or landfill.

According to the February 2012 Pier 2 Routine Inspection Report, the main platform and west trestle are in seriously degraded condition and it cannot be assumed the structure could adequately support heavy equipment. Therefore, as much as possible, the demolition would be conducted from the water. In very shallow water and intertidal areas, demolition crews would use either smaller equipment that can be operated safely from the pier or amphibious equipment that can work from the adjacent mud substrate. Land-based equipment and a bin to contain the demolished materials could be used at the shoreward ends of the approaches.

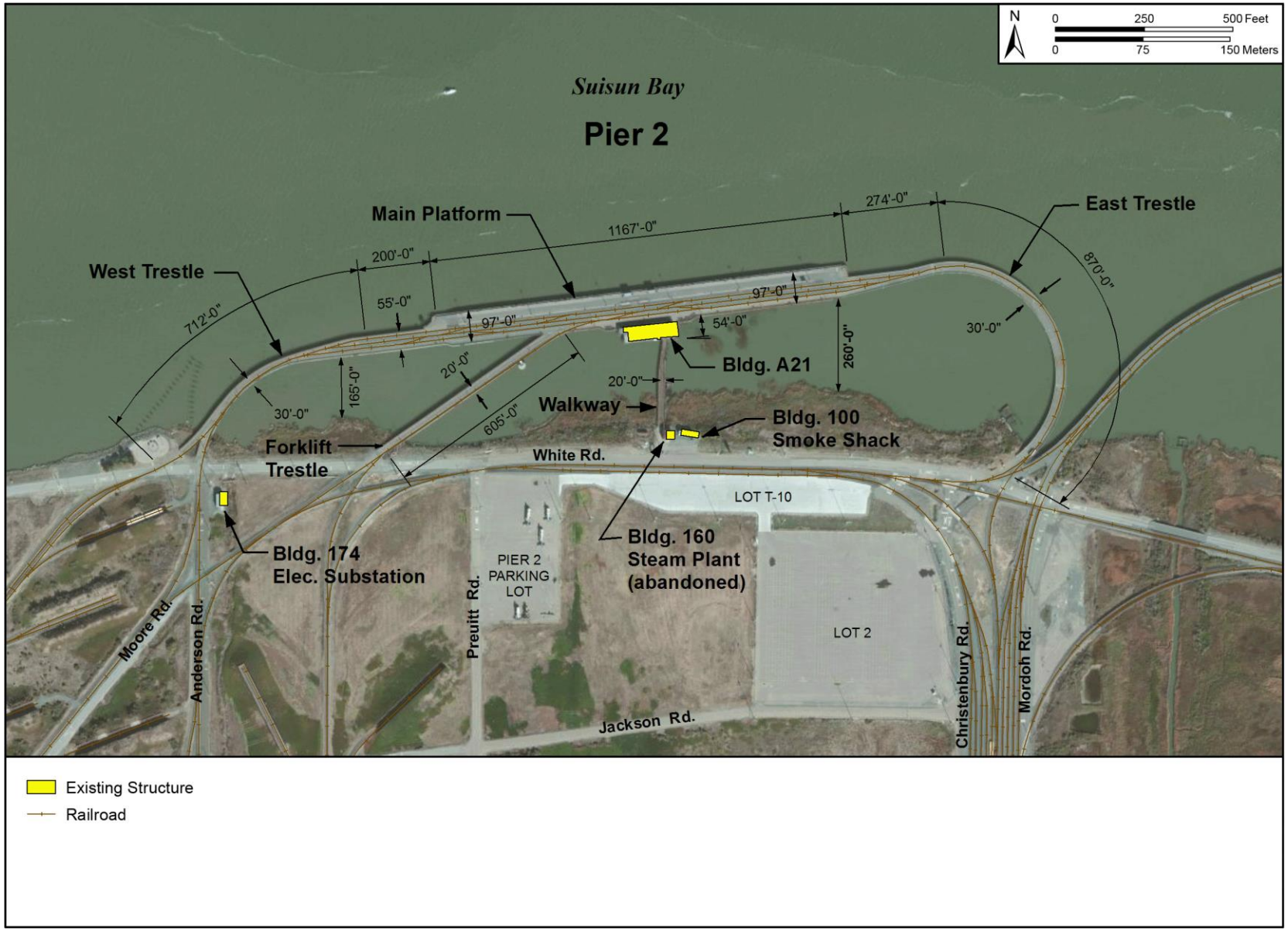

Figure ES-3. Pier 2 – General Site Plan

During demolition activities, the Barge Pier located west of Pier 2 would be used to transfer equipment and materials from land to water and vice versa. According to a February 2012 inspection report, the Barge Pier does not have a compromised load rating so it would suffice for this purpose (KCI Technologies 2012). The main effect of water-based demolition is the demolition materials would be handled one additional time: when demolished material is offloaded from the barges and reloaded onto trucks at the Barge Pier.

All demolition equipment, mostly excavators with various attachments, would be mounted on barges and brought to the work area by a small tug. Small sections of the deck and superstructure would be cut off and placed on a transport barge that would be used to move the materials to shore by tug. Another excavator would be located on the Barge Pier and would transfer the demolished deck pieces into a semi-truck, which would transport the pieces to a previously identified staging/stockpile area to be stockpiled and processed for recycling, salvage, or landfill disposal. If more appropriate, the semi-truck would transport the pieces directly from the Barge Pier to an appropriate recycling, salvage, or landfill facility.

Crews would begin work at one end of the pier, likely the western end, and move along the length of the structure. Deck removal and pile removal would occur at roughly the same location and pace, so that clear, open water is left as work progresses eastward (this would assist with maintaining control of the debris while decreasing the amount of debris boom required around the active demolition area). Debris booms would be placed around the work area in accordance with best management practices.

Personnel in skiffs, or small boats, would continually ferry workers from the barge to shore and monitor the water to keep it clear of floating debris. Railroad rails would be placed on flatbed trucks for hauling to either a recycling facility or a salvage yard. It is anticipated that the utility lines, pipes, conduits, and other miscellaneous metal would be hauled to the same metal recycling facility as the rails.

Asphalt would be removed from the decking using an excavator with a special scraping attachment. The asphalt would be placed in an 18-CY capacity end-dump truck and hauled to an asphalt recycling facility or appropriate disposal facility. The decision on whether the asphalt would be recycled or not would depend on the condition of the asphalt and how cleanly it comes off of the wood decking boards.

The piles would be removed either with a vibratory hammer or by direct pull with a crane. The operator will be trained to remove the pile slowly and as much as possible to avoid pinching, twisting, or breaking the pile. Depending on the embedment, the use of a high-pressure water jet may be required to loosen or remove mud keeping some of the piles stuck in place. Any falling debris would be contained using tarps and a floating boom. If a timber pile breaks, every effort would be made to cleanly pull out the remainder of the pile or stub. If the entire pile cannot

be removed, it would be cut at least 2 feet below the mudline using pneumatic shears or an underwater chainsaw, so that the broken tip is not exposed.

Similar to the timber pier superstructure, removed timber piles would be placed on a barge, unloaded at the Barge Pier, and taken to onsite stockpile area for cutting and reloading onto trucks for ultimate disposal. The concrete piles not suitable for recycling would be loaded onto a barge and delivered to shore to be broken into smaller pieces and hauled to a recycling facility. It is anticipated many of the square concrete piles could be reused; therefore, these piles would be stockpiled onsite at an existing staging area.

The concrete apron structure would be removed using two excavators working together, one using shears or a vibratory point and the other holding a skip box attachment to catch the concrete pieces as they are broken off. The concrete debris would be loaded onto a barge, brought to shore, transferred to an end-dump truck, and hauled either to an onsite stockpile area or directly to a recycling facility.

The stockpile area would be worked by two pieces of equipment: a loader and an excavator. The excavator would separate the different types of materials and cut them into manageable sizes. The loader would take demolished materials off the semi-truck from the Barge Pier and place them into piles for the excavator, and then load the trucks for offsite disposal and/or recycling.

At the peak of demolition operations, there would be up to four excavators or a mix of excavators and cranes working (two or three mounted on barges, one at the Barge Pier transferring materials to shore, and one cutting debris into manageable pieces in the stockpile area), about two to eight trucks per day hauling material away from the site, one tug boat moving the two barges around, and two skiffs managing the debris boom and shuttling crew members between barges and shore.

The number of off-installation truck trips per day would depend on the activity being conducted. It is estimated, however, that there would be a total of 1,300–1,350 truck trips (round trips) during demolition, amounting to 8–12 round trips per day.

During demolition, it is anticipated there would be 10–20 workers at the job site every day. It is expected the workers would park at the parking lot near Gate 1 and be shuttled to the work site.

ES.2.3 Modernization and Repair of Pier 2 and White Road Infrastructure Improvements

The modernized Pier 2 would require driving up to 1,064 new 24-inch octagonal pre-stressed concrete piles and up to 150 reused square concrete piles and installing up to 22,000 CY of concrete and 3,300 tons of reinforcing steel. The concrete piles would be driven by a Delmag Pile Hammer D62-22 or equivalent. In addition, shore-side construction and improvements would include construction of a 1,500 SF Operations Building / Breakroom, installation of a new 12-kilovolt electrical substation and two 1500-kilowatt diesel emergency generators to support

container cranes, expansion of the staging area at Lot T-10 by 39,500 SF, repairs to White Road, and realignment of the road network servicing the pier to adjust to the new access points. Building 100 would be moved from its present location on the north side of White Road to the Pier 2 parking area south of White Road. Measures to improve AT/FP would include installation of bollards waterside of the pier and security lighting throughout the area. Erosion of the shoreline west of Pier 2 would also be addressed.

Construction would proceed from west to east, following behind the demolition work. Pile driving could begin as soon as there is sufficient space behind the demolition equipment to maneuver the barge-mounted pile driving derrick. Assuming a pile driving rate of one pile every two hours (or four to five piles per day), the construction would proceed at a rate of about one bent (a substructure unit supporting each end of a span) per day (bents are at 24-foot spacing). Bents on the main deck are 20 feet apart; thus, the main deck would proceed at a rate of one bent every two days for the 95-foot deck and every three days for the 131-foot deck.

Once the piles have been driven, the formwork (or mold) could be built up around them beginning with the pile cap beams. This work is performed by pile driver personnel using hand tools with assistance from a derrick barge and electrical power. The contractor would likely form two sets of pile cap beams at a time. Once the first set of pile caps have been poured with concrete and cured, the deck slab above those pile caps can be formed. While the concrete on the first set of pile cap beams is curing, the second set —would be formed and poured. The formwork for each pile cap and deck section can then be reused in a leapfrog fashion.

As soon as a section of formwork is completed, the workers would lay out the reinforcing steel to prepare for concrete pouring. A derrick barge would be needed to lower falsework (a temporary structure used to support the structure during construction) support members and rebar to workers on the deck. Once the formwork and rebar are in place, the section would be ready for concrete. The concrete would be brought in using 9 CY cement mixer trucks from a nearby batch plant. A concrete pump would be used to transfer the concrete from the trucks to the formed section.

Construction would begin with the west trestle, followed by the forklift/pedestrian trestle and the four light platforms. Pile driving for the main deck would begin as soon as the piles for the light platforms have been driven and would proceed from west to east. Work on the east trestle can begin once the main deck piles are complete, while the deck is being poured and after the utilities and crane rails are installed.

The road leading to the west trestle would be widened to allow for a safe turn radius for trucks entering the pier from White Road. In addition to the road work at the trestle entrances, the shoreline rock revetment along White Road would be repaired.

The existing Lot T-10 would be expanded by 39,500 SF on the western end to allow for additional room for handling containers. A new electrical substation would be constructed on

shore at the existing Pier 2 employee parking lot. Approximately 8,000 SF of concrete pad would be constructed as the foundation for the new electrical substation, backup generators, and Building 100. The Lot T-10 expansion work would start at the beginning of the project, and the White Road upgrade work would occur after completion of the west trestle construction.

To accommodate night missions, four high-mast light poles (with high pressure sodium or similar floodlights) would be constructed approximately 50 feet behind the back of the pier. These light poles would be provided with maintenance-friendly lowering devices to allow for flood light replacement from the pole platform. Shields would be used to aim the lights downward to confine the directed light to the Tidal Area (i.e., prevent unwanted light from illuminating the sky and adjacent properties).

Under the proposed action, a segment of White Road between Johnson Road to 3,000 feet east of Murdoh Road would be repaired. Repairs would cover approximately 0.9 acres of existing roadway and embankment and include removing and replacing 8,500 linear feet of asphalt and base materials to a width of 20 feet, and repainting roadway stripes. The demolition of the existing road would generate approximately 12,000 CY of recyclable materials (e.g., concrete, gravel, dirt) that would be used at the installation as road base for future road repairs. The White Road profile would be redesigned for improved drivability and to conform better with existing railroad crossings. The planned construction would provide yellow, non-reflective centerline striping and white, non-reflective edge striping 10 feet on either side of the centerline. The completed road would also include compacted shoulders providing edge support for pavement and grade to drain.

Due to the age and poor condition of existing utilities infrastructure within the Tidal Area, various upgrades are planned to include replacing existing transformers, panel boards, junction boxes, and burying existing overhead power lines. The potential area of disturbance includes the transformers and panel boards on Pier 3, as well as a segment of electrical equipment along White Road between the east trestle of Pier 2 and the west trestle of Pier 4. Under the proposed action, the existing 100 SF pad-mounted transformer (oil filled) would be replaced with a new four-way switch and pad-mounted transformer. In order to bury the existing overhead power lines, a trench measuring approximately 4 feet deep by 2 feet wide would be excavated from the utility poles located at the east trestle of Pier 2 and the west trestle of Pier 4 (i.e., approximately 3,510 feet long) to approximately 5 feet into the west bound lane of White Road. (Wetlands would be avoided during trenching.) The power lines would be buried within the existing roadway of White Road and then the affected portions of White Road would be repaired. Prior to project completion, the area would be restored to appropriate native habitat, which would include proper grading for drainage.

During construction, the number of workers onsite would vary depending on how many activities are occurring at the time. For example, the pile driving derrick would require at least 7 workers, the crew doing the formwork would have up to 8 workers, and the crew pouring would have up

to 12 workers. When all three construction activities are occurring concurrently, there would be at least 30 workers at the site (in addition to any crew associated with the demolition of Pier 2). It is expected the workers would park at the parking lot near Gate 1 and be shuttled to the work site.

ES.2.4 Pier 3 Repairs

Pier 3 was constructed in 1944 as an all timber structure. In the 1960s it was modified with the addition of a 15-foot concrete apron extension on the waterside of the pier and concrete approach trestle on the east side. Pier 3 was modified again in 1999 with the addition of concrete crane rail girders on both the waterside and the landside of the main platform to support two new container gantry cranes and shore-side electrical support structures (Figure ES-4).

Pier 3 is in need of repairs to be able to maintain its limited operational capability through 2019. (For the purpose of this EIS, use of Pier 3 beyond 2019 is speculative.) The most notable repairs would be to protect up to 4,066 timber piles that are becoming infested by marine borers. Other proposed maintenance repairs include fixing cracks and spalls (surface chips) in the concrete structure, replacing decayed or missing wooden components and corroded hardware on the timber structure, replacing broken or missing utility hangers, filling potholes and cracks in the asphalt overlays, and shimming non-bearing piles.

To extend the useful life of Pier 3 until Pier 2 is ready for missions, non-reactive high-density polyethylene (HDPE) jackets would be installed around the timber piles. The jackets, or wraps, would protect the piles from further marine borer attack. The marine borer infestation has been increasing in association with the increasing salinity level in Suisun Bay, which creates a more favorable habitat for the marine organism. It is estimated that approximately 190 timber piles at Pier 3 already have wraps installed that would need to be removed and upgraded to the new HDPE jacket system. As part of the installation process, water would be used to clean existing piles to remove rotted portions and any marine or biological growth from the pile. The HDPE pile wrap would be installed 2 feet above the highest tide level down to 2 feet below the mudline.

Approximately 10–12 workers would be associated with the above-deck general maintenance repairs and 25 workers (assuming five teams of five divers each) would be associated with the pile wrapping. Therefore, the number of workers at the Pier 3 job site would total approximately 35–37.

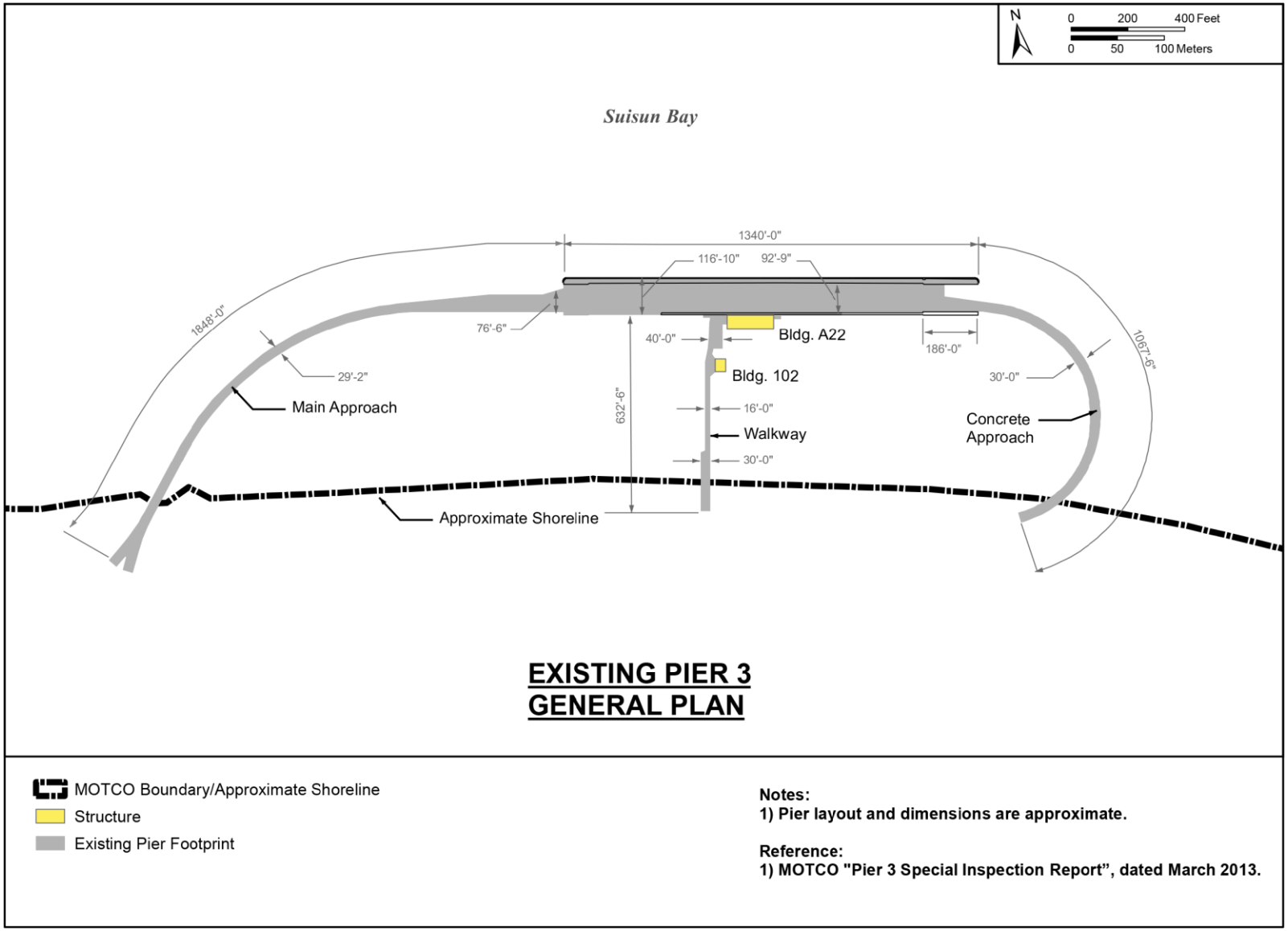

Figure ES-4. Pier 3 – General Site Plan

ES.2.5 Maintenance Dredging

Maintenance dredging is dredging performed on a regular basis; since 1943, Piers 2, 3, and 4 have been dredged nearly 20 times. Dredging was typically performed using a clamshell method to -32 feet MLLW at Piers 2, 3, and 4; -14 feet MLLW at the Barge Pier and east lighter mooring; and -22 feet MLLW at the west lighter mooring (USACE 1975). Since 1943, a total of 1.8 M CY of dredged material has been removed from the former Naval Weapons Station Seal Beach Detachment Concord (now MOTCO) (USACE 1975; 1995). Under the proposed action, maintenance dredging adjacent to Pier 2 to a depth of -32 feet MLLW plus 2 feet overdepth is proposed. No dredging is needed adjacent to Pier 3.

ES.2.6 Comparison of Major Components of Pier 2 Action Alternatives

Table ES-1 provides a comparison of the major components of Pier 2 action alternatives.

Table ES-1. Comparison of Pier 2 Alternatives

Project Element	Alternative 1	Alternative 2	Alternative 3
Waterside Construction			
Pier	95,000 SF (95 ft x 1,000 ft)	95,000 SF (95 ft x 1,000 ft)	157,200 SF (131 ft x 1,200 ft)
Loading Capacity	600 PSF	600 PSF	1,000 PSF
Change in Footprint from Existing Pier 2	-27,222 SF	-27,081 SF	+35,354 SF
Change in West Trestle Size from Existing Pier 2	-989 SF	-2,734 SF	+7,006 SF
24” Octagonal Pre-stressed Concrete Piles	876	868	1,064
16” and 18” Square Concrete Piles (Reused from Pier 2)	125	125	150
Concrete	14,338 CY	14,213 CY	21,948 CY
Wharf Reinforcing Steel	2,150 Tons	2,132 Tons	3,292 Tons
Container Cranes	(2) 80 LT/80 Gage	(2) 80 LT/80 Gage	(2) 80 LT/100 Gage
Crane Rail	2,000 LF	2,000 LF	2,400 LF
Train Rails	0 (Removed)	0 (Removed)	8,000 LF
Rubber Blocking for Fender System	1,000 LF	1,000 LF	1,200 LF
Camel Log for Fender System	1,000 LF	1,000 LF	1,200 LF
Metal Guardrails	4,156	4,056	4,156
Guardrail Posts	706	688	706
Operations Office/Break Room	1,500 SF	1,500 SF	1,500 SF
Light Platform Catwalk (Timber)	4	4	4
Security Lights (100 ft steel poles with 10 lights each)	4	4	4
Oil/Water Separator	Yes	Yes	Yes
Closed-Circuit Television	Yes	Yes	Yes
Lightning Protection	Yes	Yes	Yes
Dredging	750 CY	3,800 CY	1,450 CY

Table ES-1. Comparison of Pier 2 Alternatives

Project Element	Alternative 1	Alternative 2	Alternative 3
Waterside Demolition			
Creosote-Treated Timber Piles	4,514	4,514	4,514
Concrete 18” Apron Piles	136	136	136
Concrete 16” Fender Piles	118	118	118
Timber Pile Caps	1,549 LF	1,549 LF	1,549 LF
Concrete Pile Caps	63 CY	63 CY	63 CY
Pile Cap Blocks	660 LF	660 LF	660 LF
Bracing	2,850 LF	2,850 LF	2,850 LF
Stringers	5,623 LF	5,623 LF	5,623 LF
Concrete Girder	402 CY	402 CY	402 CY
Columns	624 LF	624 LF	624 LF
Wooden Curb	240 LF	240 LF	240 LF
Concrete Bullrail	171 CY	171 CY	171 CY
Guard Rail	3,870 LF	3,870 LF	3,870 LF
Guard Posts	650	650	650
Wood Decking Boards	160,000 SF	160,000 SF	160,000 SF
Concrete Decking	648 CY	648 CY	648 CY
Asphalt Deck Overlay	122,800 SF	122,800 SF	122,800 SF
Train Rails	12,925 LF	12,925 LF	12,925 LF
Piping for Utilities	12,235 LF	12,235 LF	12,235 LF
Mooring Gear (Bollards, Bitts, Cleats)	21	21	21
Steel Splices	250	250	250
Sheet Pile	84 LF	84 LF	84 LF
Concrete Fire Wall	14,637 SF	14,637 SF	14,637 SF
Timber Fire Wall	3,859 SF	3,859 SF	3,859 SF
Light Poles	22	22	22
Building A-21	5,782 SF	5,782 SF	5,782 SF
Landside Construction			
Improve White Road	31,500 SF	31,500 SF	31,500 SF
Improve West Approach	11,500 SF	11,500 SF	11,500 SF
Lot T-10 Expansion	39,500 SF	39,500 SF	39,500 SF
Electrical Substation	12 KV	12 KV	12 KV
Sewage Lift Station	Yes	Yes	Yes
Diesel Generators	(2) 1,500 KW	(2) 1,500 KW	(2) 1,500 KW
Concrete Pads	8,000 SF	8,000 SF	8,000 SF
Power Line Burial	7,020 SF	7,020 SF	7,020 SF
Move Building 100	Yes	Yes	Yes
Landside Demolition			
Abandoned Pumping Station	1	1	1
Building 160	576 SF	576 SF	576 SF

Notes: CY = cubic yards; ft = feet; KV= kilovolt; KW = kilowatt; LF = linear feet; LT = long ton; NA = not applicable; PSF = pounds per square foot; SF = square feet

ES.2.7 Construction Timeframe and Staging Areas

Repairs to Pier 3 are expected to be done in advance of work at Pier 2. Repairs to Pier 3 could begin as early as 2014 and would be completed within 13 months of continuous construction; this timeframe includes 7 weeks for above water work (general repairs) and 47 weeks for in-water work.

It is anticipated that the demolition and reconstruction of Pier 2, including all waterside and landside elements of the modernization effort, would commence as early as 2016. The demolition would take nearly 7 months and construction would take nearly 24 months. The construction timeframe assumes that four to five piles could be driven per day, the access trestle would proceed at a rate of one bent per day, and the main deck would proceed at a rate of one bent every two days for the 95-feet deck and every three days for the 131-feet deck. Assuming some potential to overlap, the Army estimates the total project duration would be 27 continuous months. If the project begins the first quarter of 2016, it is estimated the project could be completed in the second quarter of 2018.

The staging areas (lay-down, equipment, and material) have been identified as E-61, E-61/E-85, and E-85. These 11.06 contiguous acres of land are bounded on the north by Shaner Road, the south by Robinson Road, the east by Born Road, and the west by Johnson Road. These areas are currently used as staging lots for cargo and equipment. In order to make these staging areas acceptable for use, it is anticipated the lots would need various levels of upgrades to potentially include being graded, compacted, and resurfaced prior to use. Additional lots for storage of equipment on a day-to-day basis during repair, construction, and demolition activities would include existing lots located near Pier 2 with prior coordination with MOTCO.

ES.3 Preferred Alternative

The EIS analyzes three action alternatives and the No Action Alternative. Based on a thorough review of the alternatives, the Army has determined Alternative 1 to be its Preferred Alternative. Alternative 1 accomplishes all of the basic requirements for modernizing Pier 2 and re-orients the pier to provide more efficient access for the types of vessels that use the pier. No changes in the number of loading and unloading missions executed at MOTCO would occur under the proposed action; therefore, there would continue to be approximately five missions at MOTCO per year with each mission event totaling approximately 36 days of port operations activity.

Factors that influenced selection of Alternative 1 as the Preferred Alternative included impact analysis presented in the EIS and the operational flexibility afforded by rotating the new pier so the west end is approximately 48 feet further into deeper waters. Alternative 1 would result in a 989-SF reduction of the west trestle and a net decrease in the overall pier facility footprint of about 27,222 SF, which would result in an overall reduction in the overwater footprint that covers shallow water habitats. In conclusion, Alternative 1 was selected as the Preferred

Alternative because it meets the purpose and need of the proposed action, and balances environmental impacts with operational flexibility.

ES.4 Environmental Consequences

A summary of environmental consequences for all alternatives analyzed in this EIS is provided in Table ES-2.

ES.5 Public Comment on the EIS

The U.S. Environmental Protection Agency published a Notice of Availability in the *Federal Register* for the Draft EIS on November 22, 2013. The Draft EIS was circulated for review and comment by elected officials, government agencies, and the interested public. The Draft EIS was made available for general review at the Concord Public Library, 2900 Salvio Street, Concord, CA 94519 and at the Bay Point Library, 205 Pacifica Avenue, Bay Point, CA 94565. A public meeting will be held near MOTCO during the review period on December 18, 2013 between 5:30 p.m. and 8:30 p.m. in the Riverview Middle School Multipurpose Room, 205 Pacifica Avenue, Bay Point, CA 94565. Following public review of the Draft EIS, comments will be considered and integrated into the Final EIS, which will be distributed for public review. Following release of the Final EIS, the Army will then make a determination on how to implement the proposed action based, in part, on the analysis provided in the Final EIS. This determination will be made public in a Record of Decision.

Table ES-2. Summary of Impacts

Resource	Alternative 1	Alternative 2	Alternative 3	No Action
Earth Resources	• No impacts to geology, or seismology. • Negligible impacts to topography. • Minor adverse impacts to soil and sediments. • Existing management programs such as best management practices would continue and minimize adverse impacts.	• Same as Alternative 1.	• Same as Alternative 1.	• No impacts to geology, seismology, or topography. • Minor erosional damage to the existing rock revetment adjacent to Pier 2 west trestle would potentially result in long-term adverse impacts.
Water Resources	• No adverse impacts to hydrology or floodplains. • No net loss of wetlands. • Temporary moderate adverse impacts to water quality. • Standard erosion and sedimentation controls, spill prevention plans, and Stormwater Pollution Prevention Plan would minimize adverse impacts to water quality.	• Same as Alternative 1.	• Same as Alternative 1.	• No impacts to hydrology, wetlands, or floodplains. • Potential moderate to severe adverse impacts to water quality.
Air Quality	• Minor air emissions associated with repairs, demolition, and construction activities would not affect air quality. • A general conformity determination is not	• Same as Alternative 1.	• Same as Alternative 1.	• Minor beneficial impact to regional air quality.

Resource	Alternative 1	Alternative 2	Alternative 3	No Action
	required.			
Biological Resources	• Repairs, demolition, and construction would occur in previously developed areas. • No loss of Riverine / Palustrine wetlands; net gain of 0.041 acres of estuarine intertidal wetlands; net gain of 0.781 acres of estuarine subtidal habitat; and net loss of 0.219 acres of upland habitat. Therefore, minor adverse impact to terrestrial and wetland vegetation. • Slight, localized, and temporary increase in turbidity would result in a minor adverse impact to aquatic vegetation. • No adverse impacts to reptiles and amphibians; minor, temporary adverse impacts to invertebrates, essential fish habitat, and mammals; and moderate, temporary adverse impacts to fish. • No adverse effects to migratory birds anticipated; standard avoidance and minimization measures would be incorporated into the project to protect migratory birds.	• Same as Alternative 1, but: – Net gain of 0.041 acres of estuarine intertidal wetlands; net gain of 0.551 acres of estuarine subtidal habitat; and net loss of 0.219 acres of upland habitat.	• Same as Alternative 1, but: – Net gain of 0.041 acres of estuarine intertidal wetlands; net loss of 1.113 acres of estuarine subtidal habitat; and net loss of 0.219 acres of upland habitat.	• Long-term adverse impacts to habitats would occur from release of polycyclic aromatic hydrocarbons. • No adverse impacts to flora, fauna, or special status species.

Resource	Alternative 1	Alternative 2	Alternative 3	No Action
	• May affect, and is likely to adversely affect, the following species under the purview of the National Marine Fisheries Service: southern green sturgeon, Central California Coast steelhead Distinct Population Segment (DPS) and Central Valley Steelhead DPS, Central Valley spring-run Chinook salmon Evolutionary Significant Unit (ESU), and Sacramento River winter-run Chinook salmon ESU. • May affect, and is likely to adversely affect, the following species under the purview of the U.S. Fish and Wildlife Service: delta smelt, California clapper rail, and salt marsh harvest mouse. • May affect, but is not likely to adversely affect, the following species under the purview of the U.S. Fish and Wildlife Service: soft bird's beak and California least tern.			
Land Use and Coastal Zone Management	• No adverse impacts to land use. • Consistency, to the maximum extent practicable, with the Bay	• Same as Alternative 1.	• Same as Alternative 1.	• Current land use pattern would not change from existing conditions; however, onsite activities would lessen in frequency over the long

Resource	Alternative 1	Alternative 2	Alternative 3	No Action
	Conservation and Development Commission (BCDC) coastal management program. • When Pier 2 design is funded, the project would be routed through BCDC's Engineering Criteria Review Board to ensure compliance with the seismic engineering criteria.			term.
Transportation and Utilities Infrastructure	• Negligible short-term construction traffic impacts associated with repairs, demolition, and construction activities; no changes to area mass transit; and negligible impacts to rail transport and water transport. • Demand for utilities infrastructure would be within infrastructure capacity and negligible impacts are anticipated to sanitary sewer, natural gas, potable water, electricity, and telecommunications; and minor adverse impacts to solid waste.	• Same as Alternative 1.	• Same as Alternative 1.	• No adverse impacts anticipated.
Visual Resources	• Negligible impacts anticipated.	• Same as Alternative 1.	• Same as Alternative 1.	• Existing conditions would remain.
Recreational Resources	• Minor, short-term adverse impacts	• Same as Alternative 1.	• Same as Alternative 1.	• Existing conditions would remain.

Resource	Alternative 1	Alternative 2	Alternative 3	No Action
	associated with potential access restrictions to the Port Chicago Naval Magazine Memorial and navigable waters of Suisun Bay. • Long-term beneficial impacts associated with more efficient pier operations.			
Noise	• Minor, short-term adverse impacts.	• Same as Alternative 1.	• Same as Alternative 1.	• Noise would be generated as under existing conditions, but the noise generated would decline in proportion to the number of missions.
Socioeconomics and Environmental Justice	• No change in short- or long-term population, employment, income, or housing. • Spending for repairs, demolition, and construction activities not expected to result in noticeable regional economic impacts. • No disproportionate high and adverse human health or environmental effects on minority and low-income populations. • No disproportionate environmental health and safety risks to children.	• Same as Alternative 1.	• Same as Alternative 1.	• Existing socioeconomic conditions would continue. • No disproportionate environmental justice impacts to minority or low-income populations, or impacts that would adversely impact children's health and safety.

Resource	Alternative 1	Alternative 2	Alternative 3	No Action
Cultural Resources	• The Port Chicago Naval Magazine National Memorial would continue to operate and would not be affected. • The Port Chicago Naval Magazine Explosion Site and potential submerged cultural resources at MOTCO would not be affected. • No effects to historic properties would occur.	• Same as Alternative 1.	• Same as Alternative 1.	• The Port Chicago Naval Magazine National Memorial would continue to operate and would not be affected. • The Port Chicago Naval Magazine Explosion Site and potential submerged cultural resources at MOTCO would not be affected. • No effects to historic properties would occur.
Hazardous Materials, Hazardous Waste, Toxic Substances, and Contaminated Sites	• Established procedures for the management of hazardous materials would be followed during repair, demolition, and construction activities; therefore, negligible impacts are anticipated. • Established procedures for the management of hazardous waste would be followed during repair, demolition, and construction activities; therefore, negligible impacts are anticipated. • Prior to demolition, surveys would be conducted for toxic substances (asbestos-containing materials, lead-based paint, polychlorinated biphenyls, and mercury); all toxic substances	• Same as Alternative 1.	• Same as Alternative 1.	• Existing programs for management of hazardous materials, hazardous waste, toxic substances, and contaminated sites would continue.

Resource	Alternative 1	Alternative 2	Alternative 3	No Action
	would be removed and properly disposed and negligible impacts are anticipated. • Munitions and explosives of concern explosive risk may still be present in the subsurface around Piers 2 and 3. The contractor would follow all scheduling, coordination, security, safety, permitting, and other matters pertinent to work accomplishment in accordance with Department of Defense (DOD) Manual 6055.09, *DOD Ammunition and Explosives Safety Standards*. In addition, the contractor would be required to prepare, submit, and follow other safety plans including an unexploded ordnance (UXO) Anomaly Avoidance Plan / UXO Support During Construction Activities Plan; Environmental Protection Plan; and Quality Control Plan, Hazard Analysis, and Safety/Health Plan. Therefore, impacts associated with the Military Munitions Response Program site are considered minor.			

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ACRONYMS AND ABBREVIATIONS

AAP	Army Ammunition Plant
ACHP	Advisory Council on Historic Preservation
ACM	asbestos-containing materials
AD	Army Depot
AOR	Area of Responsibility
APE	area of potential effects
ARPA	Archaeological Resources Protection Act
AST	aboveground storage tank
AT/FP	Antiterrorism/Force Protection
ATCM	Airborne Toxic Control Measure
BA	Biological Assessment
BAAQMD	Bay Area Air Quality Management District
BART	Bay Area Rapid Transit
BCDC	Bay Conservation and Development Commission
BDCP	Bay-Delta Conservation Plan
BLM	Bureau of Land Management
BMP	best management practices
BNSF	Burlington Northern Santa Fe
BO	Biological Opinion
BRT	Biological Review Teams
CAA	Clean Air Act
CARB	California Air Resources Board
CARE	Community Action for Renewed Environment
CCAA	California Clean Air Act
CCR	California Code of Regulations
CCWD	Contra Costa Water District
CDFW	California Department of Fish and Wildlife
CDPR	California Department of Pesticide Regulation
CDWR	California Department of Water Resources
CEQ	Council on Environmental Quality
CEQA	California Environmental Quality Act
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CNDDB	California Natural Diversity Database
CNPS	California Native Plant Society
CO	carbon monoxide
CWA	Clean Water Act
CY	cubic yard
CZMA	Coastal Zone Management Act
dB	decibel
dBA	decibel, A-weighted
dB_{peak}	peak sound pressure level
dB re1µPa	dB, referenced to a pressure of 1 micropascal
dB_{RMS}	Root Mean Square pressure level
DDT	dichlorodiphenyl trichloroethane
DERP	Defense Environmental Restoration Program
DMMO	Dredge Material Management Office
DNL	Day Night Average Sound Level
DO	Dissolved Oxygen
DOD	Department of Defense
DODX	DOD-owned rail cars
DOGGR	Division of Oil, Gas, and Geothermal Resources
DPS	Distinct Population Segments
DPW	Department of Public Works
EA	Environmental Assessment
ECM	Environmental Compliance Manager
EEZ	exclusive economic zone
EFH	Essential Fish Habitat
EIR	Environmental Impact Report
EIS	Environmental Impact Statement
EJIP	Environmental Justice Implementation Plan
EMFAC	Emission Factor
EO	Executive Order
EOD	Explosive Ordnance Disposal
ESA	Endangered Species Act
ESQD	explosive safety quantity-distance
ESU	Evolutionarily Significant Units
FEMA	Federal Emergency Management Agency

FICUN	Federal Interagency Committee on Urban Noise
FIFRA	Federal Insecticide, Fungicide, and Rodenticide Act
FMP	Fisheries Management Plan
FS	Feasibility Study
FY	Fiscal Year
GHG	greenhouse gases
GIS	geographic information system
GWP	Global Warming Potential
HAP	Hazardous Air Pollutants
HAPC	Habitat Areas of Particular Concern
HDPE	high density polyethylene
HM	hazardous materials
HMMP	Hazardous Material Management Program
HSP	Habitat Suitability Probability
HW	hazardous waste
HWMP	Hazardous Waste Management Plan
ICRMP	Integrated Cultural Resources Management Plan
INRMP	Integrated Natural Resources Management Plan
IRP	Installation Restoration Program
lb	pound
LBP	lead-based paint
LID	low impact development
LOS	level of service
LTM	long-term management
LUC	Land Use Control
M	millions
MEC	munitions and explosives of concern
MHHW	mean higher high water
MLLW	mean lower low water
MMPA	Marine Mammal Protection Act
MMRP	Military Munitions Response Program
MOA	memorandum of agreement
MOTCO	Military Ocean Terminal Concord
MOTSU	Military Ocean Terminal Sunny Point
MOU	memorandum of understanding
MRS	Munitions Response Site
MSAT	Mobile Source Air Toxics
MSL	mean sea level
MTC	Metropolitan Transportation Commission
MWP	Montezuma Wetlands Project
N_2O	nitrous oxide
NAVFAC SW	Naval Facilities Engineering Command Southwest
NAVMAG	Naval Magazine
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NESHAP	National Emission Standards for Hazardous Air Pollutants
NFH	National Fish Hatchery
NHPA	National Historic Preservation Act
nm	nautical mile
NMFS	National Marine Fisheries Service
NO_2	nitrogen dioxide
NOAA	National Oceanic and Atmospheric Administration
NOI	Notice of Intent
NO_X	nitrogen oxides
NPDES	National Pollutant Discharge Elimination System
NPS	National Park Service
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NSR	New Source Review
NWI	National Wetland Inventory
NWSSBD	Naval Weapons Station Seal Beach Detachment
O_3	ozone
OHSSPRP	Oil and Hazardous Substance Spill Prevention and Response Plan
OSHA	Occupational Safety and Health Administration
OSIP	Off-Site Street Improvement Program
Pa	Pascal
PA	Preliminary Assessment

PAHs	polycyclic aromatic hydrocarbons
PCB	polychlorinated biphenyls
PFMC	Pacific Fishery Management Council
PG&E	Pacific Gas and Electric Company
$PM_{2.5}$	particulate matter less than or equal to 2.5 microns aerodynamic diameter
PM_{10}	particulate matter less than or equal to 10 microns aerodynamic diameter
ppb	parts per billion
ppm	parts per million
POL	petroleum, oil, and lubricants
POV	privately owned vehicles
ppt	parts per thousand
PSF	pounds per square foot
RA	Remedial Action
RC	Response Complete
RCRA	Resource Conservation and Recovery Act
RD	Remedial Design
REC	Record of Environmental Consideration
re1µPa^2*sec	referenced to a pressure of 1 micropascal squared second
RI	Remedial Investigation
RIP	Remedy in Place
ROD	Record of Decision
RONA	Record of Non-Applicability
RPMP	Real Property Master Plan
SAP	Satellite Accumulation Points
SAV	submerged aquatic vegetation
SC	Site Closeout
SDDC	Surface Deployment and Distribution Command
SEL	Sound Exposure Level
SF	square feet/square foot
SFBRWQCB	San Francisco Bay Regional Water Quality Control Board
SFEI	San Francisco Estuary Institute
SHPO	State Historic Preservation Officer
SI	Site Inspection
SIP	State Implementation Plan
SO_2	sulfur dioxide
SOP	standard operating procedure
SPCC	Spill Prevention, Control, and Countermeasures Plan
SWPPP	Stormwater Pollution Prevention Plan
TEU	twenty foot equivalent unit
TMDL	Total Maximum Daily Load
TNT	trinitrotoluene
TOC	total organic carbon
TSCA	Toxic Substances Control Act
TRANS BN	Transportation Battalion
TWW	treated wood waste
µg/m^3	microgram per cubic meter
UPRR	Union Pacific Railroad
USACE	U.S. Army Corps of Engineers
USC	United States Code
USEPA	U.S. Environmental Protection Agency
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
UST	underground storage tank
UXO	unexploded ordnance
VOCs	volatile organic compounds
VPR	visibility-reducing particles
WRCB	Water Resources Control Board
WWII	World War II

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1.0 INTRODUCTION

This Environmental Impact Statement (EIS) assesses the potential environmental and socioeconomic impacts associated with those actions necessary to modernize and repair Pier 2 and repair Pier 3 at Military Ocean Terminal Concord (MOTCO) to support fully MOTCO's current and future mission requirements. This document, which is required by the National Environmental Policy Act (NEPA), provides a comprehensive review of the actions required to modernize and repair these waterfront facilities in order to meet the projected mission capacity of MOTCO through 2019. Tiered and supplemental analysis will occur for actions beyond 2019 and for any actions not fully analyzed within the current scope of the proposed action.

Numerous engineering evaluations have identified serious structural deficiencies present at Piers 2 and 3 that must be addressed in order to continue to meet the installation's current mission demands as well as ensure uninterrupted mission capacity to meet future requirements.

This EIS evaluates the following in detail:

- Alternative 1: Fully implement repairs to Piers 2 and 3 with Pier 2 re-oriented to align the west end with the existing shipping channel to create a more modernized configuration.
- Alternative 2: Fully implement repairs to Piers 2 and 3 leaving the Pier 2 footprint in its present location. Alternative 2 would use the same structural system as Alternative 1.
- Alternative 3: Fully implement repairs to Piers 2 and 3, reorienting Pier 2 to create a more modernized configuration but with a larger deck surface and heavier load-carrying capacity than that proposed under Alternative 1.
- No Action Alternative: Make no repairs to Piers 2 or 3 and continue to utilize Pier 3 with loading restrictions for the remainder of its service life.

Pier 2 was built in 1944 with treated timber piles. In-water modernization of this pier includes construction of a single-level deck using concrete piles with new crane rails and two container cranes. Shore-side modernization in support of the operation of Pier 2 would include upgrades to the road network and electrical infrastructure in the immediate vicinity of the piers.

1.1 INSTALLATION DESCRIPTION AND CURRENT SITUATION

MOTCO is an Army Military Surface Deployment and Distribution Command (SDDC) munitions and general cargo transshipment facility located at a strategic site in north central Contra Costa County, California (Figure 1-1). This Department of Defense (DOD) installation is the primary West Coast common-user ammunition terminal and is home to the SDDC's 834th Transportation Battalion (TRANS BN). MOTCO is in the East San Francisco Bay region, approximately 10 nautical miles inland past the Carquinez Strait that connects Suisun Bay to San Pablo Bay. San Francisco is 30 miles to the southwest, Oakland is 20 miles to the southwest, Sacramento is 65 miles to the northeast, and the City of Concord is located approximately 5 miles south.

Figure 1-1. Regional Location

The installation is composed of an approximately 115-acre administrative complex and an approximately 6,526-acre Tidal Area. For the purposes of this EIS, the administrative complex is referred to as the Inland Area. The Inland Area and the Tidal Area are connected by a road running parallel and west of Port Chicago Highway. The Tidal Area includes all three piers, staging and transfer facilities, as well as 2,045 acres in offshore islands (Figure 1-2).

Two public rail lines, Union Pacific Railroad (UPRR) and Burlington Northern Santa Fe (BNSF), traverse the Tidal Area and interconnect with MOTCO rail lines.

MOTCO installation property was formerly owned by the Department of the Navy as part of Naval Weapons Station Seal Beach Detachment (NWSSBD) Concord (Figure 1-3). On 1 October 2008, MOTCO properties were transferred from the Navy to the Army per 2005 Defense Base Closure and Realignment Commission recommendations. The Army's presence at MOTCO dates back to 1 October 1997, when the Army's 1302nd Major Port Command was relocated from the Oakland Army Base to MOTCO and became the 834th TRANS BN. The City of Concord has been recognized as the Local Reuse Authority for the approximately 5,028 acres of former NWSSBD Concord lands that were determined surplus. MOTCO is one of five designated primary strategic ports in California and is the larger of two ammunition ports on the West Coast.

As an installation, MOTCO represents 72 percent of all DOD West Coast ammunition handling ability. To fulfill its mission, it utilizes three wharves (known as Piers 2, 3, and 4). Together they have 13.9 million (M) pounds (lbs) of net explosive weight handling capability. The net explosive weight handling capability relates to the Explosive Safety Quantity Distance (ESQD) arcs. The ESQD arcs establish separation distances from explosives to nearby structures and areas where non-related personnel (i.e., nonessential personnel) could be present. The ESQD arcs are used to ensure the safety of people and property (Figure 1-4).

A wharf is a landing place or platform built into the water or along the shore for the berthing of vessels. A pier is a landing place or platform built into the water, either perpendicular or oblique to the shore, for the berthing of vessels. While Piers 2, 3, and 4 are technically wharves, they are often referred to as piers. For the purposes of this EIS, they will be referred to as piers.

All of MOTCO's three piers are timber structures that were built between 1944 and 1945 to support ammunition movements to the Pacific theater during World War II (1939–1945; WWII). Each of the piers was constructed with a main deck plus raised platform along the waterside length of the pier. This dual-level pier design and the rail track layout at the piers were originally designed for a non-containerized handling operation. Since MOTCO primarily accommodates containerized cargo (system of transport using containers), the current configuration is suboptimal in terms of usable space for forklifts and container handling equipment to move about, which decreases the efficiency of the baseline cargo handling operations. Timber waterfront structures typically have a design life on average of 25 to 30 years and a practical service life of 50 years or more with routine maintenance, repairs, and upgrades.

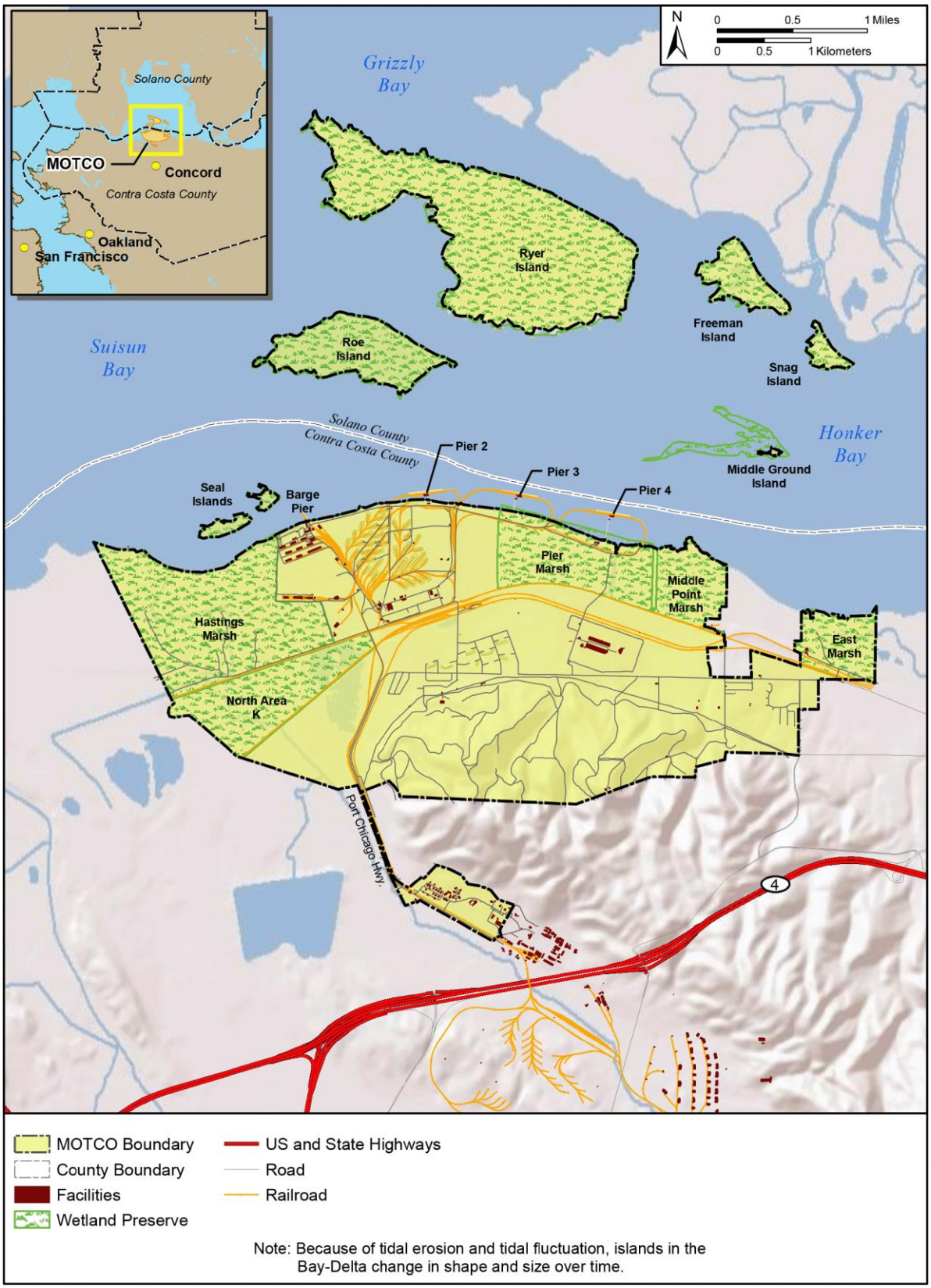


Figure 1-2. MOTCO Property

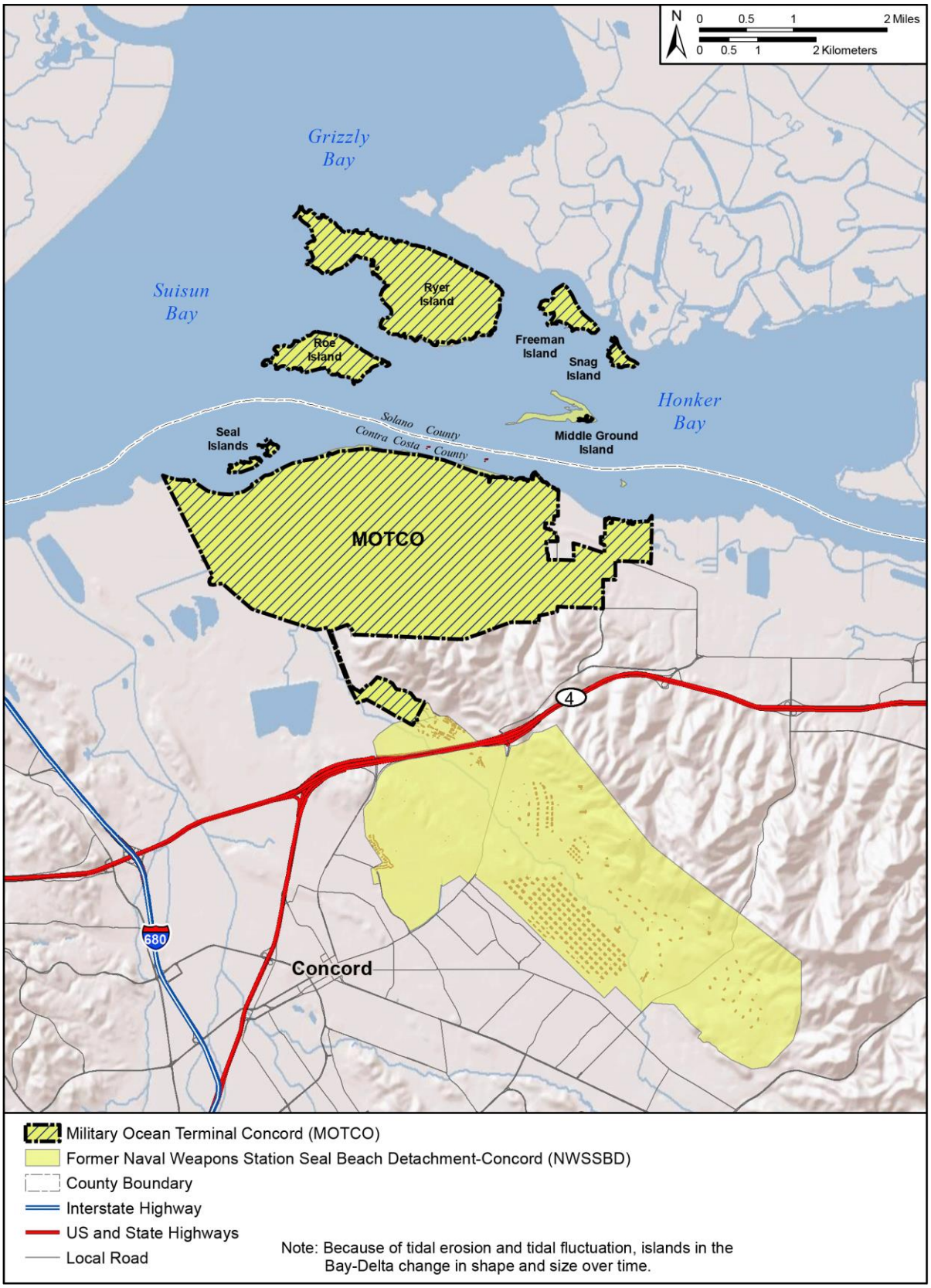


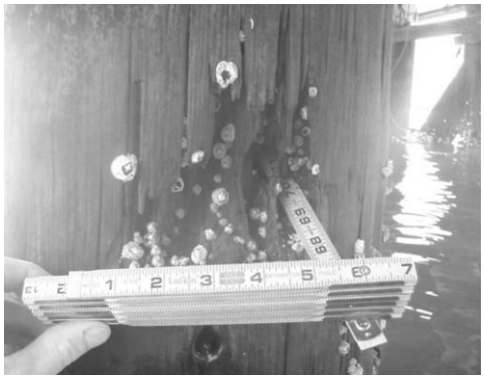
Figure 1-3. MOTCO and NWSSBD Boundaries

Figure 1-4. MOTCO Explosive Safety Quantity Distance Arcs

Both Piers 2 and 3 are almost 70 years old and have exceeded both the design life and practical service life of a typical waterfront timber structure. Pier 2 is the westernmost of three main piers and has a total net explosive weight capability of 8.2M lbs. At Pier 2, cargo is loaded and unloaded using ship's gear. The productivity of each vessel varies, but ship's gear is typically less efficient than ship-to-shore gantry cranes (specialized pier cranes for handling intermodal containers). Extensive study has documented deterioration due to a combination of marine borer damage, fungal decay, and overloading. The pier is in poor condition, is currently inoperable, and requires major rehabilitation and modernization in order to function to current containerization standards. In addition, the existing Pier 2 exit has a sharp turn and vehicles must travel at slower speeds than typically needed to ensure safe operations.

Pier 3 is currently the primary operational pier at MOTCO. Pier 3 is equipped with two gantry cranes that were installed in 1999. These cranes have a lifting capacity of 40 long tons (89,600 lbs) with the use of a spreader bar and 50 long tons (112,000 lbs) with the use of slings. Each crane is limited to approximately 12–15 lifts per hour. Pier 3 has a net explosive weight capability of 4.6M lbs. The pier is in fair condition overall but with localized areas of severe deterioration, wide-spread marine borer damage, and fungal decay. Work at the pier is subject to loading restrictions. Recent engineering assessments estimate that it has approximately 6 years of practical service life remaining.

Cracking, spalling, and 3-inch settlement along longitudinal joint, Pier 2 deck



Typical marine borer damage at Pier 3 piling

Pier 4 is also in fair condition with issues of marine borer and fungal decay similar to those at Pier 3. The cargo at Pier 4 is loaded in the same way as that described for Pier 2. Because of its proximity to industrial and residential land uses on the installation's eastern boundary, Pier 4 has a net explosive weight handling capability of 1.1M lbs. With the lowest ammunition handling capability of the three piers, it cannot serve as the primary ammunition loading point for MOTCO.

1.2 PURPOSE AND NEED

The purpose of the proposed action is to modernize and repair Pier 2 and repair Pier 3 so the Army can maintain its ability to meet documented DOD mission requirements in support of

wartime and contingency operations. Piers 2 and 3 are past their structural and design life expectancy and lack modern operational efficiencies. In its current degraded and nonoperational condition, Pier 2, the optimum operational pier for mission capability, cannot be utilized and Pier 3, currently the primary operational pier at MOTCO, requires some level of repair to maintain even its limited operational capability through 2019 based on the most recent inspection report (KCI Technologies 2013). The proposed action is therefore needed to modernize and repair pier infrastructure at MOTCO to ensure that this vital West Coast port can continue to meet its designated mission. Without these actions, the DOD's ability to perform its current and future contingency operations in the Pacific theater would be impacted.

1.3 SCOPE AND CONTENT OF THIS ENVIRONMENTAL IMPACT STATEMENT

This EIS is prepared in accordance with NEPA (42 United States Code (USC) 4321 *et seq.*), the Council on Environmental Quality (CEQ) regulations implementing NEPA (40 Code of Federal Regulations [CFR] Parts 1500–1508), the Army's regulations implementing NEPA (32 CFR Part 651 as published in *Federal Register*, Volume 67, Pages 15290–15332), and, to the extent applicable, the California Environmental Quality Act (CEQA, California Public Resources Code, Section 21000 *et seq*.). This EIS identifies the potential environmental effects of the proposed action and alternatives, and contains discussions of any avoidance, minimization, and mitigation measures; permit requirements; findings; and conclusions in accordance with NEPA. Supplemental analysis may be tiered from this EIS per 40 CFR Section 1508.28.

1.4 DECISION TO BE MADE

The decision to be made by the Commanding General of SDDC is to approve the alternative that best meets the purpose and need for the proposed action, taking into consideration the potential environmental consequences and any mitigation actions necessary to reduce adverse environmental impacts associated with the selected alternative. The alternatives, to include the "no action" alternative, are described in Chapter 2.

1.5 AGENCY AND PUBLIC INVOLVEMENT

In January 2012, MOTCO, with the support of the U.S. Army Corps of Engineers (USACE) Sacramento District, sent letters to the U.S. Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS) requesting technical assistance regarding activities associated with the modernization and repair contemplated for Pier 2 and associated facilities at MOTCO. Both agencies responded with a detailed review of relevant issues and potential effects they believe need to be addressed with regards to threatened and endangered species and critical habitat present at the project site. Coordination with these and other relevant agencies will continue throughout the preparation of the EIS and will include submission of Biological Assessment(s) (BA) and other consultation documents. See Appendix A for agency correspondence.

NEPA regulations require an early and open process for determining the scope of issues that should be addressed prior to implementation of a proposed action. The Army initiated the public scoping process on April 5, 2013, by publishing a Notice of Intent (NOI) to prepare an EIS in the *Federal Register* (Volume 78, Number 68, Page 20623), and sending scoping letters to federal, state, federally-recognized tribal, and local agencies, and other parties known or expected to be interested in the proposed action. In addition, the Army published information regarding the public scoping meeting in newspapers as identified in Table 1.5-1. Appendix B provides more public participation information.

Table 1.5-1. Publication Advertisement Schedule

Publication	Publication Date
Contra Costa Post	April 5, 6, 7, 8, 22, 23, and 24
Contra Costa Times	April 5, 6, 7, 10, 19, 20, 21, and 24

A public scoping meeting was held on April 24, 2013 in the Concord High School Multipurpose Room, 4200 Concord Blvd, Concord, CA from 5:00–8:30 p.m. Five members of the public attended the scoping meeting including the City of Concord executive director for the reuse authority. One positive comment was received during the scoping meeting. In addition, two letters were received via the project email account (usarmy.motco.sddc.mbx.list-eis@mail.mil) and two letters were received by mail. The issues raised during the public scoping period are categorized by subject and summarized in Table 1.5-2.

Table 1.5-2. Issues Identified During Public Scoping

Topic	Issue Identified in Comment
Purpose and Need	• Detail purpose and need for the action • Identify potential increases in pier operations
Traffic	• Analyze cumulative traffic effects of proposed action and proposed City of Concord's Area Plan
Air Quality	• Discuss ambient air conditions and potential air quality impacts from the proposed action • Identify all reasonable mitigation measures to reduce pollutants • Discuss at-berth emissions • Recommend installing shore power to reduce ship at-berth emissions • Encourage deployment of cleaner ocean-going vessels • Identify potential indirect emissions from truck and rail transport and equipment • Discuss health risks associated with vehicle emissions and mobile source air toxics • Address applicability of Clean Air Act Section 176 and general conformity regulations (40 CFR Parts 51 and 93) • Include mitigation measures for construction emissions • Consider alternative fuels such as natural gas and/or electric vehicles
Noise	• Discuss effects associated with construction and pier operations
Land Use	• Discuss changes to explosive safety quantity distance arcs

Table 1.5-2. Issues Identified During Public Scoping

Topic	Issue Identified in Comment
Biological Resources	• Discuss effects the action would have to Mt. Diablo Creek • Identify all petitioned and listed threatened and endangered species and critical habitat • Recommend the Environmental Impact Statement include a Biological Assessment and describe outcome of Endangered Species Act consultations • Discuss potential to spread invasive species, measures to prevent introduction of marine non-native species, and control of incipient populations • Describe how the proposed action would comply with Executive Order 13112 • Discuss potential impacts on aquatic resources due to shading
Contaminated Sites	• Address Installation Restoration and Military Munitions Programs • Discuss effects the action would have to two Military Munitions Response Program Sites
Health and Safety/Spill Response	• Describe mission activities and risk reduction to safety and spills • Discuss fueling operations and containment
Dredging	• Discuss effects from potential dredging • Discuss effects associated with filling submerged lands or wetlands in accordance with the Clean Water Action Section 404 (b) (1) Guidelines (40 CFR Part 230) • Discuss sediment testing • Discuss disposal of dredged materials
Water Quality and Sediment Transport	• Describe Suisun Bay's existing water conditions • Discuss potential for re-suspension of existing pollutants • Describe how proposed action could affect circulation, water residence time, and water quality • Discuss how proposed action could affect sediment transport
Stormwater Pollution and Wastewater Discharges	• Discuss National Pollutant Discharge Elimination System permit requirements • Identify existing stormwater pollution prevention practices and effectiveness of existing best management practices • Discuss how the proposed action would comply with stormwater regulations • Identify if there would be an increase in impervious surfaces on the shore • Discuss management and disposal of bilge and ballast water, sanitary waste, pressure wash water, and cooling water
Cumulative Impacts	• Describe cumulative impacts methodology and include temporal and geographic boundaries • Identify how resources have been previously affected by past or present activities, and characterize these resources in terms of their response to change and effects • Establish baseline, evaluate significance of historic degradation, and predict cumulative effects using trend data
Climate Change	• Discuss additive impacts from climate change on resources affected by the proposed action • Discuss any recommended adaptation measures to offset effects from climate change
Cultural Resources	• Consider preservation of the historic setting and cultural resources related to the 1944 Port Chicago disaster

The Draft EIS has been published for comment by elected officials, agencies, and the interested public and distributed as detailed in Appendix B. The Draft EIS is available at the Concord Public Library, 2900 Salvio Street, Concord, CA 94519 and at the Bay Point Library, 205 Pacifica Avenue, Bay Point, CA 94565.

The 45-day Draft EIS review period began with the publication of the *Federal Register* Notice of Availability and Notice of Public Meetings on (November 22, 2013). The Army plans to hold a public meeting to solicit comments on the Draft EIS on December 18, 2013 between 5:30 p.m. and 8:30 p.m. in the Riverview Middle School Multipurpose Room, 205 Pacifica Avenue, Bay Point, CA 94565. Following public review of the Draft EIS, comments will be considered and integrated into the Final EIS, which will be distributed for public review. Following release of the Final EIS, the Army will then make a determination on how to implement the proposed action based, in part, on the analysis provided in the Final EIS. This determination will be made public in a Record of Decision (ROD).

1.6 PERMITS, LICENSES, CONSULTATION REQUIREMENTS

In accordance with CEQ NEPA regulations (40 CFR Section 1502.25) and 32 CFR Part 651, the Army will prepare this EIS concurrently with and integrated with environmental impact analyses and related surveys and studies required by the National Historic Preservation Act (NHPA) of 1966 (16 USC 470 *et seq*.), the Endangered Species Act of 1973 (ESA, 16 USC 1531 *et seq*.), the Clean Water Act (CWA, 33 USC 1251 *et seq*.), the Coastal Zone Management Act (CZMA, 16 USC 1451 *et seq*.), the Clean Air Act (CAA, 42 USC 7401 *et seq*.), other applicable environmental review laws (and their implementing regulations), and Executive Orders (EOs). In addition to the completed and signed ROD for this EIS, the following list represents the minimum expected requirements prior to any water or land disturbance.

- In conjunction with the NEPA process, formal Section 7(a)(2) ESA consultation is required and will be supported by the preparation of separate BAs addressing species under the jurisdiction of USFWS and NMFS, respectively, and culminating in the issuance of a Biological Opinion (BO) from each agency.
- Prior to construction, CWA provisions require coverage under the state's National Pollutant Discharge Elimination System (NPDES) General Construction Permit to manage stormwater runoff during construction to minimize the discharge of pollutants to waters of the United States.
- A combined Section 10 (Rivers and Harbors Act) / Section 404 (CWA) permit would be required from the USACE San Francisco District to perform in-water construction for Pier 2 and for maintenance to Pier 3 (*Federal Register*, Volume 72, Number 47, Page 11092, pursuant to Section 10 of the Rivers and Harbors Act of 1899 [33 USC Section 403]).

- In conjunction with the Section 10/404 permit, a CWA Section 401 Water Quality Certification from the San Francisco Bay Regional Water Quality Control Board (SFBRWQCB) is required.
- In conjunction with the NEPA process, the Army must prepare and submit a Coastal Consistency Determination for review and certification by the San Francisco Bay Conservation and Development Commission (BCDC) that the action complies to the maximum extent practicable with the policies of the San Francisco Bay Plan. BCDC certification ensures compliance with the CZMA.
- In conjunction with the NEPA process, Section 106 NHPA consultation must be completed with the California State Historic Preservation Officer (SHPO), the Advisory Council on Historic Preservation (ACHP), concerned federally recognized Native American tribes, and other interested parties.
- Equipment used to perform any demolition, construction, and repair activities would be owned or leased and brought onsite by contractors, who would ensure they are properly permitted. Once Pier 2 is rebuilt, two new emergency generators would be installed. MOTCO would obtain all appropriate permits or registrations prior to operation of these generators. The Yolo-Solano Air Quality Management District and the Bay Area Air Quality Management District (BAAQMD) are the agencies implementing the California Clean Air Act (CCAA), while the U.S. Environmental Protection Agency (USEPA) is the implementing agency for the federal CAA. This EIS must demonstrate that project-related construction emissions are below any applicable General Conformity Rule *de minimis* levels or must provide a detailed air quality conformity analysis.

2.0 DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

This chapter details the proposed action and alternatives to modernize and repair Pier 2 and repair Pier 3 at MOTCO. It defines the scope of the action and alternatives and, together with the purpose and need described in Chapter 1, serves as the basis for understanding the approach for identifying reasonable alternatives.

2.1 BACKGROUND

Background information regarding end-to-end distribution, port management/operations, and cargo movement is provided to afford an adequate context for the proposed action. (The proposed action is described in Section 2.2.)

2.1.1 End-To-End Distribution

The Surface Deployment and Distribution Command provides streamlined warfighter support by providing materiel from the source of supply / point of origin to the point of use or disposal. The intent of the initiative is to influence acquisition, sourcing, positioning, and transportation to facilitate the flow of materiel to the end user, ensuring that deployment and sustainment are synchronized. In addition to terminal operations, the 834th TRANS BN at MOTCO provides customs clearance for all the DOD cargo coming into California seaports, and is also responsible for manifesting vessels that transport DOD cargo entering and leaving their Area of Responsibility (AOR). The 834th TRANS BN AOR for ammunition is the Far East and Pacific region including Korea, Japan, and Guam. Ammunition is shipped to MOTCO from Army Depots (ADs) and Army Ammunition Plants (AAPs) throughout the U.S. including Hawthorne AD, Nevada; Tooele AD, Utah; McAlester AAP, Oklahoma; Red River AD, Texas; Anniston AD, Alabama; Crane Army Ammunition Activity (AAA), Indiana; Blue Grass AD, Kentucky; and Letterkenny AD, Pennsylvania (Figure 2-1). Tier I, or active core facilities, include Blue Grass AD, Crane AAA, McAlester AAP, and Tooele AD. Tier II, or cadre depots, include Anniston AD, Letterkenny AD, Red River AD, and Hawthorne AD.

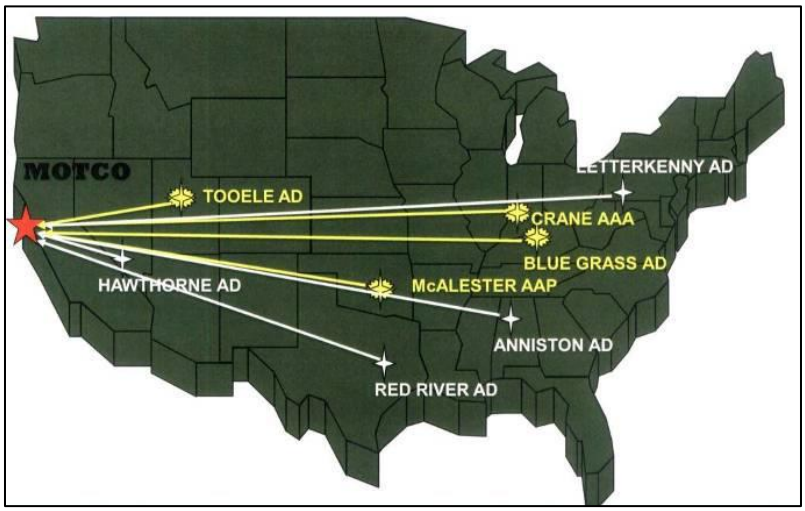


Figure 2-1. MOTCO and Ammunition Shipping Locations

2.1.2 Port Manager/Operator

The 834th TRANS BN operates its general cargo mission out of commercial ports at Oakland, Port Hueneme, Los Angeles / Long Beach, and San Diego, California. During missions, the 834th TRANS BN acts as the single port manager/operator, securing a commercial pier; setting up military missions; and maintaining command and control of the facilities. Ammunition is the focus of most cargo movement in or out of MOTCO; however, the installation is capable of handling general cargo providing it is in conjunction with or does not interfere with ammunition transshipment.

Ammunition is typically shipped in containers (containerized), with some limited cargo shipped as break-bulk or palletized (non-containerized). General cargo includes containers, rolling stock (both outbound and retrograde cargo that may not be operable), and other miscellaneous items. Depending on ship type and configuration, missions will be roll-on/roll-off or lift-on/lift-off. Given full structural capability at all piers (Piers 2, 3, and 4), the amount of net explosive weight determines which pier is most suitable for a given mission. The proposed pier modernization and repairs would allow MOTCO to utilize Pier 2 and Pier 3 simultaneously for as long as Pier 3 remains structurally viable for mission execution.

2.1.3 Cargo Movement

The mission executed at MOTCO includes both the loading and unloading of ammunition from vessels. Over the past 10 years, MOTCO has moved 200–300M tons of ammunition annually. This level of operations is expected to remain relatively constant through the foreseeable future.

The installation is configured to allow for a high level of flexibility in movement and staging of cargo when conducting loading and unloading operations. Currently, approximately 85 percent of the cargo movement is by rail and the remaining 15 percent is by truck. The piers, rail lines, class yards, transfer pads, and internal truck routes are used in cargo movement and staging is conducted at various locations throughout the Tidal Area. The cargo movement component of individual missions is pre-planned and orchestrated by the 834th TRANS BN to maximize efficiency.

2.2 PROPOSED ACTION

The proposed action is to modernize and repair Piers 2 and 3 to meet current and future mission requirements at MOTCO. The intent of the proposed action is to provide the installation with safe, functional, and efficient facilities. The proposed action has five distinct components:

- Partial demolition of existing Pier 2 and reconstruction of structural elements;
- Replacement of pier-side infrastructure and supporting facilities at Pier 2;
- Upgrades to shore-side roads and electrical infrastructure in the immediate vicinity of Piers 2 and 3;

- Removal and replacement/repair of piles and selected structural elements at Pier 3; and
- Maintenance dredging to -32 feet mean lower low water (MLLW) plus 2 feet overdepth dredging to compensate for inaccuracies in the dredging operation.

In an effort to document what would be involved with the proposed action, the Army prepared constructability memoranda for Piers 2 and 3, as well as a concept design report for Pier 2 (Moffatt and Nichol 2013a; b; c). The purpose of these memoranda was to describe the individual components of the demolition and construction at Pier 2 and repairs at Pier 3. The purpose of the concept design report was to evaluate the structural adequacy of the alternative pier configuration concepts for modernization of Pier 2. A summary of the results of these efforts is provided in the following sections for Piers 2 and 3, respectively. These are elements of the proposed action that are common to all the action alternatives.

2.2.1 Overview of Pier 2 Repairs and Modernization

Pier 2 was built using creosote-treated timber in 1944 and has a footprint of approximately 211,065 square feet (SF). A 15-foot wide concrete apron (the area from which cargo is lifted) was added to the waterside of the main deck in 1966. This portion of the deck has twin 18-inch piles every 24 feet, plus a concrete pile cap beam and a concrete slab on top. In 1966, a concrete approach trestle was added to the east side of Pier 2. The fender system along the north end of the main pier structure at Pier 2 was upgraded in 2002. The upgrade involved removing the timber fender and driving new 16-inch square concrete piles every 8 feet for the length of the pier. There are 118 16-inch square concrete fender piles and 136 18-inch square concrete apron piles; each pile is approximately 70 feet long. It is anticipated many of these square concrete piles could be reused if carefully removed during demolition.

Creosote *is a wood preservative used commercially to protect piles from animal, insect, and fungal pests. While creosote protects piles against marine borers, as the piles age and deteriorate, the chemicals that make up creosote gradually leach out into the environment where they are toxic to fish and invertebrates.*

Apron *is the area along the waterfront edge of a pier.*

Marine borers *bury themselves in wood; infestation results in the hollowing of piles.*

Fenders *protect the ship and shore facility from damage due to contact between the two during berthing and mooring.*

The existing pier has two levels, including a main deck and a platform level, which interferes with efficient container handling. Modernization of Pier 2 would require the replacement of the existing dual-level deck and fender system with a single-level deck, replacement of existing wooden piles with pre-stressed concrete piles, installation of new crane rails, and the addition of two 80-long-ton container cranes. The west trestle approach would be demolished and extended, and the east trestle would be extended, repaired, and upgraded. A third access trestle would be used to accommodate forklifts and provide pedestrian access to a new Operations Building / Breakroom after the existing Operations Building / Breakroom is

demolished. Pier-side supporting facilities including mooring hardware, office space, removable bull-rail, potable water, sanitary sewer, fire protection, lightning protection, and high mast lighting would be repaired or replaced. Existing antiterrorism/force protection (AT/FP) measures would be reinstalled or replaced. A drainage system and treatment device would be added to the pier to remove contaminants from surface runoff before it enters Suisun Bay. Refer to Figure 2-2 for a general Pier 2 site plan.

2.2.1.1 Demolition of Pier 2 and Two Buildings

> ***Pile caps*** *transmit the load from the structure to the pile group.*
>
> ***Stringers*** *form support for the superstructure. They are at right angles to, and rest on, pile caps.*
>
> ***Camels*** *are floating structures used to separate a moored vessel from the pier or wharf.*

The total estimated area for demolition is 159,000 SF of pier structure, which includes the removal of approximately 4,500 creosote-treated timber piles ranging from 55 to 75 feet long and 254 concrete square piles (136 18-inch square piles from the concrete apron and 118 16-inch square piles from the fender system) approximately 70 feet long. (It is anticipated many of the concrete piles could be reused.) In addition to pile removal, demolition would include removing 1,300 cubic yards (CY) of concrete slab; 200 tons of reinforcing steel; 1,550 timber pile cap beams; 112,500 feet of stringers; 13,500 decking boards; and 1,895 CY of asphalt. In addition to these items, there are various utility hangers, steel fasteners, sprinklers, risers, fender frames and camels, hose connections, circuit breakers, electrical cables, and other miscellaneous components that would be removed.

As part of the action, Buildings A-21 and 160, totaling 6,358 SF, would be demolished. Building A-21 is a 5,782-SF structure that was built in 1944 and used as an office/battery charging area. Building 160 is a 576 SF structure that was built in 1965 and used as a steam plant. Prior to demolition, an inspection would be conducted by a qualified inspector to determine the presence of any toxic materials. These materials would be removed prior to demolition in accordance with federal and state law. Following the removal of any toxic materials, the structures would be demolished. The materials would be transported to a previously identified staging/stockpile area where the pieces would be stockpiled and processed for recycling, salvage, or landfill disposal; or, if more appropriate, the semi-truck would transport the pieces directly to an appropriate recycling, salvage, or landfill.

According to the February 2012 Pier 2 Routine Inspection Report, the main platform and approach are in seriously degraded condition and it cannot be assumed the structure could adequately support heavy equipment (USACE 2012). Therefore, as much as possible, the demolition would be conducted from the water. In very shallow water and intertidal areas, demolition crews would either use smaller equipment that can be operated safely from the pier or amphibious equipment that can work from the adjacent mud substrate. Land-based equipment and a bin to contain the demolished materials could be used at the shoreward ends of the approaches.

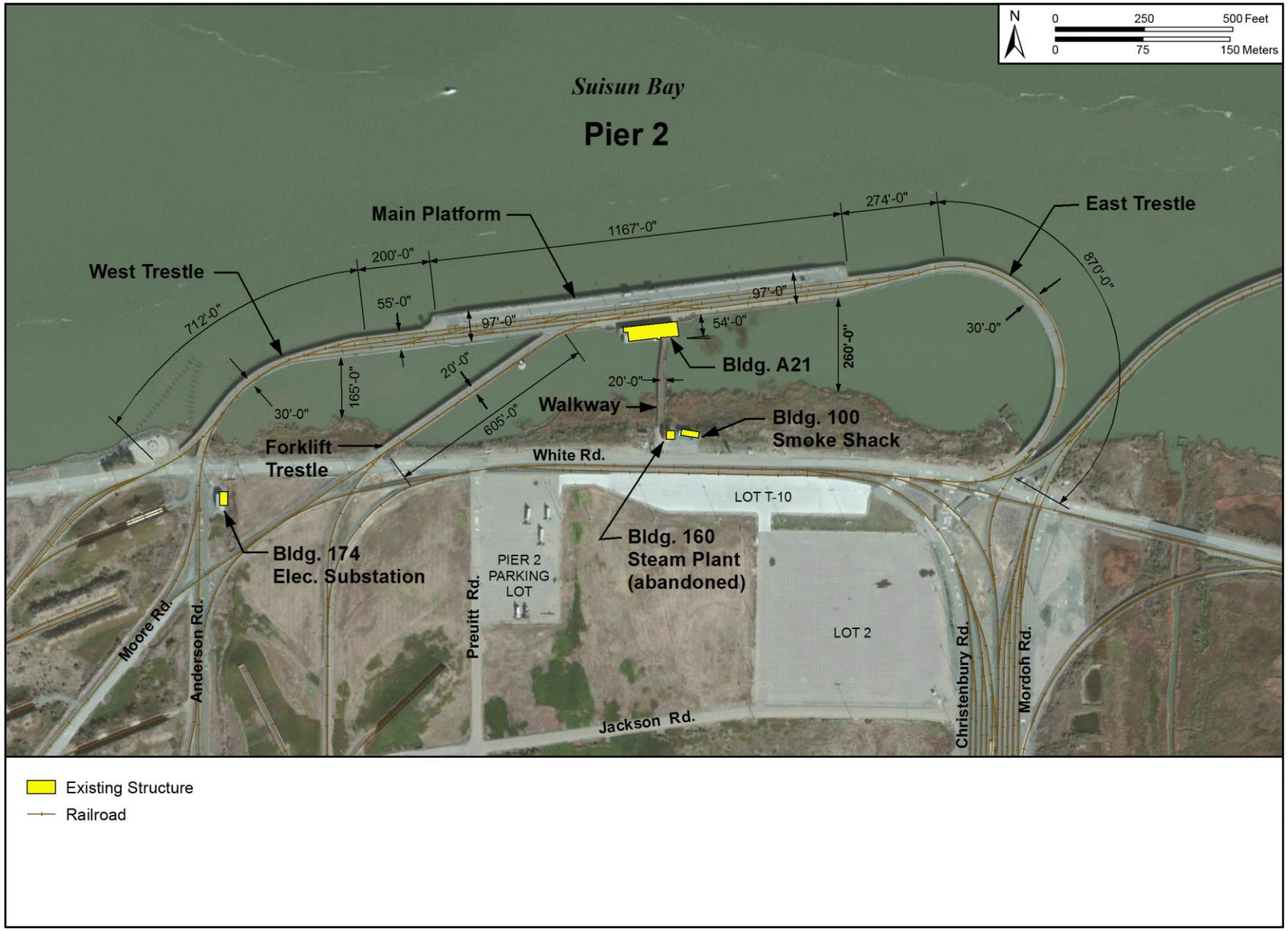


Figure 2-2. Pier 2 – General Site Plan

During demolition activities, the Barge Pier located west of Pier 2 would be used to transfer equipment and materials from land to water and vice versa. According to a February 2012 inspection report, the Barge Pier does not have a compromised load rating so it would suffice for this purpose (KCI Technologies 2012). The main effect of water-based demolition is that the demolition materials would be handled one additional time: when demolished material is offloaded from the barges and reloaded onto trucks at the Barge Pier.

All demolition equipment, mostly excavators with various attachments, would be mounted on barges and brought to the work area by a small tug. Small sections of the deck and superstructure would be cut off and placed on a transport barge that would be used to move the materials to shore by tug. Another excavator would be located on the Barge Pier and would transfer the demolished deck pieces into a semi-truck, which would transport the pieces to a previously identified staging/stockpile area to be stockpiled and processed for recycling, salvage, or landfill disposal; or, if more appropriate, the semi-truck would transport the pieces directly from the Barge Pier to an appropriate recycling, salvage, or landfill.

Work would begin at one end of the pier, likely the western end, and move along the length of the structure. Deck removal and pile removal would occur at roughly the same location and pace, so that clear, open water is left as work progresses eastward (this would assist with maintaining control of the debris while decreasing the amount of debris boom required around the active demolition area). Debris booms would be placed around the work area in accordance with best management practices.

Personnel in small boats would continually ferry workers from the barge to shore and monitor the water to keep it clear of floating debris. Railroad rails would be placed on flatbed trucks for hauling to either a recycling facility or a salvage yard. It is anticipated the utility lines, pipes, conduits, and other miscellaneous metal would be hauled to the same metal recycling facility as the rails.

Asphalt would be removed from the decking using an excavator with a special scraping attachment. The asphalt would be placed in an 18 CY capacity end-dump truck and hauled to an asphalt recycling facility or appropriate disposal facility. The decision on whether the asphalt would be recycled or not would depend on the condition of the asphalt and how cleanly it comes off of the wood decking boards.

Best management practices would be employed during pile removal activities to minimize turbidity and the release of debris.

The piles would be removed either with a vibratory hammer or by direct pull with a crane. The operator will be trained to remove the pile slowly and as much as possible to avoid pinching, twisting, or breaking the pile. Depending on the embedment, the use of a high-pressure water jet may be required to loosen or remove mud keeping some of the piles stuck in place. Any falling debris would be contained using tarps and a floating boom. If a timber pile breaks, every effort would

be made to cleanly pull out the remainder of the pile or stub. If the entire pile cannot be removed, it would be cut at least 2 feet below the mudline using pneumatic shears or an underwater chainsaw, so that the broken tip is not exposed.

Similar to the timber pier superstructure, removed timber piles would be placed on a barge, unloaded at the Barge Pier, and taken to an onsite stockpile area for cutting and reloading onto trucks for ultimate disposal. The concrete piles not suitable for recycling would be loaded onto a barge and delivered to shore to be broken into smaller pieces and hauled to a recycling facility. It is anticipated many of the square concrete piles could be reused; therefore, these piles would be stockpiled onsite at an existing staging area.

The concrete apron structure would be removed using two excavators working together, one using shears or a vibratory point and the other holding a skip box attachment to catch the concrete pieces as they are broken off. The concrete debris would be loaded onto a barge, brought to shore, transferred to an end dump truck, and hauled either to an onsite stockpile area or directly to a recycling facility.

The stockpile area would be worked by two pieces of equipment: a loader and an excavator. The excavator would separate the different types of materials and cut them into manageable sizes. The loader would take demolished materials off the semi-truck from the Barge Pier and place them into piles for the excavator, and then subsequently load up the trucks for offsite disposal and/or recycling.

At the peak of demolition operations, there would be up to four excavators or a mix of excavators and cranes working (two or three mounted on barges, one at the Barge Pier transferring materials to shore, and one cutting debris into manageable pieces in the stockpile area), about two to eight trucks per day hauling material away from the site, one tug boat moving the two barges around, and two skiffs managing the debris boom and shuttling crew members between barges and shore.

The number of off-installation truck trips per day would depend on the activity being conducted. It is estimated, however, that there would be a total of 1,300–1,350 truck trips (round trips) during demolition, amounting to 8–12 round trips per day.

During demolition, it is anticipated there would be 10–20 workers at the job site every day. It is expected the workers would park at the parking lot near Gate 1 and be shuttled to the work site.

2.2.1.2 Modernization and Repair of Pier 2 and White Road Infrastructure Improvements

The modernized Pier 2 would require driving up to 1,064 new 24-inch octagonal pre-stressed concrete piles and up to 150 reused square concrete piles and installing up to 22,000 CY of concrete and 3,300 tons of reinforcing steel. The concrete piles would be driven by a Delmag Pile Hammer D62-22 or equivalent. In addition, shore-side construction and improvements

would include construction of a 1,500 SF Operations Building / Breakroom, installation of a new 12-kilovolt electrical substation and two 1500-kilowatt diesel emergency generators to support container cranes, expansion of the staging area at Lot T-10 by 39,500 SF, repairs to White Road, and realignment of the road network servicing the pier to adjust to the new access points. Building 100 would be moved from its present location on the north side of White Road to the Pier 2 parking area south of White Road. Measures to improve AT/FP would include installation of bollards waterside of the pier and security lighting throughout the area. Erosion of the shoreline west of Pier 2 would also be addressed.

Construction would proceed from west to east, following behind the demolition work. Pile driving could begin as soon as there is sufficient space behind the demolition equipment to maneuver the barge-mounted pile driving derrick. Assuming a pile driving rate of one pile every two hours (or four to five piles per day), the construction would proceed at a rate of about one bent (a substructure unit supporting each end of a span) per day (bents are at 24-foot spacing). Bents on the main deck are 20 feet apart; thus, the main deck would proceed at a rate of one bent every two days for the 95-foot deck and every three days for the 131-foot deck.

Once the piles have been driven, the formwork (or mold) could be built up around them beginning with the pile cap beams. This work is performed by pile driver personnel using hand tools with assistance from a derrick barge and electrical power. The contractor would likely form two sets of pile cap beams at a time. Once the first set of pile caps have been poured with concrete and cured, the deck slab above those pile caps can be formed. While the concrete on the first set of pile cap beams is curing, the second set would be formed and poured. The formwork for each pile cap and deck section can then be reused in a leapfrog fashion.

As soon as a section of formwork is completed, the workers would lay out the reinforcing steel to prepare for concrete pouring. A derrick barge would be needed to lower falsework (a temporary structure used to support the structure during construction) support members and rebar to workers on the deck. Once the formwork and rebar are in place, the section would be ready for concrete. The concrete would be brought in using 9 CY cement mixer trucks from a nearby batch plant. A concrete pump would be used to transfer the concrete from the trucks to the formed section.

Construction would begin with the west trestle, followed by the forklift/pedestrian trestle and the four light platforms. Pile driving for the main deck would begin as soon as the piles for the light platforms have been driven, and would proceed from west to east. Work on the east trestle can begin once the main deck piles are complete, while the deck is being poured and after the utilities and crane rails are installed.

The road leading to the west trestle would be widened to allow for a safe turn radius for trucks entering the pier from White Road. In addition to the road work at the trestle entrances, the shoreline rock revetment along White Road would be repaired.

The existing Lot T-10 would be expanded by 39,500 SF on the western end to allow for additional room for handling containers. A new electrical substation would be constructed on shore at the existing Pier 2 employee parking lot. Approximately 8,000 SF of concrete pad would be constructed as the foundation for the new electrical substation, backup generators, and Building 100. The Lot T-10 expansion work would start at the beginning of the project, and the White Road upgrade work would occur after completion of the west trestle construction.

To accommodate night missions, four high-mast light poles (with high pressure sodium or similar floodlights) would be constructed approximately 50 feet behind the back of the pier. These light poles would be provided with maintenance-friendly lowering devices to allow for flood light replacement from the pole platform. The lights would be shielded to focus the light on the work areas where it is needed and avoid unnecessarily illuminating the sky and surrounding areas.

Under the proposed action, a segment of White Road between Johnson Road to 3,000 feet east of Murdoh Road would be repaired. Repairs would cover approximately 0.9 acres of existing roadway and embankment and include removing and replacing 8,500 linear feet of asphalt and base materials to a width of 20 feet, and repainting roadway stripes. The demolition of the existing road would generate approximately 12,000 CY of recyclable materials (e.g., concrete, gravel, dirt) that would be used at the installation as road base for future road repairs. The White Road profile would be redesigned for improved drivability and to conform better with existing railroad crossings. The planned construction would provide yellow, non-reflective centerline striping and white, non-reflective edge striping 10 feet on either side of the centerline. The completed road would also include compacted shoulders providing edge support for pavement and grade to drain.

Due to the age and poor condition of existing utilities infrastructure within the Tidal Area, various upgrades are planned to include replacing existing transformers, panel boards, junction boxes, and burying existing overhead power lines. The potential area of disturbance includes the transformers and panel boards on Pier 3, as well as a segment of electrical equipment along White Road between the east trestle of Pier 2 and the west trestle of Pier 4. Under the proposed action, the existing 100 SF pad-mounted transformer (oil filled) would be replaced with a four-way switch and pad-mounted transformer. In order to bury the existing overhead power lines, a trench measuring approximately 4 feet deep by 2 feet wide would be excavated from the utility poles located between the east trestle of Pier 2 and the west trestle of Pier 4 (i.e., approximately 3,510 feet long) to approximately 5 feet into the west bound lane of White Road. (Wetlands would be avoided during trenching.) The power lines would then be buried within the existing roadway of White Road and the affected portions of White Road would be repaired. Prior to project completion, the area would be restored to an appropriate native habitat which would include proper grading for drainage.

During construction, the number of workers onsite would vary depending on how many activities are occurring at the time. For example, the pile driving derrick would require at least 7 workers, the crew doing the formwork would have up to 8 workers, and the crew pouring would have up to 12 workers. When all three construction activities are concurrent, there would be at least 30 workers at the site (in addition to any crew associated with the demolition of Pier 2). It is expected the workers would park at the parking lot near Gate 1 and be shuttled to the work site.

2.2.2 Pier 3 Repairs

Pier 3 was constructed in 1944 as an all timber structure. In the 1960s it was modified with the addition of a 15-foot concrete apron extension on the waterside of the pier and concrete approach trestle on the east side. Pier 3 was modified again in 1999 with the addition of concrete crane rail girders on both the waterside and the landside of the main platform to support two new container gantry cranes and shore-side electrical support structures (Figure 2-3).

The proposed full-height high-density polyethylene jackets would seal the timber piles from air and water, which would prevent further deterioration, contaminant release, and infiltration of rot and/or marine borers.

Pier 3 is in need of repairs to be able to maintain its limited operational capability through 2019. (For the purpose of this EIS, use of Pier 3 beyond 2019 is speculative.) The most notable repair would be to protect up to 4,066 timber piles that are currently being infested by marine borers. Other proposed maintenance repairs include fixing cracks and spalls (surface chips) in the concrete structure, replacing decayed or missing wooden components and corroded hardware on the timber structure, replacing broken or missing utility hangers, filling potholes and cracks in the asphalt overlays, and shimming non-bearing piles.

To extend the useful life of Pier 3 until Pier 2 is ready for missions, non-reactive high-density polyethylene (HDPE) jackets would be installed around the timber piles. The jackets, or wraps, would protect the piles from further marine borer infestation.

The marine borer infestation has been increasing in association with the increasing salinity level in Suisun Bay (Enright and Culbertson 2010) which creates a more favorable habitat for the marine organism. It is estimated that approximately 190 timber piles at Pier 3 already have wraps installed that would need to be removed and upgraded to the new HDPE jacket system. As part of the installation process, water would be used to clean existing piles to remove rotted portions and any marine or biological growth from the pile. The HDPE pile wrap would be installed 2 feet above the highest tide level down to 2 feet below the mudline.

Approximately 10–12 workers would be associated with the above-deck general maintenance repairs and 25 workers (assuming five teams of five divers each) would be associated with the pile wrapping. Therefore, the number of workers at the Pier 3 job site would total approximately 35–37.

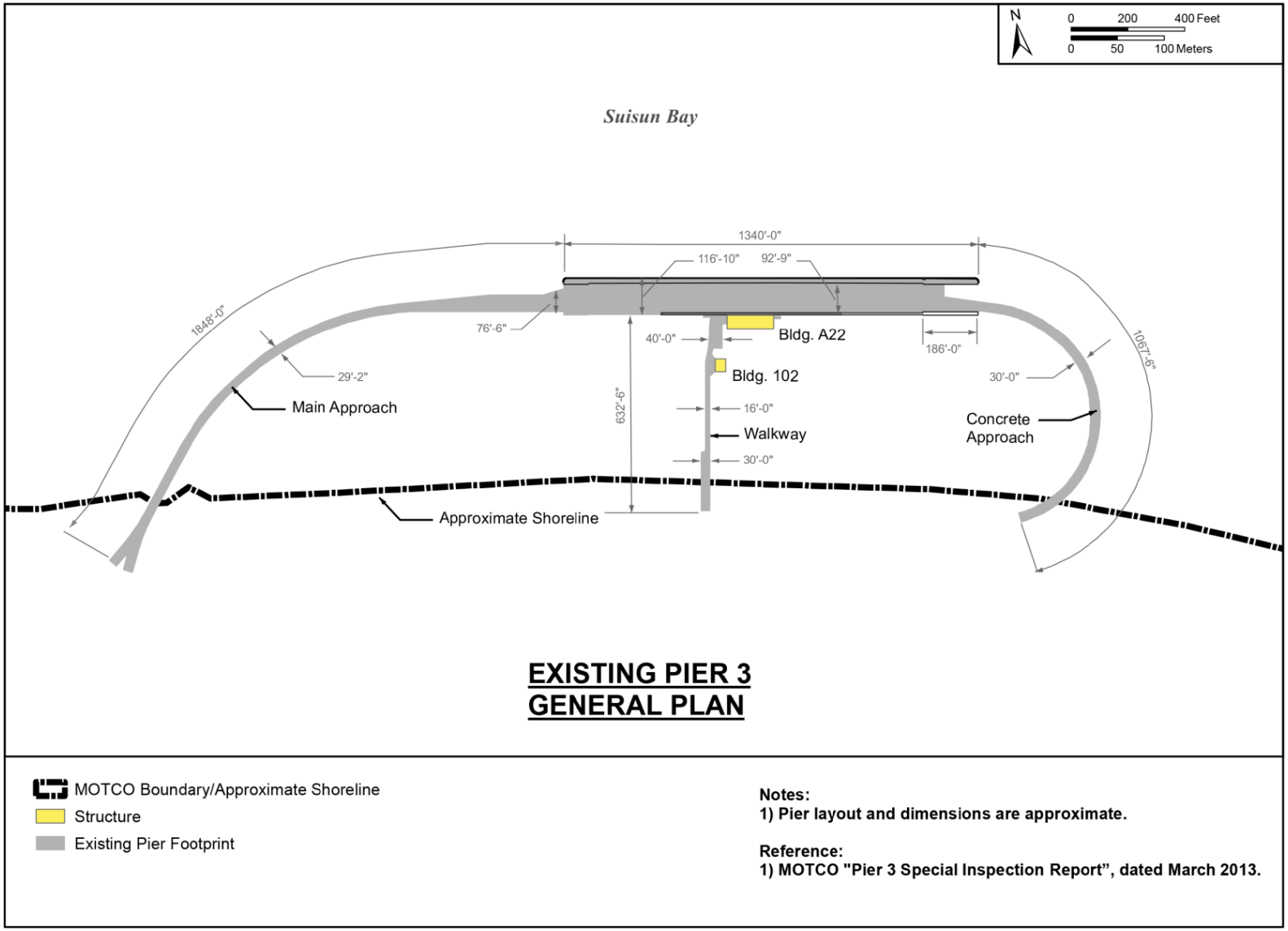


Figure 2-3. Pier 3 – General Site Plan

2.2.3 Maintenance Dredging

Maintenance dredging is dredging performed on a regular basis; since 1943, Piers 2, 3, and 4 have been dredged nearly 20 times. Dredging was typically performed using a clamshell method to -32 feet MLLW at Piers 2, 3, and 4; -14 feet MLLW at the Barge Pier and east lighter mooring; and -22 feet MLLW at the west lighter mooring (USACE 1975). Since 1943, a total of 1.8 million cubic yards of dredged material has been removed from NWSSBD Concord (now MOTCO) (USACE 1975; 1995). Under the proposed action, maintenance dredging adjacent to Pier 2 to a depth of -32 feet MLLW plus 2 feet overdepth is proposed to address shoaling that has occurred since the last dredging event. With respect to Pier 3, no dredging would be required.

2.2.4 Construction Timeframe, Equipment, and Staging Areas Common to All Action Alternatives

Repairs to Pier 3 are expected to be done in advance of work at Pier 2. Repairs to Pier 3 could begin as early as 2014 and would be completed within 13 months of continuous construction; this timeframe includes 7 weeks for above water work (general repairs) and 47 weeks for in-water work.

It is anticipated that the demolition and reconstruction of Pier 2,including all waterside and landside elements of the modernization effort, would commence as early as 2016. The demolition would take nearly 7 months and construction would take nearly 24 months. The construction timeframe assumes that four to five piles could be driven per day, the access trestle would proceed at a rate of one bent per day, and the main deck would proceed at a rate of one bent every two days for the 95-foot deck and every three days for the 131-foot deck. Assuming some potential to overlap, the Army estimates the total project duration would be 27 continuous months. If the project begins the first quarter of 2016, it is estimated the project could be completed in the second quarter of 2018. The majority of daily construction activities would commence during normal working hours.

For the purposes of this EIS, normal working hours are generally considered to be between 7 a.m. and 8 p.m. However, working hours are daylight dependent and will vary seasonally. For example, during summer, it is expected work could extend until 8 p.m. In the winter, however, it is expected work would end at 5 p.m.

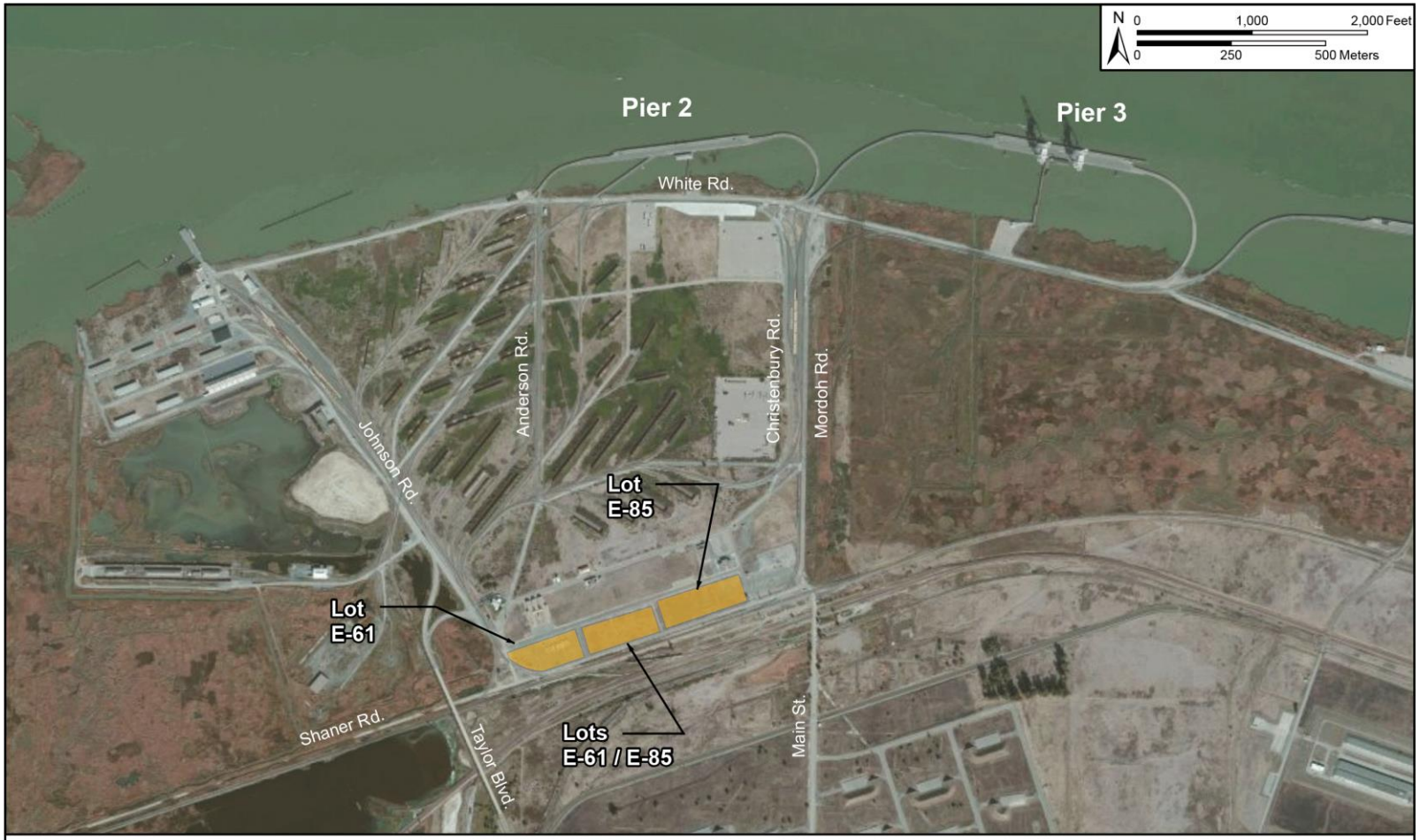
Certain construction activities may have to extend beyond these hours in order to accomplish activities that must be performed without interruption until completion. This is expected to occur rarely and would only be undertaken with appropriate notification and minimization measures employed.

Demolition, construction, and repair activities would include the use of various pieces of equipment. A list of likely equipment is provided in Table 2.2-1.

Table 2.2-1. Piers 2 and 3 Equipment List

Pier 2	
Demolition Equipment	
• Derrick Barge • Excavator – Land Based • Excavator – Barge Mounted • Front End Loader • Work Tug • Launch Boat	• Semi-truck • End Dump Truck • Pick-up Truck (4x4) • Pick-up Truck (2x4) • Shuttle Van (12 Passenger)
Construction Equipment	
• Derrick Mounted Pile Driver • Pile Driving Hammer (Delmag D62-22 or Equivalent) • Tug Boat • Work Tug • Flat Deck Barge • Concrete Pump • Crane Barge • Work Boat • Pick-up Truck (4x4) • Pick-up Truck (2x4) • Excavator • Loader	• Dozer • Asphalt Concrete Paver • Grader • Vibratory Roller • Roller • Water Truck • RT Crane • Welder • Generator Set • Forklift • Bed-Leveler Device (Alternatives 1 and 3 only) • Clamshell Dredge (Alternative 2 only) • Bottom Dump Scow (Alternative 2 only) • Shuttle Van (12 Passenger)
Pier 3 General Repairs	
• On500 -highway Truck • Flatbed Delivery Truck • Launch Boat • Excavator	• Pick-up Truck (4x4) • Pick-up Truck (2x4) • Shuttle Van (12 Passenger)

The staging areas (lay-down, equipment, and material) have been identified as E-61, E-61/E-85, and E-85 (Figure 2-4). These 11.06 contiguous acres of land are bounded on the north by Shaner Road, the south by Robinson Road, the east by Born Road, and the west by Johnson Road. These areas are currently used as staging lots for cargo and equipment and are devoid of vegetation. In order to make these staging areas acceptable for use, it is anticipated the lots would need various levels of upgrades to potentially include being graded, compacted, and resurfaced prior to use. Additional lots for storage of equipment on a day-to-day basis during repair, construction, and demolition activities would include existing lots located near Pier 2 with prior coordination with MOTCO.



Project Staging Area

Staging Area	Acres	Square Yards
E-61	3.28	15,874
E-85	4.29	20,747
E-61 / E-85	3.49	16,909

Figure 2-4. Proposed Staging Areas

2.3 ALTERNATIVES CONSIDERED

In accordance with CEQ regulations (40 CFR Section 1502.14) and 32 CFR Part 651, a reasonable range of alternatives for implementing the proposed action were considered. As detailed in Section 1.2, the purpose and need for the proposed action is to modernize and repair Piers 2 and 3 at MOTCO so the Army can maintain its ability to meet DOD requirements in support of wartime and contingency operations. For this EIS, as the major component of the proposed action is the modernization of Pier 2, the reasonable range of alternatives is based on differing configurations for that modernization. The proposed Pier 3 repairs are the same for all action alternatives; refer to Figure 2-3 for a general site plan for Pier 3.

The CEQ guidance favors the evaluation of a reasonable number of alternatives, covering the full spectrum of potential outcomes. This EIS addresses the following alternatives:

- **Alternative 1**: Fully implement repairs to Piers 2 and 3 with Pier 2 re-oriented to align the west end with the existing shipping channel to create a more modernized configuration.
- **Alternative 2**: Fully implement repairs to Piers 2 and 3 leaving the Pier 2 footprint in its present location. Alternative 2 would use the same structural system as Alternative 1.
- **Alternative 3**: Fully implement repairs to Piers 2 and 3, reorienting Pier 2 to create a more modernized configuration but with a larger deck surface and heavier load-carrying capacity than that proposed under Alternative 1.
- **No Action Alternative**: Make no repairs to Piers 2 or 3 and continue to utilize Pier 3 with loading restrictions for the remainder of its service life.

These alternatives may change and/or new alternatives may emerge as a result of the comments received during the public comment period on the Draft EIS.

2.3.1 Alternative 1: Reoriented Footprint for Pier 2

Alternative 1 accomplishes all of the basic requirements for modernizing Pier 2. The proposed pier head construction (totaling 95,000 SF) would have a single level, 1,000-foot-long by 95-foot-wide working area for container handling and break-bulk loading and offloading. The site design for Alternative 1 would have container crane rails at 80-foot spacing and would rotate the new pier head around the east end of Pier 2 so that the west end is relocated approximately 48 feet further offshore and into deeper water. The new pier would extend into deeper water sufficient to support the draft of vessels using the new pier. The berth length is shorter than the existing berth since this pier will be used for container missions instead of non-containerized cargo.

Under Alternative 1, the modernized Pier 2 would require driving 876 new 24-inch octagonal pre-stressed concrete piles; 125 reused square concrete piles; 14,338 CY of concrete; and

2,150 tons of reinforcing steel. The concrete piles would be driven by a Delmag Pile Hammer D62-22 or equivalent.

Under Alternative 1, there would be a net decrease in the overall pier facility footprint by approximately 27,222 SF and a reduction of the west trestle by 989 SF. Rotating the pier would result in an overall reduction in the overwater footprint that covers shallower water habitat areas (depth of less than 12 feet) while the footprint covering deeper water habitat areas would increase slightly.

Approximately 750 CY of dredged material adjacent to Pier 2 would be redistributed using a bed-leveler device. Bed-leveler devices consist of a large customized plow or a box beam suspended from a work barge that can be pushed or towed by a tug. It is anticipated that maintenance dredging would be conducted at the end of the project and take approximately one week. Based on summer 2012 bathymetric data, dredging at Pier 3 would not be required under Alternative 1.

With the exception of the details described above, the modernization of Pier 2 and Pier 3 repairs would be as described in Sections 2.2.1 and 2.2.2.

Refer to Figures 2-5 and 2-6 for the proposed reconstruction and typical section of Pier 2 under Alternative 1. Refer to Figure 2-7 for the extent of maintenance dredging under Alternative 1, which includes proper side slopes.

2.3.2 Alternative 2: Existing Footprint for Pier 2

This alternative also accomplishes all of the basic requirements of modernizing Pier 2. The scope of construction and demolition would be as described in Section 2.2.1 except that the orientation of the reconstructed pier would be along the same axis as the existing pier. This would result in a 2,734 SF reduction of the west trestle. Alternative 2 would provide a net decrease in overall pier facility footprint of about 27,081 SF. The overall reduction in overwater footprint would be slightly less than with Alternative 1.

Under Alternative 2, the modernized Pier 2 would require driving 868 new 24-inch octagonal pre-stressed concrete piles; 125 reused square concrete piles; 14,213 CY of concrete; and 2,132 tons of reinforcing steel. The concrete piles would be driven by a Delmag Pile Hammer D62-22 or equivalent.

Approximately 3,800 CY of dredged material would be removed adjacent to Pier 2 by mechanical dredge and placed in a barge for disposal at the Montezuma Wetlands Complex as beneficial reuse of dredged material. If an optional backup disposal method is required, the Montezuma Hills site is located nearby. It is anticipated that dredging would be conducted at the end of the project and take approximately one week. Based on summer 2012 bathymetric data, dredging at Pier 3 would not be required under Alternative 1.

With exception of the details described above, the modernization of Pier 2 and Pier 3 repairs would be as described in Sections 2.2.1 and 2.2.2.

Refer to Figure 2-8 for the proposed reconstruction under Alternative 2. The typical section of Pier 2 under Alternative 1 (Figure 2-6) is representative of the typical section of Pier 2 under Alternative 2. Refer to Figure 2-9 for the extent of maintenance dredging, which includes proper side slopes, under Alternative 2.

2.3.3 Alternative 3: Larger Reoriented Footprint for Pier 2

Alternative 3 would incorporate all the features of Alternative 1, but would retain and add to some of the capabilities of the existing piers that are reduced or eliminated under Alternatives 1 and 2. The proposed pier head construction in Alternative 3 (totaling 157,200 SF) would have a larger overwater footprint than that proposed under Alternatives 1 and 2. Alternative 3 would have a 1,200-foot long by 131-foot wide working area. Container handling and break-bulk loading/off-loading missions would take place on a single level deck, and as with Alternative 1, Alternative 3 would rotate the new pier head around the east end of the pier so that the west end would be pushed approximately 85 feet further offshore.

This alternative would increase the vertical loading capacity of the deck and trestles from the original design capacity of 600 pounds per square foot (PSF) to 1,000 PSF. The larger deck size and heavier loading capability would require approximately 1,200 concrete piles.

While the existing east trestle is adequate for continued use based on preliminary conceptual design under all action alternatives, the retrofit or strengthening of the existing east trestle under Alternative 3 is proposed to meet the increased loading requirement. The 30-foot wide east trestle approach was constructed in 1967 and is supported by 18- or 20-inch square pre-stressed concrete piles at 24 feet on center bent spacing. Strengthening would be completed through the use of a fiber wrap material to increase the bending moment capacity of the precast double tee deck slab. The fiber wrap material supplements the existing reinforcing bars at the beams thereby increasing its bending moment strength. The fiber wrap is comprised of a composite fiber and epoxy that would be installed under the beam portion of the precast double tee. The width of the fiber strip would be within the width of the existing beam flange. The installation of this fiber wrap would require preparation of the beam's soffit surface and application of epoxy to provide adhesive action for the fiber wrap.

At the east trestle, the road and approach abutment would be widened to accommodate the realignment of the rail tracks to improve safety and handling of rail cars under Alternative 3.

Under Alternative 3, the modernized Pier 2 would require driving 1,064 new 24-inch octagonal pre-stressed concrete piles; 150 reused square concrete piles; 21,948 CY of concrete; and 3,292 tons of reinforcing steel. The concrete piles would be driven by a Delmag Pile Hammer D62-22 or equivalent. Shore-side construction and improvements associated with infrastructure would be as described in Section 2.2.1.2. Under Alternative 3, there would be a net increase in

the overall pier facility footprint of about 35,354 SF and a 7,006 SF increase in size of the west trestle.

Approximately 1,450 CY of dredged material adjacent to Pier 2 would be redistributed using a bed-leveler device. Bed-leveler devices consist of a large customized plow or a box beam suspended from a work barge that can be pushed or towed by a tug. It is anticipated that maintenance dredging would be conducted at the end of the project and take approximately one week. Based on summer 2012 bathymetric data, dredging at Pier 3 would not be required under Alternative 3.

With the exception of the details described above, the modernization of Pier 2 and repairs of Pier 3 would be as described in Sections 2.2.1 and 2.2.2.

Refer to Figures 2-10 and 2-11 for the proposed reconstruction and typical section of Pier 2 under Alternative 3. Refer to Figure 2-12 for the extent of maintenance dredging under Alternative 3, which includes proper side slopes.

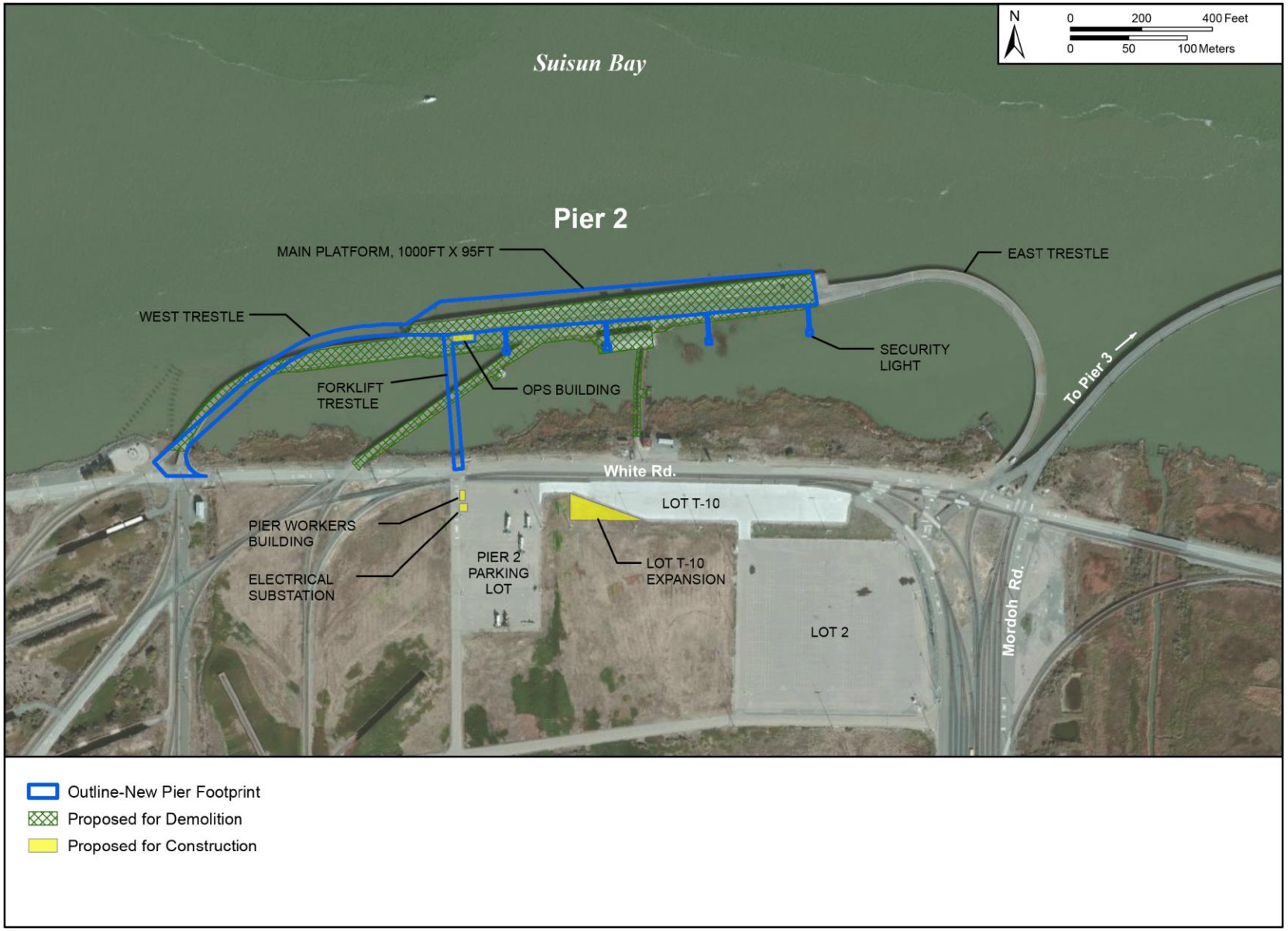


Figure 2-5. Pier 2 – Alternative 1 Reconstruction Plan

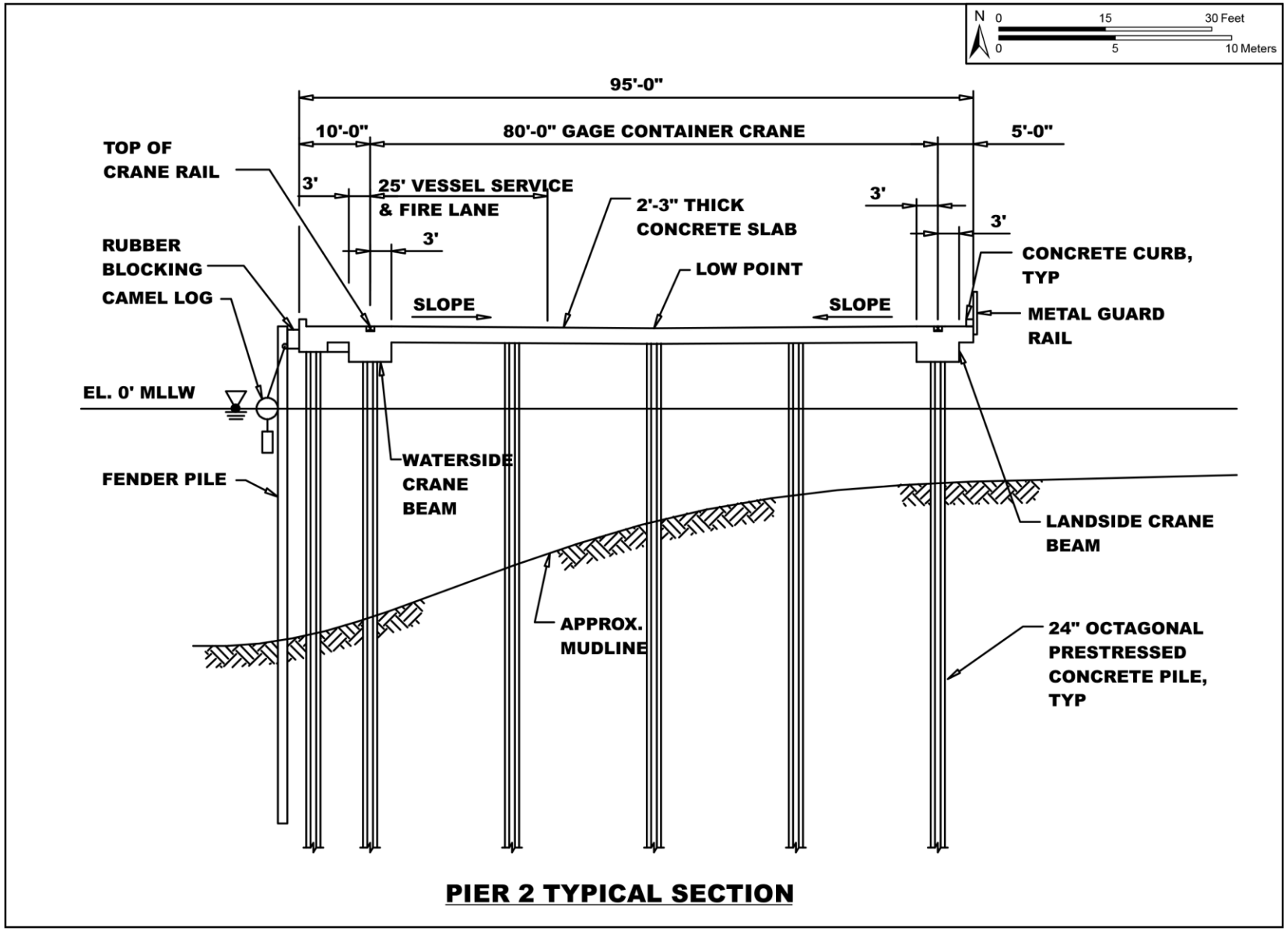


Figure 2-6. Pier 2 – Alternatives 1 and 2 Cross-Section

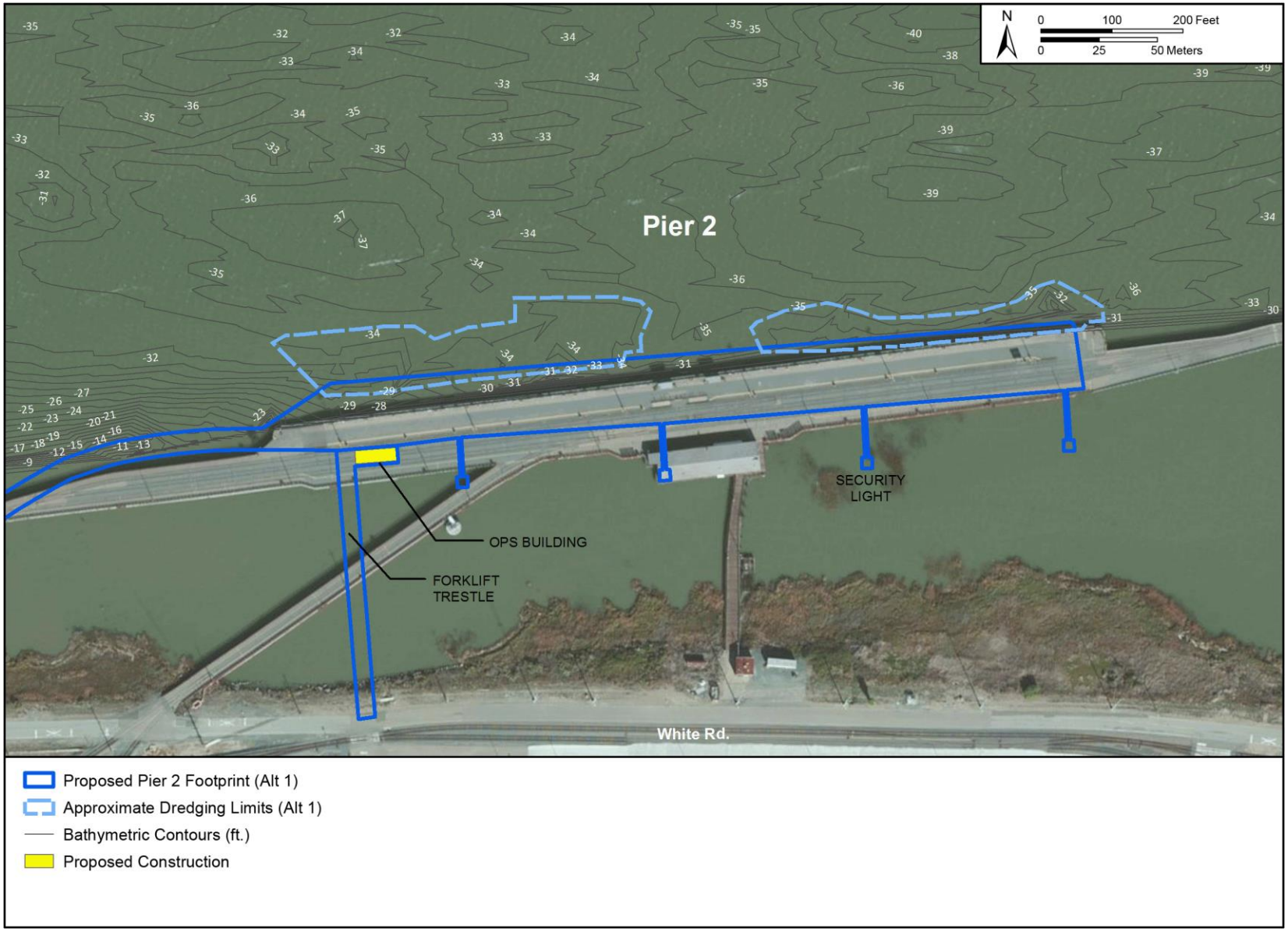


Figure 2-7. Pier 2 – Maintenance Dredging Under Alternative 1

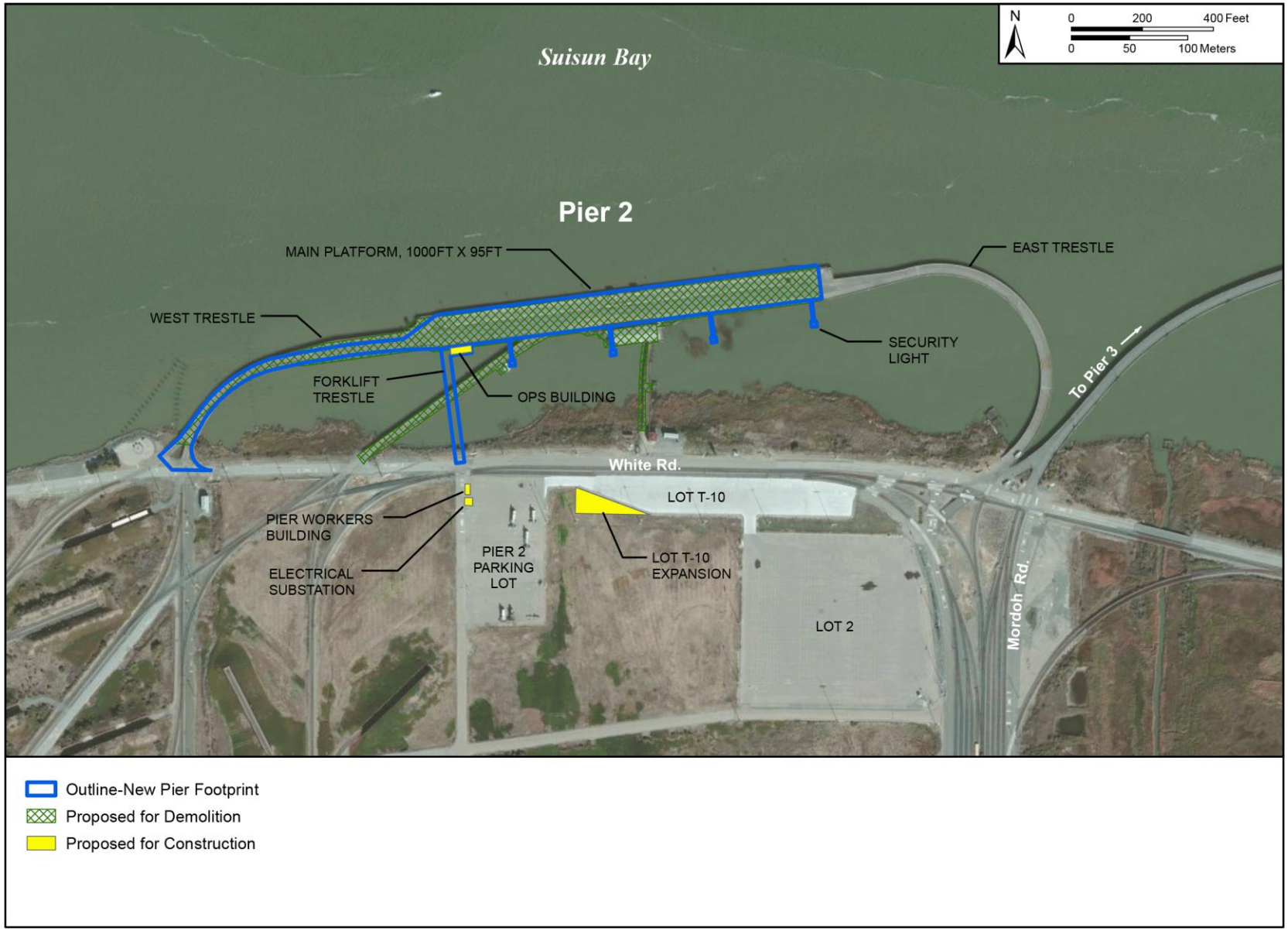


Figure 2-8. Pier 2 – Alternative 2 Reconstruction Plan

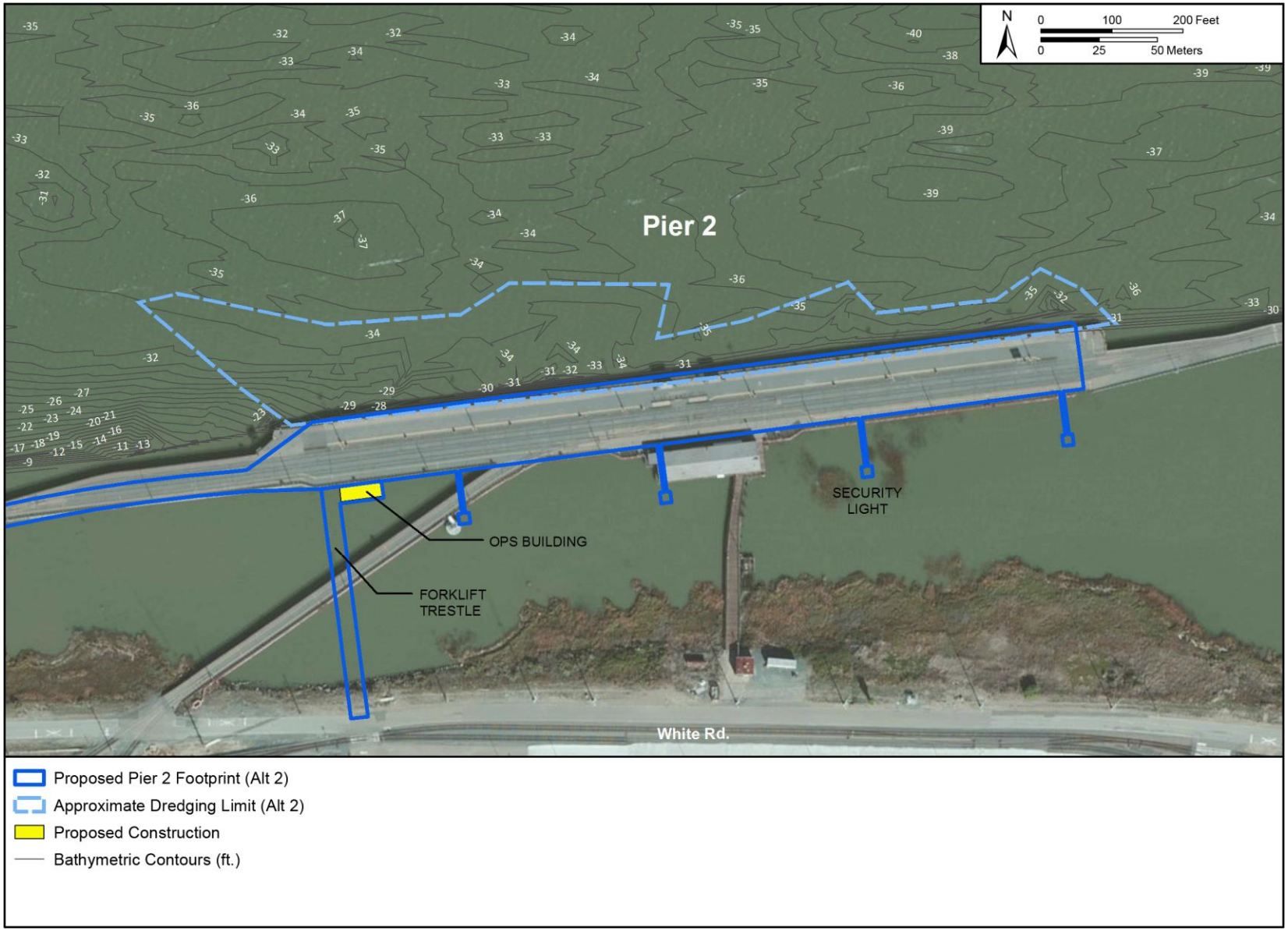


Figure 2-9. Pier 2 – Maintenance Dredging Under Alternative 2

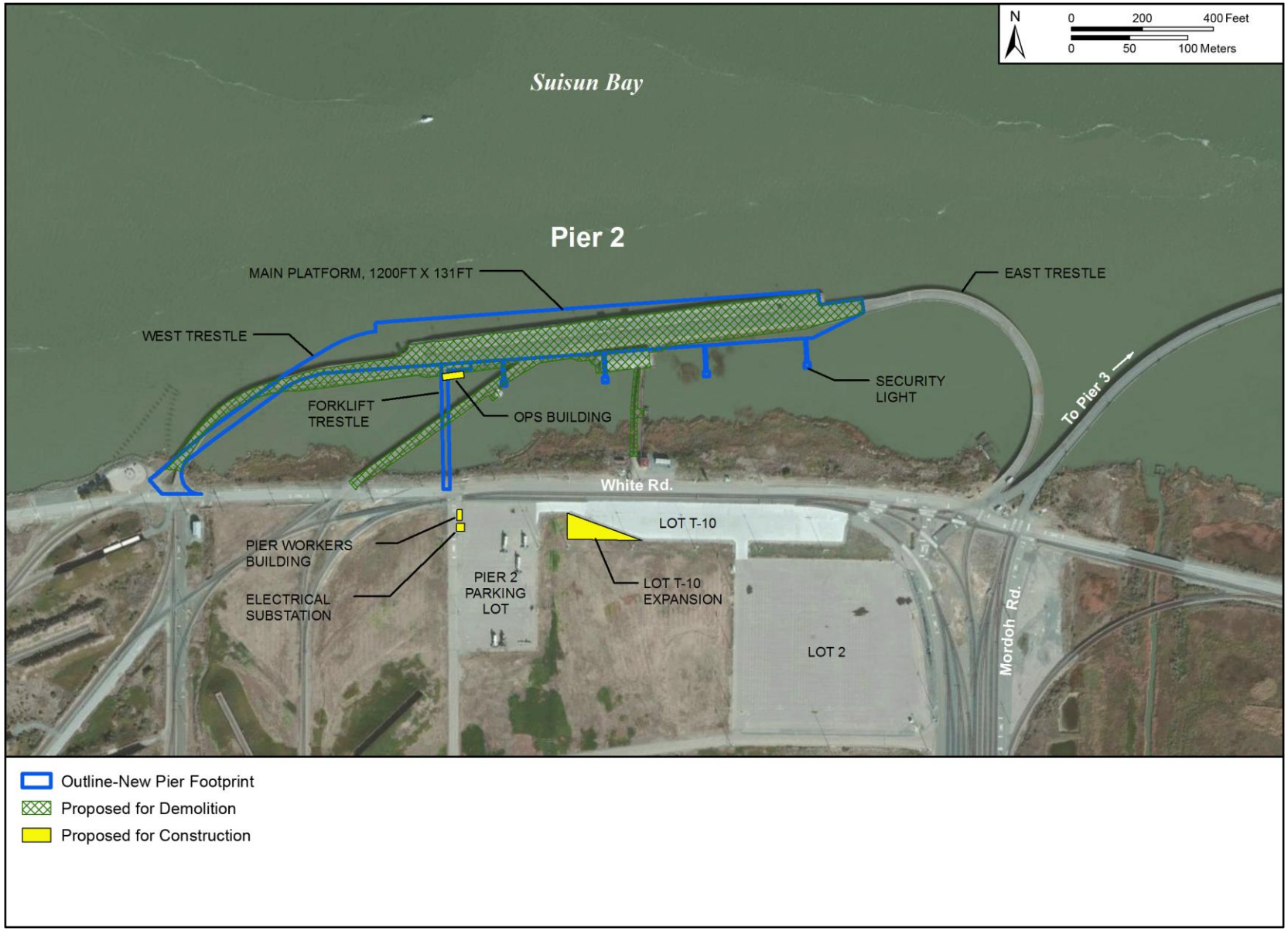


Figure 2-10. Pier 2 – Alternative 3 Reconstruction Plan

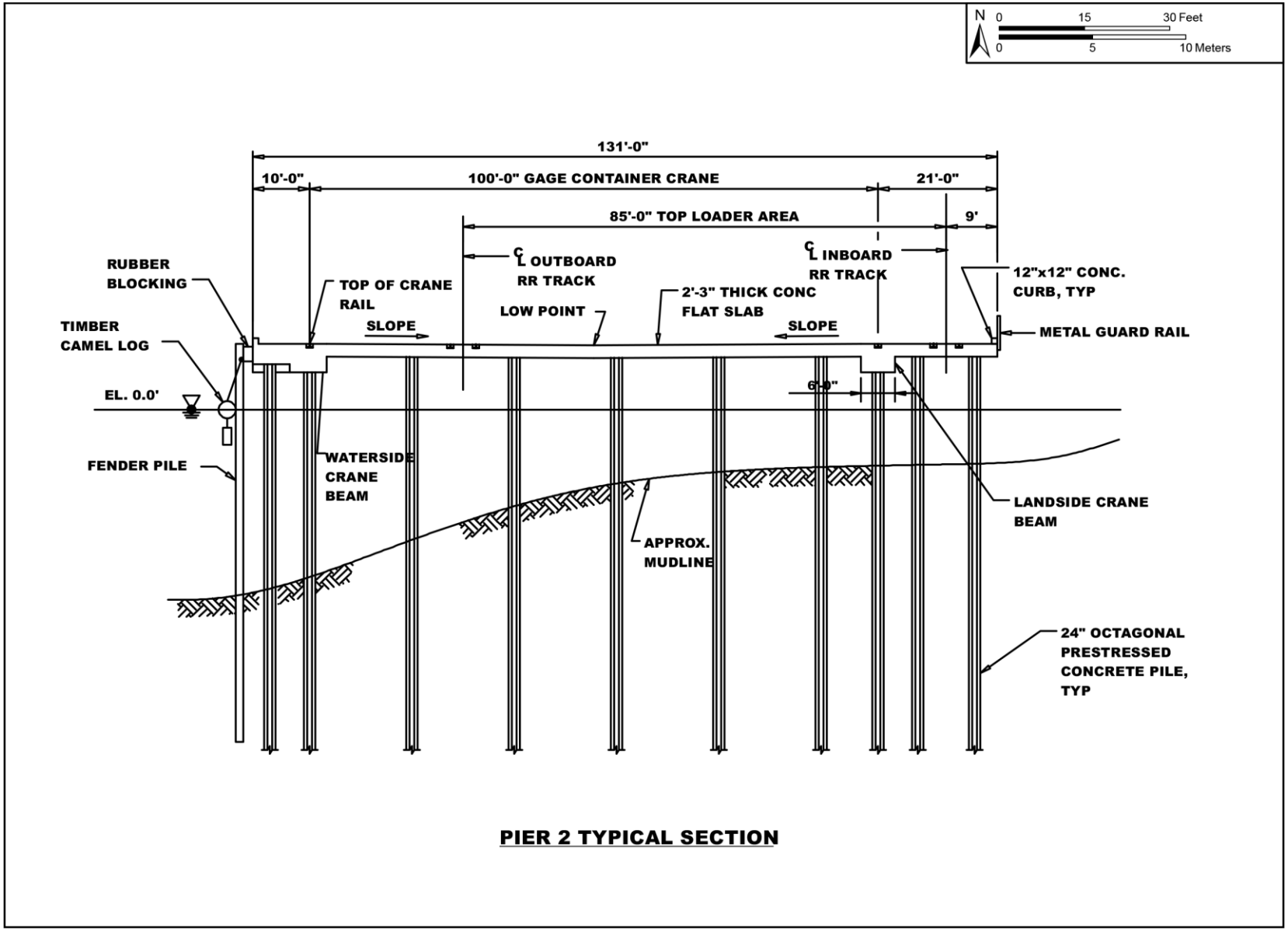


Figure 2-11. Pier 2 – Alternative 3 Cross-Section

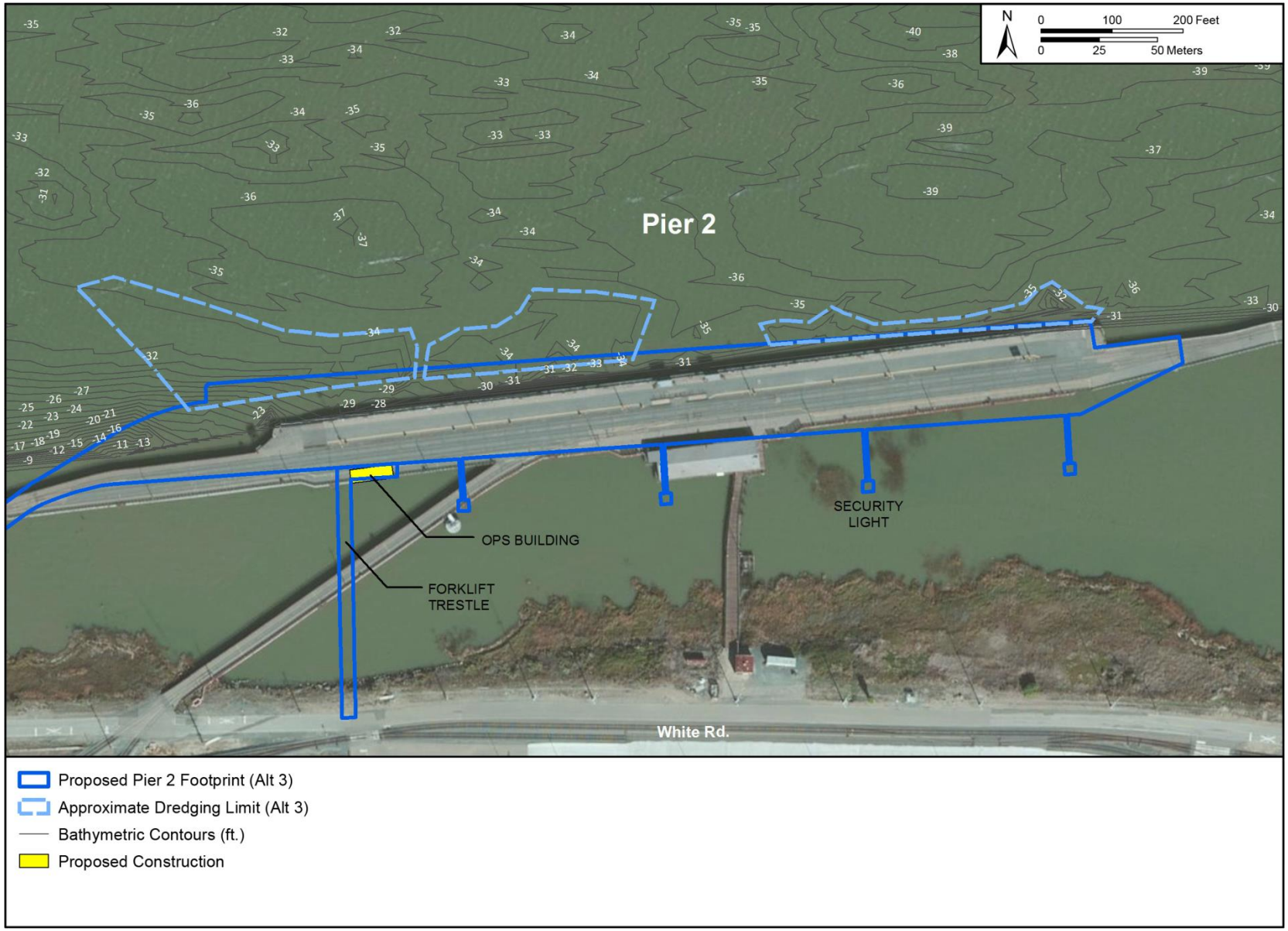


Figure 2-12. Pier 2 – Maintenance Dredging Under Alternative 3

2.4 NO ACTION ALTERNATIVE

CEQ regulations require analysis of a No Action Alternative in an EIS to provide a benchmark, enabling decision makers to compare the magnitude of the potential environmental effects caused by the proposed action and other alternative actions. The No Action Alternative is not required to be reasonable nor does it need to meet the purpose and need described in Section 1.2. An analysis of the No Action Alternative is required even if the agency is under a court order or legislative mandate to act.

Under the No Action Alternative for this EIS, the modernization and repair of Pier 2 and the repair of Pier 3 at MOTCO would not occur. The Army would be required to conduct regular detailed inspection of Pier 3 and review operations for restrictions and limitations that would need to be imposed to safely operate the pier within parameters of its remaining structural integrity. This would be expected to result in ever-increasing restrictions on the types and extent of operations that could be conducted safely at Pier 3. Without repairs, the operational life expectancy of Pier 3 is not estimated to extend beyond 2019 and further loss in structural viability preceding that could result in further loss of operational capability well in advance of 2019.

Under the No Action Alternative, dredging at Pier 2 would not be required as it would continue to be non-operational. Based on summer 2012 bathymetric data, dredging at Pier 3 would not be required.

Since Pier 2 is currently non-operational and the operational life of Pier 3 is not expected to extend beyond 2019, the Army would meet zero percent of its designated security mission at MOTCO and ammunition movement handling capability for the West Coast would be severely impaired under the No Action Alternative. Within a few years, the DOD would lose 75 percent of its West Coast pier-side ammunition handling capability, significantly limiting its ability to conduct and support contingency operations in the Pacific theater.

2.5 PREFERRED ALTERNATIVE

This EIS analyzes three action alternatives and the No Action Alternative. Based on a thorough review of the alternatives, the Army has determined Alternative 1 to be its Preferred Alternative. Alternative 1 accomplishes all of the basic requirements for modernizing Pier 2 and re-orients the pier to provide more efficient access for the types of vessels that use the pier. No changes in the number of loading and unloading missions executed at MOTCO would occur under the proposed action; therefore, there would continue to be approximately five missions at MOTCO per year with each mission event totaling approximately 36 days of port operations activity.

Factors that influenced selection of Alternative 1 as the Preferred Alternative included impact analysis presented in the EIS and the operational flexibility afforded by rotating the new pier so the west end is approximately 48 feet further into deeper waters. Alternative 1 would result in a

989 SF reduction of the west trestle and a net decrease in the overall pier facility footprint of about 27,222 SF, which would result in an overall reduction in the overwater footprint that covers shallow water habitats. In conclusion, Alternative 1 was selected as the Preferred Alternative because it meets the purpose and need of the proposed action, and balances environmental impacts with operational flexibility.

2.6 COMPARISON OF PIER 2 ALTERNATIVES

Table 2.5-1 provides a comparison of the major components of the three Pier 2 action alternatives.

Table 2.5-1. Comparison of Pier 2 Alternatives

Project Element	Alternative 1	Alternative 2	Alternative 3
Waterside Construction			
Pier	95,000 SF (95 ft x 1,000 ft)	95,000 SF (95 ft x 1,000 ft)	157,200 SF (131 ft x 1,200 ft)
Loading Capacity	600 PSF	600 PSF	1,000 PSF
Change in Footprint from Existing Pier 2	-27,222 SF	-27,081 SF	+35,354 SF
Change in West Trestle Size from Existing Pier 2	-989 SF	-2,734 SF	+7,006 SF
24” Octagonal Pre-stressed Concrete Piles	876	868	1,064
16” and 18” Square Concrete Piles (Reused from Pier 2)	125	125	150
Concrete	14,338 CY	14,213 CY	21,948 CY
Wharf Reinforcing Steel	2,150 Tons	2,132 Tons	3,292 Tons
Container Cranes	(2) 80 LT/80 Gage	(2) 80 LT/80 Gage	(2) 80 LT/100 Gage
Crane Rail	2,000 LF	2,000 LF	2,400 LF
Train Rails	0 (Removed)	0 (Removed)	8,000 LF
Rubber Blocking for Fender System	1,000 LF	1,000 LF	1,200 LF
Camel Log for Fender System	1,000 LF	1,000 LF	1,200 LF
Metal Guardrails	4,156	4,056	4,156
Guardrail Posts	706	688	706
Operations Office/Break Room	1,500 SF	1,500 SF	1,500 SF
Light Platform Catwalk (Timber)	4	4	4
Security Lights (100 ft steel poles with 10 lights each)	4	4	4
Oil/Water Separator	Yes	Yes	Yes
Closed-Circuit Television	Yes	Yes	Yes
Lightning Protection	Yes	Yes	Yes
Maintenance Dredging	750 CY	3,800 CY	1,450 CY

Table 2.5-1. Comparison of Pier 2 Alternatives

Project Element	Alternative 1	Alternative 2	Alternative 3
Waterside Demolition			
Creosote-Treated Timber Piles	4,514	4,514	4,514
Concrete 18” Apron Piles	136	136	136
Concrete 16” Fender Piles	118	118	118
Timber Pile Caps	1,549 LF	1,549 LF	1,549 LF
Concrete Pile Caps	63 CY	63 CY	63 CY
Pile Cap Blocks	660 LF	660 LF	660 LF
Bracing	2,850 LF	2,850 LF	2,850 LF
Stringers	5,623 LF	5,623 LF	5,623 LF
Concrete Girder	402 CY	402 CY	402 CY
Columns	624 LF	624 LF	624 LF
Wooden Curb	240 LF	240 LF	240 LF
Concrete Bullrail	171 CY	171 CY	171 CY
Guard Rail	3,870 LF	3,870 LF	3,870 LF
Guard Posts	650	650	650
Wood Decking Boards	160,000 SF	160,000 SF	160,000 SF
Concrete Decking	648 CY	648 CY	648 CY
Asphalt Deck Overlay	122,800 SF	122,800 SF	122,800 SF
Train Rails	12,925 LF	12,925 LF	12,925 LF
Piping for Utilities	12,235 LF	12,235 LF	12,235 LF
Mooring Gear (Bollards, Bitts, Cleats)	21	21	21
Steel Splices	250	250	250
Sheet Pile	84 LF	84 LF	84 LF
Concrete Fire Wall	14,637 SF	14,637 SF	14,637 SF
Timber Fire Wall	3,859 SF	3,859 SF	3,859 SF
Light Poles	22	22	22
Building A-21	5,782 SF	5,782 SF	5,782 SF
Landside Construction			
Improve White Road	31,500 SF	31,500 SF	31,500 SF
Improve West Approach	11,500 SF	11,500 SF	11,500 SF
Lot T-10 Expansion	39,500 SF	39,500 SF	39,500 SF
Electrical Substation	12 KV	12 KV	12 KV
Sewage Lift Station	Yes	Yes	Yes
Diesel Generators	(2) 1,500 KW	(2) 1,500 KW	(2) 1,500 KW
Concrete Pads	8,000 SF	8,000 SF	8,000 SF
Power Line Burial	7,020 SF	7,020 SF	7,020 SF
Move Building 100	Yes	Yes	Yes
Landside Demolition			
Abandoned Pumping Station	1	1	1
Building 160	576 SF	576 SF	576 SF

Notes: CY = cubic yards; ft = feet; KV= kilovolt; KW = kilowatt; LF = linear feet; LT = long ton; NA = not applicable; PSF = pounds per square foot; SF = square feet

2.7 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM FURTHER EVALUATION

In accordance with 32 CFR Part 651 and 40 CFR Section 1502.14(a), the following discussion highlights alternatives that were initially considered in the planning process but were not carried forward for detailed evaluation. There were two alternatives considered but not carried forward for detailed evaluation.

- **Modernization of Pier 3 and Repair of Pier 4:** An alternative was developed that focused on fully modernizing Pier 3 and repairing Pier 4. However, a March 2013 special inspection report for Pier 3 found heavy to very heavy marine borer damage on nearly 50 percent of 173 timber piles along the Main Approach and Platform areas. In addition, some areas of minor rot and isolated areas of moderate to heavy rot were found. Therefore, the current, degraded condition of Pier 3 indicates that it is beyond routine maintenance and would require significant repairs or replacement (KCI Technologies 2013). Since Pier 4 was built at approximately the same time and with similar methods and materials as Pier 3, it is anticipated a similar level of marine borer infestation and timber pile deterioration is occurring at Pier 4. At a minimum, the existing creosote treated timber piles would need to be replaced with concrete pre-stressed piles or encapsulated and protected from further damage. However, due to its proximity to private industrial operations adjacent to the eastern boundary, Pier 4 has limited net explosive weight handling capability. In order to shift the focus of ammunition movements at MOTCO to Piers 3 and 4, the DOD would be required to purchase the parcel of land adjacent to its eastern boundary, which is currently owned by General Chemical. This would allow for the expansion of ESQD eastward and permit increased ammunition handling capability at Pier 4 without danger to the public.

  The timing and phasing of this alternative make it a non-viable option. Pier 3 has a short remaining functional life span of approximately 6 years. Acquisition of the General Chemical parcel, which would likely include condemnation proceedings, would have to take place prior to committing to repairs at Pier 4 and the work at Pier 4 would need to be complete with Pier 4 fully functional prior to work beginning at Pier 3 to avoid a significant reduction in mission capability. Given the current economic climate it is not reasonable to assume that funding for the land purchase and repairs to both piers can be secured within the remaining operational life of Pier 3.

- **Conducting Ammunition Movements through an Alternate Port:** Ammunition movements currently conducted at MOTCO could be temporarily redirected to alternate ports in Washington on the West Coast or North Carolina on the East Coast, but neither of these ports meets the mission capacity or logistic responsiveness necessary to support contingency operations in the Pacific theater. Naval Magazine (NAVMAG) Indian Island in Hadlock, Washington functions as the ordnance management center for Navy fleet and shore stations in the Pacific Northwest Region. It has one ammunition pier

large enough to accommodate a Nimitz class aircraft carrier (1,040 feet long, 91,487 to 96,358 tons), and two explosives anchorages. It can provide technical support for both non-containerized and containerized ordnance transshipment; however, NAVMAG Indian Island does not have the net explosive weight handling capability that MOTCO has and cannot meet the Army's current mission requirement in addition to the Navy's mission to provide logistics, technical and material support for ordnance and ordnance-related equipment and processes, and logistics management for the joint services of the Pacific command. Military Ocean Terminal Sunny Point (MOTSU) in Southport, North Carolina could potentially meet the requirements for MOTCO's mission in addition to their existing workload. However, the additional resources and transit time needed to move ammunition from the Atlantic Coast to the Pacific theater of operations negates this alternative from being a viable option.

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3.0 AFFECTED ENVIRONMENT

The National Environmental Policy Act and associated regulations promulgated in 40 CFR Parts 1500–1508 and 32 CFR Part 651 require an EIS to discuss impacts in proportion to their significance and present only enough discussion of the environment to be affected or created by the alternatives to understand the potential effects. Valued environmental components are considered the resources, ecosystems, and human communities important in a specific region. This chapter addresses the general conditions and nature of the valued environmental components potentially affected by the proposed action and alternatives. The port operations analysis (provided as the first subsection) is not considered a resource area, but is included in the analysis to provide context for the resource analyses that follow. These relevant general baseline conditions establish the environmental setting against which the evaluation of potential environmental effects is presented in the environmental consequences discussions in Chapter 4.

3.1 PORT OPERATIONS

As the current primary operational pier at MOTCO, Pier 3 is the axis of all baseline loading and unloading operations at MOTCO (Figure 3-1). Pier 3 is equipped with two gantry cranes (specialized pier cranes for handling intermodal containers) that were installed in 1999. These cranes have a lifting capacity of 40 long tons (89, 600 pounds) with the use of a spreader bar and 50 long tons (112,000 lbs) with the use of slings. Each crane is limited to approximately 12–15 lifts per hour. At Piers 2 and 4, cargo is loaded and unloaded using ship's gear. The productivity of each vessel varies, but ship's gear is typically less efficient than ship-to-shore gantry cranes.

During missions, staging areas are used for temporary holding of cargo as vessels are being loaded or unloaded. Ammunition staging is conducted at holding pads 1 through 8; 5-acre Lot 2; 1.5-acre T-10 transfer pad; and barricaded rail sidings. There are up to 27 acres of open storage and inert staging throughout MOTCO.

Gantry crane

Tractor with bomb cart

Reach stackers

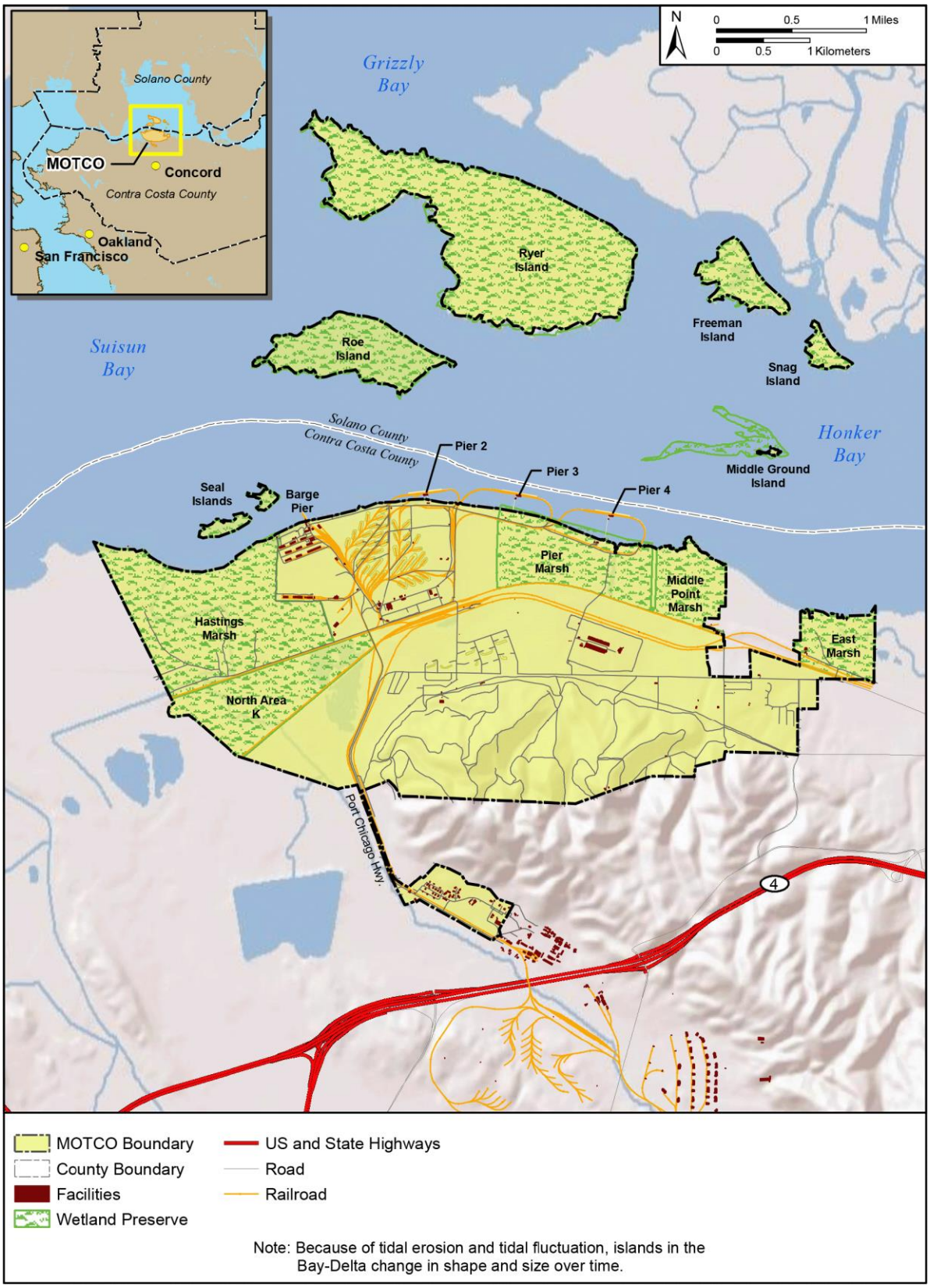


Figure 3-1. MOTCO Property

Material handling equipment used in cargo handling includes reach stackers, side loaders, and fork lifts. Primarily, reach stackers and side loaders are used for lifting and stacking containers and the fork lifts are used for handling non-containerized cargo. The rated capacity of the reach stackers is 65,000 lbs. There are various sizes of forklifts used throughout the facility with rated capacities ranging from 4,000 lbs to 33,000 lbs. To transport cargo between the staging and the loading and unloading areas, locomotives and railcars are used along the network of rail tracks. For transport along the designated truck routes, MOTCO uses a fleet of tractors, trailers, and bomb carts. The tidal range around the MOTCO piers is +/- 8 feet. Depending on the vessel type, the scheduling of inbound and outbound vessels can be limited to times when water depth is sufficient for transit.

The DOD mainly uses 20-foot end-opening containers to transport munitions or general cargo. The ammunition restraint container is capable of transporting 39,015 lbs of ammunition. The general cargo container is capable of transporting 40,100 lbs of general cargo. The average container tare weight (i.e., weight of an empty container) is 5,785 lbs for ammunition and 4,700 lbs for cargo, so the total gross weight per container is 44,800 lbs for both general cargo and munitions (Army 2013).

Each of the three piers was constructed with a main deck plus raised platform along the waterside length of the pier. The dual-level pier design and the track layout at the piers were originally designed for a non-containerized handling operation. By design, each pier accommodates three rows of boxcars by which forklifts could work cargo from the shipside loading dock. This design allowed for cargo pallets to be moved into or out of any of the three rows of side-by-side boxcars, when connected with spanner ramps laid between each boxcar's opened center doors. However, MOTCO has long since accommodated primarily containerized cargo and the current configuration is suboptimal in terms of the usable space for the forklifts and container handling equipment to move about, which decreases the efficiency of the baseline cargo handling operations. The existing Pier 2 exit has a sharp turn and vehicles must travel at slower speeds than typically needed to ensure safe operations.

View of dual-level design, Pier 2

Another view of dual-level design and gantry crane, Pier 3

Main platform, Pier 3

The past 10 years of operational data were reviewed to establish the baseline cargo operations. The number of loading and unloading missions executed at MOTCO annually has remained relatively constant at approximately five missions per year. An average mission event includes 36 days of port operations activity: 6 days of preparation, 7 days of vessel arrival/departure and loading/unloading, and 23 days of port clearance operations. Whereas the preparation days can be conducted well in advance of a mission event, the remaining 30 days are conducted consecutively (Personal communication, Cameron, P., 2013).

The average number of days in a mission event has steadily increased over the past five years. Factors contributing to the trend of increasing duration of missions in more recent data include the following.

- Due to ongoing maintenance issues, the ship-to-shore gantry cranes located on Pier 3 are currently operating at an estimated rate of 12–15 lifts per hour; average crane productivity is generally expected to be approximately 30 lifts per hour.
- Certain traffic restrictions affect transport times within the terminal. Munitions on trucks may not cross any commercial rail crossings; rather, they must use the bridge on Taylor Boulevard that goes over the BNSF and UPRR rail lines. If the holding pads are being used, transit time can take as much as 16 minutes per truck. In addition, one-way traffic patterns onto and off of the piers, plus moving through security barriers at reduced speeds for munitions-laden trucks causes transit times to be up to 12 minutes for one loop to/from Pier 3 to Lot T-10/Lot 2.
- The April 2013 inspection of Pier 3 indicated significant infestation of marine borers in nearly 50 percent of the timber piles and some areas of minor rot and isolated areas of moderate to heavy rot. Current design criteria per the Unified Facilities Criteria *Design: Piers and Wharves* (UFC 4-152-01) suggests a 600 PSF area load design value for ammunition piers. The current maximum load capacity of Pier 3 components is at 306 PSF in the main approach and from 488–529 PSF in the main platform. Consequently, the Army now prohibits some types of equipment from operating on these parts of the pier and restricts other types of equipment to certain areas of the pier based on loading capacity.

3.2 EARTH RESOURCES

3.2.1 Soils/Sediments

3.2.1.1 Surface Soils

The U.S. Department of Agriculture Natural Resources Conservation Service (NRCS) has mapped 20 soil types at MOTCO. The Tidal Area is largely composed of silty clay and saline muck soils that are very deep and poorly drained. Because these soils have poor drainage, they are subject to freshwater flooding and ponding following heavy rainfall and surface runoff from

the adjacent inlands. The soils located on hill slopes range from somewhat excessively-drained to moderately well-drained. The proposed project area is not located in an area subject to the Farmland Protection Policy Act.

Erosion factor K indicates soil susceptibility to erosion. Other factors being equal, the higher the K factor, the more susceptible the soil is to erosion by water. At MOTCO, K factor values range from 0.02 to 0.69. For the purposes of this analysis, the soils were characterized as follows:

- Low erosion potential for soils – K factors less than 0.2,
- Moderate erosion potential for soils – K factors of 0.2 to 0.4, and
- High erosion potential for soils – K factors greater than 0.4.

Within the proposed action area, the soils have a K factor of null to low. Specifically, the landside area near Pier 2 has a null erosion potential, while the landside area near Pier 3 has a low erosion potential. Figure 3-2 depicts the soil types within the proposed action area.

Soils in much of the developed area of MOTCO are categorized by NRCS as Urban Land, which indicates that they are heavily developed (i.e., covered by at least 75 percent asphalt or buildings), and natural soil series do not occur in these areas (i.e., that portion that is not covered by asphalt or buildings is normally composed of fill material).

3.2.1.2 Submerged Sediments Dredge History

When NWSSBD Concord was established, it was dredged extensively. Since then, dredging has occurred on a regular basis at the east and west lighter moorings, the Barge Pier, and Piers 2, 3, and 4 (Table 3.2-1). Maintained depths were -32 feet MLLW at Piers 2, 3, and 4; -14 feet MLLW at the Barge Pier and east lighter mooring; and -22 feet MLLW at the west lighter mooring. Since 1943, a total of 1.8 million CY of dredge materials were removed from NWSSBD Concord (USACE 1995, 1975). Prior to Fiscal Year (FY) 75, the dredged materials were disposed on land at NWSSBD Concord or in nearby water areas. During the FY75 dredging event, however, the dredged materials were deposited in Carquinez Strait (USACE 1975). In 1986, NWSSBD Concord proposed to place 285,000 CY of dredge material on Site S-20A, a 12-acre upland site located at the intersection of Port Chicago Highway and Driftwood Way on NWSSBD Concord (SFBRWQCB 1986). According to SFBRWQCB Order Number 86-54, the dredge material disposal area was to have been diked to form a settling pond. The return discharge water was to be monitored at the control structure prior to discharge to Suisun Bay through an unnamed slough to the bay (SFBRWQCB 1986). However, there are no records available from the USACE or the SFBRWQCB to confirm this dredging took place.

An EIS was prepared in 1974 for the construction of a container handling facility at Pier 2. The action involved the dredging of an approach channel between Suisun Bay Channel and Pier 2. The dredging involved the removal of 250,000 CY of material; the proposed disposal site was the 290-acre land site adjacent to Piers 3 and 4 (USACE 1975).

Figure 3-2. Soils Types

Table 3.2-1. Historic Dredging Information

Fiscal Year	Quantity Removed (Cubic Yards)	Dredging Method
1943	620,000	Clamshell
1944	298,000	Clamshell
1945	70,500	Clamshell
1950	82,300	Clamshell
1951	48,500	Clamshell
1953	37,000	Clamshell
1957	108,700	Clamshell
1959	20,900	Clamshell
1960	69,700	Clamshell
1962	40,000	Clamshell
1965	52,000	Clamshell
1967	36,800	Clamshell
1969	30,000	Hydraulic Pipeline
1970	63,200	Clamshell
1975	78,000	Clamshell
Unknown*	42,759	Unknown
Unknown*	42,759	Unknown
Unknown*	42,759	Unknown
1981*	42,759	Unknown
1986**	Unknown	Unknown

Sources: USACE 1995, 1975

Notes: * As discussed in USACE (1995), between 1957 and 1981 a total of 670,500 CY was removed at NWSSBD Concord. However, it is believed there were three additional dredging events between 1975 and 1981 (i.e., 13 events between 1957 and 1981). The quantity removed reflects the average of total amount dredged over four events.

** Project drawings show plans to perform dredging in 1986, but actual confirmation records are not available to confirm dredging occurred in 1986.

3.2.2 Seismic Conditions

As with the rest of the San Francisco Bay area, MOTCO lies within one of the most seismically active regions of the United States. There are four Seismic Zones; MOTCO is in Zone 4, which has the highest potential for earthquake damage. Based on estimates from geologists, the fault systems in Contra Costa County have a probable earthquake magnitude of between 5.0 and 8.5 on the Richter scale (Contra Costa County 2005). The Concord-Green Valley Fault is located just east of MOTCO (California Geologic Survey 2002). In addition to bodily injury and property damage, seismic activity associated with faults can cause geologic hazards such as liquefaction and landslides. At MOTCO, there is a high liquefaction probability for the portions of the Tidal Area with artificial fill Quaternary deposits; a moderate liquefaction probability for areas of the Tidal Area and Inland Area with Quaternary deposits of Bay mud and alluvial deposits; and a low to very low liquefaction potential for the Los Medanos Hills and associated alluvial fan area (USGS 2006). Inundation due to related tsunamis is also a hazard at MOTCO.

3.2.3 Mineral Resources

Approximately 65 percent of the Tidal Area (including all seven offshore islands) is under split estate rather than fee simple ownership. For these split estate lands, the surface estate is federally owned and the subsurface mineral estate is privately owned. Only one mineral estate is currently under development. There is an active natural gas field on Ryer Island operated by Veneco Inc. (California Division of Oil, Gas, and Geothermal Resources [DOGGR] 2003). There are no manned facilities on Ryer Island; the natural gas is accessed via directional drilling from a location in the Los Medanos Hills outside the MOTCO boundaries. Future requests for lease agreements for mineral exploration, development, and production and surface access for such purposes to privately owned mineral estate underlying MOTCO lands would be subject to a number of requirements, including DOD/Army safety and security requirements, California DOGGR regulatory requirements, and NEPA. Development of MOTCO split estate lands by the Army could result in competing or infringement of development and access rights held by the private owner(s) of the mineral estate, depending on the title deed and conveyance parameters (MOTCO 2011).

3.3 WATER RESOURCES

Water resources as defined in this EIS are sources of water available for use by humans, flora, or fauna, including surface and groundwater, nearshore waters, and wetlands. Surface water resources are important for economic, ecological, recreational, and human health reasons. Groundwater may be used for potable water, agricultural irrigation, and industrial applications. Groundwater is classified as any source of water beneath the ground surface and is the primary source of potable water used for human consumption. Nearshore waters can be directly affected by human activity and are important for human recreation and commerce. Nearshore waters provide a unique habitat for a variety of plants and animals. Sea grasses and other aquatic plants living in the nearshore waters provide food and shelter for many species of fish and shellfish. Many marine organisms, including most commercially valuable fish species, depend on nearshore waters at some point during their development (USEPA, 1998). Nearshore waters provide habitat for 80 percent of the fish species in the United States (USEPA, 1998). Nutrients from sources such as sewage, fertilizers, detergents, and atmospheric deposition along with sediment and other suspended solids can affect nearshore water quality. These areas close to the shoreline are subject to surface water runoff from urban and industrial areas often without the benefit of dilution, which can adversely affect the water quality in these areas. Wetlands are habitats that are subject to permanent or periodic inundation or prolonged soil saturation, and include marshes, swamps, and similar areas. Areas described and mapped as wetland communities may also contain small streams or shallow ponds.

A number of agencies have regulatory oversight for the project area. The state agencies include the SFBRWQCB, Water Resources Control Board (WRCB), San Francisco BCDC, California

Department of Fish and Wildlife (CDFW), and the State Lands Commission. Federal agencies with purview to regulate in-water activities in the project area are the USACE, USEPA, USFWS, and the NMFS.

3.3.1 Surface Water

MOTCO is located in the East San Francisco Bay region, approximately 10 nautical miles inland past the Carquinez Strait that connects Suisun Bay to San Pablo Bay. The San Francisco Bay Region is one of nine basins having water quality control plans with state agency oversight. The San Francisco Bay Region incorporates 1,100 square miles of the 1,600-square mile San Francisco Bay Estuary of which Suisun Bay is a part. Suisun Bay and San Pablo Bay make up the hydrological feature known as the North Bay. Other bays in the San Francisco Bay Estuary include Central Bay and South Bay, which are considered to be hydrologically distinct from the North Bay. San Pablo Bay is characterized by a deep channel surrounded by broad shoals. San Pablo Bay is connected to Suisun Bay by the narrow Carquinez Strait. Suisun Bay is a shallow basin consisting of braided channels and shallow shoals (WRCB 2011)

The San Francisco Bay Estuary, combining San Francisco Bay and the San Joaquin-Sacramento Delta, make up the largest estuary on the West Coast of the United States. This estuary combines freshwater from the Central Valley of California with the saline water of the Pacific Ocean (WRCB 2011). This estuary supports a wide variety of complex surface water conditions. Deeper water areas of the bays typically have greater salinity levels than the relatively shallow expanses that typify this bay. Similarly, water temperatures vary widely from the narrow deeper water to the shallow surface waters. The San Joaquin and Sacramento Rivers drain into Suisun Bay from the east. These two rivers contribute the majority of the freshwater flow into the bay. However, due to construction of dams, canals, reservoirs, and other water control structures, much of the freshwater that historically flowed into the bay has been trapped before reaching Suisun Bay, thereby reducing the natural freshwater contribution into the bay and the San Francisco Bay Estuary as a whole. Freshwater contribution is highly seasonal with more than 90 percent of the annual rainfall runoff occurring between October and April (WRCB 2011).

According to the USEPA, in 2010 the surface water quality in Suisun Bay was considered impaired for its designated use of commercial and sports fishing and for estuarine habitat (USEPA 2010). The cause of the impairment is the presence of contaminants such as chlordane, dichlorodiphenyl trichloroethane (DDT), dieldrin, dioxin-like polychlorinated biphenyls (PCBs), furan compounds, mercury, selenium, and PCBs. The probable sources contributing to the impairment designation due to chlordane, DDT, dieldrin, mercury, and dioxin-like PCBs are non-point source contributions to the surface waters (USEPA 2010). Industrial point source discharges are considered the probable source for some of the mercury and selenium present in these surface waters (USEPA 2010). Atmospheric deposition is listed as the source for dioxin, furan compounds, and mercury (USEPA 2010).

Surface freshwater features in the Tidal Area all ultimately flow northward, emptying into Suisun Bay via natural creeks, artificial ditches, canals, and sloughs. Much of this flow must also pass through the numerous culverts, tide gates, and water control structures present throughout the Tidal Area. The origin of the freshwater is also varied; some comes from groundwater springs in the Los Medanos Hills, or arrives as channel flow within the Mount Diablo / Seal Creek drainage, or is simply precipitation trapped in impermeable depressional areas.

The vast majority of surface water in the Tidal Area is brackish in nature, as Suisun Bay is an estuary where tidal mixing of saltwater from the Pacific Ocean and freshwater from the Sacramento-San Joaquin Delta occurs. In general, any area within the Tidal Area lower than 9 feet mean sea level (MSL) is subject to tidal flooding. The sloughs and ditches found within the salt marshes of the Tidal Area are also largely brackish, as they are both flushed by tides while also intercepting upland freshwater flows.

Brackish waters from Suisun Bay inundate the tidal marsh during high tides via a network of natural and artificial channels. Extensive ditching and berms located along ditches have resulted in muted tidal inundation/circulation in most of MOTCO's marshlands. In addition to the prior diking and filling, much of the natural drainage pattern and tidal influence has been altered by the roadways, rail lines, and Contra Costa Canal that traverse the Tidal Area. These features have altered drainage and runoff in some areas.

An installation-wide Stormwater Pollution Prevention Plan (SWPPP) addresses individual NPDES permit requirements for the ongoing industrial activities that occur at MOTCO. The SWPPP consists of three major components: stormwater monitoring, best management practice (BMP) implementation, and site compliance evaluations. The main objective of the installation-wide SWPPP is to provide information as to how MOTCO controls the discharge of pollutants from stormwater and to provide practical guidance to assist with implementing the SWPPP (MOTCO 2001). MOTCO is in the process of updating the 2001 SWPPP to reflect current property uses and regulatory requirements. The update of the SWPPP includes changes relative to the closure and removal of 10 aboveground storage tanks (AST) as well as the addition of one new AST, capping of the old landfill along the south side of Building A-31, and installing a chain link fence from Gate 5 in a west direction to the west end of Froid Road. The drainage plan for MOTCO has not changed since the drainage map was last updated in 2001 (Personal communication, Audinis, J., 2013).

3.3.2 Groundwater

Groundwater is defined as subsurface water that occurs beneath the water table in soils and geologic formations that are fully saturated. Groundwater is an important part of the hydrologic system in the Suisun Bay area. A variety of historical uses of groundwater and groundwater management have occurred in the vicinity of MOTCO. Groundwater use in the vicinity of MOTCO includes potable use, irrigation, and industrial processing. Coastal groundwater quality

can be degraded through the intrusion of saltwater where there is insufficient hydrologic pressure from freshwater in the soils to prevent the introduction of saline water into fresher groundwater reserves. Localized introduction of contaminants through accidental or intentional release of contaminants can also degrade groundwater. Degradation of water quality reduces the potential groundwater basin yield thereby diminishing production from existing groundwater sources and limiting future groundwater development.

Water supplies used at MOTCO are supplied by private utilities in the area that pump these supplies into storage reservoirs at MOTCO. The installation does not operate or maintain groundwater wells for potable or industrial use.

3.3.3 Wetlands

Wetlands are areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas (33 CFR Part 328[b]). Under the CWA, wetlands that have a direct connection, are adjacent to, or otherwise have a significant nexus to navigable waters are considered waters of the United States, and excavation or fill in such areas is subject to the permit requirements of Section 404 of the CWA, as administered by the USACE and USEPA. Section 401 of the CWA requires Water Quality Certification from the State's Regional Water Quality Control Board in conjunction with the issuance of Section 404 permits.

Wetlands and other waters are broadly classified according to geomorphology and hydrology as lacustrine (lakes and ponds), riverine (within a channel), palustrine (other freshwater wetlands), and estuarine (ocean-influenced) (Cowardin et al. 1979). Wetlands at MOTCO are predominantly estuarine by virtue of connections to Suisun Bay. There are small areas of palustrine wetlands, which, by definition, receive only freshwater inflows, but because of saline soils and poor drainage they often support brackish vegetation similar to that of estuarine habitats. National Wetland Inventory (NWI) data indicate that approximately 3,175 acres of potential wetlands occur on MOTCO, including 404 acres of Estuarine Subtidal wetlands, 2,687 acres of Estuarine Intertidal wetlands, and 84 acres of Palustrine wetlands. The potential wetlands at MOTCO relative to the footprints of the current location of Piers 2 and 3 are depicted in Figures 3-3 and 3-4. NWI data is not ground-truthed, as it is national-scale mapping based entirely on soils, topography, and aerial photograph interpretation. A jurisdictional wetland delineation to assess the extent of federal and state jurisdiction was completed in May 2013 using NWI data. Near Suisun Bay, the delineated wetlands are located between the shoreline and surveyed wetlands boundary as shown in Figure 3-4. All tidally influenced estuarine wetlands and unimpaired drainages are assumed to be hydrologically connected to Suisun Bay and are, therefore, jurisdictional. Isolated palustrine wetlands may or may not be jurisdictional (USEPA and USACE 2008).

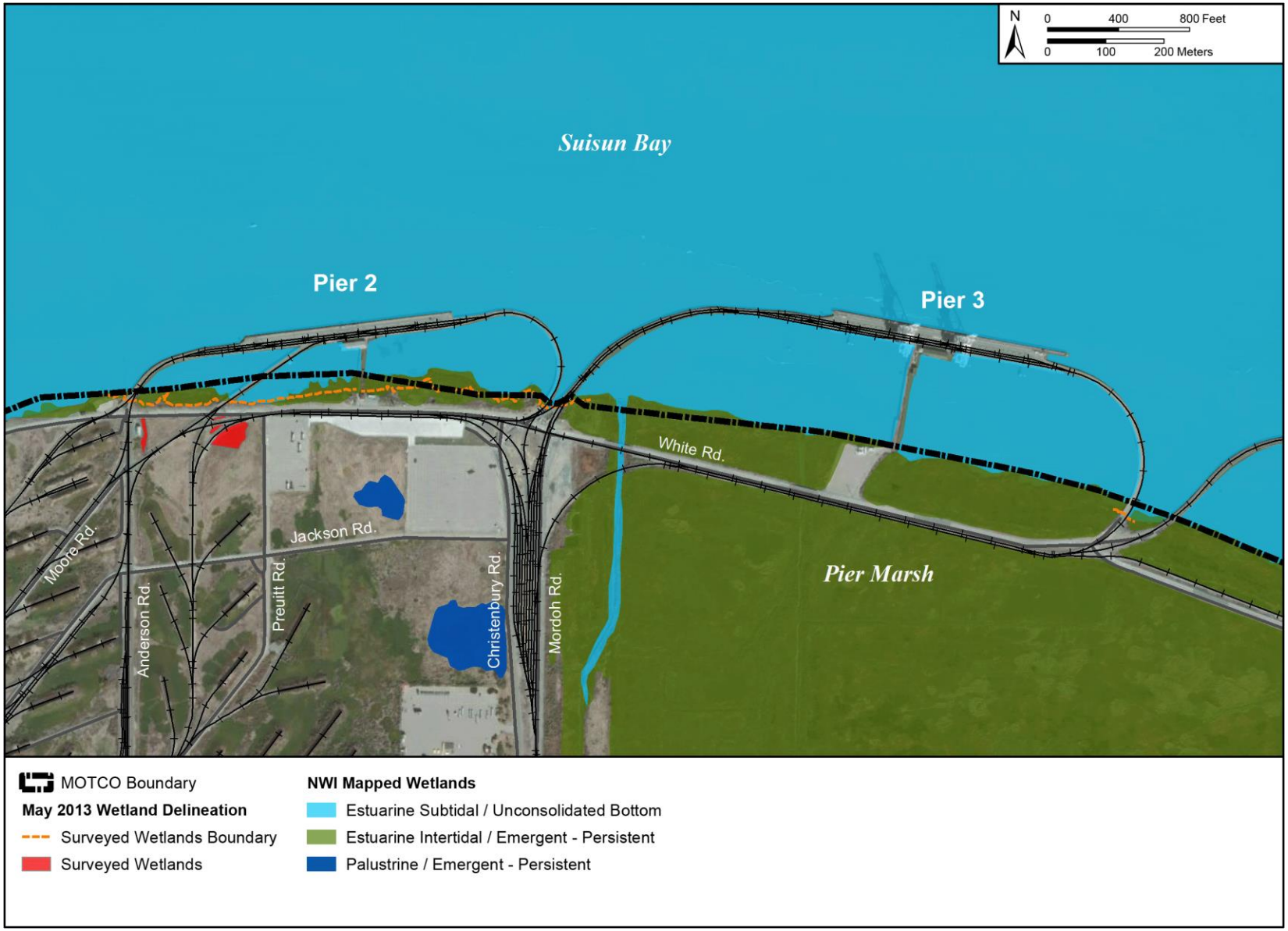


Figure 3-3. Potential and Delineated Wetlands Near Piers 2 and 3

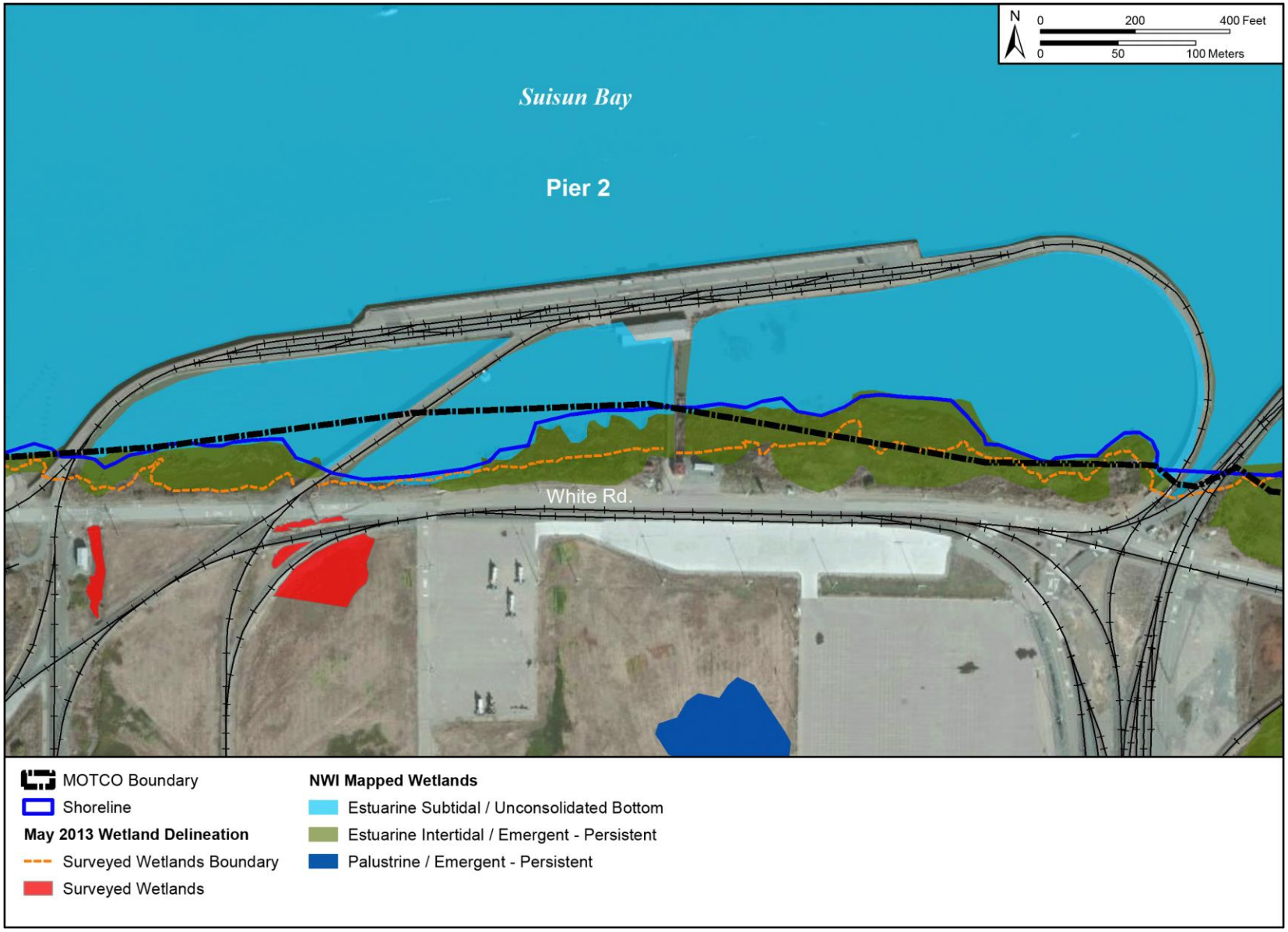


Figure 3-4. Potential and Delineated Wetlands Near Pier 2

The offshore islands (i.e., Roe Island, Ryer Island, Freeman Island, Snag Island, Middle Ground Island, and Seal Islands) and the majority of the marshlands at MOTCO (i.e., Hastings Marsh, Pier Marsh, Middle Point Marsh, East Marsh, and North Area K Marsh) are part of a Wetland Preserve Area. The Wetland Preserve Area, which includes Pier Marsh within the Tidal area at MOTCO (Figure 3-3), was first established through a memorandum of understanding (MOU) between the Navy and USFWS (1 February 1984) and is now a component of MOTCO's Integrated Natural Resources Management Plan (INRMP).

The State of California has a policy of no net loss of wetlands and requires all impacts to wetlands to be mitigated under Section 401 (State Water Quality Certification of USACE permits) of the CWA. However, USACE only requires Section 404 permitting for jurisdictional wetlands, which are defined as having a significant nexus to navigable waters; hence the state may assert jurisdiction over some water bodies not subject to Section 404 / USACE permit jurisdiction.

3.3.4 Floodplains

The 100-year floodplain represents those areas that could be inundated in the event of high flood water levels expected to occur once every 100 years from the combination of heavy rainfall, high tides, and storm surges. Development within the 100-year floodplain is constrained by regulatory requirements related to safety and environmental concerns. Executive Order 11988, *Floodplain Management*, directs federal agencies to provide leadership in avoiding direct or indirect development of floodplains, as well as to restore and preserve the natural and beneficial values of floodplains. Engineering methods can be used to reduce potential impacts from development in floodplains; however, the engineering costs involved with development in floodplains are often prohibitive.

Flood hazard areas at MOTCO for the Inland Area are based on mapping developed by the Federal Emergency Management Agency (FEMA). The Tidal Area floodplain has not been mapped by FEMA. As part of the development of MOTCO's Real Property Master Plan (RPMP) in 2011, the available 100-year floodplain map for areas located adjacent to the Tidal Areas as well as the Tidal Area's topographical information were used to determine what portion of land along the southern portion of Suisun Bay was within the 100-year floodplain (MOTCO 2011). As shown in Figure 3-5, a considerable portion of land along the southern border of Suisun Bay is comprised of 100-year floodplain. Most existing facilities in the Tidal Area are not located within the 100-year floodplain. Mount Diablo/Seal Creek drains the north slope of Mount Diablo, crosses under the Port Chicago Highway, and empties into the tidal marshes within MOTCO. Historical records indicate that flooding occurs in the Mount Diablo / Seal Creek watershed almost every year.

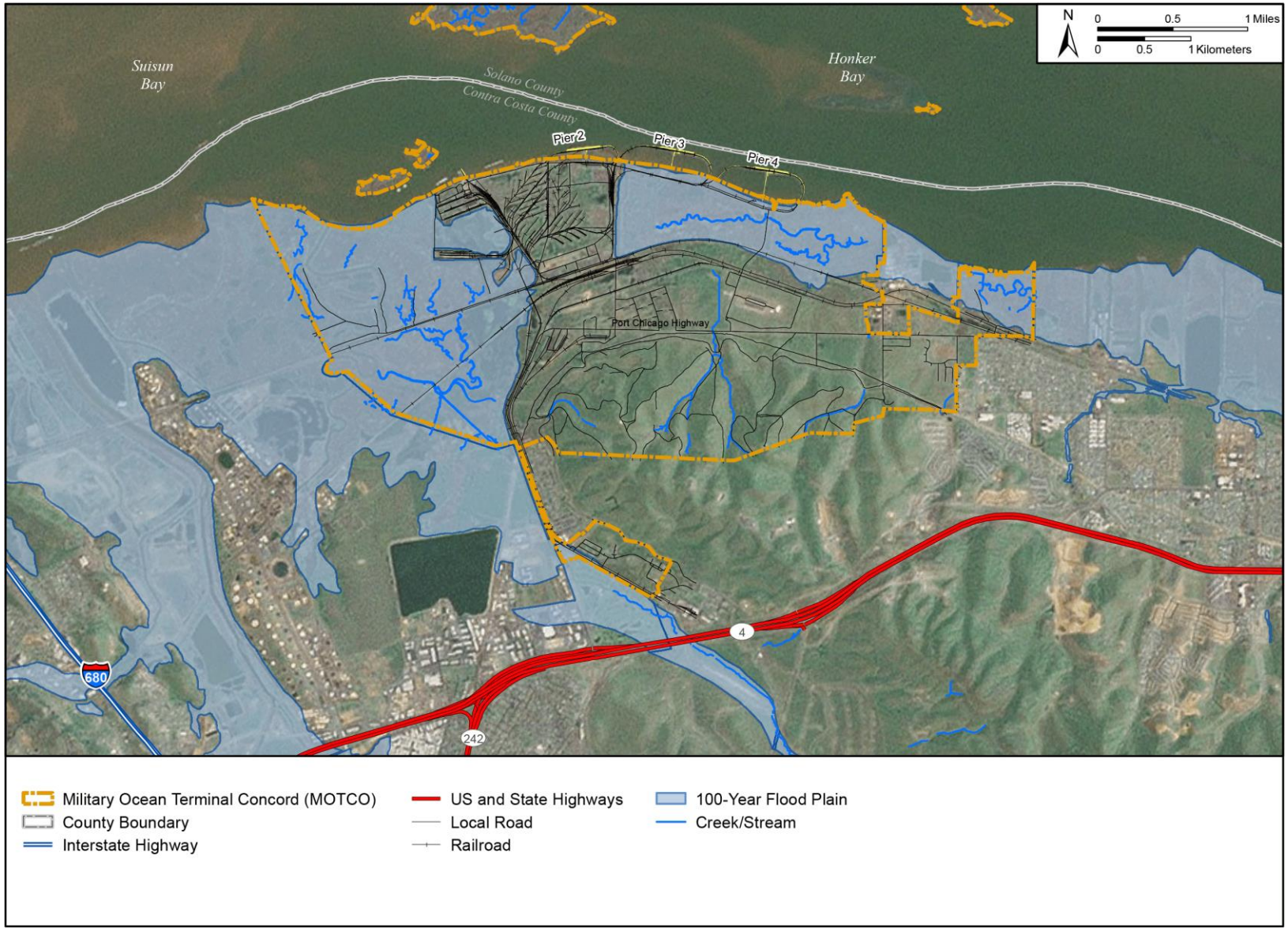


Figure 3-5. 100-Year Floodplain

3.4 AIR QUALITY

Air quality is defined by ambient air concentrations of specific pollutants determined by the USEPA to be of concern related to the health and welfare of the general public and the environment. Widespread across the U.S., the primary pollutants of concern are called "criteria pollutants" and include carbon monoxide (CO), sulfur dioxide (SO_2), nitrogen dioxide (NO_2), ozone (O_3), particulate matter less than or equal to 10 microns aerodynamic diameter (PM_{10}), particulate matter less than or equal to 2.5 microns aerodynamic diameter ($PM_{2.5}$), and lead. Under the CAA, the USEPA has established National Ambient Air Quality Standards (NAAQS) (40 CFR Part 50) for these pollutants. These standards represent the maximum allowable atmospheric concentrations that may occur to protect public health and welfare with a reasonable margin of safety. Short-term standards (1-, 3-, 8-, and 24-hour periods) are established for pollutants contributing to acute health effects, while long-term standards (quarterly and annual averages) are established for pollutants contributing to chronic health effects.

States may also establish their own ambient air quality standards that are more stringent than those set by federal law. The California Health and Safety Code, Section 39606, authorizes the California Air Resources Board (CARB) to set ambient air pollution standards in consideration of public health, safety, and welfare. The Board makes area designations for 10 pollutants: O_3, suspended particulate matter (PM_{10} and $PM_{2.5}$), CO, NO_2, SO_2, sulfates, lead, hydrogen sulfide, and visibility reducing particles. Table 3.4-1 lists the ambient air quality standards enforced by the USEPA and CARB and the air quality status for these standards within the San Francisco Bay Area.

Table 3.4-1. Ambient Air Quality Standards

Pollutant	Averaging Time	California Standards[1]		National Standards[2]	
		Concentration	Attainment Status	Concentration[3]	Attainment Status
Ozone (O_3)	8 hour	0.070 ppm	N	0.075 ppm	N[4]
	1 hour	0.09 ppm	N	-	-
Carbon Monoxide (CO)	8 hour	9.0 ppm	A	9 ppm	A[5]
	1 hour	20 ppm	A	35 ppm	A
Nitrogen Dioxide (NO_2)	1 hour	0.18 ppm	A	0.100 ppm[6]	U
	Annual arithmetic mean	0.030 ppm	A	0.053 ppm	A
Sulfur Dioxide (SO_2)	24 hour	0.04 ppm	A	0.14 ppm	A
	1 hour	0.25 ppm	A	0.075 ppm	A
	Annual arithmetic mean	-	-	0.030 ppm	A
Particulate Matter (PM_{10})	Annual arithmetic mean	20 µg/m^3	N	-	-

Table 3.4-1. Ambient Air Quality Standards

Pollutant	Averaging Time	California Standards[1]		National Standards[2]	
		Concentration	Attainment Status	Concentration[3]	Attainment Status
	24 hour	50 µg/m^3	N	150 µg/m^3	U
Particulate Matter ($PM_{2.5}$)	Annual arithmetic mean	12 µg/m^3	N	12 µg/m^3	A[7]
	24 hour	-	-	35 µg/m^3	N[8]
Lead[9]	30 day average	1.5 µg/m^3	A	-	A
	Calendar quarter	-	-	1.5 µg/m^3	A
	Rolling 3 month average	-	-	0.15 µg/m^3	A
Sulfates	24 hour	25 µg/m^3	A	-	-
Hydrogen Sulfide	1 hour	0.03 ppm	U	-	-
Vinyl Chloride[9]	24 hour	0.010 ppm	No information available	-	-
Visibility Reducing Particles	8 hour (1000 to 1800 Pacific Standard Time	See footnote 10	U	-	-

A=Attainment, N=Nonattainment, U=Unclassified

Notes:

1. California standards for ozone, carbon monoxide (except Lake Tahoe), sulfur dioxide (1-hour and 24-hour), nitrogen dioxide, suspended particulate matter - PM_{10}, and visibility reducing particles are values that are not to be exceeded. The standards for sulfates, Lake Tahoe carbon monoxide, lead, hydrogen sulfide, and vinyl chloride are not to be equaled or exceeded. If the standard is for a 1-hour, 8-hour or 24-hour average (i.e., all standards except for lead and the PM_{10} annual standard), then some measurements may be excluded. In particular, measurements are excluded that CARB determines would occur less than once per year on the average. The Lake Tahoe CO standard is 6.0 parts per million (ppm), a level one-half the national standard and two-thirds the state standard.

2. National standards shown are the "primary standards" designed to protect public health. National standards other than for ozone, particulates and those based on annual averages are not to be exceeded more than once a year. The 1-hour ozone standard is attained if, during the most recent three-year period, the average number of days per year with maximum hourly concentrations above the standard is equal to or less than one. The 8-hour ozone standard is attained when the 3-year average of the 4th highest daily concentrations is 0.075 ppm (75 parts per billion [ppb]) or less. The 24-hour PM_{10} standard is attained when the 3-year average of the 99th percentile of monitored concentrations is less than 150 microgram per cubic meter (µg/m^3).The 24-hour $PM_{2.5}$ standard is attained when the 3-year average of 98th percentiles is less than 35 µg/m^3.

   Except for the national particulate standards, annual standards are met if the annual average falls below the standard at every site. The annual $PM_{2.5}$ standard is met if the 3-year average of annual averages spatially-averaged across officially designed clusters of sites falls below the standard.

3. National air quality standards are set by USEPA at levels determined to be protective of public health with an adequate margin of safety.

4. Final designations effective July 20, 2012.

5. In April 1998, the Bay Area was redesignated to attainment for the national 8-hour carbon monoxide standard.

6. To attain this standard, the 3-year average of the 98th percentile of the daily maximum 1-hour average at each monitor within an area must not exceed 0.100 ppm (effective January 22, 2010).

7. Published December 14, 2012. USEPA anticipates making initial attainment/nonattainment designations by December 2014, with those designations likely becoming effective in early 2015.

8. USEPA lowered the 24-hour $PM_{2.5}$ standard from 65 µg/m^3 to 35 µg/m^3 in 2006. USEPA designated the Bay Area as nonattainment of the $PM_{2.5}$ standard on October 8, 2009. The effective date of the designation is December 14, 2009 and the Air District has three years to develop State Implementation Plan (SIP) that demonstrates the Bay

Area will achieve the revised standard by December 14, 2014. The SIP for the new $PM_{2.5}$ standard must be submitted to the USEPA by December 14, 2012.

9. CARB has identified lead and vinyl chloride as 'toxic air contaminants' with no threshold level of exposure below which there are no adverse health effects determined.
10. Statewide visibility-reducing particles (VRP) Standard (except Lake Tahoe Air Basin): Particles in sufficient amount to produce an extinction coefficient of 0.23 per kilometer when the relative humidity is less than 70 percent. This standard is intended to limit the frequency and severity of visibility impairment due to regional haze and is equivalent to a 10-mile nominal visual range.

In addition to the criteria pollutants, California maintains ambient air quality standards for vinyl chloride, sulfates, and hydrogen sulfide. Because none of these are expected to be emitted as a result of the proposed action, they are not carried forward in the analysis. Additionally, airborne emissions of lead are not addressed in this EIS because there are no known significant lead emission sources associated with the proposed action.

In addition to the ambient air quality standards for criteria pollutants, regulations exist for hazardous air pollutants (HAPs). The National Emission Standards for Hazardous Air Pollutants (NESHAP) regulates 188 HAPs based on available control technologies (40 CFR Parts 61 and 63). HAPs include compounds such as benzene, which is found in gasoline; the majority of HAPs are volatile organic compounds (VOCs).

Hazardous air pollutants emitted from mobile sources are called Mobile Source Air Toxics (MSATs). These are compounds emitted from highway vehicles and non-road equipment that are known or suspected to cause cancer or other serious health and environmental effects. In 2001, USEPA issued its first MSATs Rule, which identified 21 compounds as being HAPs that required regulation (USEPA 2001). A subset of six of these MSAT compounds were identified as having the greatest influence on health: benzene; 1,3-butadiene; formaldehyde; acrolein; acetaldehyde; and diesel particulate matter. USEPA issued a second MSAT Rule in February 2007, which generally supported the findings in the first rule and provided additional recommendations of compounds having the greatest impact on health. The rule also identified several engine emission certification standards that must be implemented (USEPA 2007).

Unlike the criteria pollutants, there are no NAAQS for HAPs. The primary control methodologies for these pollutants for mobile sources involves reducing their content in fuel and altering the engine operating characteristics to reduce the volume of pollutants generated during combustion. MSATs would be the primary HAPs emitted by mobile sources during the proposed demolition and construction. The equipment used during construction would likely vary in age and have a range of pollution reduction effectiveness. Construction equipment, however, would be operated intermittently over a large area and would produce negligible ambient HAPs in a localized area, which is not located near any publicly accessible areas. For these reasons, HAPs are not further evaluated in this EIS.

Based on measured ambient criteria pollutant data, the USEPA designates all areas of the United States as having air quality better than the NAAQS (attainment), worse than the NAAQS

(nonattainment), or unclassifiable (40 CFR Part 81, Subpart C, Section 107). The CAA requires each state to develop a SIP that is its primary mechanism for ensuring that the NAAQS are achieved and maintained within that state. According to plans outlined in the State Implementation Plan (SIP), designated state and local agencies implement regulations to control sources of criteria pollutants. The CAA stipulates that federal actions in nonattainment and maintenance areas will not hinder future attainment with the NAAQS and must conform to the applicable SIP (i.e., California SIP).

California is divided into 15 Air Basins to better manage air pollution. The San Francisco Bay Air Basin, also known as the BAAQMD, encompasses all of seven counties: Alameda, Contra Costa, Marin, San Francisco, San Mateo, Santa Clara, and Napa, and portions of Solano and Sonoma counties. MOTCO is located in Contra Costa County and so falls under the jurisdiction of the BAAQMD. The Air Basin is designated as a federal attainment area for PM_{10}, SO_2, and lead standards; a marginal federal nonattainment area for the O_3 standard; and a federal nonattainment area for 24-hour $PM_{2.5}$. The Basin was designated attainment for CO in 1998 and remains a maintenance area. The Air Basin is also designated as a state nonattainment area for O_3, PM_{10}, and $PM_{2.5}$.

The most recent BAAQMD ozone plan prepared in response to federal air quality planning requirements is the 2001 Ozone Attainment Plan. This plan is under review by USEPA. To fulfill federal air quality planning requirements for $PM_{2.5}$, the BAAQMD's Board of Directors adopted a $PM_{2.5}$ emissions inventory for year 2010 at a public hearing on 7 November 2012. The BAAQMD transmitted the inventory to the CARB for inclusion in the California SIP.

3.4.1 Conformity Requirements

The General Conformity rule prohibits any federal action that does not conform to the applicable air quality attainment plan or SIP and applies to areas designated as nonattainment or maintenance for NAAQS. Therefore, the purpose of conformity is to ensure federal activities do not interfere with the budgets in the SIP.

Some emissions are excluded from conformity determination, such as those already subject to new source review (NSR); those covered by the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) (42 USC 9601 et seq.) or other environmental laws; emissions associated with actions that are not reasonably foreseeable; and those for which the agency has no continuing program responsibility. A project is exempt from the conformity rule if the total net project-related emissions (construction and operation) are less than the *de minimis* thresholds established by the conformity rule. A project that produces emissions that exceed conformity thresholds is required to demonstrate conformity with the SIP through mitigation, application of offsets, or other accepted practices.

The proposed action would be located in the BAAQMD and the general conformity requirements apply to the ozone precursors VOCs and nitrogen oxides (NOx); CO and $PM_{2.5}$; and SO_2, which

is considered a $PM_{2.5}$ precursor. In accordance with the air conformity requirements of 40 CFR Section 93.153(b)(1), the applicable *de minimis* levels are presented in Table 3.4-2.

Table 3.4-2. General Conformity de Minimis Thresholds (tons/year)

	VOC	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$
Applicable *de minimis* Thresholds	100	[1]100	100	[2]100	NA	100

Source: 40 CFR Section 93.153

Notes:
[1]CO is included because the BAAQMD is a maintenance area for CO.
[2]SO_2 is included as a potential precursor for $PM_{2.5}$ formation.

The air quality analysis for this EIS refers exclusively to regulatory requirements and air quality impacts in BAAQMD as the assumption is made that all project-related vehicles and equipment would stay within this district while performing project-related work.

3.4.2 Greenhouse Gases

Greenhouse gases (GHGs) are gas emissions that trap heat in the atmosphere. These emissions occur from natural processes and human activities. Scientific evidence indicates a trend of increasing global temperature over the past century due to an increase in GHG emissions from human activities. The climate change associated with this global warming is predicted to produce negative economic and social consequences across the globe.

USEPA issued the *Final Mandatory Reporting of Greenhouse Gases Rule* on October 30, 2009 (USEPA 2009). In general, the rule is referred to as 40 CFR Part 98 or "Part 98." Implementation of Part 98 is referred to as the Greenhouse Gas Reporting Program. GHGs covered under the Greenhouse Gas Reporting Program are CO_2, methane, nitrous oxide (N_2O), hydrofluorocarbons, perfluorocarbons, sulfur hexafluoride, and other fluorinated gases including nitrogen trifluoride and hydrofluorinated ethers. Each GHG is assigned a global warming potential (GWP). The GWP is the ability of a gas or aerosol to trap heat in the atmosphere. The GWP rating system is standardized to CO_2, which has a value of one. For example, methane has a GWP of 21, which means that it has a global warming effect 21 times greater than CO_2 on an equal-mass basis. The equivalent CO_2 rate is calculated by multiplying the emission of each GHG by its GWP and adding the results together to produce a single, combined emission rate representing all GHGs. Under the Greenhouse Gas Reporting Program, suppliers of fossil fuels or industrial GHGs, manufacturers of mobile sources and engines, and facilities that emit 25,000 metric tons or more per year of GHG emissions as CO_2 equivalent are required to submit annual reports to USEPA.

On a national scale, federal agencies are addressing emissions of GHGs by reductions mandated in federal laws and EOs. Most recently, EO 13423, *Strengthening Federal Environmental, Energy, and Transportation Management,* and EO 13514, *Federal Leadership in Environmental, Energy, and Economic Performance,* were enacted to address GHGs, including GHG emissions inventory, reduction, and reporting.

The California Global Warming Solutions Act of 2006, also known as Assembly Bill 32, directs the State of California to reduce statewide GHG emissions to 1990 levels by the year 2020. The *Climate Change Scoping Plan* is California's strategy to reach the required GHG reduction goals. This plan calls for reducing the current annual emissions of 14 tons of CO_2 for every man, woman, and child in California down to about 10 tons per person by 2020. The Scoping Plan identifies a cap-and-trade program as one of the strategies California will employ to reduce the GHG emissions that cause climate change. On October 20, 2011, the Board adopted the final cap-and-trade regulation and Resolution 11-32. Under cap-and-trade, an overall limit on GHG emissions from capped sectors will be established by the cap-and-trade program and facilities subject to the cap will be able to trade permits (allowances) to emit GHGs.

In an effort to reduce energy consumption, GHGs, and dependence on petroleum and increase the use of renewable energy resources in accordance with the goals set by EO 13423 and the Energy Policy Act of 2005, the Army published the *Army Energy Security Implementation Strategy* in 2009 with the following goals:

- Reduce energy consumption,
- Increase energy efficiency across platforms and facilities,
- Increase use of renewable/alternative energy supplies,
- Assure access to sufficient energy supplies, and
- Reduce adverse impacts on the environment.

Greenhouse gas emissions occur locally, but GHG impacts are both global and cumulative. Therefore, GHG emissions for the baseline and the proposed action have been calculated and are presented and assessed in Chapter 5, *Cumulative Impacts*.

3.4.3 Permitted Stationary Sources

MOTCO maintains a permit, B2769, issued by BAAQMD, for the operation of stationary sources of air emissions. The permit covers nine permitted and two exempt sources, including nine emergency generators, one fixed fuel storage tank, and one piece of woodworking equipment.

3.5 BIOLOGICAL RESOURCES

Biological resources include native or naturalized plants and animals and the habitats in which they occur. This section is focused on biological resources within the area of potential direct and indirect effects, i.e., the area located in proximity to Piers 2 and 3. The terms "project area" and "action area" may be used interchangeably to describe this area. Biological resources discussed include habitats (Section 3.5.1), flora (Section 3.5.2), fauna (Section 3.5.3), and special status species (Section 3.5.4).

3.5.1 Habitats

MOTCO is located on the south side of Suisun Bay, which comprises the eastern, upstream portion of San Francisco Bay and the western extent of the Sacramento-San Joaquin Delta. Suisun Bay represents the central, brackish-transition zone of the largest estuary, and contains the largest continuous area of brackish wetlands found in the Western United States. Habitat types (from the San Francisco Estuary Institute [SFEI] EcoAtlas Baylands Mapping Project [SFEI 2013]) and associated species existing within the project area are discussed below in order from deep water estuarine habitat moving into shallower water and inland to developed/disturbed areas (Figure 3-6). Special status species are discussed later in this section.

3.5.1.1 Subtidal Habitats

Suisun Bay represents a brackish tidal environment with variable salinities, ranging from oligohaline (0.5–5 parts per thousand [ppt]) to mesohaline (5–18 ppt) and polyhaline (18–30 ppt) (USACE 2011). Tides in Suisun Bay as elsewhere along the West Coast are mixed semi-diurnal, with two high and low tides of unequal amplitude occurring approximately every 24.8 hours, and tidal amplitude increasing or diminishing concurrent with lunar cycles. The vertical distance between the highest high tides and lowest low tides is approximately 8 feet at MOTCO. Except during periods of heavy outflows from the Delta, the dominant currents of Suisun Bay are those associated with the rising or falling tides. Large freshwater inflows enter Suisun Bay from Denverton Creek and the Delta. Because of strong winds and shallow depths, mixing typically occurs throughout the water column, leading to well-oxygenated waters.

The subtidal waters and substrates of Suisun Bay help to sustain a number of commercially important fisheries and as a result have been designated as Essential Fish Habitat (EFH) under three Fishery Management Plans, including those for Pacific Coast Salmon, Pacific Coast Groundfish, and Coastal Pelagic Species (Pacific Fishery Management Council [PFMC] 1998, 2011a–c, 2012). See Section 3.5.3.2 for further descriptions of existing EFH within the proposed project area.

The habitat in Suisun Bay and the Bay-Delta in general has been altered dramatically over the years as a result of various human activities. Correlated with the alteration of habitat has been a long-term decline in abundance of several important pelagic fish species: delta smelt (*Hypomesus transpacificus*), longfin smelt (*Spirinchus thaleichthys*), striped bass (*Morone saxatilis*), and threadfin shad (*Dorosoma petenense*). The causes of this decline, termed the Pelagic Organism Decline, are the subject of ongoing investigations (Interagency Ecological Program 2008).

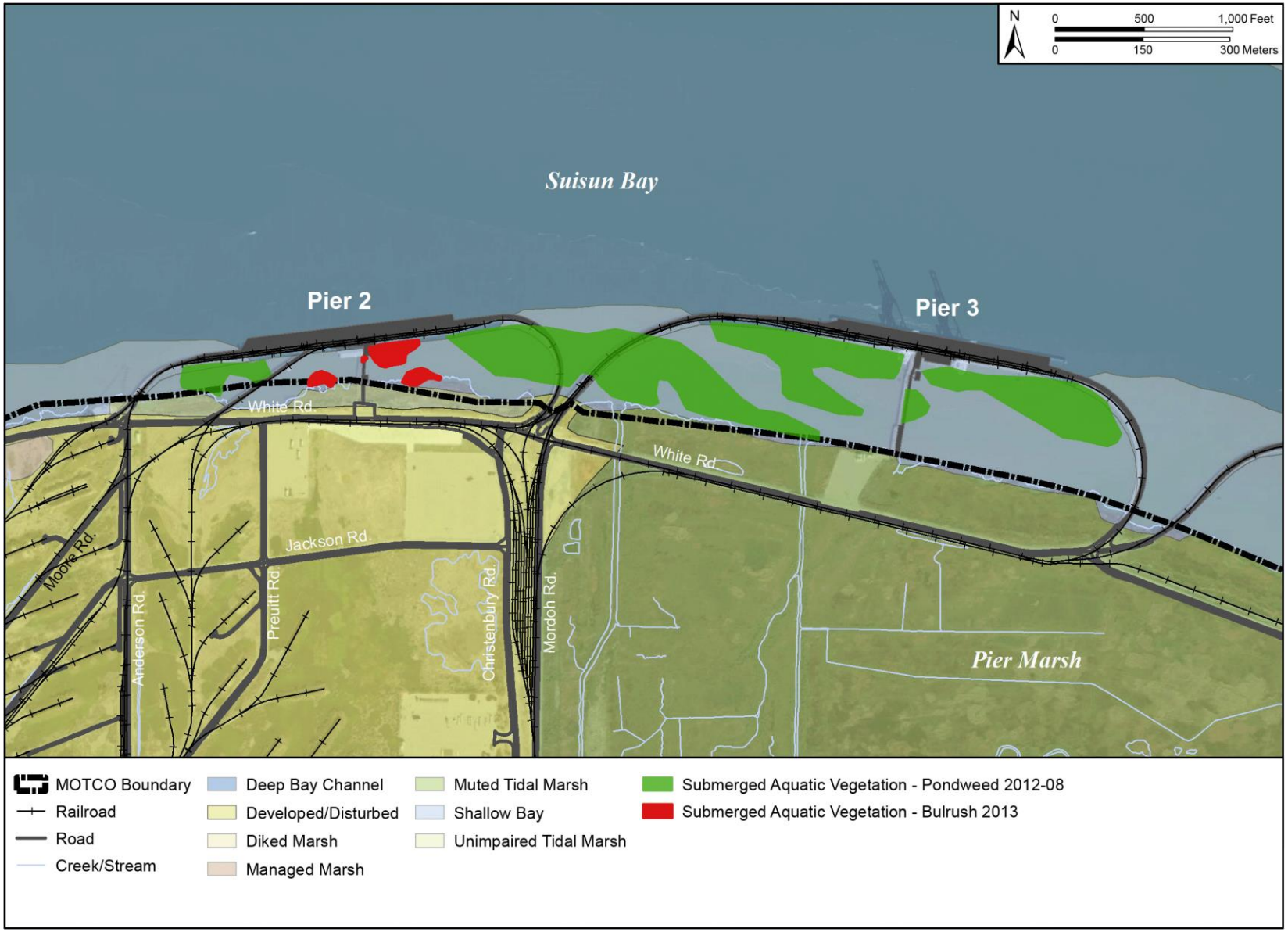


Figure 3-6. Habitats

The majority of deepwater subtidal habitat in Suisun Bay is comprised of unconsolidated bottom sediments. Deep bay/channel habitat is associated with the John F. Baldwin Ship Channel, which is just offshore of MOTCO (between the mainland and the islands) and the seaward edge of the MOTCO piers where depths are 30–40 feet below MLLW. These areas have been previously dredged, but dredging is infrequently required at the MOTCO piers as sediment builds slowly under natural conditions. The last dredging event occurred in 1986.

Shallow bay habitat is found inshore of the MOTCO piers as well as in the sheltered lees of the piers and headlands. Although not common in Suisun Bay, numerous small beds of submerged aquatic vegetation (SAV) consisting of eelgrass (*Zostera marina*) have been observed in this area at MOTCO. An eelgrass resource assessment was conducted in May 2013 and no signs of eelgrass were observed or documented during land- or water-based surveys within the project footprint. Areas surveyed within the project footprint were dominated by in-water vegetative communities consisting primarily of California bulrush (*Schoenoplectus californicus*) and pondweed (*Stuckenia* spp.) (See Figure 3-6.)

Suisun Bay channels are dominated by bivalves (*Corbula amurensis* and *Corbicula fluminea*), polychaetes (*Marenzellaria viridis* and *Heteromastus filiformis*), and a small surface-dwelling cumacean (*Nippoleucon hinumensis*). Although these same species dominate channel edges, channel edges also support the deposit feeding isopod (*Synidotea laevidorsalis*) and filter feeding barnacle (*Balanus improvisus*). In shallow subtidal areas the dominant species include a bivalve (*C. amurensis*), a polychaete (*M. viridis*), and an amphipod species (*Monocorophium alienense*) (NMFS 2007).

Common bony fish species in Suisun Bay include various smelt species, gobies, small fish such as Pacific herring (*Clupea pallasii*), white sturgeon (*Acipenser transmontanus*), flatfish, and perches. In the early 1990s, native fish abundance in the Bay-Delta region was at an extreme low. Suisun Bay experienced the most significant decline of the Bay regions, and native fish populations have only increased slightly, although significantly, in recent years (Bay Institute 2005).

3.5.1.2 Intertidal Habitats

There are a number of habitats within the 8-foot vertical range of extreme low to extreme high tides at MOTCO. Low intertidal shores and flats are largely unvegetated areas occurring below mean tide level. There are three different types of substrates and associated biological communities that occur on shores and flats in the project area at MOTCO: low tidal marsh mudbanks that front natural shorelines; hard substrates of the piers and developed areas that support sparse, patchy growths of green algae (*Ulva* spp., *Enteromorpha* spp.) and attached epifauna – predominantly barnacles (*Balanus improvisus*); and narrow fringes of low intertidal sand or mudflat below the mudbanks and artificial substrates. Away from the shoreline and

outside of the project area there are extensive mudflats around the edges and shallowest portions of muted tidal ponds (USACE 2011).

The tidal marshlands at MOTCO are a mosaic of marsh vegetation and bodies of water including tidal sloughs, channels, ponds, and manmade ditches, all of which function as a circulatory system for water, oxygen, sediment and nutrient transport, and as pathways for the movement of fish and aquatic wildlife. The interface between marsh vegetation and water throughout the marshes provides a structurally complex and productive habitat that is used for nesting, foraging, nursery, and refuge by a variety of fish and wildlife. Within the project area, there are two primary slough channels, Belloma Slough and an unnamed channel, which provide tidal circulation to Belloma Marsh, inland from Pier 3. These channels are relatively wide, deep, open, and extend under White Road, connecting to remnants of the network of natural tidal channels on the marsh plain of Pier Marsh, between the shore and the railroad tracks. In this area and elsewhere, linear ditches were excavated in the past across the Tidal Area for drainage and agricultural use, resulting in a series of parallel or intersecting ditches that crisscross the historic marsh plain. In these areas, the natural tidal channels are largely obliterated. Linear stands of upland (often weedy) vegetation established on the soils that were excavated and mounded along the banks of the ditches fragment the native marsh habitat. Benthic invertebrate communities in slough channels are similar to those found in the shallow subtidal habitat described above, although species abundance is much lower (NMFS 2007).

The vast majority of marshlands on MOTCO are brackish tidal marshes, either fronting Suisun Bay or connected to it by sloughs, channels, and ditches. On the immediate shoreline and in well-flushed portions of the marshes, the vegetation is dominated by species that occur across a broad range of salinities both upstream and downstream in the Bay-Delta. Except along the immediate shoreline, these marshlands are Muted Tidal Marsh habitats. These areas are subject to regular daily or monthly tidal action, but to an extent that is lessened by the tidal circulation that has been constricted, impeded, or diverted relative to historic conditions. The distribution of tidal marsh plants is strongly (but not exclusively) influenced by tidal elevation and salinity; the low-, mid-, and high marsh habitats at MOTCO are described below.

- **Low-Tidal Brackish Marsh**. Low tidal brackish marsh vegetation is important in stabilizing shorelines, is a major source of primary production in this part of the estuary, and provides a structurally complex habitat for fish and wildlife, especially migratory waterfowl and wading birds. The low tidal brackish marsh vegetation is characterized by several tall emergent monocot species, including smooth cordgrass (*Spartina foliosa*), common reed (*Phragmites australis*), hardstem tule (*Scirpus acutus*), and California bulrush (*Scirpus californicus*). In addition to the tall emergents, on wave-exposed consolidated mud banks there is a low-growing turf made up of dwarf spikerush (*Eleocharis parvula*), low bulrush (*Scirpus cernuus*), Delta mudwort (*Limosella subulata*), and Mason's and western lilaeopsis (*Lilaeopsis masonii* and L. *occidentalis*).

- **Mid-Tidal Brackish Marsh**. The mid-tidal zone typically supports low-growing herbaceous vegetation patchily dominated by saltgrass (*Distichlis spicata*), pickleweed (*Salicornia virginica*), Baltic rush (the *Juncus balticus-lesueurii* complex), spearscale (*Atriplex triangularis*), jaumea (*Jaumea carnosa*), creeping spikerush (*Eleocharis macrostachya*), alkali heath (*Frankenia salina*), dodder (*Cuscuta salina*), arrowgrass (*Triglochin* spp.), and the extremely invasive perennial pepperweed (*Lepidium latifolium*).
- **High-Tidal Brackish Marsh**. Areas that were probably native mid-tidal marsh on MOTCO have been converted to high marsh by diking and ditching, which limit tidal flooding onto the former marsh plain. In addition to the high marsh species mentioned above, this zone at MOTCO supports San Francisco Bay gumplant (*Grindelia stricta var. angustifolia*), western goldenrod (*Euthamia occidentalis*), salt marsh baccharis (*Baccharis douglasii*), western ragweed (*Ambrosia psilostachya*), tarragon (*Artemisia dracunculus*), and the federally endangered state-listed rare soft bird's-beak (*Cordylanthus mollis ssp. mollis*) and Suisun Marsh aster (*Aster lentus*). The upland-transition portion of the high marsh zone is structurally dominated by coyote brush (*Baccharis pilularis*) and is exaggerated where manmade linear features such as ditch banks and railroad berms are elevated above the marsh plain.

3.5.1.3 Non-Tidal Habitats

Freshwater aquatic habitats are of limited extent in the Tidal Area on MOTCO and do not occur in the project area (USACE 2011); all aquatic habitats are brackish or saline. Non-tidal brackish marshes are extensive on MOTCO and include formerly tidal but now diked marshes and marshes on saline soils in non-tidal depressions and drainages. Non-tidal brackish marsh is highly variable and often includes alkali heath, saltgrass, pickleweed, cattails, alkali and three-square bulrush, creeping spikerush, heliotrope (*Heliotropum currasavicum*), and Italian ryegrass (*Lolium multiflorum*). Patches of non-tidal brackish/saline marsh occur in the project area on the inland side of White Road in areas of poor drainage.

Developed/disturbed areas on MOTCO support mostly non-native vegetation. The earthen berms at ammunition storage facilities are covered by the highly invasive, non-native ice plant (*Carpobrotus edulis*) and inhabited by a dense population of burrowing California ground squirrels (*Spermophilus beechyii*). Other wildlife in developed/disturbed areas is typical of species that live in close proximity to humans. Barn owls (*Tyto alba*) and other bird species have been observed inhabiting unused buildings with broken windows and damaged eaves. Swallows are common on the S Buildings and have been observed nesting on the Barge Pier.

3.5.2 Flora

The Integrated Natural Resources Management Plan (USACE 2011) contains a list of all plant species known to occur within the present boundaries of MOTCO. The following sections

describe the general features of 1) aquatic vegetation and 2) terrestrial and wetland vegetation in the project area.

3.5.2.1 Aquatic Vegetation

Aquatic flora includes SAV and various species of algae and phytoplankton. Submerged aquatic vegetation includes vascular plants that are adapted for life under water. In general, the occurrence of aquatic vegetation in the subtidal habitats in the vicinity of MOTCO is not common due to the lack of hard substrate and high water motion in the area (Goals Project 1999). Estuarine soft bottom habitat is not ideal habitat for most SAV and algae, as fine-grain sediments create complications for organisms that require attachment to the substrate. Most SAV and macroalgae require coarse-grain materials to anchor into or attach to. Algae species typically require higher salinity levels than those found in Suisun Bay, but some species (e.g. *Gracilaria sjoestedtii*, *Enteromorpha* spp., and *Ulva* spp.) can adapt to changing salinity levels. Although flexible in their salinity range tolerance, these species still require coarse sediments, rocks, or some other stable substrate to attach to (Goals Project 2000), and hence their occurrence at MOTCO is limited to artificial hard substrates along the shoreline.

Eelgrass is one species of SAV that is capable of anchoring into fine-grain sediments. Eelgrass is an important species because it forms large beds that function as habitat for many invertebrates and a nursery area for juvenile fish. Previous SAV surveys conducted in the San Francisco Bay-Delta did not reveal the presence of eelgrass along the shorelines of Suisun Bay near MOTCO. These surveys revealed that eelgrass is much more prevalent in the central and southwestern portions of San Francisco Bay (Wyllie-Echeverria and Fonseca 2003). High turbidity, low light levels, and low salinity prohibit eelgrass success in Suisun Bay; in the San Francisco Bay region, eelgrass has generally been found in polyhaline waters. Most eelgrass surveys in the Bay-Delta region have not extended east of San Pablo Bay, as these areas have lower salinities (Goals Project 2000; Merkel and Associates, Inc. 2004; NMFS 2007). During a survey conducted in November 2009, biologists observed beds of SAV in shallow water along the MOTCO shoreline by boat and from shore. A 2013 survey of the Piers 2 and 3 areas confirmed that the SAV at MOTCO consists of pondweed (*Stuckenia* spp.). Physical conditions in the area are not typically favorable for eelgrass due to high turbidity and low salinity, although salinity varies considerably in the project area. A salinity measurement taken near one of the eelgrass sightings was 20 ppt, which is much greater than the normal high salinity in Suisun Bay (7 ppt [Cuetara et al. 2001]). A measurement of 20 ppt is within the polyhaline salinity range (18–30 ppt), which is uncharacteristic of Suisun Bay, but a range that is known to support eelgrass beds. Salinity values

Euhaline waters *have salinity levels at or near the same concentrations (30–35 ppt) as the oceans.*

Polyhaline waters *are waters whose salinity levels are variable and range from 18–30 ppt due to ocean-derived salts.*

up to 20 ppt have been recorded in fall and winter during periods of prolonged low Delta outflows of freshwater (Cuetara et al. *2*001).

Although most commonly found in euhaline (30–35 ppt) and polyhaline (18–30 ppt) waters, widgeon grass (*Ruppia maritima*) can also anchor into soft sediments and tolerate lower salinities. Widgeon grass is known to occur in northern Suisun Bay (Merkel and Associates, Inc. 2004; NMFS 2007). Widgeon grass has a unique morphology including very thin and relatively short leaves that allows for easy distinction from similar SAV species. This species was not sighted along the shores of Suisun Bay during a survey conducted in November 2009, but likely occurs in ditches and ponds elsewhere on the property.

An eelgrass resource evaluation was conducted in May 2013. No signs of eelgrass or widgeon grass were observed or documented during land- or water-based surveys, both within the project footprint or in transit to the installation by small boat. Based on the site specific survey and the review of existing research and physical data documented in the Natural Resources Report for the MOTCO EIS (Cardno TEC 2013), conditions for the recruitment, growth, or persistence of eelgrass do not presently exist within the project footprint. Areas surveyed within the project footprint were dominated by in-water vegetative communities consisting primarily of California bulrush (*Schoenoplectus californicus*) and pondweed (*Stuckenia* spp.) (Cardno TEC et al. 2013).

3.5.2.2 Terrestrial and Wetland Vegetation

Terrestrial and wetland vegetation in the project area was mapped to the association level (classified according to dominant and co-dominant species) based on fieldwork conducted in 2010 (HT Harvey and Associates 2011). The dominant plant species associated with various terrestrial and wetland habitats were described previously or are indicated in Figure 3-7.

The terrestrial and wetland flora of the installation as a whole is representative of the brackish and upland elements of the San Francisco Bay Estuary flora and includes several rare species associated with brackish marshes (Baye et al. 1999). As shown in Figure 3-7, the shoreline portions of the project area are dominated by regionally common tidal brackish marsh species including Baltic rush, pickleweed, bulrushes, tules, cattail, and common reed, as well as the invasive perennial pepperweed. The low-tidal brackish marsh fringe is discussed further under Special Status Species. The area inland from Pier 2 consists largely of fill and comprises developed/disturbed areas, extensive mats of the invasive iceplant and ruderal (weedy) upland grasses, and a fairly large stand of saltgrass – a native wetland plant which is indicative of saline soils. The area inland from Pier 3 is primarily native soil supporting muted tidal brackish marsh dominated by cattail, bulrush, and pickleweed.

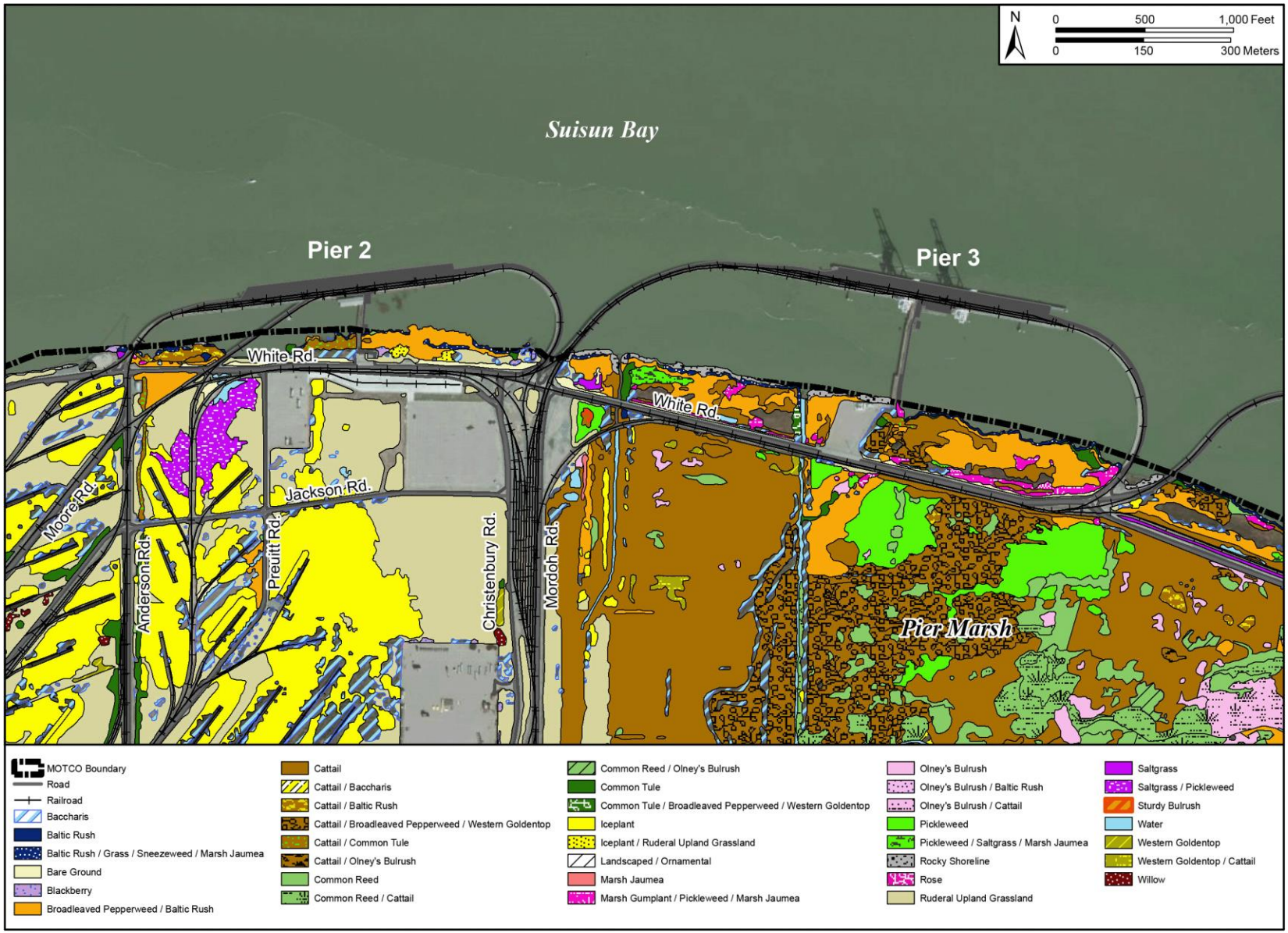


Figure 3-7. Plant Associations

3.5.3 Fauna

This section describes the fauna of the project area. The Integrated Natural Resources Management Plan provides a complete list of animal species for MOTCO as a whole (USACE 2011).

3.5.3.1 Invertebrates

Table 2-4 of the INRMP (USACE 2011) contains a list of the common estuarine invertebrate species of the Suisun Bay region. Invertebrates associated with estuarine soft-bottom environments include those that live in the sediments (infaunal), on top of the sediments (epifaunal), and in the water column (pelagic). The San Francisco Bay-Delta region has been altered by the introduction of various non-native invertebrates, and new introductions continue (NMFS 2007). Pelagic invertebrates, which are important consumers of aquatic plants as well as fishery resources, include opossum shrimp (*Neomysis mercedis*) and several species of bay shrimp, both native (*Crangon* spp.) and non-native (*Palaemon macrodactylus*) (California Department of Water Resources [CDWR] 2013).

Studies specific to Suisun Bay have revealed species assemblages of small infauna and epifauna broken down by locations including channels, channel edges, shallow subtidal, and slough channels. The channels are dominated by the bivalves *Corbula amurensis* and *Corbicula fluminea*, the polychaetes *Marenzellaria viridis* and *Heteromastus filiformis*, and the surface-dwelling cumacean (small crustacean) *Nippoleucon hinumensis*. Channel edges house a greater species diversity and abundance, with the dominant species being those mentioned above for the channel areas, with the addition of the deposit feeding isopod, *Synidotea laevidorsalis*, and the non-native filter feeding barnacle, *Balanus improvisus*. In shallow subtidal areas, the dominant species include the bivalve *C. amurensis*, the polychaete *M. viridis*, and an amphipod species, *Monocorophium alienense*. In the slough channels, the benthic invertebrate communities are similar to those found in the shallow subtidal habitat described above, although species abundance is much lower (NMFS 2007).

3.5.3.2 Fish and Essential Fish Habitat

Table 2-5 of the MOTCO INRMP includes a list of fish species common in the Suisun Bay region and likely to occur in the project area. A large number of fish species are known to frequent estuarine waters, including some non-native species (e.g. striped bass). Common bony fish species in Suisun Bay include various smelt species, gobies, small fish such as herring and anchovy, white sturgeon, flatfish, and perches. In the early 1990s, native fish abundance in the Bay-Delta region was at an extreme low. Suisun Bay experienced the most significant decline of all of the Bay regions, and native fish populations have only increased slightly, although significantly, in recent years (Bay Institute 2005).

Estuarine and SAV habitat is designated EFH for various species and is summarized and analyzed below. Special status fish species presumed to occur in the project area are described in Section 3.5.4, below, and include the green sturgeon, steelhead, Chinook salmon (comprising four distinct races), delta smelt, Longfin smelt, and Sacramento splittail.

Essential Fish Habitat

The PFMC has designated EFH for each of the four primary fisheries that they manage within their Fisheries Management Plans (FMPs): Pacific Coast Groundfish, Pacific Coast Salmon, Coastal Pelagic Species, and West Coast Highly Migratory Species (PFMC 1998, 2011a–c, 2012). Of these fisheries, only three (Pacific Coast Groundfish, Pacific Coast Salmon, and Coastal Pelagic) contain species for which EFH has been designated within Suisun Bay. Pacific Coast Groundfish, Coastal Pelagic, and Pacific Coast Salmon EFH species covered by the respective FMPs that are likely to occur in the project area are listed in Table 3.5-1. The FMP for Coastal Pelagic Species includes one species that is known to occur in the project area based on their abundance and distribution throughout Suisun Bay (PFMC 1998; Herbold et al. 1992). The FMP for West Coast Salmon includes one species (Chinook salmon) consisting of several distinct "runs", including two federally listed Evolutionarily Significant Units (ESUs), which are known to occur in or near the project area (PFMC 2000). The Pacific Coast Groundfish FMP manages 83 species over a large ecologically diverse area, only three of which, however, are expected to occur in the project area (Herbold et al. 1992; Orsi et al. 1999; PFMC 2006; NMFS 2013a).

Table 3.5-1. Fish Species with Designated EFH that Are Expected to Occur in Suisun Bay and the Project Area

Common Name	Scientific Name	Life Stage in Area
Pacific Coast Groundfish Species		
Brown rockfish	*Sebastes auriculatus*	J
English sole	*Parophrys vetulus*	A, J, L
Starry flounder	*Platichthys stellatus*	A, E, J
Coastal Pelagic Species		
Northern anchovy	*Engraulis mordax*	A, L, E
Pacific Coast Salmon Species		
Chinook salmon	*Oncorhynchus tshawytscha*	A, J

Sources: PFMC 1998; 2005; 2011a,b; 2012; NMFS 2013a
A = Adult, J = Juvenile, L = Larvae, E = Eggs.

MOTCO is also within an area designated as Habitat Area of Particular Concern (HAPC) for various federally managed fish species within the Pacific Coast Groundfish FMP. Habitat Areas of Particular Concern are subsets of EFH that provide extremely important ecological functions or are especially vulnerable to degradation based on one or more of the following reasons: 1) importance of the ecological function provided by the habitat; 2) the extent to which the habitat is sensitive to human-induced environmental degradation; 3) whether, and to what extent,

development activities are, or will be, stressing the habitat type; and 4) rarity of the habitat type (NOAA 2004).

Pacific Coast Groundfish EFH

The Pacific Coast Groundfish FMP manages over 90 groundfish species with varying degrees of data availability for individual species life history (PFMC 2011a). While some species are well-studied, there is little information on others. Additionally, information about habitats and life histories of managed species will change over time. For this reason, the FMP describes the overall extent of groundfish EFH for all fisheries management units species as well as all waters and substrates within the following areas.

- Depths less than or equal to 11,483 feet to mean higher high water level (MHHW) or the upriver extent of saltwater intrusion, defined as upstream and landward to where ocean-derived salts measure less than 0.5 ppt during the period of average annual low flow.
- Seamounts in depths greater than 11,483 feet as mapped in the EFH assessment geographic information system (GIS).
- Areas designated as Habitat Areas of Particular Concern (HAPCs) not already identified by the above criteria (PFMC 2011a).

Groundfish FMP species that are expected to occur in Suisun Bay include brown rockfish, English sole, and starry flounder (Table 3.5-1). Information on these species is provided below.

Brown Rockfish. Brown rockfish are common in shallow water and are taken by recreational fishers, as well as from private boats, piers, shore, and by divers. They are bottom dwellers and aggregate near sand-rock interfaces, seagrass beds, and around artificial structures. Brown rockfish are a valuable hook-and-line species for the commercial live-fish fishery along the central California coast. Juveniles are widely distributed in inland bays and estuaries, using these areas as nursery grounds and moving into deeper water as they age. Brown rockfish appear present and abundant as both adults and juveniles in some parts of San Francisco Bay, but few are present in Suisun Bay, and only as juveniles (PFMC 2005; NMFS 2013a).

English Sole. English sole is an ecologically and commercially important fish in shallow, soft-bottom marine and estuarine environments along the Pacific coast. The eggs and larvae are pelagic (free floating) and are transported by tidal currents, whereas juveniles and adults are demersal (sinking to the bottom). English sole uses nearshore coastal and estuarine waters as nursery areas and is often associated with seagrass beds. English sole is abundant throughout San Francisco Bay and upstream to the Carquinez Strait, but is much less common in Suisun Bay (PFMC 2005; NMFS 2013a).

Starry Flounder. Starry flounder are a modestly important commercial fish species, taken by bottom trawlers and often by anglers fishing from boats or shore. They are an important member of the inner continental shelf and shallow sublittoral fish communities (PFMC 2005).

Most spawning occurs in estuaries or sheltered bays. The eggs and larvae are epipelagic (free-floating at the surface) and widely dispersed in coastal environments. Juveniles are demersal and are more closely associated with estuarine conditions. Starry flounder are abundant in northern San Francisco Bay, San Pablo Bay, and Suisun Bay (NMFS 2013a).

Coastal Pelagic EFH

Coastal pelagic EFH consists of all estuarine and marine waters from the shoreline along the coasts of California, Oregon, and Washington offshore to the limits of the exclusive economic zone (EEZ) and above the thermocline where sea surface temperatures range from 50º to 68ºF (degrees Fahrenheit) (PFMC 2011b). These boundaries include the estuarine waters of Suisun Bay. The Coastal Pelagic FMP includes four finfish (Pacific sardine, Northern anchovy, Pacific [chub] mackerel, and jack mackerel). Also included are one invertebrate (market squid) and all euphausiid (krill) species that occur in the West Coast EEZ. The four finfish species are treated as a single species complex because of similarities in life histories and habitat requirements. Only northern anchovy is expected to occur within Suisun Bay (Table 3.5-1).

Northern Anchovy. Northern anchovy are small, short-lived fish that are typically found in schools near the surface. They eat phytoplankton and zooplankton and spawn year-round with peaks from February to April. Eggs and larvae are translucent and are found near the surface, generally at depths of less than 164 feet. Eggs typically hatch within two to four days depending on water temperature. Densities of juvenile anchovy in near shore areas were found to be ten times higher than in other habitat areas. Adults are typically found further offshore (PFMC 1998). Northern anchovy are abundant in Suisun Bay as adults, juveniles, and larvae (NMFS 2013a).

Pacific Coast Salmon EFH

Pacific Coast Salmon EFH includes all estuarine and marine environments extending from nearshore and tidal submerged environments within state territorial waters out to the full extent of the EEZ (200 nautical miles) offshore (PFMC 2012). In addition to the marine and estuarine waters, salmon species have a defined freshwater EFH, which includes all lakes, streams, ponds, rivers, wetlands, and other bodies of water that have been historically accessible to salmon (PFMC 2012). Suisun Bay is EFH for Chinook salmon, including the fall-run, late-fall-run, winter-run, and spring-run races, all of which migrate through Suisun Bay and spawn in the Sacramento and San Joaquin River systems (Brandes and McLain 2001; NMFS 2008a). The fall run is by far the most abundant, and is sustained at least partly by hatchery production (Brandes and McLain 2001).

The abundance and distribution of juvenile Chinook salmon in the Bay-Delta has been monitored by seining, trawling, and mark-recapture studies conducted by the USFWS in collaboration with regional partners in the Interagency Ecological Program since the early 1970s. Juvenile abundance (as measured by trawls at Chipps Island, about 10 miles upstream

from MOTCO near Pittsburgh) peaks during April–May for the spring and fall runs, which are by far the most numerous. Much smaller numbers of juveniles are associated with the winter run and late fall run, which are typically found in March and November-January, respectively (USFWS 2012a). Juvenile movement through the Delta and Suisun Bay is fairly rapid and has been estimated at 1 mile (1.6 kilometers) per day or faster (MacFarlane and Norton 2002). Juvenile Chinook salmon consume a wide variety of planktonic and benthic invertebrate prey during their movement through these areas (MacFarlane and Norton 2002).

Habitat Areas of Particular Concern (HAPCs)

Suisun Bay is designated as a coastal estuary HAPC and eelgrass (within San Francisco Bay is designated as seagrass HAPC, for various federally-managed fish species within the Pacific Groundfish FMP (NMFS 2011c). During a survey conducted in November 2009, biologists observed several beds of SAV in Suisun Bay along the coast of MOTCO by boat and from shore. As part of the EIS, a visual survey, sonar observations, and a composite review of 2008–2012 aerial imagery of SAV was conducted in the proposed action area in May 2013. This survey found that habitat conditions observed and documented within the project footprint in terms of salinity, substrate, and light availability appear to be near or beyond the growth limitations for eelgrass. In addition, high turbidity and eutrophication driven by nutrient loading associated with localized agricultural runoff increase the probability that eelgrass communities will not become established at MOTCO (Cardno TEC et al. 2013). Areas surveyed were dominated by in-water vegetative communities consisting primarily of California bulrush (*Schoenoplectus* spp.) and pondweed (*Stuckenia* spp.) (Figure 3-6). Investigations of the status and ecological relationships of pondweed in Suisun Bay are just beginning (Personal communication, Boyer, K., 2013). Although pondweed's importance as a component of EFH is unknown, it is considered an HAPC in this EIS.

Descriptions of Habitats

The existing conditions of EFH in the project area include deep subtidal soft bottom and open water habitat on the outboard side of the piers, the shaded deep to shallow soft-bottom, water column, and piling habitat of the piers; the shallow subtidal soft-bottom habitat, which supports SAV; and the intertidal shoreline of both natural mud and artificial substrates. Refer to the Water Quality section for additional description of physical conditions.

3.5.3.3 Reptiles and Amphibians

Ten amphibian and 22 reptilian species are known or likely to occur on MOTCO (USACE 2011). Of these, the northwestern pond turtle (*Actnemys m. marmorata*), a CDFW species of concern; American bullfrog (*Rana catesbeiana*); Pacific chorus frog (*Pseudacris regilla*); valley garter snake (*Thamnophis sirtalis fitchi*); red-sided garter snake (*Thamnophis sirtalis infernalis*); Pacific gopher snake (*Pituophis catenifer catenifer*); California kingsnake (*Lampropeltis getula californiae*); Pacific ringneck snake (*Diadophis punctatus amabilis*); sharptail snake (*Contia*

tenuis); California alligator lizard (*Elgaria multicarinata multicarnata*); coast garter snake (*Contia tenuis terrestris*); and the coast range fence lizard (*Sceloporus occidentalis bocourtii*) are known or likely to occur in the project area, although occurrence of some species is uncertain. Species observed only within the Tidal Area during the 1998 and 1999 surveys (Morrison et al. 1999) are valley garter snake, ringneck snake, and California red-sided garter snake. Three special status amphibian species, California tiger salamander (*Ambystoma californiense*), California red legged frog (*Rana aurora draytoni*), and foothill yellow-legged frog (*Rana boylii*), have not been documented within the MOTCO boundary, are not considered to have the potential to occur within the project action area, and will not be discussed further. The northwestern pond turtle is discussed further in Section 3.5.4.3.

3.5.3.4 Birds

The California Bay-Delta Area including Suisun Marsh, Grizzly Island Wildlife Area, Hill Slough Wildlife Area, and Peytonia Slough Ecological Reserve and the surrounding marshes and uplands (annual grasslands) support over 291 bird species (American Bird Conservancy 2009). The National Audubon Society recognizes these areas as Important Bird Areas (IBA). MOTCO is within this area and is important for breeding, migrating, and wintering songbirds, raptors, shorebirds, and waterfowl. The project site is located within or adjacent to the Concord Marshes IBA, which spans 8,291 acres (National Audubon Society 2013).

During the 1998 and 1999 surveys (Morrison et al. 1999), average species richness as well as seasonal variance were relatively high within brackish marsh habitat. The high level of seasonal variability in species richness observed for brackish marsh sites is directly related to the predominance of migratory waterfowl and shorebird species in these areas. Salt marsh, however, generally had a relatively low average species richness and seasonal variance in species richness. Suisun song sparrow (*Melospiza melodia pusillula*), marsh wren (*Cistothorus palustris*), and saltmarsh common yellowthroat (*Geothlypis trichas sinuosa*) were the most commonly detected species in “inner” tidal marsh areas. Here “inner” refers to areas within tidal marsh located greater than or equal to 164 feet from the edge of the tidal marsh area (e.g., borders with roads, grassland). Less than 17 percent of all raptor observations were made within tidal marsh, although 68 percent of northern harriers and 56 percent of white-tailed kite observations were made within these areas.

The MOTCO INRMP (USACE 2011) lists 160 bird species known or likely to occur at MOTCO, including a large number of shorebird and waterfowl species, as well as raptors and songbirds. Water- and wetland-associated species are especially numerous and are to be expected in the project area. Birds of Conservation Concern (USFWS 2008) that are on the INRMP list and are known or likely in the project area include peregrine falcon (*Falco peregrinus*), black rail (*Laterallus jamaicensis*), long-billed curlew (*Numenius americanus*), marbled godwit (*Limosa fedoa*), burrowing owl (*Athene cunicularia*), loggerhead shrike (*Lanius ludovicianus*), yellow warbler (*Dendroica petechia*), common yellowthroat, Suisun song sparrow, and tricolored

blackbird (*Agelaius tricolor*). All migratory birds found on MOTCO are protected by the Migratory Bird Treaty Act.

3.5.3.5 Mammals

Forty mammal species have been observed or are considered to potentially occur at MOTCO (USACE 2011). The 1998 and 1999 surveys (Morrison et al. 1999) found a greater variety and abundance of small mammal species in the Tidal Area than in the Inland Area. House mice (*Mus musculus*) comprised 36 percent of all captures within tidal marshes; California voles (*Microtus californicus*) and salt marsh harvest mice (discussed in more detail below) each comprised 19.8 percent of captures within tidal marshes. The surveys also observed river otter, opossum, long-tailed weasel, beaver, California voles, and muskrat in the Tidal Area; all except opossum were only documented within tidal marsh. Mammals most likely to occur within the project area include wide-ranging generalists and predators and a few that are specific to brackish marshes in the region. These include the following:

- Wide-ranging species: Virginia opossum (*Didelphis virginiana*), big brown bat (*Eptesicus fuscus*), Brazilian free-tailed bat (*Tadarida brasiliensis*), brush rabbit (*Sylvilagus bachmani*), California ground squirrel (*Spermophilus beecheyi*), western harvest mouse (*Reithrodontomys megalotis*), deer mouse (*Peromyscus maniculatus*), Pinyon mouse (*Peromyscus truei*), Black-tailed jackrabbit (*Lepus californicus*), California vole, Norway rat (*Rattus norvegicus*), house mouse, coyote (*Canis latrans*), red fox (*Vulpes fulva*), gray fox (*Urocyon cinereoargenteus*), raccoon (*Procyon lotor*), muskrat (*Ondatra zibethicus*), long-tailed weasel (*Mustela frenata*), badger (*Taxidea taxus*), western spotted skunk (*Spilogale gracilis*), striped skunk (*Mephitis mephitis*), river otter (*Lutra canadensis*), and mule deer (*Odocoileus hemionus*).
- Brackish marsh species: salt marsh wandering shrew (*Sorex vagrans halicoites*) and Suisun shrew (*Sorex ornatus sinuosus*).

3.5.4 Special Status Species

For the purposes of this EIS, special status species include species that are federally listed as threatened or endangered, or considered a candidate species by USFWS or NMFS under the ESA. Special status species also include species protected under the Bald and Golden Eagle Protection Act or the Marine Mammal Protection Act (MMPA); species listed as threatened or endangered by the State of California, for which CDFW (formerly the California Department of Fish and Game) is the responsible agency, under the California Endangered Species Act or Native Plant Protection Act; and other species of concern. The listing of federal and/or state listed threatened or endangered species and other state or federal species of concern is provided in Table 3.5-2.

Table 3.5-2. Special Status Species Potentially Occurring in the Action Area

Common Name	Scientific Name	Status* Federal/State/CNPS *Critical Habitat Present?*	Occurrence within Project Area	Responsible Agency	Habitat/Regional Occurrence
PLANTS					
Soft Bird's-beak	*Cordylanthus mollis* ssp. *mollis*	E / R / --	Unlikely, not detected in surveys	USFWS	Low marsh zone and eroding banks of Delta tidal brackish marshes. No occurrences were found within or adjacent to the project action area during 2010 or 2013 surveys.
Delta Mudwort	*Limosella subulata*	-- / -- / 2	Possible	CDFW	Mud banks of the Delta, usually in marsh associations with Mason's lilaeopsis.
Mason's Lilaeopsis	*Lilaeopsis masonii*	-- / R / 1B	Confirmed	CDFW	Exposed sediments, mud banks along Delta brackish-tidal shorelines. On base, found in Middle Point Marsh.
Delta Tule Pea	*Lathyrus jepsonii ssp. jepsonii*	-- / -- / 1B	Confirmed	USFWS	Upper edges of fresh and brackish marshes and along streams and rivers of the Delta. On base, found on Ryer Island.
Suisun Marsh Aster	*Symphyotrichum lentum*	-- / -- / 1B	Confirmed	USFWS	High marsh zone of Delta freshwater and tidal brackish marshes, also along slough and creek banks. On base, found in Middle Point Marsh, Pier Marsh, Hastings Slough, and on Ryer Island.
FISH					
Delta Smelt	*Hypomesus transpacificus*	T / -- / -- *Suisun Bay Designated as Critical Habitat*	Presumed	USFWS	Larval, juvenile, and adult delta smelt may all be found in Suisun Bay, including the shallow edges and backwater sloughs.
Sacramento Splittail	*Pogonichthys macrolepidotus*	-- / SC / --	Presumed	USFWS	Occurs in Suisun Bay, but prefers shallow water with low salinity (0-10 ppt).
Longfin Smelt	*Spirinchus thaleichthys*	C / T / --	Confirmed	USFWS	Larval and juvenile longfin smelt may be found in Suisun Bay.
Green Sturgeon	*Acipensir medirostris*	T / -- / -- *Suisun Bay Designated Critical Habitat*	Presumed	NMFS	Suisun Bay supports juvenile, sub-adult, and adult Southern Distinct Population Segment fish, serving as important rearing habitat and an important migratory corridor from the San Pablo and San Francisco Bays to and from the Delta and Sacramento River system.
Central Valley Steelhead	*Oncorhynchus mykiss irideus*	T / -- / --	Possible during migration	NMFS	An ocean-maturing species that migrates through Suisun Bay, primarily December-April, to spawn upstream.

Table 3.5-2. Special Status Species Potentially Occurring in the Action Area

Common Name	Scientific Name	Status* Federal/State/CNPS *Critical Habitat Present?*	Occurrence within Project Area	Responsible Agency	Habitat/Regional Occurrence
Central California Coast Steelhead	*Oncorhynchus mykiss*	T / -- / --	Possible during migration	NMFS	An ocean-maturing species that migrates through Suisun Bay, primarily January-April, to spawn upstream.
Sacramento Chinook Salmon, *Winter Run*	*Oncorhynchus tshawytscha*	E / -- / -- *Suisun Bay Designated as Critical Habitat*	Possible during migration	NMFS	Adults migrate through Suisun Bay in December-July, with smolts returning downstream to the ocean within one year.
Central Valley Chinook Salmon, *Spring Run*	*Oncorhynchus tshawytscha*	T / -- / --	Possible during migration	NMFS	Adults migrate through Suisun Bay in March-July, with smolts returning downstream to the ocean within one year.
Central Valley Chinook Salmon, *Fall Run*	*Oncorhynchus tshawytscha*	C / -- / --	Possible during migration	NMFS	Adults migrate through Suisun Bay in June-December, with smolts returning downstream to the ocean within one year.
Reptiles					
Northwestern Pond Turtle	*Actinemys m. marmorata*	-- / SC / --	Confirmed	CDFW	Permanent or near-permanent freshwater ponds. Was found in Tidal Area on base in Otter Slough and Seal Creek Marsh.
BIRDS					
California Clapper Rail	*Rallus longirostris obsoletus*	E / E / --	Extremely unlikely; limited potential habitat, no recent occurrences, and not detected in surveys	USFWS	Salt and brackish marshes. Rare in Suisun Bay. No occurrences were found within or adjacent to the project action area during 2010 or non-protocol 2013 survey; protocol survey planned for early 2014.
California Black Rail	*Laterallus jamaicensis coturniculatus*	-- / T / --	Confirmed	CDFW	Low-lying salt marshes with abundant pickleweed. Found during 2010 and other surveys at numerous sites within Tidal Area.
California Least Tern	*Sternula antillarum browni*	E / E / --	Possible transient occurrence	USFWS	Colonial breeder on bare or sparsely vegetated sand beaches or alkali flats. Last observed on installation in 1982. Nesting colony ~10 mi up Delta in Montezuma Slough.

Table 3.5-2. Special Status Species Potentially Occurring in the Action Area

Common Name	Scientific Name	Status* Federal/State/CNPS *Critical Habitat Present?*	Occurrence within Project Area	Responsible Agency	Habitat/Regional Occurrence
San Francisco Common Yellowthroat	*Geothlypis trichas sinuosa*	-- / SC / --	Confirmed	CDFW	Endemic to marshes bordering San Francisco Bay. Observed on base in numerous tidal marsh areas (2009).
Suisun Song Sparrow	*Melospiza melodia maxillaris*	-- / SC / --	Confirmed	USFWS	Endemic to marshes bordering San Francisco Bay. Observed on base in numerous tidal marsh areas (2009).
Loggerhead Shrike	*Lanius ludovicianus*	-- / SC / --	Confirmed	USFWS	Dry grasslands with scattered trees and shrubs. Observed on base at numerous locations within Tidal Area (2009).
MAMMALS					
Salt Marsh Harvest Mouse	*Reithrodontomys raviventris*	E / E / --	Unlikely given limited extent of potential habitat	USFWS	Requires large pickleweed flats with adjoining refuge areas above the High Tide line. Based on 2010 survey data, there is an up to 30 percent probability for this species to occur on MOTCO, primarily in areas of Pier Marsh; occurrence in other marsh areas cannot be discounted, but regarded as very low potential.
Salt Marsh Wandering Shrew	*Sorex vagrans halicoetes*	-- / SC / --	Unlikely given limited extent of potential habitat	USFWS	Mid-marsh (6-8 feet above MSL) pickleweed habitat, similar to the harvest mouse and clapper rail.
Humpback Whale	*Megaptera novaeangliae*	E, MMPA / -- / --	Extremely unlikely	NMFS	Rare occurrence in Suisun Bay-Delta.
Pacific Harbor Seal	*Phoca vitulina richarii*	MMPA/ -- / --	Possible	NMFS	Small numbers present in Suisun Bay.
California Sea Lion	*Zalophus californianus*	MMPA/ -- / --	Possible	NMFS	Spotted periodically in Suisun Bay.

Sources: USACE 2011; HT Harvey and Associates 2011

Notes: ***** T = Threatened; E = Endangered; C = Candidate; R = Rare; SC = Special Concern; BGEPA = Bald and Gold Eagle Protection Act; MMPA = Marine Mammal Protection Act; 1B = Plants that are considered by the California Native Plant Society (CNPS) as Rare, Threatened, or Endangered in California and elsewhere; and **2 =** Plants that are considered by CNPS as Rare, Threatened, or Endangered in California but are more common elsewhere. The Species of Concern category does not apply at the federal level as it is an informal term and is not defined in the federal ESA.

Species occurrence data is based on special status surveys conducted in 2010 and in 2013 for the MOTCO Tidal Area covering the area of potential effect analyzed in this EIS (HT Harvey and Associates 2011; Cardno TEC et al. 2013), as well as previous comprehensive survey efforts conducted in 1998 and 1999 (Downard et al. 1999), targeted and localized survey efforts conducted in association with interim environmental restoration projects and the INRMP (USACE 2011), and a California Natural Diversity Database (CNDDB) search (CNDDB 2013). Documented occurrences of special status plant and animal species within the project area are shown in Figures 3-8 and 3-9, respectively.

3.5.4.1 Special Status Plants

Federally Listed Plant Species

Soft Bird's-beak

Soft bird's-beak (*Cordylanthus mollis* ssp. *mollis*) is listed by the USFWS as endangered, and by the State of California as rare; it is also a California Native Plant Society (CNPS) list 1B.2 species, indicating it is rare, threatened, or endangered in California and elsewhere (CNPS 2013). Soft bird's-beak is threatened by non-native vegetation encroaching on its habitat, erosion of the landscape by feral pigs, trampling, urbanization, and by marsh drainage (CNPS 2013).

Soft bird's-beak is a hemi-parasitic annual herb in the Orobanchaceae (broomrape) family. It grows in the coastal salt marshes and brackish marshes of San Pablo and Suisun Bays, in Solano, Contra Costa, Sonoma, and Marin Counties. Its gray-green foliage, often tinged with purple, is covered with soft hairs. The whitish flowers in a spike-like inflorescence are partially hidden by lobed bracts that are densely soft-hairy. The soft hairs distinguish soft bird's-beak from the stiff-bristly hispid bird's-beak (*C. mollis* ssp. *hispidus*), which occurs in more alkaline areas elsewhere.

Soft bird's-beak most frequently occurs in the marsh/upland transition zone with pickleweed (*Salicornia virginica*), jaumea (*Jaumea carnosa*), alkali heath (*Frankenia salina*), gumplant (*Grindelia stricta*), and saltgrass (*Distichlis spicata*). Habitats include seasonally flooded areas in hypersaline or eurysaline environments (CDWR 1994). A natural hydrologic connection to a tidal slough system is an important habitat requirement for this species; its seeds require water for dispersal and germination. Diked seasonal wetlands, which are isolated from natural, year-round tidal cycle hydrology, do not appear to support this species (CDWR 1994). Like many other *Cordylanthus* species, soft bird's-beak is a hemiparasite; it is partially dependent on other plants for mineral nutrients and water. It blooms July through November, depending on environmental conditions (CNPS 2013).

Figure 3-8. Soft Bird's-Beak Survey Area and Survey Results

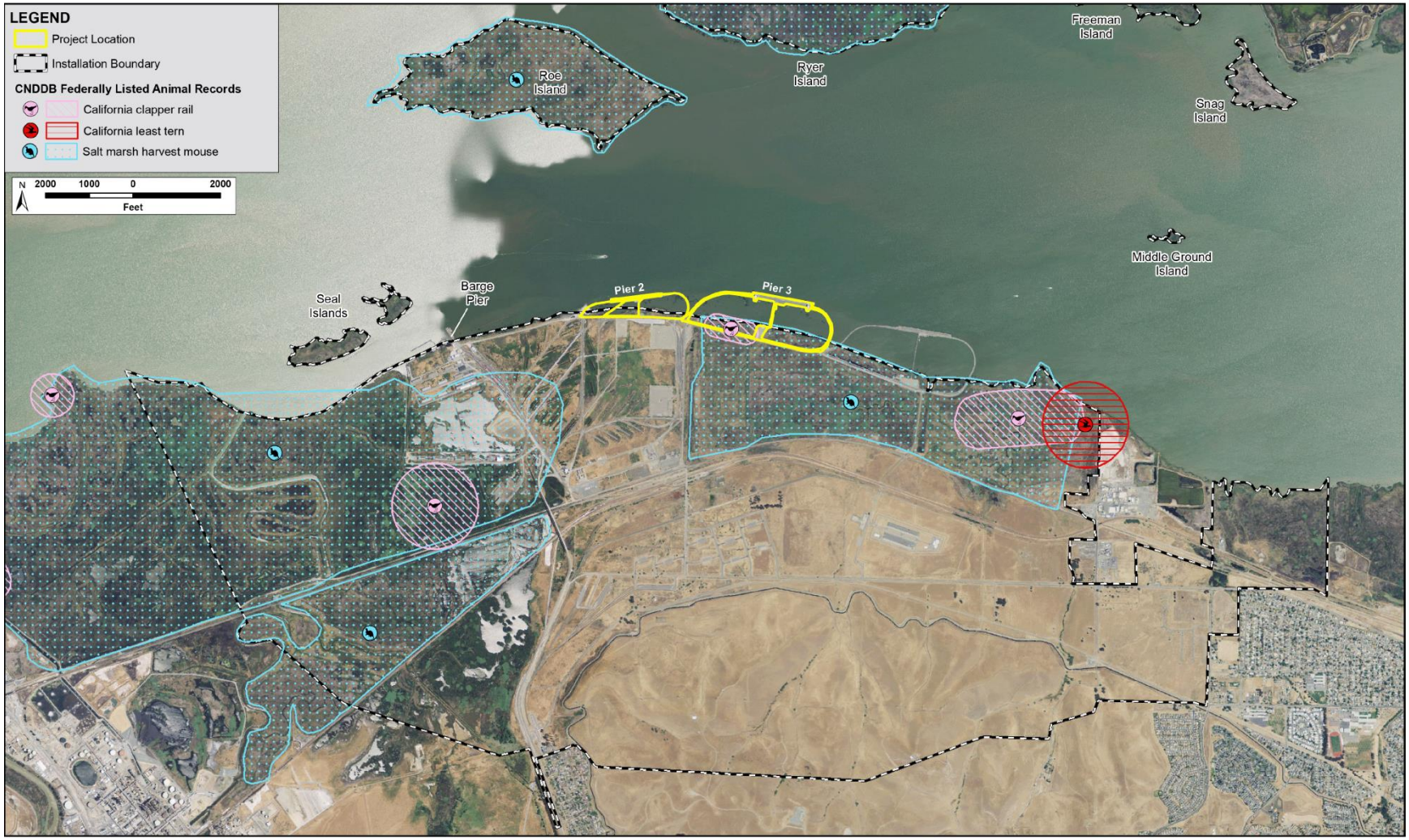


Figure 3-9. Special Status Animals in the Project Area

Two small populations of this plant were observed at various locations within the Tidal Area during the University of Arizona surveys in 1998 and 1999 (Morrison et al. 1999), including populations in Middle Point Marsh and Hasting's Slough West Marsh. Of the 14 occurrences (totaling approximately 2,600 individuals) observed in 2010, three occurrences, totaling over 450 individuals, were found near the eastern Pier 4 access way at the eastern end of White Road. The remainder of occurrences was observed at the eastern end of Middle Point Marsh, well outside of the project area. No occurrences were found within or adjacent to the Piers 2 and 3 project action area (HT Harvey and Associates 2011). The Piers 2 and 3 areas were re-assessed in May 2013 and it was determined habitat conditions had not changed significantly since the 2010 survey (Cardno TEC et al. 2013). Therefore, it is not likely soft bird's-beak occurs within the project action area.

<u>Other Special Status Plant Species</u>

Delta Mudwort

The California Native Plant Society lists Delta mudwort (*Limosella subulata*) as Rank 2.1 (rare, threatened, or endangered in California but more common elsewhere). In California, Delta mudwort is found only in the Sacramento-San Joaquin Delta region. Delta mudwort is threatened by stream bank alteration, levee maintenance, erosion, recreational activities, and foot traffic (CNPS 2013).

Delta mudwort is a stoloniferous, aquatic, perennial herb in the snapdragon family (Scrophulariaceae) and strongly resembles Mason's lilaeopsis when vegetative (before flowering and fruiting). It grows on intertidal flats and muddy banks of watercourses in estuarine areas, surrounded by brackish or freshwater marsh and riparian scrub communities. Occasionally it can be found along the edges of tule marshes and is often found growing near other sensitive plants in Suisun Bay, including Mason's lilaeopsis, Delta tule pea, and Suisun Marsh aster. It blooms from May to August, and is typically found right below the elevation where Delta tule pea and Suisun Marsh aster occur.

There are documented occurrences of Delta mudwort in Contra Costa County. The mud banks on the shoreline on the north edge of MOTCO contain potential habitat for Delta mudwort, although it was not detected during the 2010 surveys and there are no documented occurrences within or near the project area (HT Harvey and Associates 2011; CNDDB 2013). Therefore, it is possible but unlikely that the Delta mudwort occurs in the project action area.

Mason's Lilaeopsis

Mason's lilaeopsis was State-listed as rare in November 1979 and is ranked by CNPS as 1B.1 (found only in California and seriously threatened throughout its range). It is threatened by erosion, bank and channel stabilization, flood-control projects, development, agriculture, recreation, shading resulting from marsh succession, and, in some areas, by over-competition

with water-hyacinth (*Eichhornia crassipes*), an extremely invasive, nonnative aquatic weed (CNPS 2013).

Trends for this species are undocumented, although it is likely declining or stable. Mason's lilaeopsis tends to occur with other rare plants such as Delta mudwort (*Limosella subulata*), Suisun Marsh aster (*Aster lentus)*, and Delta tule pea (*Lathyrus jepsonii* var. *jepsonii*).

Mason's lilaeopsis, sometimes called mudflat quillplant, is a small, up to 3 inches tall, rhizomatous, semi-aquatic, perennial herb in the carrot family (Apiaceae). The thread-like leaves with obscure internal cross-walls are tufted on creeping stems. The inflorescences consist of few to several flowered umbels of tiny white or maroon flowers (Hickman 1993); they bloom from April to November (CNPS 2013).

Mason's lilaeopsis occurs in the northeastern portion of the San Francisco Bay area in Alameda, Contra Costa, Marin, and Napa counties, including Suisun Bay, and also occurs in the Sacramento-San Joaquin Delta in Solano, San Joaquin, Sacramento, and Yolo counties. The total known population for this species is represented by approximately 195 occurrences (CNPS 2013). This is a native plant species that is endemic to California.

Mason's lilaeopsis is found in riparian scrub and freshwater and brackish marsh and within the tidal zone in muddy or silty soils and dunes, although it is usually found on saturated clay soils that are regularly inundated by waves and tidal action. It is often found in the low marsh zone, especially on eroding shores or earthen levees associated with bulrush (*Scirpus* sp.) and cattail (*Typha* sp.). It spreads by rhizomes and produces narrow jointed leaves. This species is semi-aquatic and is usually found on saturated clay soils that are regularly inundated by waves and tidal action. It is a colonizing species*, i.e.,* it is one of the first species to begin growing on newly deposited or exposed sediments.

Habitat for Mason's lilaeopsis near MOTCO would best be described as a narrow (less than or equal to 3.3 feet) intertidal band on sandy/silty/mucky substrate with accumulated small organic matter, forming dense mats elevated within 1 to 2 feet off the sandy beach below. Here, Mason's lilaeopsis is often found in the understory of marsh vegetation such as Baltic rush (*Juncus balticus*) and tules (*Schoenoplectus* spp.) and is also associated with three ribbed arrowgrass (*Triglochin striata*). As the elevation increases slightly into the marsh, Mason's lilaeopsis is rapidly replaced by low bulrush (*Isolepis cernua*) (HT Harvey and Associates 2011).

During the 1998 and 1999 surveys in support of the 2002 Navy INRMP (Morrison et al. 1999), Mason's lilaeopsis was found in one area near the shoreline of Middle Point Marsh. In 2010, many thousands of individuals of Mason's lilaeopsis were found throughout the Tidal Area inhabiting a narrow band of vegetation, described above, within the intertidal zone that is directly exposed to wind, wave, and tidal movements. Figure 3-10 shows the locations near Pier 2, Pier 3, and Pier 4 where populations were found, as well as a location in Middle Point Marsh where a spot-check confirmed that habitat for the species extends farther to the east.

Figure 3-10. Special Status Plants in the Project Area

Due to the species' very small size, the total population present during the survey was difficult to estimate, but it is likely that more than 100,000 individuals were present.

During the time of the 2010 special-status plant surveys, sections of marsh containing Mason's lilaeopsis were actively being eroded away between the Barge Pier and Pier 2. Mason's lilaeopsis was also not observed growing where patches of common reed or riprap dominated the shoreline. Although Mason's lilaeopsis is present along much of the immediate shoreline, there are stretches of shoreline that are particularly exposed to wind and wave action that do not support the species (HT Harvey and Associates 2011). The Piers 2 and 3 areas were re-assessed in May 2013 and it was determined habitat conditions had not changed significantly since the 2010 survey and thousands of Mason's lilaeopsis still occur along the shoreline of Piers 2 and 3 (Cardno TEC et al. 2013). Therefore, Mason's lilaeopsis is known to occur in the project action area.

Delta Tule Pea

Delta tule pea (*Lathyrus jepsonii jepsonii*), with a CNPS rank of 1B.2, is threatened by erosion and water diversions of its natural habitat of coastal and estuarine marshes as well as by conversion of habitat for agricultural purposes (CNPS 2013; Natureserve 2013). It is a perennial twining vine occurring in both riparian and marsh habitats. Resembling the vetch or sweet pea, it is a climbing plant that generally grows up and spreads over the top of other vegetation. In the spring it is identified by pink to pink-purple bell-shaped flowers that grows in bunches resembling grapes between May and September (Natureserve 2013; CNPS 2013). It is most often identified by the large wings on the branches, the number of leaflets, and the lack of hairs on the stems or leaflets.

Delta tule pea is found in tidally influenced freshwater and brackish marshes and swamps primarily on slough edges and natural levees (LSA Associates 2007) from sea level to 13 feet above sea level (CNPS 2013). This species is endemic to California, populations having been identified in Contra Costa County, Napa County, Sacramento County, San Joaquin County, Solano County, Sonoma County, and Yolo County (CNPS 2013).

During the 1998 and 1999 surveys in support of the 2002 Navy INRMP (Morrison et al. 1999), Delta tule pea was found in one area near the shoreline on Roe Island. Of the 16 occurrences (totaling approximately 200 individuals) observed during the 2010 surveys, one occurrence (of one individual) was found on the shoreline parallel to Pier 2, one occurrence (of eight individuals) was found along White Road adjacent to Pier 3, two occurrences (totaling eleven individuals) were found immediately west of the eastern Pier 3 access way, and two occurrences (totaling eleven individuals) were found between the eastern Pier 3 access way and the western Pier 4 access way. It was typically found in low densities (five to ten individuals) climbing on much taller marsh vegetation up to approximately 6.6 feet in height. Associate species on which Delta tule pea was observed climbing included common tule (*Schoenoplectus*

acutus), alkali bulrush (*Schoenoplectus robustus*), and invasive common reed. It was also associated with hedge bindweed (*Convolvulus sepium* ssp. *limnophila*) (HT Harvey and Associates 2011). Delta tule pea is also known to occur east of the Pier 3 pedestrian access way (CNDDB 2013; Figure 3-10). The Piers 2 and 3 areas were re-assessed in May 2013. Although it was determined habitat conditions had not changed significantly since the 2010 survey, only one Delta tule pea was present by the eastern approach to Pier 3 (Cardno TEC et al. 2013). As such, for the purposes of this EIS, the Delta tule pea is known to occur within the project action area.

Suisun Marsh Aster

The Suisun Marsh aster (*Aster chilensis* var. *lentus* – currently *Symphyotrichum lentum*), with a CNPS rare plant rank of 1B.2, is threatened by habitat alteration and habitat loss due to rip-rapping, recreation, pipeline construction, invasive species, and land maintenance (Natureserve 2013). It may also be threatened by herbicide application (CNPS 2013). Historically, the greatest threat to Suisun Marsh aster was habitat loss; however the greatest threats today are erosion, channelization of creeks, levee construction, invasive plants, and feral pigs (LSA Associates 2009).

The Suisun Marsh aster is a robust, slightly succulent, rhizomatous, dichotomous herb endemic to California and belongs to the sunflower family (Asteraceae). The perennial Suisun Marsh aster produces a smooth stem 16–59 inches tall with linear pointed leaves, and an inflorescence that is an open mix of flower heads having yellow discs surrounded by a ray of violet florets. The Suisun Marsh aster is found in elevations ranging from sea level to 10 feet in brackish and freshwater marshes and swamps within Contra Costa County, Napa County, Sacramento County, San Joaquin County, Solano County, and Yolo County (CNPS 2013). This plant is endemic to the Suisun Marsh as well as the Sacramento-San Joaquin Delta (Bay-Delta Conservation Plan [BDCP] 2008b). Blooms of the Suisun Marsh aster occur from May through November (LSA Associates 2009).

Suisun Marsh aster is found at the upper margin of the tidal zone as well as along rivers and is known to occur with common reed, cattails, bulrushes, and blackberry (BDCP 2008). It is also known to occur within proximity of other rare plants such as Mason's lilaeopsis, Delta tule pea, Delta mudwort, and soft bird's-beak (BDCP 2008; LSA Associates 2009).

During the 1998 and 1999 surveys in support of the 2002 Navy INRMP, Suisun Marsh aster was found at four locations in the Tidal Area, including Hastings Slough West Marsh, Pier 4 Marsh, Middle Point Marsh, and the shoreline of Roe Island (Morrison et al. 1999). It was also observed in the mainland Tidal Area in 2009 during reconnaissance surveys for the INRMP update (USACE 2011). In 2010, 16 occurrences (totaling approximately 3,800 individuals) of the Suisun Marsh aster were identified, primarily at the east end of White Road near Pier 4. One occurrence of 20–30 individuals was located immediately east of the western Pier 3 access way

(Figure 3-10). The Piers 2 and 3 areas were re-assessed in May 2013. Although it was determined habitat conditions had not changed significantly since the 2010 survey, the 20–30 Suisun Marsh aster plants near the west approach to Pier 3 that were documented in 2010 were absent. However, the timing of the May 2013 survey may have been too early to detect this species (Cardno TEC et al. 2013). Therefore, for the purposes of this EIS, the Suisun Marsh aster is known to occur within the project action area.

3.5.4.2 Special Status Fish

Federally Listed Fish Species

Chinook Salmon

Chinook salmon are anadromous fish, meaning they are born in freshwater and migrate out to the marine environment to grow into adults before returning to their natal streams to spawn. They are also semelparous, meaning they spawn only once and then die (Groot and Margolis 1991). Juvenile Chinook spend from three months to two years in freshwater before migrating to estuarine areas as smolts (physical transformation for survival in marine environments). Chinook remain at sea for one to six years, with the exception of yearling males (referred to as jack salmon) that either mature in freshwater or return to freshwater after only spending two to three months in the marine environment (Groot and Margolis 1991). Chinook salmon are the largest of any species of salmon with adults typically exceeding 40 lbs.

Four distinct runs of Chinook salmon spawn in the Sacramento-San Joaquin River system: winter-run, spring-run, fall-run, and late fall-run. The runs are named after the season of adult migration, with each run having a distinct combination of adult migration, spawning, juvenile residency, and smolt migration periods (CDFW 2013a). Two ESA-listed Evolutionarily Significant Units (ESUs) of Chinook salmon occur within the project area. These include the Sacramento River winter-run Chinook salmon ESU and the Central Valley spring-run Chinook salmon ESU. These two ESUs are described in more detail below. In addition, two other runs (Central Valley fall and late-fall run [considered one ESU]) are federally listed as a species of concern and state listed as a species of special concern. This ESU is described further under *California State Listed and Federally Listed Species of Concern*.

Sacramento River Winter-Run Chinook Salmon ESU. The Sacramento River winter-run Chinook salmon ESU was originally listed as threatened in 1989 under an emergency rule but then reclassified in 1994 as endangered (NMFS 2011a). The National Marine Fisheries Service proposed to reclassify the ESU as threatened due to increasing run sizes, but a final ruling was issued in 2005 for the Sacramento River winter-run Chinook salmon ESU to remain under the status of endangered (NMFS 2005a). This ESU includes all naturally spawned populations in the Sacramento River and its tributaries in California as well as two artificial propagation programs: winter-run Chinook from the Livingston Stone National Fish Hatchery (NFH) and

winter-run Chinook in a captive broodstock program maintained at Livingston Stone NFH and the University of California Bodega Marine Laboratory (NMFS 2005a).

Critical habitat was designated for the Sacramento River winter-run ESU on June 16, 1993 (NMFS 1993). All waters of Suisun Bay (overlapping the project area), as well as areas upstream through the Delta and in the Sacramento River, downstream through the Carquinez Strait and San Pablo Bay to the Golden Gate Bridge, are included in the critical habitat designation (NMFS 1993). This ESU is represented by a single naturally spawning population. Access to historical spawning grounds was eliminated with the construction of Shasta and Keswick Dams. The winter-run population now spawns only in the mainstem of the Sacramento River between Keswick Dam and Red Bluff (approximately 44 miles) (NMFS 2011a).

Adult winter-run Chinook pass under the Golden Gate Bridge from November through May, and enter the Sacramento River from December through early August. They spawn in the upper mainstem Sacramento River from mid-April through August. Fry and smolts emigrate downstream from July through March though the Sacramento River, reaching the Delta from September through June (CDFW 2013a). The primary foods of Chinook during freshwater rearing are larval and adult insects. Cladocera, Diptera, Copepoda, and Homoptera are the dominant foods of Chinook fry in freshwater regions of the Sacramento-San Joaquin River Delta (Kjelson et al. 1982). Adults primarily feed on other fish.

A five-year review of the Sacramento River winter-run Chinook salmon ESU showed a drastic decline from 2006 based on carcass surveys conducted 2005 through 2010. Unfavorable ocean conditions (2005–2006) and drought (2007–2009) were the suspected causes (Williams et al. 2011). The recommendation from NMFS was for this ESU to remain listed as an endangered species (NMFS 2011a). Sacramento River winter-run Chinook salmon are likely to be present within the project area during adult migration and juvenile rearing (Table 3.5-3).

Central Valley Spring-Run Chinook Salmon ESU. The Central Valley spring-run Chinook salmon ESU was listed as threatened by NMFS in 2005 (NMFS 2005a). The ESU includes all naturally spawned populations in the Sacramento River and its tributaries in California, including the Feather River and Feather River Hatchery spring-run Chinook program. The final critical habitat designations for the Central Valley spring-run Chinook salmon ESU excluded the entire San Joaquin Delta watershed and therefore critical habitat for this ESU is not present within or adjacent to the project area (NMFS 2005b).

The San Francisco-San Pablo-Suisun Bay estuarine complex provides rearing and migratory habitat for this ESU (NMFS 2005b). Central Valley spring-run Chinook enter the Sacramento River from late March through July as immature fish. When they arrive at the spawning grounds, the spring-run adults remain in cool water habitats through the summer and spawn from late August through early October. Spawning has been documented in Mill Creek, Deer Creek, Butte Creek, Battle Creek, and a tributary of Feather River (Yuba Creek) (NMFS 2011b).

Table 3.5-3. Lifestage Timing and Distributions of Protected Fish Species Potentially Affected by the Proposed Action

Species/Life Stage	Distribution	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
ESA-Listed Salmonid Species (T/E)													
Chinook													
Sacramento River Winter-run ESU													
Adult Migration	San Francisco Bay to Sacramento River												
Spawning	Sacramento River - mainstem												
Juvenile Movement/rearing	Sacramento River through Delta												
Central Valley Spring-run ESU													
Migration (as immature fish)	San Francisco Bay to Sacramento River tributaries												
Immature Growth to Adults and Holding	Sacramento River tributaries												
Spawning	Upper Sacramento River and tributaries												
Juvenile Movement/rearing (yearlings)	Upper Sacramento River and tributaries to San Francisco Bay												
Steelhead													
Central Valley Steelhead DPS													
Adult Migration	Sacramento and San Joaquin River systems and tributaries												
Spawning	Sacramento and San Joaquin River systems and tributaries												
Juvenile rearing	Sacramento and San Joaquin River systems and tributaries												

Table 3.5-3. Lifestage Timing and Distributions of Protected Fish Species Potentially Affected by the Proposed Action

Species/Life Stage	Distribution	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Central California Coast Steelhead DPS													
Adult Migration	San Francisco Bay to San Pablo Bay and tributaries												
Spawning	San Francisco Bay tributaries												
Rearing	San Francisco Bay tributaries												
Other ESA-listed Fish Species													
North American Green Sturgeon Southern DPS													
Migration	San Francisco Bay to Sacramento River												
Spawning	Sacramento River												
Rearing	Rearing in Sacramento River and Estuarine waters (possibly Delta)												
Delta Smelt													
Adult migration	Low Salinity estuary to freshwater spawning sites												
Spawning	Possibly near Suisun Bay												
Larval movement	From spawning sites through Delta												
State Listed Species and Federally-listed Species of Concern													
Central Valley Fall and Late-fall Run Chinook ESU													
Adult Migration (fall-run)	San Francisco Bay into Sacramento and San Joaquin Rivers and tributaries												
Spawning (fall-run)	Sacramento-San Joaquin River systems and tributaries												
Juvenile Rearing (fall-run)	Sacramento-San Joaquin												

Table 3.5-3. Lifestage Timing and Distributions of Protected Fish Species Potentially Affected by the Proposed Action

Species/Life Stage	Distribution	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
	Rivers, tributaries, potential presence in Delta												
Adult Migration (late fall-run)	San Francisco Bay into Sacramento and San Joaquin Rivers and tributaries												
Spawning (late fall-run)	Sacramento-San Joaquin River systems and tributaries												
Juvenile Rearing (late fall-run)	Sacramento-San Joaquin Rivers, tributaries, potential presence in Delta												
Sacramento Splittail													
Adult Migration	San Francisco Estuary, Suisun Marsh, or Sacramento-San Joaquin Delta to upstream tributaries												
Spawning	Upstream tributaries												
Juvenile Rearing (year-round with increased juvenile presence spring and summer months)	In Delta and Marsh												

Sources: CDFW 2013a, b; NMFS 2005c, 2006a, 2011b; Moyle 2002; USFWS 2010a, b
Notes: Grey shading indicates presence as indicated during that month; E-Endangered; T-Threatened

Emergence occurs from November to March, depending on water temperatures. Juveniles migrate soon after emergence as young-of-the-year or remain in fresh water and migrate as yearlings (CDWR 2009). As described above for the Sacramento River winter-run ESU, Cladocera, Diptera, Copepoda, and Homoptera are the dominant foods of Chinook fry in freshwater regions of the Sacramento-San Joaquin River Delta (Kjelson et al. 1982) and adults feed on other fish.

Escapements have declined over the past ten years, in particular since 2006 (Williams et al. 2011). Further efforts, such as those underway to facilitate production in the San Joaquin River below Friant Dam and the passage above Englebright Dam on the Yuba River, will likely improve the status of the ESU (Williams et al. 2011). Central Valley spring-run Chinook salmon may be present within the project area during migration and rearing (Table 3.5-3).

Steelhead

Steelhead trout (like Chinook salmon and other Pacific salmonids) are anadromous. Unlike salmon, however, steelhead trout are iteroparious, meaning they can spawn more than one time (NMFS 2013b). Juvenile steelhead typically rear in freshwater for longer periods (1–3 years) as compared to Pacific salmon. Adults and juveniles both are more variable in the amount of time they spend in fresh and salt water. Throughout their range, steelhead typically remain at sea for one to four years before returning to freshwater to spawn. There are two basic reproduction types of steelhead, stream-maturing and ocean-maturing. The stream-maturing type enters freshwater in a sexually immature state, requiring them to spend several months maturing before they can spawn. The ocean-maturing type reaches maturity prior to entering freshwater and spawns at their natal streams shortly after arrival. Two ESA-listed Distinct Population Segments (DPSs) of steelhead trout occur within the project area. These include the Central Valley Steelhead DPS and the Central California Coast Steelhead DPS. Both DPSs are of the ocean-maturing type and are described in more detail below.

Central Valley Steelhead DPS. The Central Valley Steelhead DPS was listed by NMFS as threatened in 1998 with status reaffirmed in 2006 (NMFS 2006a). The DPS includes all naturally spawned anadromous steelhead populations below natural and manmade impassable barriers in the Sacramento and San Joaquin Rivers and their tributaries, excluding steelhead from San Francisco and San Pablo Bays and their tributaries. The DPS also includes fish spawned at the artificial propagation programs at the Coleman NFH and the Feather River Hatchery (NMFS 2006a). Critical habitat has not been designated for the Central Valley Steelhead DPS within or adjacent to the project area (NMFS 2005b).

Approximately 80 percent of historical steelhead spawning and rearing habitat is currently located above impassible dams. Remaining steelhead populations are presently distributed throughout the mainstem and tributaries of the Sacramento and San Joaquin Rivers (CDFW 2010a). Spawning occurs from September through April, peaking in December. Incubation and

emergence typically occurs from January through June with fish rearing, as described above, lasting one to three years in freshwater before moving downstream into the estuaries and out to sea (NMFS 2006a). Stream-dwelling juveniles feed on terrestrial and aquatic insects, insect larvae, amphipods, snails, and small fish whereas adult ocean resident steelhead feed on fish, squid, and crustaceans (Moyle 2002).

A previous review by the NMFS Biological Review Teams (BRT) determined that the Central Valley Steelhead DPS was in danger of becoming extinct (Good et al. 2005). A recent status review (Williams et al. 2011) determined a continued decline for this DPS after trawl data updated through 2010 indicated that a decline in natural production of steelhead has continued unabated since the 2005 review. Further, the Central Valley Steelhead DPS has worsened with an increased extinction risk determined (Williams et al. 2011). The California Department of Fish and Wildlife currently has a Central Valley Steelhead monitoring program in place (CDFW 2010a, b). In general, steelhead were found to be more abundant in the upper Sacramento River and Deer Creek and lowest in the San Joaquin tributaries (CDFW 2010b). Small numbers of adult steelhead from this DPS may be present at the project area during migration (Table 3.5-3).

Central California Coast Steelhead DPS. The Central California Coast Steelhead DPS was listed by NMFS as threatened in 2006 (NMFS 2006a). The DPS includes all naturally spawned anadromous steelhead populations below natural and manmade impassable barriers in California streams from the Russian River (inclusive) to Aptos Creek (inclusive) and the drainages of San Francisco, San Pablo, and Suisun Bays eastward to Chipps Island at the confluence of the Sacramento and San Joaquin Rivers. It also includes tributary streams to Suisun Marsh including Suisun Creek, Green Valley Creek, and an unnamed tributary to Cordelia Slough (commonly referred to as Red Top Creek) (NMFS 2006a). Critical habitat has not been designated for the Central California Coast Steelhead DPS within or adjacent to the project area (NMFS 2005b). Central California Coast Steelhead DPS spawning occurs from January through April. Like the Central Valley Steelhead DPS, young can remain in streams for one to three years before heading out to sea. Small populations spawn in several San Francisco Bay tributaries including Alameda Creek and San Pablo Creek, as well as coastal streams including the Russian River system, Scott Creek, and Lagunitas Creek. A recent review supports continued decline and elevated extinction risk of this DPS from previous reviews conducted in 1997 and 2005 (Williams et al. 2011; NMFS 1997; Good et al. 2005). The Central California Coast Steelhead DPS is expected to occur infrequently within the project area as suitable spawning habitat within the San Francisco Bay strata is either lost due to urbanization or impassable barriers (Williams et al. 2011).

Other ESA-Listed Fish Species

The North American Green Sturgeon Southern DPS and delta smelt are two non-salmonid species that are also federally protected under ESA and may occur within the project area. These species are described in more detail below.

North American Green Sturgeon Southern DPS. The North American Green Sturgeon Southern DPS was listed by NMFS as threatened in April 2006 (NMFS 2006b). They are broadly distributed, ranging from Mexico to Alaska in marine waters and observed in bays and estuaries up and down the West Coast of North America (Moyle et al. 1995). Critical habitat was designated for this DPS with a portion of it including the Sacramento-San Joaquin Delta and Suisun, San Pablo, and San Francisco Bays (NMFS 2009).

Green sturgeon use both freshwater and saltwater habitat and are believed to spend the majority of their lives in nearshore oceanic waters, bays, and estuaries. Adults return to freshwater to spawn when they are about 15 years of age and exceeding 4 feet in length. Spawning is believed to occur every two to five years. Adult migration to spawning grounds begins in late February. Green sturgeon spawn in deep pools or “holes” in large, turbulent, freshwater river mainstems between the months of March and July with peak activity occurring from April through June. The Southern DPS currently has only a single spawning population in the Sacramento River (Moyle 2002; NMFS 2005c). Spawning substrates ranges from clean sand to bedrock within cold clean water (NMFS 2013c).

Juvenile green sturgeons spend a few years maturing in fresh and estuarine waters before continuing on to the ocean. Green sturgeons are believed to forage on benthic invertebrates including shrimp, mollusks, amphipods, and small fish (NMFS 2013c).

A status review has not been conducted on the green sturgeon since 2005. However, a notice of intent to conduct one was published in the *Federal Register* in 2012 (NMFS 2012). The 2005 review stated that the San Joaquin River and its tributaries have been heavily modified and that no green sturgeon has ever been documented in the San Joaquin River or its tributaries (NMFS 2005c). However, two adult green sturgeons were captured in the Delta in 2002. Juvenile, sub-adult, and adult green sturgeon may be present within the project area either rearing or passing by within the migration corridor between San Pablo and San Francisco Bays to the Delta and Sacramento River System (Table 3.5-3).

Delta Smelt. Delta smelt was listed by USFWS as threatened in 1993 (USFWS 1993). Their historic distribution was from San Pablo Bay upstream to the city of Sacramento on the Sacramento River and Mossdale on the San Joaquin River. It is the only smelt endemic to California and the only true native estuarine species found in the Delta. Delta smelt are adapted to living in fresh and brackish water and prefer estuarine areas with salinities below 2 ppt. They rarely occur in waters with more than 10–12 ppt salinity (USFWS 2010a). Due to substantial

human-caused changes in freshwater outflows, the delta smelt has become rare in Suisun Bay (USFWS 2010a).

Critical habitat was designated for the delta smelt in 1994 and includes areas of all water and all submerged lands below the ordinary high water and the entire water column bounded by and contained in Suisun Bay (including contiguous Grizzly and Honker Bays); the length of Goodyear, Suisun, Cutoff, First Mallard (Spring Branch), and Montezuma sloughs; and the existing contiguous waters contained within the Delta (USFWS 1994).

Although spawning has not been observed in the wild, spawning location and timing has been inferred from the collection of larvae in sloughs and shallow edge-waters of channels in the upper Delta and in Montezuma Slough near Suisun Bay. Delta smelt spawn in freshwater temperatures from 45º to 59ºF with timing believed to occur between late January and June or early July. Eggs attach to substrates (i.e., rocks, gravel, submerged branches) within spawning areas and hatch within 12 to 14 days. Planktonic larvae are transported downstream to the mixing zone and begin feeding five to six days later. The most abundant time for larvae in the Delta is from mid-April through May. Larvae then move downstream to low salinity nursery habitat (2–7 ppt). Juveniles will rear for several months in shallow water until adulthood is reached, typically in September or October. Adults gradually migrate up into freshwater to spawn. Most delta smelt die after spawning; however, a small number of adults survive to spawn in their second year (USFWS 2010a).

Adult delta smelt forage primarily on free-floating small planktonic crustaceans and to a lesser degree on insect larvae. The main prey for delta smelt is copepods (*Limnoithona tetraspina* and *Acartiella sinenisi*) and mysid shrimp (*Neomysis mercedis*). Larval delta smelt feed exclusively on larval copepods.

A recent five-year status review of delta smelt (USFWS 2010a) showed a continued decline from surveys conducted in 2002. Surveys conducted in 2009 were the lowest ever recorded (USFWS 2010). Larvae surveys conducted in 2012 identified presence of delta smelt larvae during the month of March within the proposed project area (CDFW 2012). Surveys conducted in 2013, also in March, did not detect any delta smelt larvae near the project area. Instead, they were collected near Browns, Winter, and Spinner Islands approximately 10 miles east of the project area (CDFW 2013b).

Other Special Status Fish Species

Longfin Smelt. The Bay-Delta DPS of longfin smelt was added to the candidate species list on 2 April 2012 (USFWS 2012a). This species is currently also state listed in California as endangered. Longfin smelt generally spawn in freshwater and then move downstream to brackish water to rear. Juvenile and adult longfin smelt have been found year-round in salinities ranging from pure freshwater to pure seawater, although once past the juvenile stage, they are typically collected in waters with salinities ranging from 14 to 18 ppt. This species is also

believed to be restricted to waters generally less than 71ºF and will move into deeper waters during the summer months when water temperatures in the Bay-Delta are higher. Adult longfin smelt occupy water at temperatures ranging from 61º to 68ºF with spawning occurring in water with temperatures of 41º to 58ºF (USFWS 2012a). In the Bay-Delta, most longfin smelt spend their first year in the Suisun Bay and Marsh; the remainder of their life is spent in the San Francisco Bay or the Gulf of Farallones. Delta smelt and longfin smelt hybrids have been observed in the Bay-Delta estuary, although these offspring are not thought to be fertile (USFWS 2012a).

Central Valley Fall, Late-fall Chinook Salmon ESU. The Central Valley fall, late-fall Chinook salmon ESU was listed as a species of concern on 15 April 2004 and is currently also state listed in California as a species of special concern. This ESU includes all naturally spawned fall-run Chinook salmon in the San Joaquin and Sacramento Basins east of Carquinez Strait.

Adult migration of fall-run Chinook occurs generally from July through December, peaking mid-October through November. Spawning occurs from early October through late December. Migration for the late fall-run begins in October, peaking in December and concluding in April. Late fall-run Chinook spawn from January through mid-April. Spawning for this ESU (both fall and late-fall runs) occurs in the several tributaries of the Sacramento and San Joaquin Rivers. Specifically, the fall-run spawns in the lower American River, lower Yuba River, Feather River, and tributaries of the upper Sacramento River. Most spawning occurring within the mainstem of the Sacramento River takes place between Keswick Dam and the Red Bluff Diversion Dam. The main spawning areas for late-fall run Chinook are located in Battle Creek, Cottonwood Creek, Clear Creek, and Mill Creek. Mainstem Sacramento River spawning also occurs for the late fall-run between Keswick Dam and the Red Bluff Diversion Dam (CDFW 2013a). Freshwater rearing of juvenile fall-run Chinook lasts three to six months and late-fall Chinook spend up to a year before juveniles migrate out to sea in the spring. Approximately one to four years is spent at sea (CDFW 2013a).

The fall-run Chinook are currently the most abundant of the Central Valley Chinook runs. They are also raised at five major hatcheries in Central Valley, which release more than 32 million smolts per year. Because of concerns to this ESU from hatchery influence, the status of the Central Valley fall/late fall-run is monitored both by federal and state protected species regulations (CDFW 2013a).

Sacramento Splittail. The Sacramento splittail is a California species of special concern. In October 2010, the USFWS published a 12-month finding that the splittail did not warrant protection under the ESA because the best available scientific information demonstrated no recent decline in the overall abundance of the splittail nor threats that rise to the level of being significant to the splittail at the population level (USFWS 2012a).

The splittail can live seven to nine years and has a high tolerance of variable water quality (i.e., salinity, temperature, and dissolved oxygen). Adults primarily occur within the Suisun Marsh and can also be found in brackish marshes of the San Francisco Estuary and fresher water habitats of the Sacramento-San Joaquin Delta (Moyle 2002; USFWS 2010b).

Adults begin migration upstream between late November and late January and peak during high spring flow events (February through April). Adult splittail spawn from late February to early July within inundated flood plains, created in the spring by snowmelt runoff from the Sierra Nevada Mountains. At the conclusion of spawning, adults will move back downstream to brackish marsh or estuarine habitats. Sacramento splittail lay their eggs on submerged vegetation; the eggs generally hatch within a few days into larval fish. Growth from larval stage to juvenile stage is quick, approximately 15 days. Once larval fish have grown into juveniles they move downstream as juveniles measuring only a few inches in length. They grow to maturity within marsh habitats and reach adulthood in two to three years (Moyle 2002).

Within the Sacramento River tributaries, splittail have been documented in the American River, Feather River, and Butte Creek. Within the San Joaquin tributaries, they have been documented in several rivers including the Consumnes, Mokelumne, Toulumne, Merced, Napa, and Petaluma Rivers (USFWS 2010b).

The dominant lifestage likely to be present within Suisun Bay and the Delta in general is the juvenile lifestage of Sacramento Splittail. Occurrence would be expected in late spring and early summer (USFWS 2010b).

3.5.4.3 Special Status Wildlife

<u>Federally Listed Wildlife Species</u>

California Clapper Rail

The California clapper rail (*Rallus longirostris obsoletus*) was federally listed as endangered on 13 October 1970 and state listed as endangered on 27 June 1971 (CDFW 2013c). Pre-1913 sport and professional hunting was the reason for population decline. Since listing, its continuing population decline has been attributed to alteration and loss of habitat, as well as an increase in the predator population of red fox (*Vulpes fulva*) (LSA Associates 2004).

The California clapper rail is a part of the large family (Rallidae) of small to medium sized birds that have a large cosmopolitan distribution; however, this subspecies is endemic only to California's San Francisco Bay, Monterey Bay, and Morro Bay. Clapper rails are generally 14–16 inches in height, males being slightly larger than females, and have long curved bills at least 2 inches in length (LSA Associates 2004). The upper areas of these birds are greenish-brown, the breast is cinnamon colored, the flanks are dark and barred by white, and the undertail is white (USFWS 2012b).

California clapper rails live in salt water and brackish marshes and favor tidal sloughs and marsh channels (USFWS 2012b). Historically, the clapper rail has ranged from the tidal marshes of Humboldt Bay south to Morro Bay as well as within the estuarine marshes of the San Francisco Bay and San Pablo Bay (LSA Associates 2004). Today, these birds are generally limited to San Francisco Bay.

Currently, there is a single population of breeding California clapper rail, which is located within the geography of the San Francisco Bay (USGS 2006). Research has shown that the reason for low fecundity of the California clapper rail is due mainly to environmental contamination as well as predation of eggs (USGS 2006). An increase in the number of transmission lines transecting its marsh habitats has been responsible for some of the increased predation as the lines provide perch sites for predatory raptors (USFWS 2012b).

Clapper rails have previously been recorded at MOTCO, including in the vicinity of Pier 3, in Middle Point Marsh, in the vicinity of Otter Slough, and west of Taylor Bridge. In 1994, three pairs of clapper rails near Belloma Slough were reported in the west end of Pier Marsh; all other detections of clapper rails at MOTCO were sporadic and may have been related to unmated and/or young individuals that were dispersing through the area (HT Harvey and Associates 2011). During the 1998 and 1999 surveys in support of the 2002 INRMP, the California clapper rail was found in the brackish habitat of Seal Creek Marsh as well as within Hastings Slough East Marsh (Morrison et al. 1999). No California clapper rails were detected during the 2010 surveys. The absence of clapper rails from surveyed portions of the Tidal Area during the 2010 breeding season is not unexpected given that the site largely lacks habitat that clapper rails typically use for breeding. Pier Marsh, much of Middle Point Marsh, and the portions of Hastings Marsh closest to the project area lack extensive, well developed tidal channels used by clapper rails for breeding, and these marshes do not support stands of cordgrass that represent more typical breeding habitat for this species.

Similarly, no clapper rails were detected during black rail surveys conducted by WRA Environmental Consultants in Middle Point Marsh between 26 March and 18 May 2010, suggesting that clapper rails were absent from the interior of Middle Point Marsh to the east of the project area as well (WRA 2010). Moreover, Clapper rails have never been recorded regularly in Middle Point Marsh, whereas black rails have been detected frequently. The paucity of clapper rail detections, despite substantial survey effort, indicates the marsh represents low quality habitat for clapper rails. The portions of Hastings Marsh to the west of the project action area have a somewhat higher potential for supporting clapper rails due to the more intricate network of channels associated with Hastings Slough, as compared with Pier Marsh and Middle Point Marsh (HT Harvey and Associates 2011). Therefore, it is possible but unlikely that California clapper rails occur in the project action area.

California Least Tern

The California least tern (*Sternula antillarum brownii)* was federally listed as endangered in October 1970 and was state listed as endangered in June 1971 (USFWS 1970; CDFW 2013c). Populations of the California least tern are threatened by development and encroachment by humans of their nesting habitat, in addition to predation of eggs and young by other birds and mammals (Natureserve 2013). For example, red foxes destroyed 75 percent of the California least tern nests in Orange County, California in 1988 (Natureserve 2013). Other activities that have been documented as detrimental to the California least tern are noise pollution, such as from helicopters flying low or landing in nesting areas and military training noise (USFWS 2006).

The California least tern is part of the larger family of gulls and terns (Laridae*),* which have long tapered wings, a 30-inch wingspan, and measure about 10 inches in length (California Department of Pesticide Regulation [CDPR] 2003). Their heads are capped in black as are the tips of their wings; upper wings are pale grey contrasting with their white body, white forehead, and yellow bill (CDPR 2003). It is the smallest tern of all North American terns, and a typical colony size includes about 25 pairs (USFWS 2006).

The California least tern is a migratory species that arrives to breed in the end of April and leaves in August (USFWS 1985). Its breeding range extends along the Pacific coast from Monterey County to southern Baja. Nesting sites in the San Francisco Bay area have been documented since 1970 (USFWS 1985).

The California least tern inhabits coastal bays and estuaries and lays its eggs in nearby open beach areas. Their eggs are laid in depressions in sparsely vegetated areas near water on gravel to sandy substrate, with clutches of two to three being common (CDPR 2003; USFWS 1985). To minimize predation, California least terns roost at sites well away from breeding locations before egg laying occurs (USFWS 1985).

The California least tern was not seen during the 1998 and 1999 surveys or during the 2010 surveys (Morrison et al. 1999; HT Harvey and Associates 2011). This species was last observed on the installation in 1982, but has recently established a nesting colony at the Montezuma wetlands project site, some 6 miles to the northeast. There is no suitable nesting or shoreline roosting habitat in the project area; therefore, California least terns are not likely to occur in the project action area except as possible transients during migration through Suisun Bay.

Salt Marsh Harvest Mouse

In 1970, the salt marsh harvest mouse (*Reithrodonomys raviventris*) was federally listed as an endangered species (USFWS 2009). Because this species is specifically adapted to the salt marsh environment and is endemic only to San Francisco Bay, loss of habitat is responsible for drastic declines in its populations. It has been documented that since 1850, there has been an approximate 84 percent reduction in marsh habitat in San Francisco Bay (Mossman 2008). In

addition, present marsh habitats are eroding and water diversions are altering salinity levels in the Bay, resulting in massive ecosystem changes.

The salt marsh harvest mouse is one of the smallest rodents in the U.S. and is a member of the largest family of mammals (Muridae) (Mossman 2008). Adult salt marsh harvest mice are about 3 inches in length and weigh only 0.25–0.45 ounces; they have grooved teeth, a cinnamon colored belly, a bi-colored tail, large ears relative to their size, and a brown body (Golovanova and Holzman 2009).

Salt marsh harvest mice are endemic to San Francisco Bay salt marsh habitats. Their eastern limit seems to be defined by salinity, in that they require pickleweed habitats, which do not occur east of Antioch because waters become too fresh (Mossman 2008). The salt marsh harvest mouse prefers dense cover, most commonly inhabiting pickleweed beds (*Salicornia virginica*), and during winter's highest tides they move into the marsh-upland transition zone (Mossman 2008). In general, salt marsh harvest mice eat a diet of leaves, seeds, and stems, tending toward pickleweed and eating mainly at night (Mossman 2008). During summer, the salt marsh harvest mouse can tolerate higher salinity levels in water and higher concentrations of salt in its vegetative diet, which is believed to give it a competitive advantage over other marsh inhabitants (Golovanova and Holzman 2009, LSA Associates 2009).

Since 1979, habitat within the project area has generally converted from species associated with saltwater marshes to those associated with freshwater marshes. As discussed above, freshwater marsh habitat is unsuitable for salt marsh harvest mice, and trapping surveys in Middle Point Marsh during the 1990s documented a decline in the salt marsh harvest mouse population (HT Harvey and Associates 2011). During the 1998 and 1999 University of Arizona surveys, populations of salt marsh harvest mouse were found within seven locations in the Tidal Area, including Ryer Island, Hastings Slough West Marsh, Middle Point Marsh, Hastings Slough East Marsh, and Tug Slough Marsh (Morrison et al. 1999).

In 2010, the original approach to assess the current status of salt marsh harvest mice in the vicinity of RPMP-related improvements at MOTCO was to conduct a trapping study. However, it was determined through consultation with the CDFW that trapping was not the preferred approach. As such, a detailed vegetation mapping effort was conducted to assess the potential for occurrence of the harvest mouse using the vegetation mapping results. Results indicate that, with one exception, the project action area has a very low potential for occurrence. These areas of "very low potential" are very unlikely to support harvest mice. However, the potential for occurrence cannot be eliminated, and there is at least a minimal probability that these areas could be used on occasion for dispersal or may represent "sink" habitat that mice disperse into from higher quality areas but that do not provide habitat of sufficient quality to support a self-sustaining population. The one exception is an area of "low potential for occurrence" (i.e., 20–30 percent probability of occurrence) near the eastern half of Pier 3 in Pier Marsh, immediately south of White Road. This area represents the largest contiguous patch of pickleweed in the

project area and thus has the highest potential for salt marsh harvest mouse occurrence. However, this area is still mapped as “low potential” because it is isolated from other patches by infrastructure or other unsuitable cover types, including more than 656 feet of cattail, reed, and other freshwater cover types that are largely unsuitable for salt marsh harvest mice (HT Harvey and Associates 2011). Therefore, it is possible but unlikely that the salt marsh harvest mouse occurs in the project area.

Humpback Whale

The humpback whale (*Megaptera noveangilae*) was listed as endangered by NMFS in 1970 and remained listed with the passing of the Endangered Species Act in 1973. No critical habitat has been designated for this species. Primary threats include increased anthropogenic sound in the ocean, vessel strikes, and entanglement in fishing gear (NMFS 2008b).

The humpback whale is a large baleen whale found worldwide in all ocean basins but absent from Arctic waters. In the United States, humpback whales are found along all coasts and make long migrations to feeding and breeding grounds. Along the coast of California, migrations occur twice annually from breeding grounds in Central America and Mexico to feeding grounds off the coasts of Washington and Canada. The group that may be present in the vicinity of MOTCO is part of the Eastern North Pacific stock. The most common habitat types where this species is known to reside include offshore and nearshore marine waters but individuals are known to venture into estuaries, bays, and sounds. Diet consists of krill and small fish (NMFS 1991).

The habitat and inland location of Suisun Bay is not ideal for humpback whales and, therefore, this species occurrence is not expected to be common in the vicinity of MOTCO. However, humpback whales in the Sacramento River Delta have been documented on several occasions. An individual swam up the Sacramento River in 1985 and was successfully guided back to the Pacific Ocean. This whale, named “Humphrey”, had distinct markings that allowed for identification. In 1990, Humphrey returned to San Francisco Bay and became stranded on a mudflat. He was pulled off the mudflat and once again guided back to the Pacific Ocean. In 2007, a cow/calf pair was sighted in the Sacramento River Delta near Rio Vista. It was apparent that both whales were injured, but within two weeks they were confirmed to have made it back to the Pacific Ocean (NMFS 2007). Humpback whale sightings are rare in the Sacramento River Delta area. Therefore, it is possible but extremely unlikely that humpback whales would occur in the project action area.

<u>Other Special Status Wildlife Species</u>

Northwestern Pond Turtle

Due to state-wide population declines, northwestern pond turtles (*Actinemys marmorata marmorata*) are a state species of concern. Natural predator species of the northwestern pond turtle include raccoons, skunks, coyotes, and bullfrogs, all of which are known to prey on newly hatched pond turtles (Atlantis 2009). Anthropogenic threats to Northwestern pond turtles include

commercial exploitation for the pet trade as well as overall degradation and loss of habitat from urbanization (Atlantis 2009; Natureserve 2013).

Historically, the range of this pond turtle extended along the Pacific coast from Klickitat County, Washington south to Baja California. Today, populations have been eradicated from Baja California (Atlantis 2009). They are found between sea level and up to 6,496 feet within a variety of aquatic habitats as these species are known as generalists (ECCC HCP Association 2006; Atlantis 2009). Slow moving rivers, streams, lakes, ponds, reservoirs, and saltwater marshes that have refuge areas such as undercut banks and submerged vegetation and rocks are all likely habitat locations (Atlantis 2009, ECCC HCP Association 2006). Basking sites (logs, boulders, and other substrate) are also necessary for thermoregulation (ECCC HCP Association 2006). Breeding occurs between April and May and eggs may be laid through August (LSA Associates 2004).

During the 1998 and 1999 surveys in support of the 2002 Navy INRMP, there were two occurrences of the northwestern pond turtle, one located within Seal Creek Marsh and the other within Otter Slough (Morrison et al. 1999). During reconnaissance surveys for the INRMP, a number of pond turtles were observed in a creek by the railroad tracks within the tidal area (USACE 2011). Therefore, northwestern pond turtles occur in the project action area.

California Black Rail

The California black rail (*Laterallus jamaicensis*) population has severely declined in size and is state listed as threatened. Black rail abundance, as documented in the 1980s, was about 3,300 individuals (Natureserve 2013). As the main habitat area of these birds has been drastically reduced by about 85 percent from historic times, the populations of the species have been likewise reduced (LSA Associates 2004). In addition to the destruction and loss of habitat, other human-induced impacts such as flood control activities, pollutant contamination, freshwater diversions, sea level rise, and livestock grazing are also factors in declining populations.

The black rail is a small bird about the size of a sparrow, ranging between 5 and 6 inches in length (LSA Associates 2004). Males and females tend to be similar in both size and weight. These birds have a short black bill along with blackish legs. The coloration of the body is black to gray with faint speckles of white on its sides and back and a neck of deep chestnut brown (NatureServe 2013). Juveniles tend to be solely black in color.

California black rails are generally found in fresh and brackish marshes, especially those dominated by pickleweed (Natureserve 2013). As documented in the 1980s, 80 percent of the population occurred in the northern part of the San Francisco Bay estuary (Natureserve 2013; Spautz et al. 2005). They almost exclusively inhabit the most pristine areas of salt marsh habitat along the shoreline of northern San Pablo Bay, along the Carquinez Strait, and throughout parts of Suisun Bay (LSA Associates 2004). Although dispersal of this species is not well understood, they are believed to migrate between August and October.

In order to protect populations of the California black rail, restoration of wetlands has been identified as a critical tool. Past research has also indicated that larger, contiguous marsh areas are more likely to sustain populations (Spautz et al. 2005).

During the 1998 and 1999 surveys in support of the 2002 Navy INRMP (Morrison et al. 1999), California black rails were found in a number of areas onsite, including Hastings Slough Marsh West, Hastings Slough Marsh East, two locations on East Marsh, Middle Point Marsh, Lost Slough West, Pier 4 Marsh, and Otter Slough. In 2010, during formal black rail surveys, a total of 68 California black rail detections were recorded at 36 of the 72 listening stations. Results indicate black rails occur throughout Pier Marsh and likely also use surrounding areas, although they generally do not breed along the west end of Pier Marsh. During the breeding surveys, one black rail was detected on the north side of White Road, approximately 700 feet west of the Pier 3 pedestrian bridge. Thus, black rails could breed in bayshore marshes north of White Road adjacent to Pier 3 but likely do so only in low densities. Black rails do not breed in or occur along the Bay shoreline near Pier 2. California black rails appear to be able to use a wide variety of wetland types (i.e., freshwater, brackish, and saline), but their distribution is likely influenced by other factors, such as vegetation structure and water regime rather than specific plant associations (HT Harvey and Associates 2011).

During the California clapper rail surveys, which were conducted prior to the black rail breeding season, there were 32 black rail detections from 17 of the clapper rail survey stations, indicating that a large portion of the black rails using these marshes are likely resident year-round (as opposed to migratory). The detection of vocalizing black rails in some areas during the winter surveys but not during the spring, such as on the west side of Pier Marsh, suggests some differential habitat use between the breeding and nonbreeding seasons (HT Harvey and Associates 2011). Therefore, California black rails occur in the project action area.

San Francisco Common Yellowthroat

The San Francisco common yellowthroat (*Geothylpis trichas sinuosa*) is a California state bird species of special concern because of a documented 80 to 95 percent decline in population size over the past 100 years within the Bay Area (Green 2008; LSA Associates 2004). The species' population decline has been attributed to loss of riparian and forest habitats within the San Francisco Bay region (Shuford and Gardali 2008). Degradation of wetland environments by draining, flood control measures, and development are also factors in reduced populations (Shuford and Gardali 2008).

The San Francisco common yellowthroat, a part of the order Passeriformes and the family Parulidae, is a subspecies of the common yellowthroat and has experienced a dramatic decline in population numbers. Male San Francisco common yellowthroats have yellow coloring of the throat and breast, a broad black mask boarded by white above the mask, with olive-brown coloring up-top and tan coloring on its sides, and a white belly (Natureserve 2013). Female

yellowthroats are similar to males except they are paler yellow or creamy whitish where males are bright yellow (LSA Associates 2004). These are fairly small birds, ranging from 4 to 6 inches in length (Natureserve 2013).

Range of the San Francisco common yellowthroat is within the salt marsh habitat surrounding San Francisco Bay and along the California coastline bounded by Tomales Bay in the north and Santa Cruz County in the south (LSA Associates 2004; Natureserve 2013).

The San Francisco common yellowthroat frequents dense vegetation that is both low and near to water. Habitat types where yellowthroats are found include freshwater marsh, coastal swales, swampy riparian thickets, brackish marsh, and salt marsh (LSA Associates 2004). During breeding times, nests are created within 3 inches of the ground or water (Green 2008; Natureserve 2013). Breeding occurs between April and mid-July, with females laying three to six eggs and incubating the eggs an average of 12 days (Green 2008).

During the 1998 and 1999 surveys in support of the 2002 Navy INRMP (Morrison et al. 1999), San Francisco common yellowthroats were reported to have been present at numerous locations within the Tidal Area. However, it is believed that this less common subspecies occurs only west of the Carquinez Strait, and that earlier sightings may have been of the more ubiquitous common yellowthroat (USACE 2011). During the 2010 surveys, all yellowthroats observed during the breeding-season surveys were assumed to be San Francisco common yellowthroats as MOTCO is located within the subspecies' breeding range and because the detected birds were exhibiting behavior typical of breeding birds. Survey results indicate that the San Francisco common yellowthroat is likely ubiquitous within Pier Marsh, with particularly high densities near the western access way for Pier 3. The area south of the western access way for Pier 4 was also densely populated. San Francisco common yellowthroats occur at lower densities near the eastern access way for Pier 2 and do not occur within the project area west of the Pier 2 pedestrian access way (HT Harvey and Associates 2011). Therefore, San Francisco common yellowthroats occur in the project area.

Suisun Song Sparrow

The Suisun song sparrow (*Melospiza melodia maxillaries*) is a state species of concern. This species is threatened by habitat loss, fragmentation, and degradation (Spautz and Nur 2008). An increase in water diversions from the San Joaquin and Sacramento Rivers has resulted in an increase in salinity within the Bay, which has the potential to change dominant vegetation types and therefore impact habitat (Spautz and Nur 2008). Introduced predator species such as the house cat (*Felix catus*), Norway rat (*Rattus norvegicus*), and red fox are impacting reproductive success of the species. Further, disturbance activities such as oil exploration, grazing, and recreation are having an effect on this species' habitat (Spautz and Nur 2008).

The Suisun song sparrow is a small chunky perching bird with a rounded outline, large feet, conical bill, rounded wingtips, slender tail, and streaked whitish under-parts. Coloration between

the black feather shafts and back is the feature that best distinguishes the Suisun song sparrow from similar subspecies endemic to marshes bordering the San Francisco and San Pablo Bays. The Suisun song sparrow is also unique in its larger bill depth. Like other song sparrow subspecies, the Suisun song sparrow has a long rounded tail, which is pumped during flight. Eyebrows are grayish, and a broad dark stripe borders the whitish throat. Streaking occurs on upper parts and sides of the breast and legs and feet are pinkish.

Suisun song sparrows occur within all tidal marsh habitats in Suisun Bay; however; dense vegetation is required for nesting sites, song perches, and predator protection (Spautz and Nur 2008). In addition, Suisun song sparrows are primarily associated with tidal channels with a dominance of pickleweed (*Salicornia virginica*) and gumplant (*Grindelia stricta*) (LSA Associates 2009). Food sources for Suisun song sparrows generally include bulrush seeds, insects, and other invertebrates exposed during low tide. And, because they are the only ground foraging bird in this geographic niche, they are highly successful (LSA Associates 2009). Egg-laying generally begins by late March with females having clutch sizes of three to five eggs.

The Suisun song sparrow is endemic to Suisun Bay (LSA Associates 2009). Year round, the range and distribution of this sparrow is confined to the marshes surrounding the Carquinez Strait and Suisun Bay, with the densest populations in Benicia State Park and the Martinez shoreline (Spautz and Nur 2008).

During the 1998 and 1999 surveys in support of the 2002 Navy INRMP (Morrison et al. 1999), Suisun song sparrows were observed in 19 locations dispersed throughout Ryer Island, but located mainly on the outer shorelines. It was also observed in the mainland Tidal Area in 2009 during reconnaissance surveys for the INRMP (USACE 2011). In 2010, Suisun song sparrows were detected at least once at all 72 survey stations, including those adjacent to Pier 2 and Pier 3, with an average density of 1.3 birds per acre. Areas with higher song sparrow abundance were generally associated with taller wetland vegetation that provided appropriate structure for sparrows to perch and sing (i.e., for establishing breeding territories), although they were observed using upland vegetation (e.g., coyote brush) as well. The highest density occurred near the southeast corner of Pier Marsh, along Stevens Road (bordering the eastern edge of Pier Marsh and the western edge of Middle Point Marsh), and along the eastern edge of Hastings Marsh (HT Harvey and Associates 2011). Therefore, the Suisun song sparrow is known to occur in the project action area.

Loggerhead Shrike

A state species of special concern, loggerhead shrikes (*Lanius ludovicianus*) can be found throughout the year in the lowlands and foothills of California and range from the Canadian provinces southward through the United States and into southern Mexico. Populations in the southernmost part of the range tend to be resident while northern populations tend to be migratory (Reuven 1996).

As documented by the Audubon Society over the past 40 years, loggerhead shrikes have declined in population size within the United States by 71 percent, or from an estimated 10 million individuals 40 years ago, to a current population of 2.9 million (Audubon Society 2009). Threats to loggerhead shrike are mainly due to habitat loss, as open farmland is being converted into developed land, or is reverting to forestland, while other farmland is being farmed more intensively and trees and shrubs are being eliminated from hedgerows (Audubon Society 2009).

During the 1998 and 1999 surveys in support of the 2002 Navy INRMP, loggerhead shrikes were observed at eight locations including Hastings Slough East Marsh, Seal Creek Marsh, the upland hills of the Tidal Area, the very western portion of East Marsh, Lost Slough East, and within the bunker areas (Morrison et al. 1999). It was also observed in the mainland Tidal Area in 2009 during reconnaissance surveys for the INRMP (USACE 2011). The Tidal Area of MOTCO provides fairly high-quality habitat for this species, as it provides scattered coyote brush and other shrubs and small trees within a matrix of open marsh and grassland. A loggerhead shrike was observed in the southeast corner of Pier Marsh during the 2010 surveys (HT Harvey and Associates 2011). Therefore, the loggerhead shrike is known to occur in the project action area.

Salt Marsh Wandering Shrew

The salt marsh wandering shrew (*Sorex vagrans halicoetes*) is listed by the state as a species of special concern. It is threatened by degradation and loss of salt marsh habitat around the San Francisco Bay area. Since European settlement, roughly 91 percent of tidal wetland habitats around the Bay have been eradicated due to human alteration (Collins 1998). Other factors that may be affecting shrew populations are introductions of pesticides, heavy metals, and PCBs, all of which could potentially be accumulating within the food chain (Collins 1998).

The salt marsh wandering shrew, also known as the vagrant shrew, is a small wandering shrew historically found along streams, in grasslands, and marshy areas of San Francisco Bay. They occur within the same habitat (e.g., pickleweed) as two other federally and state listed species, the salt marsh harvest mouse and the California clapper rail. Although this species of shrew is sympatric with other shrew species that are found within a greater geographic range, populations of the salt marsh wandering shrew are restricted to San Francisco Bay salt marsh habitat in San Mateo, Santa Clara, Alameda, and Contra Costa counties (Collins 1998; Harris 2009). They tend to restrict most of their activity to elevations of 6–9 feet above MSL, which corresponds to the middle marsh area (Collins 1998). Salt marsh wandering shrews tend to prefer areas that are inundated daily by tidal flows and contain dense litter or ground cover (Collins 1998).

During the 1998 and 1999 surveys (Morrison et al. 1999), salt marsh wandering shrews were captured during small mammal live-trapping efforts within the Tidal Area at a number of different

locations. However, given the change in habitat (from salt marsh to freshwater), and similar to the salt marsh harvest mouse, wandering shrew occurrence within the project action area is considered possible but unlikely.

California Sea Lion and Pacific Harbor Seal

Marine mammals generally require higher salinity conditions than those occurring near MOTCO, but several species have been known to venture into the waters of Suisun Bay. Soft bottom habitats, which are abundant in the waters surrounding MOTCO, are preferred by the marine mammal species occurring in the region for feeding (NMFS 2007). The federally endangered humpback whale (*Megaptera noveangilae*) has been sighted infrequently many miles up the Sacramento River and is described in detail above.

Other marine mammals that may occur in Suisun Bay include the California sea lion (*Zalophus californianus*) and harbor seal (*Phoca vitulina*). Although sightings have been documented, sea lions are not frequent visitors of the Suisun Bay area. Harbor seals are known to occur consistently, in low abundance, in the vicinity of MOTCO, and have been sighted in the Sacramento and San Joaquin Rivers. All marine mammals are protected by the MMPA.

The Pacific harbor seal is one of the most common pinnipeds in California. They are present year-round and occupy virtually all types of nearshore habitats, including offshore rocks; sandy, gravelly, or rocky beaches; and estuarine mud flats. They are found in most coastal bays and in many rivers, and their populations have also increased significantly since the MMPA was passed (USACE 2011).

Both California sea lions and Pacific harbor seals are known to occur in the project action area.

3.6 LAND USE AND COASTAL ZONE MANAGEMENT

3.6.1 Land Use

Land use generally refers to human modification of land, often for residential or economic purposes. It also refers to the use of land for preservation or protection of natural resources such as wildlife habitat, vegetation, or unique features. Unique natural features are often designated as national or state parks, forests, wilderness areas, or wildlife refuges. Human land uses include residential, commercial, industrial, agricultural, public, and recreational.

Attributes of land use described in this EIS include general land use and ownership, land management plans, and special use areas. Land ownership is a categorization of land according to type of owner. The major land ownership categories include federal, state, Native American, and private. Federal lands are further described by the managing agency, which may include the U.S. Forest Service (USFS), Bureau of Land Management (BLM), or DOD. Land uses are frequently regulated by management plans, policies, ordinances, and regulations that determine the types of activities that are allowed or that protect specially designated or

environmentally sensitive uses. Land use as it relates to the proposed action consists of the land located in the Tidal Area of MOTCO.

The current pattern of land use in the 6,526-acre Tidal Area (see Figure 3-11) serves the primary shipping and distribution mission of the 834th TRANS BN at MOTCO. In the Tidal Area, missions generally occur in the northern portion adjacent to Suisun Bay, with ammunition holding and transfer facilities located in the center. Large portions of the Tidal Area (30 percent) are marshlands / wetlands preserve lands within the ESQD arcs. Also included within the Tidal Area are 2,045 acres of off-shore islands.

Primary road access to the Tidal Area is via Port Chicago Highway and Taylor Boulevard, with entry control at Gate 2. The ammunition transfer and holding pads are separated from the port missions by the BNSF and UPRR railroad corridors. Ammunition holding/staging is the most prominent active land use in the Tidal Area, with approximately 8 percent of lands devoted to this function. Piers 2, 3, and 4 are the key port facilities in the Tidal Area and together make up most of the 6 percent of lands used for missions. Rail lines, railcar yards, barricaded railcar holding areas, piers, transfer facilities, holding pads, staging areas, and main supply routes are all operated within the Tidal Area to support the receipt and movement of cargo.

The pattern described above has comprised the land use of the Tidal Area for the past several decades. Few facilities have been constructed or undergone improvement in recent years. A number of existing facilities are vacant or underutilized. Nonetheless, the existing pattern of development is relatively efficient, with similar or supporting uses close to one another and dissimilar uses separated.

3.6.2 Coastal Zone Management

The federal CZMA (16 USC Section 1451, *et seq*., as amended) is a voluntary law enacted to encourage coastal states and territories to develop and implement programs to manage the nation's coastal resources. In accordance with Section 307 of the CZMA and 15 CFR Part 930, Subpart C, federal agency activities affecting a land or water use or natural resource of a state's coastal zone must be "consistent to the maximum extent practicable" with the enforceable policies of the state's coastal management program. The CZMA establishes national policy to protect resources in the coastal zone; CZMA policy is implemented by state coastal management programs that have been approved by the National Oceanic and Atmospheric Administration (NOAA). Federal lands are excluded from the jurisdiction of such approved state coastal management programs. However, the CZMA and its implementing regulations provide that federal agencies must determine if it is reasonably foreseeable that their proposed actions, whether inside or outside of a state's coastal zone, will directly or indirectly affect any land or water use or natural resource within that coastal zone. To implement the provisions of the CZMA, federal agencies must make "consistency determinations" on their proposed activities.

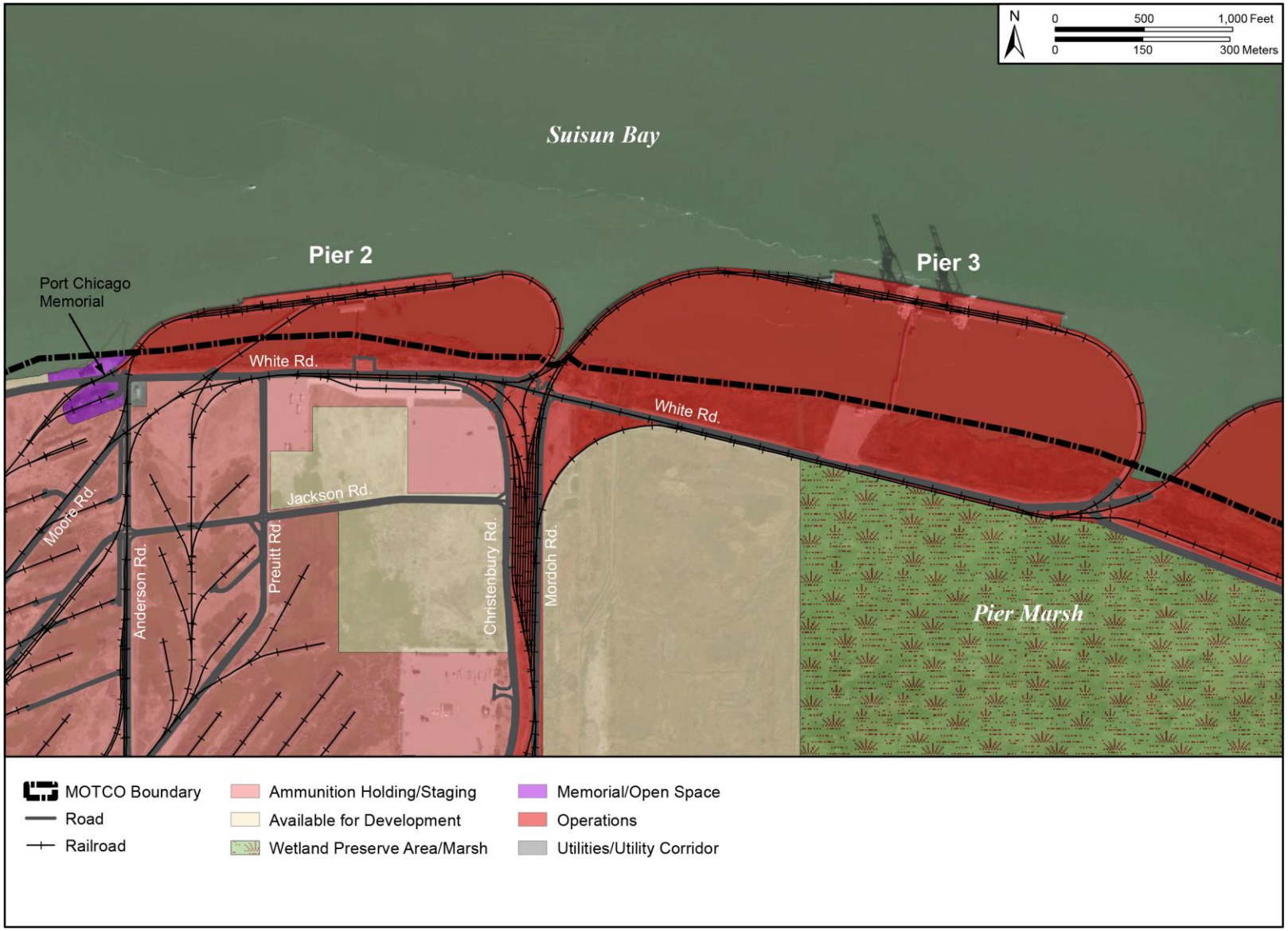


Figure 3-11. Existing Land Use

The San Francisco BCDC is the federally-designated state coastal management agency for the San Francisco Bay segment of the California coastal zone. This designation empowers the Commission to use the authority of the federal CZMA to ensure that federal projects and activities are consistent with the policies of the San Francisco Bay Plan and state law to the maximum extent practicable. The coastal zone for the BCDC includes the open water, marshes, and mudflats of greater San Francisco Bay, and areas 100 feet inland from the line of highest tidal action. The boundary also includes the Suisun marsh and buffer zone, managed wetlands diked off from the Bay, and open waters diked off from the Bay and used in salt production.

The BCDC coastal management program is based on the provisions and policies of the McAteer-Petris Act, the Suisun Marsh Preservation Act of 1977, the San Francisco Bay Plan, the Suisun Marsh Protection Plan, and BCDC administrative regulations. MOTCO is located in the Suisun Bay and Marsh area of the San Francisco Bay Plan. As part of the proposed action, the Army would need to obtain BCDC concurrence with its consistency determination by submitting a determination that the proposed activity is consistent to the maximum extent practicable with the Commission's management program or that it will not affect the state's coastal zone.

3.7 TRANSPORTATION AND UTILITIES INFRASTRUCTURE

3.7.1 Road Transport

California Highway 4 provides the main access to MOTCO with State Highway 242 and Interstates 680, 80, 580, and 780 providing access towards San Francisco, Oakland, San Jose, and Sacramento. Port Chicago Highway, a county road, provides access to MOTCO from California Highway 4.

As shown in Figure 3-12, MOTCO has five gates; Gate 1 is manned at all times and provides access to the Inland Area and Tidal Area. Four of the five gates, Gates 2, 3, 4, and 5 provide access to the Tidal Area. Gate 1 is also considered MOTCO's Main Gate and is accessible via Kinne Boulevard. Gate 2 is located at Port Chicago Highway and Taylor Boulevard. Gate 3 is located near the community of Clyde at the intersection of Port Chicago Highway and the Pacific Gas and Electric Company (PG&E) utility corridor; Gate 3 is normally unmanned and closed unless needed for oversize vehicle entry. Gate 4 is located on the western side of the Tidal Area in the Hastings Marsh Area along Waterfront Road; Gate 4 is normally unmanned and closed. Gate 5 is located in the eastern portion of the Tidal Area at the intersection of Port Chicago Highway and Nichols Road; Gate 5 is normally unmanned and closed unless needed for missions.

The Tidal Area primary road network consists of Port Chicago Highway / Taylor Boulevard, Waterfront Road, White Road, Main Road / Murdoh Road, and Stevens Road. These roads provide access to the Tidal Area and between the various Tidal Area functions.

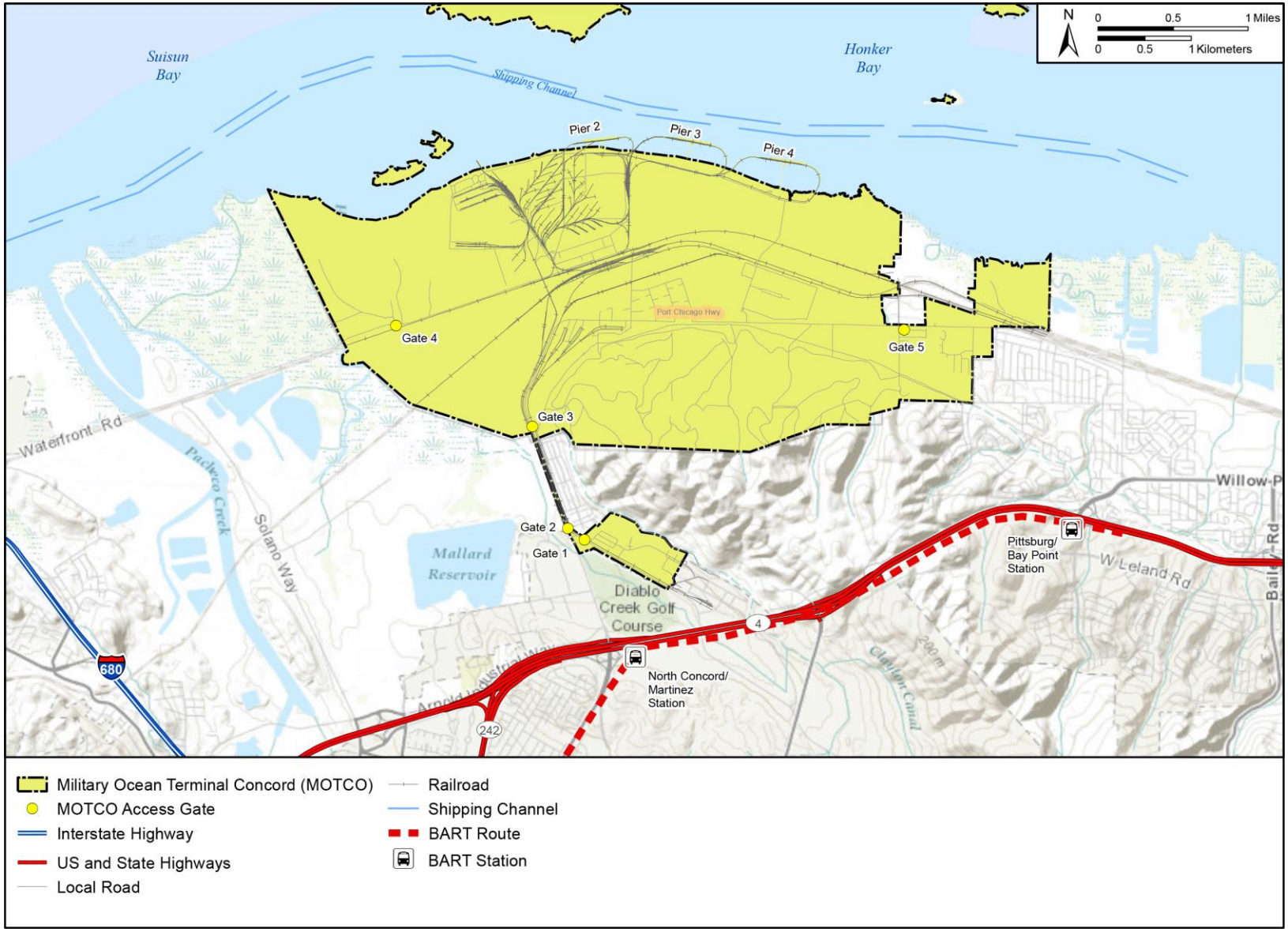


Figure 3-12. Regional Transportation

Port Chicago Highway, Main Street, and Waterfront Road were formerly open to public travel but were closed to public access in 1994. During a mission, stevedore crews park their privately owned vehicles (POVs) in the parking lot outside of Gate 1 and are bused to and from their vehicles and within the Tidal Area (Army 2011).

Average daily traffic volumes on Port Chicago Highway near California Highway 4 in 2005 were 21,005–27,119 vehicles. In addition, average daily traffic volume on Willow Pass Road near California Highway 4 in 2005 was 20,386 (City of Concord 2013a). In 2011, the annual average daily traffic count on the back and front sides of mile marker 18.83 on Port Chicago Highway was 127,000 and 141,000 vehicles, respectively (California Department of Transportation 2011). At this same location, the truck annual average daily traffic count was 7,290 and 7,010, respectively; this total represents the total truck traffic volume divided by 365 days (California Department of Transportation 2011).

In 2007, most roadways in Concord operated within the levels of service (LOS) benchmarks set for them. A LOS is represented by one of the letters “A” through “F.” A LOS of “A” is considered the least restricted, or freest, flow of traffic while a LOS of “F” is considered the most restricted flow of vehicles. With exception of the more urban, pedestrian-oriented Central Business District, the benchmark for roadway segments is LOS D. In the Central Business District, the benchmark is LOS E (City of Concord 2013b). All the roadways that failed to operate within the levels of service benchmarks are proposed to have future improvements in roadway capacity (City of Concord 2013b). These improvements will reduce the effect of additional development on traffic associated with the development of the Concord Reuse Project, which may result in the addition of 12,200 homes and 26,300 jobs in Concord (City of Concord 2013b).

The City of Concord has designated a truck route for vehicles exceeding a maximum gross weight of 3 tons. Trucks exceeding this weight are prohibited from using all other streets except when necessary to travel to their destination for the purposes of loading or unloading (passenger buses, public utility vehicles while in use, and refuse collection vehicles are exempt) (City of Concord 2013c). Near the MOTCO Tidal Area, designated truck routes include Willow Pass Road and Port Chicago Highway near Arnold Industrial Way. In addition, Contra Costa County issues special permits to operate or move a vehicle, combination of vehicles, or special mobile equipment of a size or weight of vehicle or load exceeding the maximums specified in the California Vehicle Code. Permits available include single trip, repetitive, and annual transportation permits (Contra Costa County 2013).

MOTCO has planned several projects that would improve the overall traffic safety conditions for missions in the Tidal Area, including a near-term project that would construct a new Truck Inspection Facility within the undeveloped Gate 5 area; funding is anticipated for FY15. Once completed, Gate 5 would serve as the primary truck inspection location for the installation. The infrastructure incorporated in this project includes approximately 6,200 SF of facilities, to include

a guard booth, gatehouse, over-watch location, entrance canopy, and Visitor Control Center. In addition, there would be approximately 100,000 SF of paved surfaces for POV parking, truck parking / queuing area, search areas, and dual-lane entrance and exit roads. Also included are sidewalks, security control devices and barriers, fencing, lighting, and landscaping. Additional utility service infrastructure would be installed to connect with existing systems.

When the facility is completed, truck and stevedore-related traffic would be shifted from Gate 2 to Gate 5, which would reduce the overall traffic at Gate 2 during MOTCO missions, resulting in increased safety and efficiency. Currently, during a mission event averaging approximately 36 days, cargo handling truck traffic is estimated to be 55 trucks per day and stevedore truck/bus/POV traffic is estimated to be 45 vehicles per day. Personal vehicles are parked at the parking lot near Gate 1 and workers are shuttled to the Tidal Area (Personal communication, Cameron, P., 2013). Daily truck traffic (estimated at 25–35 trucks per day) and construction-related truck traffic would be suspended for the duration of any mission involving net explosive weight.

Several other out-year projects (FY17 and beyond) are also planned for the Tidal Area. These projects include reconfiguring the main gate, connecting the MOTCO interchange yard to the BNSF line, improving main supply routes, connecting transfer pads to the MOTCO interchange yard, improving Stevens Road, constructing Murdoh Road Bridge, reconfiguring the barricaded rail sidings area, and expanding the MOTCO interchange yard. If funded, these projects would improve traffic safety conditions during MOTCO missions (Army 2012).

3.7.2 Mass Transit

Bay Area Rapid Transit (BART) commuter train service is available in the area. BART stations on the yellow line are located near MOTCO with the North Concord / Martinez Station located at the northwest intersection of Highway 4 and Port Chicago Highway, approximately 1 mile south of the MOTCO main gate and the Pittsburg / Bay Point Station located approximately 3 miles southeast of MOTCO Gate 5.

3.7.3 Rail Transport

Two major railroad lines currently carry freight and commuters within Contra Costa County. The UPRR, formerly Southern Pacific railroad line, stretches 60 miles from Richmond to the Alameda County line. The UPRR line carries by far the most freight traffic of all the railroad corridors in the County. The 55-mile long BNSF railroad corridor roughly parallels the UPRR line between Richmond and Hercules. AMTRAK currently operates north bound and south bound commuter train routes that traverse MOTCO seven days a week, primarily on the BNSF tracks (Amtrak 2013).

A railroad track inspection completed in 2005 (HDR Inc. 2005) found that, in general, the railroad at MOTCO is in fairly good condition. MOTCO rail infrastructure was designed and built at a time when 40-foot and 50-foot boxcars were the common rail conveyance vehicle. Today's

DOD-owned rail cars (DODX) are 89-foot flatcars. There are some areas where tight curvature impacts mission efficiency as tight turns must be negotiated at very slow speeds of 10 miles per hour or less to avoid derailments.

3.7.4 Water Transport

MOTCO is located 40 nautical miles (nm) inland from the Sea Buoy just outside the Golden Gate Bridge on the Baldwin-Stockton Deepwater Shipping Channel, which extends an additional 35 nm to the Port of Stockton. The existing depth of the channel is -35 feet MLLW level. The authorized depth of the channel, including the Suisun Bay Channel north of MOTCO, is -45 feet MLLW, but required environmental clearances have not been obtained for the dredging project that would be required to deepen the channel.

As listed in Table 3.7-1, there are several ports located around San Francisco Bay, including ports located on San Francisco Bay, Carquinez Strait, Suisun Bay, Sacramento-San Joaquin River Delta, Sacramento River, and San Joaquin River (World Port Source 2013). In April 1996, the Metropolitan Transportation Commission (MTC) and the San Francisco BCDC adopted the San Francisco Bay Area Seaport Plan; this plan was amended through January 2012 (MTC and BCDC 2012). The Seaport Plan constitutes the maritime element of MTC's Regional Transportation Plan and is incorporated into BCDC's San Francisco Bay Plan. The MTC uses the Seaport Plan to assist in making project funding decisions and managing the metropolitan transportation system, and BCDC uses the Seaport Plan to help guide its regulatory decisions on permit applications, consistency determinations, and related matters. In the Seaport Plan, the MOTCO Tidal Area has been identified as a port priority use area in the event the military facilities become available for private use (MTC and BCDC 2012).

Table 3.7-1. San Francisco Bay Ports

Waterway	Port Location	Port Name
San Francisco Bay	San Francisco	Port of San Francisco
San Francisco Bay	Redwood City	Port of Redwood City
San Francisco Bay	Oakland	Port of Oakland
San Francisco Bay	Richmond	Port of Richmond
Carquinez Strait	Crockett	Port of Crockett
Carquinez Strait	Carquinez Strait	Carquinez Strait
Carquinez Strait	Benicia	Port of Benicia
Carquinez Strait	Martinez	Shell Oil Terminal Martinez
Suisun Bay	Avon	Port of Avon
Sacramento-San Joaquin River Delta	Pittsburg	Port of Pittsburgh
Sacramento-San Joaquin River Delta	Antioch	San Joaquin Harbor
Sacramento-San Joaquin River Delta	Rio Vista	Rio Vista Harbor
Sacramento River	West Sacramento	Port of West Sacramento
San Joaquin River	Stockton	Port of Stockton

Source: World Port Source 2013

3.7.5 Sanitary Sewer

Sanitary sewer infrastructure has been installed to serve current and past development in the majority of the Tidal Area (with the notable exception of the eastern Tidal Area). Much of the piping at MOTCO is more than 50 years old and targeted repair and replacement projects have been implemented or are planned. The Inland Area Sewer is served by the Contra Costa Sanitation District and the Q Area is on a septic system. The Delta Diablo Sanitation District receives discharge from the Tidal Area (Naval Facilities Engineering Command Southwest [NAVFAC SW] 2008). In 2010, Delta Diablo treated an average of 13.4 million gallons per day; the plant is capable of treating up to 16.5 million gallons per day (Delta Diablo Sanitation District 2013).

3.7.6 Natural Gas

Natural gas is supplied to MOTCO by PG&E. The gas meter for MOTCO is located north of the intersection between Port Chicago Highway and California Highway 4. Natural gas is transported from San Francisco through transmission mains from Canada and Texas. All major administrative facilities at MOTCO (i.e., Buildings 542, 605, 607, 608, and the Reserve Center) are connected to the natural gas lines (Army 2011).

3.7.7 Potable Water

All major facilities at MOTCO are connected to the potable water lines. In addition, all three piers have potable water piped to them (Army 2011). The Contra Costa Water District (CCWD) supplies potable water to MOTCO, which is treated at the Bollman Water Treatment Plant located in Concord and also owned and operated by the CCWD. Together with the Randall Bold treatment facility, the CCWD has the capacity to treat the current and projected service population (City of Concord 2013b). In addition, MOTCO has the capacity to receive water from the East Bay Municipal Utility District.

3.7.8 Electricity

Power at MOTCO is delivered to an electrical substation located at Facility 606 in the Inland Area. Electricity is delivered to the Tidal Area through 12-kilovolt transmission lines. The lines typically branch out to 4 kilovolt transmission lines with the exception of the piers, which are served by 12 kilovolt lines. The Tidal Area also contains four substations owned by PG&E; two are 12 kilovolt and two are 4.16 kilovolt. The electrical infrastructure at MOTCO is aging and in need of upgrades to meet current standards (Army 2011).

3.7.9 Telecommunications

Telecommunications services are provided by AT&T via pole lines and conduit communications ducts for voice and data services.

3.7.10 Solid Waste

Solid waste, recyclable materials, and green waste are collected by Concord Disposal Services. There are two active solid waste landfills located within Contra Costa County: Acme Landfill and Keller Canyon Landfill (CalRecycle 2013a). In 2011, Contra Costa County disposed of a total of 721,079 tons of solid waste at Acme or Keller Canyon Landfill (CalRecycle 2013b). Acme Landfill has a maximum permitted throughput of 1,500 tons per day and remaining capacity of 175,000 CY (CalRecycle 2013c). Keller Canyon Landfill has a maximum permitted throughput of 3,500 tons per day and a remaining capacity of 63,408,410 CY (CalRecycle 2013d).

Waste diversion is the prevention and reduction of generated waste through source reduction (reduce amount of waste generated), recycling (process used products into new products), reuse (delaying final disposal or recycling by reusing the product), or composting (recycling organic [e.g., food and yard waste] material) (USEPA 2013). Effective January 1, 2011, California's Green (CAL Green) Building Standards Code (CAL Green Sections 4.408 and 5.408) requires the diversion of at least 50 percent of the non-hazardous construction waste generated during most "new construction" projects. On July 1, 2012 that requirement was expanded to include additions and alterations to existing nonresidential building projects (CAL Green Section 5.713) (CalRecycle 2013e). The City of Concord adopted a local construction and demolition materials ordinance that requires that at least 50 percent of the non-hazardous waste materials and at least 75 percent of all non-hazardous inert debris generated by a construction or demolition project be diverted from the landfill (City of Concord 2013d). These goals are consistent with EO 13423, *Strengthening Federal Environmental, Energy, and Transportation Management*, and EO 13514, *Federal Leadership in Environmental, Energy, and Economic Performance*, which expanded the requirements set forth in EO 13423. Specifically EO 13514 requires the diversion of at least 50 percent of construction and demolition materials and debris by the end of FY15.

3.8 VISUAL RESOURCES

3.8.1 Existing Conditions

The visual resources of an area include the features of its landforms, vegetation, water surfaces, and cultural modifications (physical changes caused by human activities) that give the landscape its visually distinctive qualities. Landscape features, natural appearing or otherwise, form the overall impression of an area. This impression is referred to as "visual character." Visual character is considered as a point of reference to assess whether a given project would appear compatible with the established features of the setting or would contrast noticeably and unfavorably with them.

There are two viewsheds at MOTCO that offer visual diversity that is somewhat rare in terms of color, line, and form. The first is the marshland/waterfront viewsheds that provide views of Suisun Bay and minimally interrupted marshlands of the Wetland Preserve. The second is the

Los Medanos Hills that provide rolling grassland covered background views for MOTCO and the surrounding area. Both viewsheds are minimally disrupted by existing MOTCO development and activities. Both of these viewsheds contribute to the visual environment of the Port Chicago Naval Magazine National Memorial, which has unique visual elements designed by the National Park Service (NPS) to commemorate the site.

While MOTCO personnel are the main viewers of the visual environment at MOTCO, sensitive viewers include those who visit the Port Chicago Naval Magazine National Memorial, nearby residents in Clyde, Shore Acres, Bay Point, and Pittsburg, as well as users of Diablo Creek Golf Course. Views of MOTCO from these locations are largely screened or obstructed by intervening vegetation and topography. In addition, as discussed in Section 3.6.4, there are several ports located on San Francisco Bay, Carquinez Strait, Suisun Bay, Sacramento-San Joaquin River Delta, Sacramento River, and San Joaquin River. Since the shipping industry is a common component in the San Francisco Bay region, views of the piers from the water are consistent with the region's shipping industry.

3.9 RECREATIONAL RESOURCES

3.9.1 Existing Conditions

Recreation refers to the use of natural resources in an outdoor setting for human enjoyment. Recreational resources consider outdoor recreational activities that take place away from the residences of participants. They can include natural resource areas and man-made facilities that are designated or available for public or private recreational use. This EIS identifies recreational resources located at MOTCO that could be affected by the proposed action.

The affected environment for outdoor recreation for this EIS consists of the Tidal Area of MOTCO and the waters of Suisun Bay adjacent to the MOTCO piers. Included within this area is the Port Chicago Naval Magazine National Memorial, which is located on five acres at MOTCO, west of Pier 2. The Port Chicago Naval Magazine National Memorial is administered by the NPS and the Navy. It honors the memory of those who gave their lives and were injured in the Port Chicago munitions explosion on 17 July 1944, recognizes those who served at the magazine, and commemorates the role of the facility during World War II. On October 28, 2009, the Port Chicago Naval Magazine National Memorial became the 392nd unit of the NPS (NPS 2013).

Public access to the Memorial is through two-week advance reservation only, Thursdays, Fridays or Saturdays. There is no access Sundays, Mondays, Tuesdays, Wednesdays, Thanksgiving, Christmas, New Year's Day, and during MOTCO missions. Access for tours is granted based on U.S. Army and NPS scheduling availability. MOTCO is a controlled access area and all visitors to the site must be U.S. citizens or permanent residents. All visitors are shuttled to the Port Chicago Naval Magazine National Memorial in NPS vehicles from the MOTCO Identification Office. MOTCO personnel report that the NPS makes about 50 to 60

individual trips to the Port Chicago Naval Magazine National Memorial site per year. The average group is about 6 people, but can range from 6 to 20 people (Personal communication, Audinis, J. 2013).

Suisun Bay is used by owners and operators of commercial vessels, as well as by motorized and non-motorized boaters (including human-powered boats and beachable sail craft) engaged in recreational activities and sightseeing. In January 2013, the U.S. Coast Guard enacted a rule that established a safety zone in the navigable waters of Suisun Bay near MOTCO in support of military onload and offload missions (Department of Homeland Security, Coast Guard 2013). This safety zone was established to enhance the safety of mariners transiting the area in the unlikely event of an ordnance related mishap. All persons or vessels are prohibited from anchoring or otherwise loitering in the safety zone during military onloads and offloads without permission of the Captain of the Port or their designated representative. This rule created a no-loitering area in the zone between 500 yards of MOTCO Pier 2 in position 38°03′30″ N, 122°01′14″ W (NAD 83) as depicted in NOAA Chart 18656 (the perimeter of the existing security zone) and 3,000 yards of the pier. This safety zone is effective for the entire duration of onload and offload missions. The safety zone will be enforced in conjunction with the MOTCO security zone, established in 33 CFR Section 165.1199, which restricts vessel traffic during military onloads and offloads at MOTCO.

Additional recreational users at MOTCO include members of Mount Diablo Audubon Society, who have access to MOTCO for purposes of conducting an annual Christmas bird count.

3.10 NOISE

Noise is often defined as any sound that is undesirable because it interferes with communication, is intense enough to damage hearing, diminishes the quality of the environment, or is otherwise annoying. Noise may be intermittent or continuous, steady or impulsive, and may be generated by stationary or mobile sources. The individual response to similar noise events can vary widely and is influenced by the type and characteristics of the noise source, distance between source and receptor, receptor sensitivity, and time of day.

The perception and evaluation of sound involves three basic physical characteristics:

1. *Intensity, or loudness, expressed in decibels,*
2. *Frequency, or the number of cycles per second, in hertz, and*
3. *Duration or the length of time the sound can be detected.*

Sound, expressed in decibels (dB), is created by vibrations travelling through a medium such as air or water. A sound level of 0 dB is the approximate threshold of human hearing and is barely audible under extremely quiet conditions. By contrast, normal speech has a sound level of approximately 60 dB. Sound levels above 100 dB begin to be felt inside the human ear as discomfort. Sound levels between 110 and 130 dB are felt as pain (Berglund and Lindvall 1995).

The minimum change in the sound level of individual noise events that an average human ear can detect is about 3 dB. On average, a person perceives a doubling (or halving) of a sound's loudness when there is a 10 dB change in sound level.

3.10.1 Noise Metrics

The impact of noise is described through the use of noise metrics, which depend on the nature of the event and who or what is affected by the sound.

3.10.1.1 Airborne Noise

Airborne noise is represented by a variety of metrics that are used to quantify the noise environment. Human hearing is more sensitive to medium and high frequencies than to low and very high frequencies, so it is common to use maximum "A-weighted" (dBA) metrics (also shown as dB LAmax) representing the maximum A-weighted sound level over a duration of an event. A-weighting provides a good approximation of the response of the average human ear and correlates well with the average person's judgment of the relative loudness of a noise event. A-weighted Sound Exposure Level (SEL) represents both the magnitude of a sound and its duration. SEL is greater than dBA because an individual event can take several minutes while dBA occurs instantaneously. The Day Night Average Sound Level (DNL) is a cumulative noise metric that accounts for all noise events over an average 24 hours.

Noise in the U.S. is regulated under a number of different statutes and regulations. The Noise Control Act of 1972 and as amended by the Quiet Communities Act of 1978, set forth the policy of the U.S. to promote an environment for all citizens that is free from noise that jeopardizes human health and welfare. Specific noise regulations can be imposed by federal agencies and state and local governments. Guidelines for airborne noise applicable to activities at MOTCO are provided below, along with standard thresholds.

3.10.1.2 Underwater Acoustics

Underwater acoustics behave much like sound in the air, but due to the denser medium the sound waves can propagate much farther than in the air. Unlike airborne noise, underwater noise is not weighted to match frequencies that can be heard by the human ear. Two common descriptors of underwater noise are instantaneous peak sound pressure level (dB_{peak}) and the Root Mean Square (dB_{RMS}) pressure level during the impulse. The

- *Peak Sound Pressure level (Lpeak) – Peak sound pressure level based on the largest absolute value of the instantaneous sound pressure over the frequency range from 20–20,000 Hertz. Pressure is unweighted and measured as decibels referenced to a pressure of 1 micropascal (dB re 1µPa).*
- *Root Mean Square (RMS) – RMS level is the square root of the energy divided by a defined time period.*
- *Sound Exposure Level (SEL) – Constant level over 1 second that has the same amount of acoustic energy, as indicated by the square of the sound pressure, as the original sound.*

dB_{peak} is the instantaneous maximum overpressure or underpressure observed during each sound pulse and can be presented in Pascal (Pa), or sound pressure level in dB referenced to a pressure of 1 micropascal (dB re1µPa). The dB_{RMS} is the square root of the energy divided by the duration of the sound pulse. This level is often used by the NMFS to describe disturbance-related effects to marine mammals from underwater impulse sounds. Potential injury to fish from noise is estimated using the dB_{peak} metric (WSDOT 2011). Underwater acoustics typically do not create any adverse or noticeable impacts to humans, unless commercial or recreational divers are in the vicinity of an in-water construction activity. Generally, these impacts are related to the biotic environment. Because of this relation, underwater acoustics thresholds and impacts are discussed further in Section 4.4, Biological Resources.

3.10.2 Noise Thresholds

The Occupational Safety and Health Act of 1970 created the Occupational Safety and Health Administration (OSHA), which strives to ensure safe and healthy working conditions by enforcing standards and by providing training, education, outreach, and assistance. OSHA regulates noise impacts to workers and sets forth thresholds for a safe work environment. The OSHA standard (29 CFR Section 1910.95) provides noise exposure limits for employees in noisy environments or workplaces. According to OSHA, an employee should not be subjected to continuous noise exceeding 90 dBA for durations lasting more than 8 hours per day (Table 3.10-1). As the level increases, the allowed duration of noise decreases. The maximum limit is 115 dBA for duration of 15 minutes or less. OSHA standards are the best documented requirements in regards to long-term human noise exposure. In addition, OSHA standards state that exposure to impulsive or impact noise (loud, short duration sounds) is not to exceed 140 dB peak sound pressure level (OSHA 2012).

Table 3.10-1. OSHA Permissible Noise Exposures

Duration per Day (hours)	Sound Level (dBA)
8	90
6	92
4	95
3	97
2	100
1.5	102
1	105
0.5	110
0.25	115

In June 1980, an ad hoc Federal Interagency Committee on Urban Noise (FICUN) published guidelines relating DNL to compatible land uses (FICUN 1980). This committee was composed of representatives from DOD; Transportation; Housing and Urban Development; USEPA; and the Veterans Administration. Research indicated that about 87 percent of the population is not highly annoyed by outdoor sound levels below 65 DNL (FICUN 1980). Since the issuance of the

guidelines, federal agencies have generally adopted the guidelines for their noise analyses. Noise levels between 65 and 70 dB DNL are compatible with educational services, such as schools, provided that measures are taken to reduce noise levels in the buildings to 25 dB (FICUN 1980).

3.10.3 Existing Noise Environment

The daily operation of POVs and use of government and contractor equipment during mission and non-mission related activities (e.g., construction) are considered minor sources of noise. Typically, the dBA value for POVs is 50 dBA (for light traffic). Common government and contractor equipment used at MOTCO during mission events include locomotives, bombcarts, tractors, gantry cranes, diesel and electric forklifts, Terex-type stackers, and trucks. Typically, the dBA value for these types of equipment is less than 80 dBA. Construction noise varies greatly depending on the construction process, type and condition of equipment used, and the layout of the construction site. Overall, construction noise levels are governed primarily by the noisiest pieces of equipment (e.g., dump truck, excavator, grader, pile hammer, and operational equipment) with dBA values up to 101 dBA. Typically, the sound level attenuates, or diminishes, at a rate of 6 dBA for each doubling of the distance (i.e., if the noise level is 85 dBA at 50 feet, it is 79 dBA at 100 feet) from a point source (USEPA 1971).

3.11 SOCIOECONOMICS AND ENVIRONMENTAL JUSTICE

On February 11, 1994, President Clinton signed EO 12898, *Federal Actions to Address Environmental Justice in Minority and Low-Income Populations*. The general purposes of the Executive Order are to 1) focus the attention of federal agencies on the human health and environmental conditions in minority communities and low-income communities with the goal of achieving environmental justice; 2) foster nondiscrimination in federal programs that substantially affect human health or the environment; and 3) give minority communities and low-income communities greater opportunities for public participation in and access to public information on matters relating to human health and the environment. Executive Order 12898 directs federal agencies to develop environmental justice strategies.

Executive Order 13045, *Protection of Children from Environmental Health Risks and Safety Risks,* was issued in 1997 to identify and address issues that affect the protection of children. Children may suffer disproportionately more environmental health and safety risks than adults because of various factors: children's neurological, digestive, immunological, and other bodily systems are still developing; children eat more food, drink more fluids, and breathe more air in proportion to their body weight than adults; children's behavior patterns may make them more susceptible to accidents because they are less able to protect themselves; and children's size and weight may diminish the protection they receive from standard safety features.

3.11.1 Existing Conditions-Socioeconomic

MOTCO is surrounded by the Cities of Concord and Pittsburg and the unincorporated community of Bay Point (Figure 3-13). MOTCO employs 123 personnel, including military, civilian, and contractor personnel.

There are 10 personnel at MOTCO on a daily basis associated with the new Army Reserve Center; during drill weekends, the weekend population could be 200 to 300 reservists. In addition, there are nine Military Police temporarily providing security support until 2014. During missions, an additional 75 to 85 personnel are present for contracted terminal operations and as stevedore personnel. This comprises less than 1 percent of the total number of people employed in Contra Costa County, which was 475,403 in 2011 (U.S. Bureau of Economic Analysis 2013).

Based on results of the 2010 Census, Contra Costa County is the ninth most populous county in California, with 1,049,025 persons, a 10.6 percent increase from the 2000 Census population (U.S. Census Bureau 2011). The distribution of race and ethnicity is presented in Table 3.11-1 for Contra Costa County and the two census tracts that include MOTCO. Census Tract 3142 includes the eastern MOTCO Tidal Area, a portion of Bay Point, and the Shore Acres neighborhood east of the MOTCO Tidal Area and Nichols Road. Census Tract 3150 includes the remainder of MOTCO and the area between California Highway 4 and Suisun Bay, including a portion of Bay Point and Clyde to the west of Point Edith State Wildlife Management Area.

Table 3.11-1. Study Area Race and Ethnicity Data

Race	Contra Costa County		Census Tract 3142		Census Tract 3150	
	Population	Percentage	Population	Percentage	Population	Percentage
White	614,512	58.6	3,081	47.5	1,824	55.6
Black or African American alone	97,161	9.3	254	3.9	256	7.8
American Indian and Alaska Native alone	6,122	0.6	63	1.0	23	0.7
Asian alone	151,469	14.4	321	5.0	635	19.4
Native Hawaiian and Other Pacific Islander alone	4,845	0.5	48	0.7	23	0.7
Some Other Race alone	112,691	10.7	2,263	34.9	315	9.6
Two or More Races	62,225	5.9	452	7.0	205	6.2
Ethnicity						
Hispanic or Latino Origin (of any race)	548,102	52.2	4,481	69.1	755	23.0

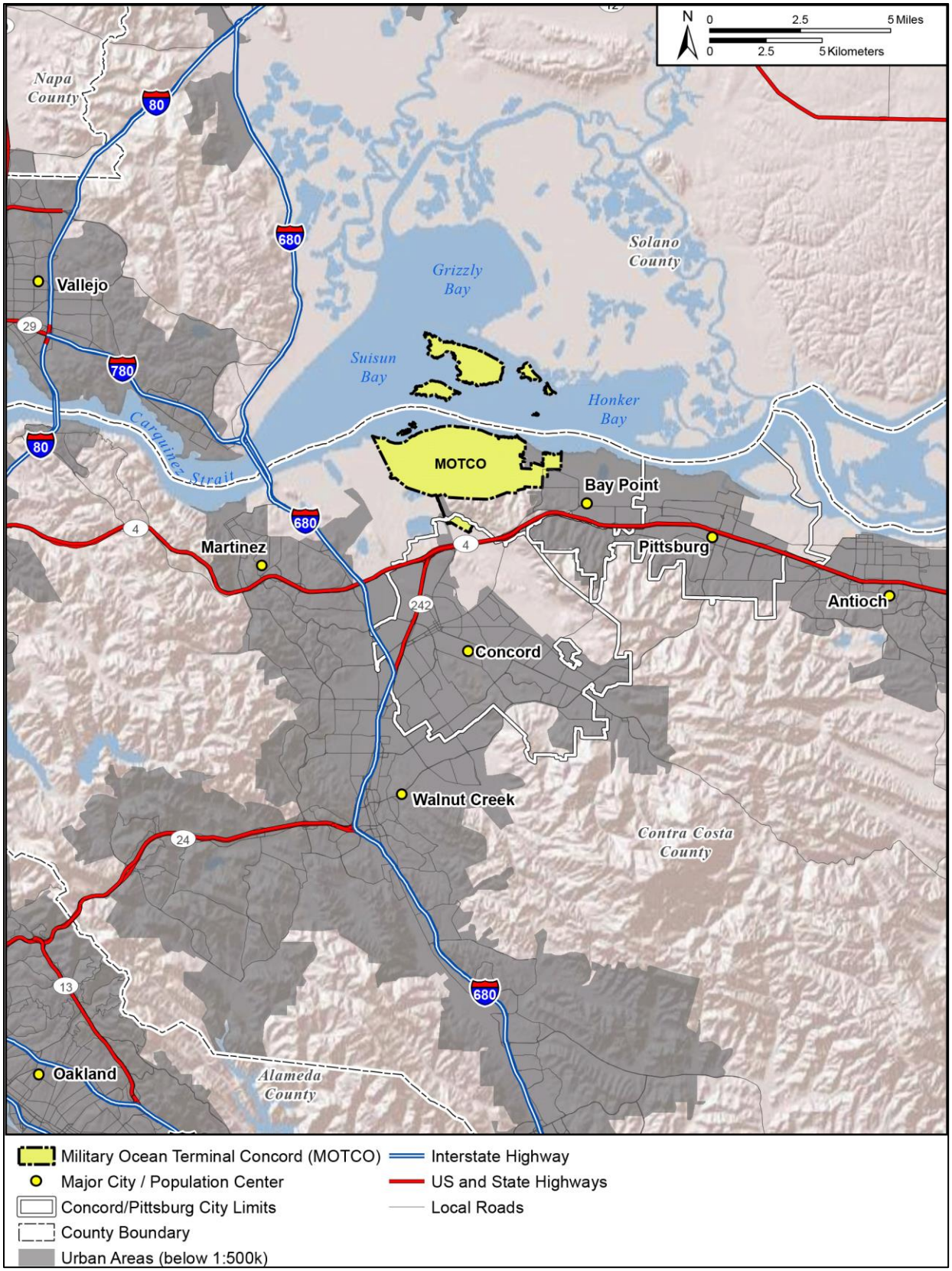


Figure 3-13. Regional Communities

Based on the 2010 Census, there are 400,263 total housing units in Contra Costa County, of which 93.8 percent (375,364) are occupied. Of those occupied, 67.1 percent (251,904) are owner-occupied and 32.9 percent (123.460) are renter-occupied (U.S. Census Bureau 2010). As shown in Table 3.11-2, the poverty rate (individuals below the poverty level) of Contra Costa County was at 8.6 percent as compared to the poverty rate of 13.2 percent in California and the nationwide average of 12.4 percent (U.S. Census Bureau 2009). At the Census Tract level, the best available data on poverty rates is from the 2009 American Community Survey. At that time, the poverty rate in Census Tract 3142 was 21.5 percent and the poverty rate in Census Tract 3150 was 12.1 percent. In addition, the estimated median household income for Census Tract 3142 was lower than for California and Contra Costa County, while the estimated median household income for Census Tract 3150 was higher than for California and Contra Costa County.

Table 3.11-2. Income and Poverty

Jurisdiction	Median Household Income ($)	Percent Below Poverty
California	60,392	13.2
Contra Costa County	77,838	8.6
Census Tract 3142	44,222	21.5
Census Tract 3150	87,846	12.1

Source: U.S. Census Bureau 2009 Survey

3.11.2 Existing Conditions-Environmental Justice

Based on the data presented in Tables 3.10-1 and 3.10-2, Census Tracts 3142 and 3150 have greater proportions of minority and low-income populations as compared to Contra Costa County as a whole. Therefore, adverse impacts that extend beyond the MOTCO property boundary are evaluated for potential disproportionate impacts to these populations.

The nearby community of Bay Point was awarded an Environmental Justice grant by the USEPA in 2007. Bay Point was one of 48 communities nationwide to receive a Community Action for Renewed Environment (CARE) grant through a partnership with the USEPA and University of San Francisco and in cooperation with the Centers for Disease Control and Prevention. The purpose of the grant was to foster an innovative way for a community to organize and become more aware of the problems related to toxic chemicals in the community and possible solutions to this concern. In a USEPA Level 1 Grantee Final Report, Contra Costa County was noted as having the “highest concentration of oil refineries and chemical factories in California, and residents of Bay Point are exposed to multiple sources of toxic pollution” (USEPA 2009). In this report, it was noted that the residents are subject to chronic exposures to a number of air toxics such as ammonia, nickel, and diesel exhaust due to the fact that Highway

4, which runs adjacent to Bay Point and serves as an access route to MOTCO, carries approximately 60,000 cars and trucks per day (USEPA 2009). This report noted further that diesel truck emissions are of particular concern since Bay Point residents have a "significantly higher risk of lung cancer than residents of the County overall" (USEPA 2009). Projects that would increase the amount of vehicular traffic, especially truck traffic, would have to consider the environmental justice aspects of any projected increase to the residents of Bay Point.

The report stated that recent studies suggest that, due to the racial and ethnic makeup of Bay Point, a greater number of residents there are likely to consume more Suisun Bay fish than is recommended by State Health advisories (USEPA 2009). Thus, consideration must be given to those elements of a project that might result in the release of contaminants through direct release, accidental or intentional, into the water column where they may potentially accumulate in food resources consumed by Bay Point residents.

The report noted that illegal dumping was a concern for any project that may involve the disposal of solid waste. Due to Bay Point's proximity to the municipal landfill for the area, waste haulers often illegally dump solid waste in the fringes of Bay Point so they can avoid the tipping fees at the landfill or if they arrive after hours at the landfill and still want to dispose of their wastes (USEPA 2013).

3.12 CULTURAL RESOURCES

Cultural resources are defined as prehistoric or historic sites, buildings, structures, objects, or other physical evidence of human activity that are considered important to a culture or community for scientific, traditional, or religious reasons. Cultural resources are divided into three resource categories: archaeological, architectural, and traditional cultural resources or properties.

Federal agencies are required to review their projects in accordance with Sections 106 and 110 of the NHPA of 1966, as amended, and as implemented by 36 CFR Part 800. Section 106 requires federal agencies to consider the effects of their actions on historic properties before undertaking a project. A historic property is defined as any cultural resource that is included in, or eligible for inclusion in, the National Register of Historic Places (NRHP). The NRHP, administered by NPS, is the official inventory of cultural resources that are significant in American history, prehistory, architecture, archaeology, engineering, and culture. The NRHP also includes National Historic Landmarks. In consideration of 36 CFR Part 800, Federal agencies are required to initiate consultation with the SHPO to inform them of the planned action and to request their submittal of any comments or concerns. Once an undertaking has been identified, the area of potential effects (APE) must be determined and documented. The APE is the geographical area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist. The APE is influenced by the scale and nature of an undertaking and may be different for different

kinds of effects caused by the undertaking. The APE for the proposed project includes all areas of ground disturbance, underwater disturbance, staging areas, and haul roads. The determination and documentation for the APE associated with this proposed action will be submitted to the SHPO for comment and concurrence in accordance with Section 106.

Section 110 of the NHPA requires federal agencies to locate, inventory, and nominate all properties that may qualify for the National Register.

This section summarizes historic records and literature searches, as well as results of an updated search completed in 2012 (USACE 2012). Specifically, a records and literature search at the Northwest Information Center at Sonoma State University in Rohnert Park, California, was conducted in 2010, with an updated search conducted in 2012 that covered the APE. Those searches revealed that the APE has been inventoried twice for cultural resources; by William Self Associates (William Self Associates 1993) and by JRP Consulting (JRP Historical Consulting Services 1998). Additionally the APE is covered by the MOTCO 2000-2005 Integrated Cultural Resources Management Plan (ICRMP) prepared by Far Western Anthropological Research Group (Rosenthal and Milliken 2000). The updated MOTCO ICRMP from 2011 also covers the APE (MOTCO 2011).

3.12.1 Archaeological Resources

Archaeological resources, as governed by the Archaeological Resource Protection Act (ARPA, Section 3(I) 16 USC 470aa *et seq.*), include any material remains of past human life or activities that are capable of providing scientific or humanistic understandings of past human behavior and cultural adaptation through the application of scientific or scholarly techniques (ARPA, Section 3(I) 16 USC 470bb). As of September 2009, 24 cultural resources investigations have been conducted at MOTCO (JRP Historical Consulting Services 2009). No prehistoric archaeological resources have been recorded on the landside APE.

MOTCO contains at least one underwater resource due to its location on Suisun Bay and its unique function as a munitions transshipment facility. The Port Chicago Explosion of 1944 occurred at Pier 1, sinking two ships, the S.S. Quinalt Victory and S.S. E.A. Bryant and destroying the pier. Based on historic aerial photography, standing pilings that are visible in the area of the former Pier 1 are likely associated with Pier 1 located near the Port Chicago Naval Magazine National Memorial in the Tidal Area.

Within the proposed action area, the Port Chicago Naval Magazine National Memorial is a NRHP-listed property. The memorial was established by the Port Chicago Memorial Act of 1992 (Public Law 102-562), and was made a unit of the national park system in 2009, which automatically entered the memorial into the NRHP as a listed historic district. The Port Chicago Naval Magazine National Memorial is a tribute to the 320 men who died in the World War II explosion and includes a proposed 5-acre site located along the shoreline of Suisun Bay west of Pier 2 and in the Tidal Area.

Magnetic and side scan sonar surveys were completed in November 2012 of the offshore area past Piers 2 and 3. The results of those efforts indicate there is metal debris located near the piers, some of which is likely munitions and remaining fragments from the ships that exploded in 1944, as well as modern debris resulting from the operation of Piers 2 and 3 since their construction. The munitions likely include projectile bombs, incendiary bombs, and fragmentation from the Port Chicago Naval Magazine Explosion. In addition, as discussed further in Section 3.11.4, a submerged cultural resource survey was conducted within the project area in May 2013. The findings of the survey indicate the underwater resources and unidentified objects found are not eligible for listing in the NRHP. These findings are currently being coordinated with SHPO.

The Port Chicago Naval Magazine Explosion Site has been recorded and evaluated as an underwater cultural resource that is eligible for listing in the NRHP under Criterion A and B for its association with events that led to: 1) the desegregation of the Navy and the United States Armed Forces; 2) alterations to safety practices in the military; and 3) contributions to the eventual Civil Rights Movement, as well as its association with the lives of persons significant to the past. The original location of Pier 1 (including pile remnants from Pier 1 that are visible above water), S.S. *Quinault Victory*, and S.S. *E.A. Bryant* comprise the boundary of the Port Chicago Naval Magazine Explosion Site (Figure 3-14).

Table 3-12.1 summarizes the resources that would potentially be impacted by implementation of the proposed action.

Table 3.12-1. Potential Cultural Resources within Action Area

Resource	Description	Year Built	Eligibility
A-21	Pier 2 Offices/Battery Charging Area	1944	Not Eligible for Listing
A-22	Pier 3 Offices/Battery Charging Area	1944	Not Eligible for Listing
100	Smoke Shack (Pier 2)	1946	Not Eligible for Listing
102	Smoke Shack (Pier 3)	1946	Not Eligible for Listing
160	Steam Plant for Pier 2	1965	Not Eligible for Listing
544	Generator – Crane Back Up (Shoreside Pier 3)	2000	Not Eligible for Listing
545	Generator – Crane Back Up (Shoreside Pier 3)	2000	Not Eligible for Listing
Pier 2	Tidal Area	1944	Not Eligible for Listing
Pier 3	Tidal Area	1945	Not Eligible for Listing
Underwater Resources	Submerged Resources in Tidal Area	Unknown	Not Eligible for Listing
Underwater Resource	Port Chicago Naval Magazine Explosion Site	1944	Eligible for Listing in the NRHP
Port Chicago Naval Magazine National Memorial	National Memorial and National Park System Unit		NRHP Listed

Source: MOTCO 2011

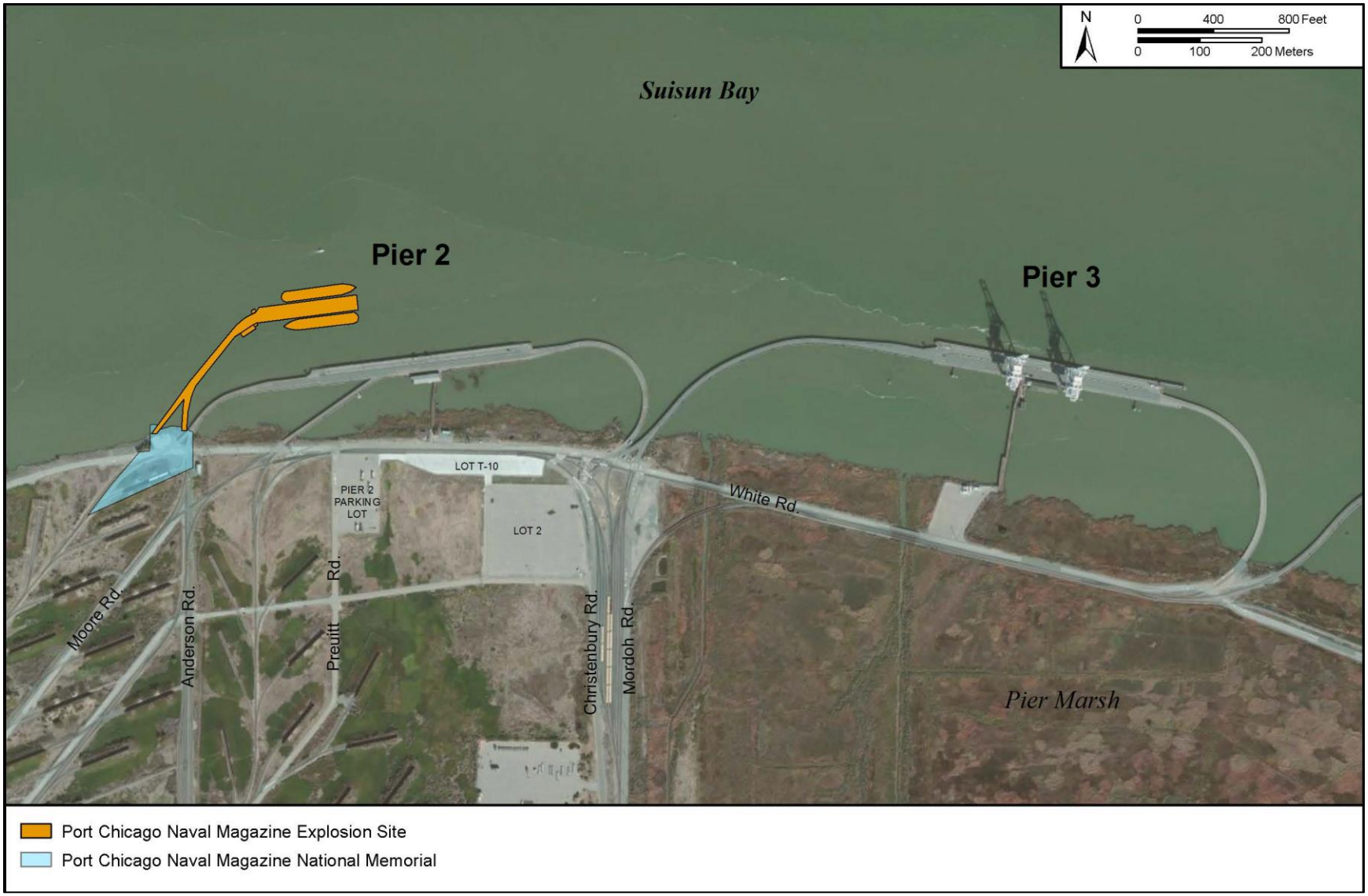


Figure 3.14. Location of Port Chicago Naval Magazine Explosion Site and National Memorial

3.12.2 Architectural Resources

Architectural resources include standing buildings, dams, canals, bridges, and other structures of historic or aesthetic significance. The 1993 and 1998 Section 110 surveys evaluated the World War II and Cold War Era resources at MOTCO, and as a result, all of the cultural resources built before 1990 have been previously determined not eligible for listing in the National Register (JRP Historical Consulting Services 1993; William Self Associates 1993). Buildings and structures that were not 50 years of age by 1998 (i.e., resources built between 1948 and 1966) require survey and evaluation (MOTCO 2011). In 2012, MOTCO conducted a complete and up-to-date inventory and evaluation of structures within the Inland and Tidal areas that had reached 50 years of age.

Resources potentially affected by the proposed action include Piers 2 and 3, and Buildings A-21, A-22, 100, 102, 160, 544, and 545. Piers 2 and 3 were built in 1944 and 1945, respectively. Both piers included wood trestle bridges for rail access to the western end of the piers for loading materials onto rail cars. The two piers received concrete extensions at the east side of the piers in the 1960s. In addition, several repairs have occurred over the years. Buildings A-21, A-22, 100, 102, and 160 are considered operational support buildings and were built in 1944, 1944, 1946, 1946, and 1965, respectively. Buildings 544 and 545 were built in 2000 as backup generators to operate the cranes on Pier 3 in the event of a power outage.

As part of the May 2011 ICRMP update, the rebuilding of Pier 2 and the demolition of Buildings A-21, 100, and 160 was included (USACE 2010; MOTCO 2011). Previous assessments have not identified these structures as historic. Table 3.12-1 summarizes the architectural resources that would potentially be impacted by implementation of the proposed action.

3.12.3 Traditional Cultural Properties

Traditional cultural properties can include archaeological resources, buildings, neighborhoods, prominent topographic features, habitats, plants, animals, or traditional hunting and gathering areas that American Indians or others consider essential for the continuance of traditional cultures (NPS 1998). The Native American Heritage Commission has identified four federally recognized American Indian groups with potential interest in MOTCO: the Bay Miwok, Ohlone/Constanoan, Plains Miwok, and Patwin/Winton. There are no known traditional cultural properties within the APE/Action Area. In addition, no items subject to the Native American Graves Protection and Repatriation Act (25 USC Section 3001 *et seq.*) have been recovered from or identified at MOTCO through cultural resources studies conducted to date (MOTCO 2011). As part of this EIS, interested federally-recognized Native American tribes were contacted (Appendix B).

3.12.4 Summary of Cultural Resources Field Studies Completed To Date

The landside portion of the APE, to include the structures and buildings within the APE, has been previously surveyed for cultural resources. The landside APE is on fill and does not have the potential for discovery of prehistoric resources. All cultural resources 50 years of age or older on the landside have been identified and recorded. Piers 2 and 3 and their related features have also been identified and recorded; however, Piers 2 and 3 have been found to be ineligible for listing in the NRHP. The location of the Port Chicago disaster, which consists of the original Pier 1 location and the locations of the *E.A. Bryan* and the *Quinault Victory* has been identified, recorded, and evaluated as a NRHP-eligible cultural resource named the Port Chicago Naval Magazine Explosion Site.

As previously noted, due to the 1944 Port Chicago disaster and daily transshipment operations at the piers, there is the potential for the presence of submerged debris within the offshore APE. In addition to previously completed magnetic and sonar scans, a survey for underwater archeological resources was conducted in May 2013. Specifically, a remote-sensing survey of 100 percent of Pier 3 including an additional 100 feet outside of Piers 2 and 3 was accomplished. A remote-sensing survey could not be accomplished inside of Pier 2; therefore, a photographic survey was conducted at low tide. During the May 2013 survey, ferrous objects were identified inside Pier 3 and debris items were exposed during the photographic survey of Pier 2. It is likely that many of the objects documented during the remote sensing survey are related to the construction and operation of Piers 2 and 3. The Army has determined the underwater debris associated with the construction and operation of Piers 2 and 3 is not eligible for listing in the NRHP.

During the May 2013 survey, submerged pilings associated with Pier 1 and unidentified ferrous object(s) were located within the Port Chicago Naval Magazine Explosion Site boundary but outside the project area. The Army has determined the underwater debris associated with the Port Chicago Naval Magazine Explosion Site is not a contributing feature to the characteristics that make the site eligible for listing in the NRHP; therefore, the underwater debris is not eligible for listing. The Army has determined the existing Pier 1 pilings, which are visible above the water, are contributing elements to the Port Chicago Naval Magazine Explosion Site, which has been determined eligible for listing in the NRHP.

3.13 Hazardous Materials, Hazardous Waste, Toxic Substances, and Contaminated Sites

This EIS analyzes impacts related to hazardous materials (HM), hazardous waste (HW), toxic substances, and contaminated sites. Specifically, this EIS analyzes the potential for HM to be introduced to the environment during the course of site demolition and construction activities; for toxic and HW to be generated as a result of construction and demolition activities; and for

encounter with contaminated media during the course of site preparation and construction/demolition activities.

This EIS does not analyze further impacts related to the continuing use or transport of HM and generation of HW after demolition and construction activities and as regular pier operations and maintenance resume because no changes to current MOTCO missions are proposed as part of this proposed action.

3.13.1 Hazardous Materials

A hazardous material is defined in 29 CFR Section 1910.120(a)(3) as any substance that is 1) listed in Section 101(14) of CERCLA; 2) designated as a biologic agent and other disease causing agent which after release into the environment and upon exposure, ingestion, inhalation, or assimilation into any person, either directly from the environment or indirectly by ingestion through food chains, will or may reasonably be anticipated to cause death, disease, behavioral abnormalities, cancer, genetic mutation, physiological malfunctions (including malfunctions in reproduction) or physical deformations in such persons or their offspring; 3) listed by the U.S. Department of Transportation as hazardous materials under 49 CFR Section 172.101 and appendices; or 4) defined as a hazardous waste per 40 CFR Section 261.3 or 49 CFR Part 171. Hazardous materials are federally regulated by the USEPA in accordance with the Federal Water Pollution Control Act; CWA; Toxic Substance Control Act (TSCA); Resource Conservation Recovery Act (RCRA); CERCLA; and CAA.

Hazardous materials are generally in use at MOTCO for the maintenance of buildings, facilities, vehicles, and equipment. In order to fulfill its mission, MOTCO also stores and transports HM, including munitions, as required by Army activities. Common hazardous substances used on the installation include petroleum, oil, and lubricants (POL) products such as motor oils, hydraulic fluids, diesel fuel, and motor gasoline; paints; sealants; solvents; antifreeze; and batteries. MOTCO governs the handling of HM and HW through the Hazardous Waste Management Plan (HWMP) (MOTCO 2012a). The HWMP describes the hazards and techniques associated with HM/HW handling specific to MOTCO activities so that personnel will be better able to protect their health, prevent damage to the environment, and comply with applicable laws, regulations, and policies.

The MOTCO Hazardous Material Management Program (HMMP) reduces waste generation from overstocked or expired product and enhances regulatory compliance by limiting the amount of HM stored onsite. The MOTCO Department of Public Works (DPW) Environmental Compliance Manager (ECM) tracks the HM used on the installation; all HM must be approved by and registered with the ECM. The ECM maintains an activity-wide HM inventory and provides a copy to the MOTCO Fire Department. POL may be stored within a flammables locker at work locations in accordance with material requirements and the MOTCO HWMP, but most

other HM and HW is stored at one of the four Satellite Accumulation Points (SAPs) near to work locations (Buildings 604, 350, A-3, and A-14).

The MOTCO Spill Prevention, Control, and Countermeasures Plan (SPCC) and the Oil and Hazardous Substance Spill Prevention and Response Plan (OHSSPRP) establish procedures, methods, equipment, and other criteria to prevent and respond to unintentional releases of oils or hazardous substances from onshore and offshore facilities (MOTCO 2013; OHSSPRP is Appendix A of SPCC). Releases requiring response include DOD and non-DOD spills occurring on the installation, offsite spills affecting the installation, and possibly other spills in the geographic area for which DOD assistance would be deemed appropriate. Hazardous substances include those involved in operations, processes, cargo, and HW. The SPCC addresses on-Post storage locations and proper handling procedures of all POL and HM to minimize potential spills and releases at the point of use. The OHSSPRP further outlines activities to be undertaken to minimize the adverse effects in the incidence of a spill, including notification, containment, decontamination, and cleanup of spilled materials.

The MOTCO SWPPP addresses proper management of POLs and HM at construction sites to reduce the potential for soil contamination and expediently address any spills or breaches of protective systems in accordance with applicable laws and regulations (MOTCO 2001). The SWPPP has been developed to comply with California NPDES General Permit Requirements for Stormwater Discharges Associated with Industrial Activities. The Plan identifies industrial activities for each unit/activity located on MOTCO and the potential stormwater sources associated with those units/activities; it also establishes the BMPs designed to control pollutants in discharges of stormwater.

3.13.2 Hazardous Waste

Hazardous wastes, as defined by RCRA (42 USC 6903[5]), are wastes or combination of wastes that, because of quantity, concentration, or physical, chemical, or infectious characteristics, may either cause, or significantly contribute to, an increase in mortality or an increase in serous irreversible illness, or pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, disposed of, or otherwise managed. To be classified as a hazardous waste, material must first qualify as a solid waste. A solid waste is any material that is disposed, incinerated, treated, or recycled except those exempted under 40 CFR Section 261.4.

Although the amount of HW disposed of fluctuates between calendar years, MOTCO is regulated as a Small Quantity Generator of HW as defined under RCRA. MOTCO disposed of 7.75 tons of HW in Calendar Year 2012, 18.38 tons in Calendar Year 2011, and 8.13 tons in Calendar Year 2010 (MOTCO 2013b; Personal communication, Audinis, J. 2013; CA DTSC 2011a). Typically, the common HW generated at MOTCO includes spent, contaminated, off-

spec, or unrecyclable HM, although fluctuations and abnormal disposal requirements can be attributed to facility cleanup efforts.

The MOTCO DPW Environmental Division oversees HW management via the HWMP on behalf of the military units and activities that generate the waste (MOTCO 2012a). There is no one central, designated HW storage area at MOTCO. All HWs are stored at the four SAPs (Buildings 604, 350, A-3, A-14), which are at or near the point of HW generation and are under the control of the operator generating the waste. SAPs are maintained to facilitate the collection of HW and to ensure that the wastes are transported off post in accordance with applicable federal, state, and DOD regulations. Hazardous wastes may be stored at SAPs for no longer than 90 days before being transported offsite for recycling, treatment, or disposal. The transport and disposal of HW is arranged through contracts with appropriately licensed waste management and transportation companies. MOTCO recycles POL products (including waste oils and uncontaminated POL), various conventional batteries (including radio batteries as well as lead-acid), and compressed gas cylinders.

3.13.3 Toxic Substances

The enactment of TSCA (15 USC 2601 *et seq*.) and the promulgation of its implementing regulations (40 CFR Parts 700–766) represented an effort by the federal government to address those chemical substances and mixtures for which it was recognized that the manufacture, processing, distribution, use, or disposal may present unreasonable risk of personal injury or health of the environment, and to effectively regulate these substances and mixtures in interstate commerce. The TSCA Chemical Substances Inventory lists information on more than 62,000 chemicals and substances. Certain substances are generally excluded from TSCA, including, among others, food, drugs, cosmetics, and pesticides. The Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) (7 USC 136 *et seq.*) registers and regulates pesticide use (40 CFR Parts 150–189).

Toxic chemical substances regulated by USEPA under TSCA and typically associated with buildings and facilities include asbestos, lead, mercury, and PCBs. For the purposes of this EIS, existing buildings and structures are inspected for the presence of the most common forms of these chemicals. Asbestos-containing materials (ACM) include materials that contain more than one percent asbestos and are categorized as either friable or non-friable. Lead-based paint (LBP) includes paint with lead levels equal to or exceeding 0.5 percent by weight or 50 ppm total concentration. Fluorescent lighting fixture ballasts have the potential to contain PCBs. Additionally, PCB paints are those that have greater than 50 ppm PCB content, and they may be present upon or within building surfaces as they were commonly used as a plasticizer in paints, sealants, mastics, and caulk. Buildings may contain liquid mercury in thermostats and thermometers, and fluorescent lighting fixtures typically contain elemental mercury in the fluorescent light bulb; compact fluorescent lamps also contain mercury. Creosote, used to

preserve wooden railroad ties and marine structures, is considered a pesticide and thus is regulated under FIFRA.

The MOTCO DPW Environmental Division provides guidance for the location, condition, and recommended methods of managing toxic substances found throughout the installation. An installation asbestos register is maintained and updated regularly, including the type and the percentage of asbestos found in each type of material. Buildings and suspect materials are screened for fixtures that may contain toxic materials prior to demolition and disposal. Buildings are tested for LBP and PCB paint before maintenance or demolition, especially if they were built prior to 1978 when the federal government banned consumer uses of lead and PCBs in paint. With respect to PCB paints, both the surface and the building material below the surface are tested in order to determine proper disposal requirements; in California, materials with greater than 50 ppm PCB concentrations must be sent to a Class 1 HW landfill (California Code of Regulations [CCR] Title 22, Division 4.5, Section 66). This is different from the federal regulation that allows PCB bulk waste materials to be disposed at a permitted municipal landfill (USEPA 2012); however, MOTCO is authorized to ship PCB bulk waste out of California for disposal in a permitted landfill. Certified contractors are used in all renovation or demolition projects; contractors follow MOTCO, Army, and California regulatory guidance for asbestos, LPB, PCBs/PCB paints, and mercury management.

No lead-based or PCB paints or ACM were found or are otherwise expected to occur at Piers 2 and 3. However, Buildings A-21, 160, and 100 all contain ACM (MOTCO 2012b; MOTCO 2011a). Lead-based and PCB paints are also expected to occur at Buildings A-21 and 160 due to their construction age (MOTCO 2011b).

Creosote is a wood preservative used commercially to protect utility poles, railroad ties, and marine infrastructure from animal, insect, and fungal pests (USEPA 2008a). Pressurized-creosote-treated wood has been used to protect wooden pilings and other portions of Piers 2 and 3 from marine borers, a group of marine invertebrates chiefly comprised of mollusks that target woody debris during part of their lifecycle (Castagna 1961; LSU 2012). Creosote-treated lumber has also been used in railroads at the installation.

Creosote is obtained from high-temperature distillation of coal tar and hundreds of chemical components in creosote have been identified, including polycyclic aromatic hydrocarbons (PAHs), phenol, and arsenic (ATSDR 2002; USEPA 2008b). Although creosote application is restricted, creosote-treated lumber is not generally subject to regulation as a HW unless testing reveals that it leaches arsenic above a certain threshold (USEPA 2008b). In California, creosote-treated wood waste (TWW) may be disposed of in a HW landfill or in the composite-lined portion of a municipal solid waste landfill that meets specific water protection standards (CA EPA 2011; CCR Chapter 34, Title 22). It is the generator's responsibility to determine whether the wood should be classified as HW and treated as such; otherwise, a TWW-approved landfill facility may be used for disposal (CA EPA 2012; CA DTSC 2008). Treated wood waste

may be recycled, but its use is limited only to onsite purposes consistent with the FIFRA-approved use of creosote-treated wood. Although risk to workers is minimal, the use of personal protection equipment when handling creosote-treated materials is recommended to reduce demolition crew exposure to the skin- and eye-irritating effects of creosote contact (ATSDR 2002).

Although creosote is generally not water-soluble, PAH is known to leach from treated wood and migrate to sediments and/or accumulate in marine organisms. While the exposure risk will be removed as the creosote-treated deck and piling materials are removed, contaminated sediments localized around the pilings may occur (USEPA 2008b).

3.13.4 Contaminated Sites

The Defense Environmental Restoration Program (DERP) was developed by the DOD pursuant to legislation codified at 10 USC Section 2700 *et seq*., to identify, investigate, and remediate potentially hazardous material disposal sites on DOD property. As part of DERP, the DOD has created the Installation Restoration Program (IRP) and the Military Munitions Response Program (MMRP). The IRP is designed to address the cleanup of hazardous substances on military installations. The MMRP addresses the challenges presented at sites called munitions response sites (MRS) that are located on other than operational ranges. Munitions responses are response actions, including investigation, removal actions, and remedial actions that address the explosives safety, human health, or environmental risks presented by munitions and explosives of concern (MEC). The DERP is implemented using the process developed for cleanup under the CERCLA legislation, including a series of eight steps that follow the accepted plan of action beginning with a site investigation and, if necessary, ending in the remediation/clean-up of the site. The eight steps, which range in length to completion, are as follows:

- Preliminary Assessment (PA)
- Site Inspection (SI)
- Remedial Investigation (RI)
- Feasibility Study (FS) / ROD
- Remedial Design (RD)
- Remedial Action (RA)
- Post RA: Remedy in Place (RIP); Response Complete (RC); Long-term Management (LTM)
- Site Closeout (SC)

As stated previously, MOTCO installation property was formerly owned by the Navy as part of NWSSBD Concord. As part of the IRP, in 1983 the Navy began to collect and evaluate information in response to speculation that certain areas of the installation had contamination above acceptable levels. The DERP sites at MOTCO are depicted on Figure 3-13.

3.13.4.1 Military Munitions Response Program

There are three MMRP Munitions Response Sites (MRS) at MOTCO, two of which are located within the proposed action area: MRS 8, Port Chicago Tidal Area (MOTCO-008-R-01), and MRS 10, Suisun Bay Impact Area (MOTCO-010-R-01) (Figure 3-15). The Port Chicago Tidal Area and Suisun Bay Impact Area sites represent the 1944 Port Chicago disaster blast radius from the shipboard explosion at the former Pier 1, which involved more than 5,000 tons of ammunition (MOTCO 2011c; MOTCO 2010). Objects were thrown over 2 miles (11,616 feet) away from the center of the blast, although most of these objects fell within 0.7 miles (3,696 feet) of the explosion site. In addition, there is evidence that chemical agents, including mustard gas and lewisite, were transshipped through the area. Emergency response actions occurred immediately after the explosion and explosive ordnance disposal (EOD) area operations have addressed discoveries and potential risk of MEC items in the bay, marsh, and on the shoreline since then (MOTCO 2011c; NAVFAC 2003; USACE 2009). The Port Chicago Tidal Area MMRP site encompasses approximately 4,945 acres including the main Tidal Area and Roe and Ryer Islands. The Suisun Bay Impact Area covers approximately 4,830 acres of the 1944 blast radius. The sites are currently in the RI phase and Site Closeout is predicted in March 2017 (TetraTech EMI 2011; MOTCO 2013c).

MOTCO is in the process of developing a Land Use Control (LUC) and Implementation Plan with ongoing or future response actions for each MRS. The DOD's *Policy on Land Use Controls Associated with Environmental Restoration Activities* defines LUCs as any type of physical, legal, or administrative mechanism that restricts the use of, or limits access to, real property to prevent or reduce risks to human health and the environment (DOD 2001). The purpose of this policy is to select and implement LUCs that minimize the potential for human exposure to explosive hazards and to maintain the integrity of the MRS with respect to the current land use. For these two areas, land use restrictions include the prohibition, or otherwise careful management, of required excavation activities and the restriction of daycare, hospital, schools, or residential use in these areas. The Land Use Control Plans include the requirement to obtain dig permits and coordination with the MOTCO RPMP.

Prior to the initiation of work, a meeting will be held with the contractors and representatives from the USACE and MOTCO DPW to discuss general conditions, work schedule, phasing, and coordination, security, safety, permits, and other matters pertinent to work accomplishments. In addition, the contractor would be required to submit various plans including an Unexploded Ordnance (UXO) Anomaly Avoidance Plan / UXO Support During Construction Activities; Environmental Protection Plan; Quality Control Plan, Hazard Analysis, and Safety/Health Plan. These plans will discuss safety protocols and notification requirements that will minimize any potential for adverse impacts.

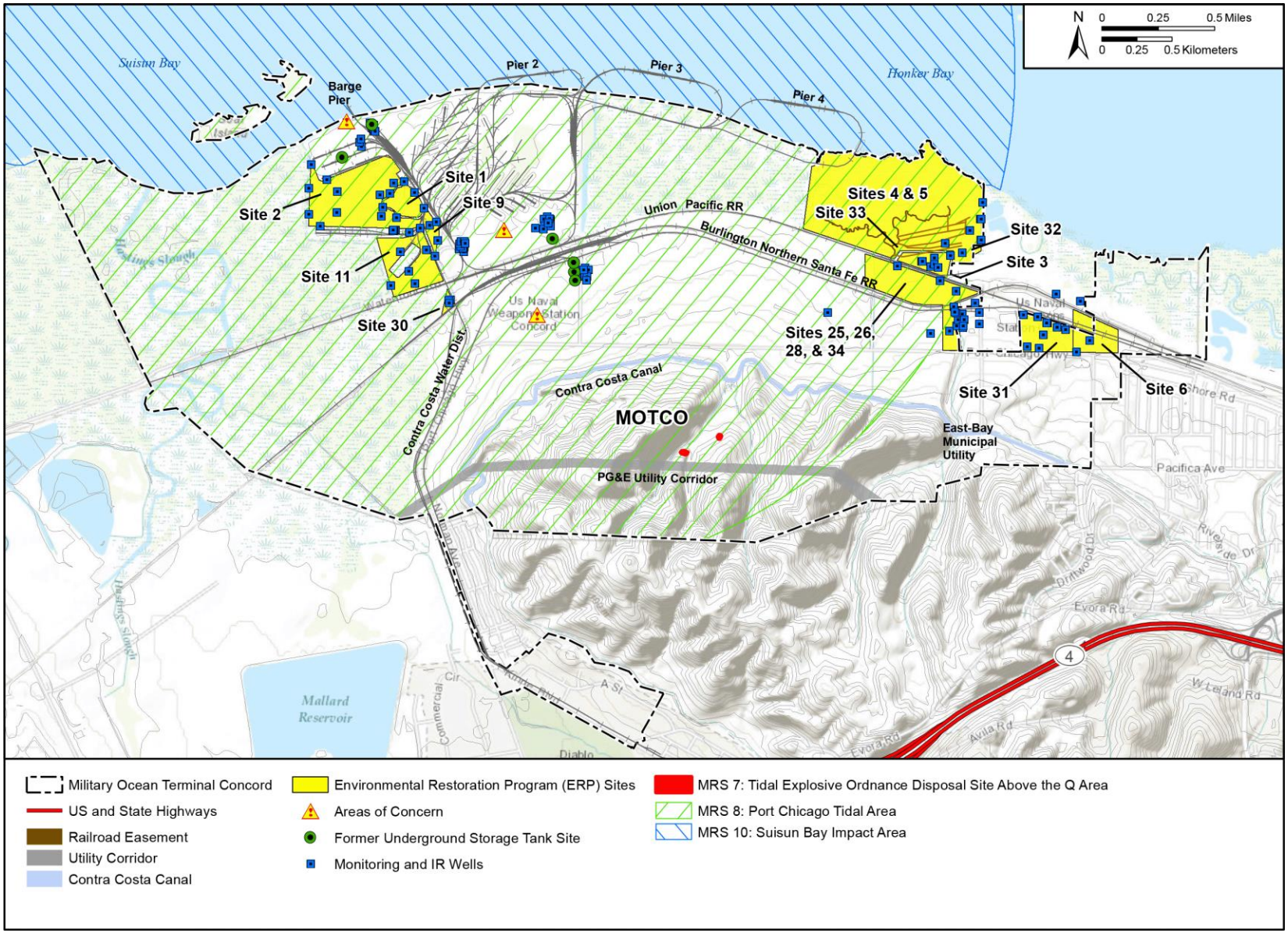


Figure 3-15. DERP and MMRP Sites

3.13.4.2 Installation Restoration Program

Continuous military missions have taken place at MOTCO since the early 1940s. Over this period, waste disposal practices deemed appropriate at the time and accidental spills of hazardous substances led to the contamination of soils and groundwater in several locations throughout the installation. The IRP identified 32 potentially contaminated areas, which are divided into 16 management sites in various DERP stages (USEPA 2012; MOTCO 2011c). None of the sites are within the vicinity of the proposed action (USACE 2011; MOTCO 2013d). These sites are shown in Figure 3-15 and described in Table 3.13-1 (Sites 38, 39, and 40 have not yet been mapped as boundaries have yet to be determined).

3.13.4.1 Underground Storage Tanks/Petroleum Sites

There are six former Underground Storage Tank (UST) petroleum sites at MOTCO, two of which have been decommissioned and closed (MOTCO 2012c; USACE 2011). None of these former UST sites are located within proximity to the proposed action area nor would they be impacted by construction or demolition activities.

3.13.4.2 Underground Pipelines

In addition to the DERP and MMRP MRS considerations, one active petroleum pipeline and remnants of two former crude oil pipelines run through the installation (USACE 2011; MOTCO 2013d). All petroleum pipelines cross the MOTCO Tidal Area generally following the railroad corridor and/or Port Chicago Highway. It is not anticipated that any current or former pipelines are located within proximity to the proposed action area or would be impacted by construction or demolition activities.

Table 3.13-1. Tidal Area Environmental Restoration Sites List and Status

Site No.	Name	Waste Types	Status
1	Tidal Area Landfill	Petroleum, paints, pesticides, metals, PCBs	*Response Complete* Start Date: 27 June 2003 End Date: September 2012
1A	Tidal Area Landfill (groundwater)	Metals	*RI/FS Stage* Start Date: 15 March 2004 End Date: June 2013
2	R Area	Metals, VOCs, SVOCs, pesticides, PCBs	*RA Stage* Start Date: 30 January 2002 End Date: April 2013
3–6; 25, 26, and 28	Litigation Areas	Metals	*LTM Stage* Start Date: 31 March 2003 LTM End Date: 30 September 2021 RA implemented from 1992 to 1995
9	Froid and Taylor Roads	Metals, pesticides, ordnance items, VOCs, SVOCs	*RA Stage* Start Date: 30 January 2002 End Date: April 2013
11	Wood Hogger	VOCs, SVOCs, metals, dioxin, pesticides	*RA Stage* Start Date: 30 January 2002 End Date: April 2013
30	Taylor Boulevard Bridge	Metals, PCBs	*Site Closeout Stage* Start Date: 31 January 2002 RA implemented in October 2009, Completion Report issued October 2010
31	Fertilizer Plant	Metals	*RI/FS Stage* Start Date: 10 December 2002 Proposed End Date: June 2014
32	Mosquito Ditches, Litigation Area	Metals	*ROD/RD Stage* Start Date: 27 February 2006 Proposed End Date: June 2014
33	Lost Slough, Litigation Area	Metals	*ROD/RD Stage* Start Date: 27 February 2006 Proposed End Date: 30 June 2014
38	Port Chicago Dump	Hazardous Substances	*RI Stage* Start Date: 1 August 2002 Proposed Completion Date: 30 September 2015
39	Dry Cleaning Facility	Hazardous Substances	*SI Stage* Start Date: 1 August 2002 SI Completion Date: 23 November 2012
40	Copper Smelter	Hazardous Substances	*RI Stage* Start Date: 1 August 2002 Proposed Completion Date: 30 September 2015

This Table is modified from the MOTCO RPMP (USACE 2011)
Sources: MOTCO 2013d; MOTCO 2012c
Notes: RASS = Remedial Action Subsite; VOC = Volatile Organic Compound; SVOC = Semivolatile Organic Compound

4.0 ENVIRONMENTAL CONSEQUENCES

Chapter 4 presents an analysis of the potential direct and indirect effects of each alternative on the affected environment. In this EIS, any reference to “demolition and construction of Pier 2” includes the associated shore-side construction and improvements at Pier 2 as described in Section 2.2.1. Cumulative impacts of the proposed action alternatives with other past, present, and foreseeable future actions are presented in Chapter 5.

For the purposes of the analysis presented in Chapters 4 and 5 of this EIS, it is assumed the mission throughput capacity under Alternatives 1 through 3 would remain within the historic 10-year average. In addition, under the No Action Alternative, Pier 2 would remain non-operational and missions would continue with growing restrictions at Pier 3 for as long as it is structurally viable. Since the No Action Alternative does not meet the purpose and need of the proposed action, any potential long-term impacts associated with reduced throughput mission capacity or long-term pier deterioration are too speculative to analyze. Therefore, the affected environment presented for the respective resource areas in Chapter 3 of this EIS is considered representative of these effects unless otherwise noted in the respective resource area section. As with Chapter 3, the port operations analysis (the first subsection) is not analyzed as a resource area but rather to provide context for the resource analyses that follow.

The terms below are used to describe the intensity of effects and to assess significance. Significance was determined according to NEPA implementing regulations at 40 CFR Section 1508.27, which requires considerations of both context and intensity as follows.

(a) Context. This means that the significance of an action must be analyzed in several contexts such as society as a whole (human, national), the affected region, the affected interests, and the locality. Significance varies with the setting of the proposed action. For instance, in the case of a site-specific action, significance would usually depend upon the effects in the locale rather than in the world as a whole. Both short- and long-term effects are relevant.

(b) Intensity. This refers to the severity of impact. Responsible officials must bear in mind that more than one agency may make decisions about partial aspects of a major action. The following concepts should be considered in evaluating intensity.

1. Impacts that may be both beneficial and adverse (a significant effect may exist even if the federal agency believes that on balance the effect will be beneficial).
2. The degree to which the proposed action affects public health or safety.
3. Unique characteristics of the geographic area such as proximity to historic or cultural resources, park lands, prime farmlands, wetlands, wild and scenic rivers, or ecologically critical areas.

4. The degree to which the effects on the quality of the human environment are likely to be highly controversial.
5. The degree to which the possible effects on the human environment are highly uncertain or involve unique or unknown risks.
6. The degree to which the action may establish a precedent for future actions with significant effects or represents a decision in principle about a future consideration.
7. Whether the action is related to other actions with individually insignificant but cumulatively significant impacts. Significance exists if it is reasonable to anticipate a cumulatively significant impact on the environment. Significance cannot be avoided by terming an action temporary or by breaking it down into small component parts.
8. The degree to which the action may adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the NRHP or may cause loss or destruction of significant scientific, cultural, or historical resources.
9. The degree to which the action may adversely affect an endangered or threatened species or its habitat that has been determined to be critical under the ESA.
10. Whether the action threatens a violation of federal, state, or local law or requirements imposed for the protection of the environment.

For the purposes of this EIS, the following categories are used to describe the level of impact:

- *Negligible.* This term indicates that the environmental impact is barely perceptible or measurable, remains confined to a single location, and will not result in a sustained recovery time for the resource impacted (days to months).
- *Minor.* This term indicates that the environmental impact is readily perceptible and measurable, however, the impact will be temporary and the resource should recover in a relatively short period of time.
- *Moderate.* This term indicates that the environmental impact is perceptible and measurable, and may not remain localized, impacting areas adjacent to the proposed action. Under the impact, recovery of the resource may require several years or decades.
- *Significant.* This term indicates the environmental impact would be considered significant and mitigation would be applied to minimize adverse impacts.

4.1 PORT OPERATIONS

Impacts would be considered significant if port operations at this vital West Coast port were restricted or limited to the point the Army would no longer be able to use or ensure the continued safe operation of the piers that are essential to MOTCO's designated mission.

4.1.1 No Action Alternative

Under the No Action Alternative for this EIS, the modernization and repair of Pier 2 and the repair of Pier 3 at MOTCO would not occur. Pier 3 would be expected to continue to deteriorate, likely at increasing rates as the marine borer infestation is expected to continue as creosote in the piles is depleted and salinity levels in Suisun Bay rise. The Army would be required to conduct regular detailed inspection of Pier 3 and review operations for restrictions and limitations that would need to be imposed to safely operate the pier within the parameters of its remaining structural integrity. This would be expected to result in ever-increasing restrictions on the types and extent of operations that could be conducted safety at Pier 3. Without repairs, the operational life expectancy of Pier 3 is not estimated to extend beyond 2019 and further loss in structural viability preceding that could result in further loss of operational capability well in advance of 2019. With no investment in Pier 2 repairs or modernization, it would remain in its non-operational condition. The remaining port operations capability at Pier 4 and the Barge Pier would not be able to accommodate the ammunition transshipment mission assigned to MOTCO. Within a few years, the DOD would lose 75 percent of its West Coast pier-side ammunition handling capability, significantly limiting its ability to conduct and support contingency operations in the Pacific theater. Under the No Action Alternative, port operations at MOTCO would be severely limited and the Army would no longer be able to meet its designated mission at MOTCO; therefore, there would be significant impacts if the Army does not take action.

4.1.2 Alternative 1

Under Alternative 1, it is anticipated that repairs to Pier 3 would begin as early as 2014 to maintain its limited operational capability through 2019. These repairs do not include structural repairs that would be necessary to allow all vehicles and material handling equipment that formerly operated at Pier 3 to operate in all areas of the piers. The proposed repairs are intended only to preserve the already limited current condition and capacity of Pier 3. Following repairs to Pier 3, work on Pier 2 could begin as early as 2016 and be completed in 2018. This would ensure that the Army is able to retain operational capability and meet its designated mission at MOTCO without interruption. For as long as Pier 3 retains structural viability, there would be the ability to operate Piers 2 and 3 concurrently.

Key elements that would increase port operations capabilities associated with Pier 2 modernization are as follows.

- Primary port operations would be appropriately shifted to the pier that has the highest net explosive weight capability (Pier 2).
- No adjustments to operations would be needed to address load restrictions as currently required with the condition of Pier 3.
- The elimination of the outdated dual-level platform configuration would allow for improved cargo handling equipment maneuverability.

- The stronger deck would allow more heavy equipment and associated heavy equipment operations to occur on the pier at any given time.
- Installation of two new 80-long-ton container cranes at Pier 2 with a rated capacity of 179,000 lbs (the rated capacity of the gantry cranes at Pier 3 is 112,000 lbs) and productivity rate of 30 lifts per hour.

In conclusion, implementation of Alternative 1 would provide port operations capabilities to ensure that the Army is able to meet its designated mission at MOTCO while greatly improving the efficiencies of current pier operations. Therefore, implementation of Alternative 1 would result in a beneficial impact to MOTCO's port operations.

4.1.3 Alternative 2

Although the overall Pier 2 footprint would be 27,081 SF smaller than the existing Pier 2 footprint, all of the key operational capability gains noted above for Alternative 1 would also apply for Alternative 2. Therefore, implementation of Alternative 2 would result in a beneficial impact to MOTCO's port operations.

4.1.4 Alternative 3

The impacts on missions under Alternative 3 would be similar to those under Alternative 1; however, Alternative 3 would provide the operationally preferred configuration. Under Alternative 3, the overall Pier 2 footprint would increase by 35,354 SF, which would allow for greater flexibility in container handling operations. In addition, the widening of the road and approach abutment of the east trestle and realignment of the rail tracks at this approach would allow for more expedient and safe use of this trestle by rail and other equipment. All of the other key operational capability gains noted above for Alternative 1 would also apply for Alternative 3. Therefore, implementation of Alternative 3 would result in a beneficial impact to MOTCO's port operations.

4.2 EARTH RESOURCES

Impacts would be considered significant if ground disturbance or other activities would violate applicable federal or state laws and regulations, and result in the potential for Notices of Violation for the failure to receive or follow stipulations within applicable state permits.

4.2.1 No Action Alternative

4.2.1.1 Topography

Under the No Action Alternative, Alternatives 1, 2, or 3 would not be implemented and existing conditions would remain. There would be no adverse impacts to topography from the implementation of the No Action Alternative.

4.2.1.2 Soils/Sediments

There would be no adverse impacts to soils or sediments with the implementation of the No Action Alternative. Soil and sediment conditions would remain in their current state. Minor erosional damage to the existing rock revetment adjacent to the existing west trestle at Pier 2 would continue, potentially resulting in a long-term adverse impact if not remedied under another action.

4.2.2 Alternative 1

4.2.2.1 Topography

During the demolition phase of Pier 2 and repairs to the support system for Pier 3, minor alterations to the subsurface topography would occur. Similarly, the re-construction of the Pier 2 pile support system would redistribute small amounts of sediment as the old piles are removed and new piles are pushed into the bay bottom with pile driving equipment.

The topographical disturbance associated with the demolition and re-construction activities for the removal or relocation of trestles would be a minor re-distribution of bottom conditions and would not violate federal or state laws or regulations with state and federal permits having been issued prior to the demolition and construction activities.

The sites proposed for the 39,500 SF expansion of the existing T-10 staging area and the additional 8,000 SF of concrete pad or series of pads within the Pier 2 employee parking area is planned in a location where the topography is relatively flat. Increasing impervious area at this location from the existing semi-impervious dirt and gravel area to pavement would not substantially alter the existing slope; however, it would increase the runoff velocity from these areas. Construction BMPs to control the runoff and to prevent erosion during and after construction would be part of the project specific SWPPP. Therefore, negligible adverse impacts to topographical conditions would occur with the implementation of Alternative 1.

4.2.2.2 Soils/Sediments

Pile removal and installation may involve some degree of re-suspension of sediments and increased turbidity that could have short-term adverse effects on marine life and water quality (see Section 4.3.2.2 for further discussion of effects to water quality).

No significant impacts to soils or sediments would occur as a result of the implementation of Alternative 1. The in-water work involves the displacement of soils beneath the existing pier structures that were previously displaced by the initial pier construction and has been continuously affected by ongoing currents and wake action upon the large and stationary piles. Pile removal and installation may involve some degree of re-suspension of sediments and increased turbidity that could have short-term adverse effects on marine life and water quality (see section 4.3.2.2 for further discussion of effects to Water Quality). The location of the new Pier 2 is in the approximate same footprint as the existing Pier 2 with a small northward

extension of the pier where a new west trestle would be built. Although the pier would be extended waterward to avoid the need for dredging to accommodate modern vessels at MOTCO, there would be a 27,222 SF reduction in the overwater footprint of Pier 2. There would be fewer pilings in the water for Pier 2 with the replacement of 4,514 old and/or damaged timber piles with approximately 1,001 pre-stressed concrete piles (Table 2.5-1). The re-construction of Pier 2 would not require dredging, so major hydrodynamic changes to the existing shipping channel would not occur that could significantly alter the subsurface movements of soils and sediments.

Under Alternative 1, approximately 750 CY of dredging material adjacent to Pier 2 would be redistributed using a bed-leveler device. Bed-leveler devices consist of a large customized plow or a box beam suspended from a work barge that can be pushed or towed by a tug. Maintenance dredging would be achieved by towing a heavy steel blade or bar over the bottom in order to redistribute ("level") the sediment to deeper portions of Suisun Bay near Pier 2 so that the authorized project depth can be achieved without physical removal of the sediment through the water column. The dredge depth would be to -32 feet MLLW with a 2 foot allowable overdredge. (The allowable overdredge is a means to provide for advance maintenance of a dredged channel or berth and also allows the contractor to be paid for the inaccuracies of dredging to get a precise project depth, which in this case is -32 feet MLLW.) The primary physical impact from maintenance dredging involves a re-suspension of sediments and increased turbidity that could adversely affect marine life and water quality. Past core borings in the vicinity of Pier 2 have indicated the presence of silty clay and very silty clay with sand between -30 feet to -35 feet MLLW (NAVFAC Western Division 1973). While temporarily redistributed, the dredging would not adversely affect or substantially alter the existing soils and sediments in this portion of Suisun Bay. The potential impacts to water quality from proposed dredging are discussed in Section 4.3.2.2.

The soils surrounding the T-10 staging area are not shown on soil maps as having an erosion factor (K factor) since previous disturbance has substantially altered their natural condition. The areas proposed for the 39,500-SF expansion of the existing T-10 staging area and the additional 8,000-SF concrete pad or series of pads within the Pier 2 employee parking area occur where the topography is relatively flat. Construction BMPs to control the altered runoff to prevent erosion during and after construction would be part of the project specific SWPPP.

The staging areas for construction laydown equipment and temporary storage of construction materials and demolition-related materials along the waterfront proximal to the two piers would not alter the existing soils and sediments. The soils may be compacted as a result of the weight of the construction equipment and temporary storage of materials, but these soils have been disturbed in the past by both construction and operational impacts.

The upland portion of Alternative 1 would occur on lands that have been previously disturbed, including either impervious areas or semi-impervious areas. Upland construction activities have

the potential to cause soil erosion; therefore, a site-specific erosion and sediment control plan would be developed and utilized to ensure that soil erosion during construction is minimal. This plan would implement BMPs that are outlined in the installation's project specific SWPPP and include an Erosion and Sediment Control Plan. The BMPs for Alternative 1 include using silt fencing, soil stabilization blankets, and matting around areas of land disturbance during construction. Bare soils would be vegetated after construction to reduce erosion and stormwater runoff velocities. Minor changes to topography would occur in areas that would be graded for new construction. There would be no impacts to geology or seismology from the implementation of Alternative 1. With the proper use of BMPs during the demolition and re-construction activities for Pier 2 and the repair activities for Pier 3, impacts to soil and sediments would be minor.

4.2.3 Alternative 2

4.2.3.1 Topography

The impacts to topography from Alternative 2 are the same as those for Alternative 1 except that the footprint of the newly constructed Pier 2 would be in the same overwater footprint as the existing pier. There would be a reduction of 2,734 SF of the west trestle with Alternative 2. With the removal of the existing pedestrian/forklift trestle and pedestrian trestle in the center of the existing pier combined with the west trestle size reduction, Alternative 2 would have a total pier facility footprint reduction of 27,081 SF. Similar to Alternative 1, Alternative 2 would result in negligible changes to the current topographic condition in the vicinity of Piers 2 and 3 due to demolition activities, re-construction of a new Pier 2, and repair of Pier 3.

4.2.3.2 Soils/Sediments

The impacts to soils and sediments from the construction and demolition activities associated with Alternative 2 are similar to Alternative 1 except that the footprint of the newly constructed Pier 2 would be in the same overwater footprint as the existing pier. In addition, under Alternative 2, approximately 3,800 CY of dredged material would be removed adjacent to Pier 2 by a mechanical dredge. The potential impacts to water quality from proposed dredging are discussed in Section 4.3.3.2.

4.2.4 Alternative 3

4.2.4.1 Topography

The impacts to topography for Alternative 3 are the same as those for Alternative 1.

4.2.4.2 Soils/Sediments

Except for dredging, the impacts to soils and sediments from Alternative 3 are the same as those for Alternative 1. With regards to dredging, Alternative 3 involves dredging approximately 1,450 CY of dredged material adjacent to Pier 2 using a bed-leveler device. The potential impacts to water quality from proposed dredging are discussed in Section 4.3.4.2.

4.3 WATER RESOURCES

The threshold level of significance for water resources is defined as any long-term impacts (chemical, physical, or biological effects) that would adversely alter the historical baseline or violate standard water quality conditions. Additionally, project actions adversely impacting a water body currently considered impaired under CWA would be considered significant.

4.3.1 No Action Alternative

4.3.1.1 Hydrology

Surface Water

Under the No Action Alternative, no adverse impacts to the hydrology would occur as there would not be any changes to surface water flows or currents in the area. In addition, there would not be any changes to surface water runoff conditions.

Groundwater

No adverse impacts to groundwater would occur with implementation of the No Action Alternative.

4.3.1.2 Water Quality

If the No Action Alternative is chosen, potential adverse impacts to water quality could occur. Failure to replace and/or repair the existing pilings would allow the continued leaching of creosote-related contaminants that remain in the pilings above the mudline into the surface waters surrounding the piers. Without the re-construction of the existing failing pier support structure, the piers will eventually fail and could result in debris falling into Suisun Bay. Regular inspections of the structural condition of the piers and operations would be reviewed and restrictions would be put in place as necessary to meet safety parameters of the remaining structurally viable pier components. Such measures would reduce the risk that a catastrophic failure could occur during loading or unloading operations that could release munitions and fuel-laden equipment into the bay, which could moderately to severely adversely affect surface water quality.

4.3.1.3 Wetlands and Floodplains

Under the No Action Alternative, no adverse impacts to wetlands or floodplains would occur.

4.3.2 Alternative 1

4.3.2.1 Hydrology

Surface Water

The demolition and re-construction of Pier 2 and repairs to Pier 3 under Alternative 1 would not adversely affect the hydrology of the surface waters surrounding these existing structures. There would be a net decrease in the overall pier facility footprint of approximately 27,222 SF

although the west trestle would be extended approximately 48 feet north of the existing location. The in-water changes to the pier support system would be the replacement of existing creosote treated timber piles with pre-stressed concrete piles. The effect on the surface water movements of the new pre-stressed concrete piles would be similar to the existing timber piles. Because a total of 4,514 creosote treated timber piles would be removed and replaced with approximately 1,001 concrete piles, current movements would be increasingly free-flowing as fewer piles would decrease trapping or reduction of the current movements around the piers.

There would be approximately 39,500 SF of impervious area added to the existing T-10 staging area to provide more room to handle containers. The Pier 2 parking area, which is currently a semi-impervious dirt/gravel surface, would remain as semi-impervious and not be changed. Runoff from the additional impervious area for the T-10 staging area would be directed to vegetated swales, which would reduce the flow velocity of the runoff from the impervious area prior to its return to Suisun Bay. There would be no adverse impacts to surface water flow from the additional impervious area.

There would be staging areas along the waterfront for the construction equipment and temporary storage of demolition related materials. These staging areas would occur on impervious or semi-pervious areas near the shoreline in close proximity to the pier work. The staging areas, construction equipment, and temporary storage of construction materials and material from the demolition would not adversely impact the hydrology of the area.

Groundwater

The demolition and re-construction of Pier 2 and repairs to Pier 3 under Alternative 1 would not adversely affect groundwater. The concrete deck to be demolished is composed of relatively inert materials whose placement onsite for future reuse would not release contaminants into the groundwater while being stored. Based on the age of the creosote-treated timber piles and the results of a recent Pier 3 inspection report (KCI Technologies, Inc. 2013), creosote retention levels are low due to leaching over time. The portion of the timbers below the mud line, however, may still have near-original creosote levels that have not leached into the water. Under Alternative 1, it is planned that the removed creosote timbers would be placed in dump trucks to be hauled to an onsite temporary storage location to be cut and then disposed of properly.

4.3.2.2 Water Quality

Suisun Bay is listed by the CWA Section 303(d) as an impaired waterbody with a Category 5A status. A waterbody is considered impaired when one or more designated uses are not attained. The Total Maximum Daily Load (TMDL) is a calculation of the maximum amount of a pollutant that a waterbody can receive and still safely meet water quality standards. The chemicals on the TMDL list for Suisun Bay include chlordane, DDT, dieldrin, dioxin, furan compounds, mercury, and PCBs. While there are a number of chemical manufacturing facilities proximal to MOTCO,

these chemicals are not compounds that are normally associated with activities at MOTCO or expected with the proposed action.

The proposed demolition and construction activities associated with Alternative 1 would follow *USEPA Technical Guidance on Implementing the Stormwater Runoff Requirements for Federal Projects* under Section 438 of the Energy Independence and Security Act (USEPA 2009). Obtaining the required NPDES permit, including development of a project specific SWPPP and use of BMPs for all construction disturbances in excess of an acre, would minimize potential impacts to surface water resources. The BMPs include measures to reduce stormwater runoff and the transport of sediments from the construction sites into receiving bodies of water. These BMPS, such as vegetated swales for stormwater treatment, address management measures that reduce the potential for surface water contaminants to enter into surface or groundwater supplies. Under Alternative 1, surface water runoff from the decks of both Piers 2 and 3 would be collected using a series of scuppers and pipes with transport to the adjacent uplands. The stormwater from the new deck impervious surfaces, as well as runoff from the expanded parking lot and container staging area, would be placed into vegetated swales prior to discharge into Suisun Bay to remove contaminants such as oils and greases that may be present. BMPs would also be in place where the recyclable demolition materials are stockpiled on the uplands within MOTCO waiting onsite re-use or offsite recycling. In either case, the storage of these materials would be temporary and not affect surface water hydrology.

The Alternative 1 related SWPPP would be incorporated into the installation-wide SWPPP. In addition, implementation of Alternative 1 would require modification of the installation-wide SPCC Plan, which identifies management practices designed to prevent and respond to discharges of oil-based products into navigable waters.

Throughout the demolition and construction of Pier 2 and repairs of Pier 3, there would be construction-related truck traffic at levels not normally occurring at MOTCO for the duration of the project. This truck traffic would be associated with the delivery of construction materials and removal of demolition-related materials. This project-related traffic has the potential to release contaminants such as oils and greases onto the roadway entering and leaving MOTCO. As part of the project specific SWPPP, these roadways on MOTCO would be visually inspected weekly with any cleaning or remedial action noted. Crews would be mobilized within 72 hours of an identification of a deficiency. Fueling of construction-related equipment, including the storage of fuels and oils to support the construction work, would be required to comply with this SPCC Plan. The contractors performing the demolition and construction work would be required to be familiar with the SWPPP and restrict their activities to designated work areas and construction laydown sites. Truck traffic and construction of new impervious surface areas have the potential to cause erosion with the subsequent discharge of soils into receiving water bodies. Contractors working onsite would be required to implement temporary erosion control measures per the project specific SWPPP. Contractors would also be required to control all project related

materials and wastes from exposure to stormwater runoff. Any process water that is created during the construction/demolition activity would be contained by the contractors performing the work and would be strictly prohibited from being discharged into Suisun Bay. Routine maintenance of construction-related vehicles and equipment used specifically for the project during the construction/demolition would not be performed onsite. In addition to weekly inspections by the contractors performing the construction/demolition work, all contractors would be required to prepare a written final inspection report to ensure that the environmental condition of the work areas they are responsible for are in the same condition as they were prior to the project with respect to any contamination or erosional conditions that could affect water quality.

Implementation of Alternative 1 would have the potential for short-term localized impacts to water quality from increased turbidity. There would also be a release of contaminants, such as PAHs, from the Pier 3 creosote-treated timber piles that would be cleaned prior to installing the HDPE jackets, as well as from sediments disturbed during removal of Pier 2 piles. Floating booms and nets would be used to capture debris and/or slick associated with these activities. Captured materials would be disposed of in accordance with federal and state regulations.

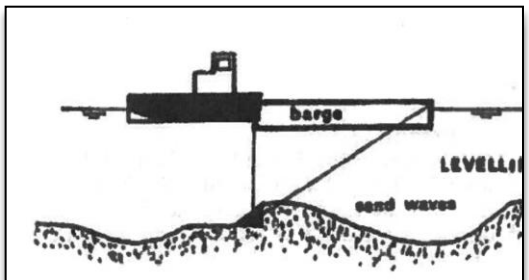
Due to the instability of the existing deck and supporting pile conditions, the demolition crews would not be able to use the existing pier decks as removal points but would have to use in-water equipment. As the existing pilings are removed by pulling them, using a barge-mounted excavator with vibratory attachment to loosen the soils around the piles, or employing a jet wash to release stubborn soils, subsurface sediments may be redistributed causing temporary turbidity. Vessels supporting the demolition activity have the potential for propeller wash ("prop wash") that can occur in shallow portions of the project area at low tide also contributing to temporarily elevated turbidity levels.

It is also possible that pier-related components may come apart during the demolition activity. The pilings to be removed may break under tension releasing debris into the water. Although not intended, it is possible that portions of the piers may also break and fall into the water while being removed, which could result in debris falling to the bottom or in some cases floating on the surface. Removal of the old creosote pilings has the potential to release remaining creosote trapped in the timbers, especially below the mud line, and release it into the water as they are being pulled up through the water column. If the timbers do still contain creosote, it is possible that a petroleum-based "slick" associated with the creosote could rise to the surface. Since the bottom sediments are a combination of clay and silty clay, it is possible that contaminants sorbed to bottom sediments may also be released into the water column with the removal of the buried timbers.

The construction of the new piers would use equipment, such as tugboats, barge mounted cranes, construction crew support vessels, and pile driving equipment, with the potential to cause increased temporary turbidity in shallow areas. The pile driving activity can also result in

increased turbidity from the pressure of the blows to the piles to drive the piles down into the bay bottom.

The demolition of the old pier structures and construction of the new pier structures would require permitting under both Section 10 of the Rivers and Harbors Act of 1899 and Section 404 of the CWA for "incidental fallback" that may occur during demolition and construction. A Section 401 Water Quality Certification from the RWQCB would include assurances that BMPs would be used to minimize potential impacts to water quality. This permitting process would ensure that state water quality standards would not be affected by implementation of these demolition or construction activities. To minimize the impacts from temporary elevated turbidity, control floating debris, and to ensure that floating creosote-related contamination is constrained to the construction site, floating booms would be in place during the duration of the demolition and construction for both piers.



Typical Bed Leveler Device

Alternative 1 involves dredging approximately 750 CY of shoal material adjacent to Pier 2 using a bed-leveler device. Bed-leveler devices consist of a large customized plow or a box beam suspended from a work barge. A 1,000 to 3,000 horsepower tug is generally used to push or pull the barge-mounted bed-leveler at towing speeds ranging from 1–2 knots. A typical bed-leveler varies from 30–50 feet in width and weighs anywhere from 25–50 tons. The vertical amount of material moved per pass is dependent on the type of material being moved. For example, in very soft mud, up to 1 foot or more of sediment could be moved in a single pass. However, in stiffer materials such as clay, only 2–4 inches of sediment would be moved in a single pass (USACE 2006). Maintenance dredging would be achieved by towing a heavy steel blade or bar over the bottom in order to redistribute the sediment to deeper portions of Suisun Bay near Pier 2. The dredge depth would be to -32 feet MLLW with a 2-foot allowable overdredge.

The primary physical impact from maintenance dredging involves a re-suspension of sediments and increased turbidity that could adversely affect marine life and water quality. Sediment loss to the water column reduces the efficiency of the dredging process, increases the size of the residual sediment plume, and compounds the impacts to the marine environment.

The nature, degree, and extent of sediment re-suspension that occurs during dredging operations are controlled by many factors including the particle size distribution, solids concentration, and composition of the dredged material; the dredge type and size; operational procedures used; and finally, the characteristics of the receiving water in the vicinity of the operation, including density, turbidity, and hydrodynamic forces (i.e., waves, currents, etc.) causing vertical and horizontal mixing. The relative importance of the different factors will vary

significantly from site to site (SAIC 2001). For example, shoal material removed from channel dredging would likely include coarse material, limiting the re-suspension of materials and turbidity in the water column. Dredging in the barge basin is likely to include finer material combined with coarse materials and increase the likelihood of increased turbidity levels during dredging.

Maximum concentrations of suspended solids would occur in the immediate vicinity of the dredging areas and decrease rapidly with distance from the operation due to settling and dilution of the material. However, the overall area to be dredged is small and it is anticipated the maintenance dredging would be completed within one week.

Re-suspended sediment plumes may have chemical impacts on water quality by increasing the biological oxygen demand of the water column that could affect marine organisms, both on the bay floor and in the water column as a result of a decrease in DO. In addition, since contaminants have a tendency to adhere to sediment particles, a portion of the chemical burden in the sediments would be released into the water column.

Dissolved oxygen reduction due to dredging is a function of the amount of re-suspended sediment in the water column, the oxygen demand of the sediment, and the duration of re-suspension (LaSalle et al. 1991). Studies have indicated wide variations in DO levels associated with dredging from minimal, or no measurable reduction, to large reductions in DO levels (USACE 1998). The release of organic-rich sediments during dredging or dredged material disposal can result in the localized removal of oxygen from the surrounding water. The re-suspension of this material creates turbid conditions and decreases photosynthesis. The combination of decreased photosynthesis and the release of organic material with high biological oxygen demand can result in short-term oxygen depletion to aquatic resources (Nightingale and Simenstad 2001b in NOAA [2008]). According to Herbich (2000), elevated suspended solids concentrations, and subsequent impacts on DO levels, are generally confined to the immediate vicinity of the dredge or discharge point and dissipate rapidly at the completion of the operation.

Contaminants are sequestered in the total organic carbon (TOC) fraction of sediments (USEPA 2003a in NOAA 2008; USEPA 2003b in NOAA 2008; USEPA 2003c in NOAA 2008). Dredging and disposal causes re-suspension of the sediments into the water column and the contaminants that may be associated with the sediment particles. The disturbance of bottom sediments during dredging can release metals (e.g., lead, zinc, mercury, cadmium, copper), hydrocarbons (e.g., polyaromatic hydrocarbons), hydrophobic organics (e.g., dioxins), pesticides, pathogens, and nutrients into the water column and allow these substances to become biologically available either in the water column or through trophic transfer (Wilbur and Pentony 1999 in NOAA 2008; USEPA 2000 in NOAA 2008; Nightingale and Simenstad 2001b in NOAA 2008).

In a 1979 study, Bohlen et al, determined that the total suspended load in an estuarine system after a storm event is an order of magnitude greater than that produced by dredging activities (e.g., bucket load leakage, dredge-induced plume). The study also detected that sediment concentration along the centerline of the dredge-induced plume decreased rapidly to background levels within 2,300 feet (Bohlen et al. 1979). Therefore, the turbidity generated by sediment dredged along the north side of the west trestle would have a short suspension time during dredging, transport, and placement in the disposal site.

No other water quality parameters are anticipated to be substantially impacted during the maintenance dredging as these areas have been dredged before without any past record of water quality violations; however, sediment testing to assess the current contaminant levels of the material to be dredged will be conducted as part of the water quality certification process. An evaluation report based on Section 404(b)(1) of the CWA, *Guidelines for Specification of Disposal Sites for Dredged or Fill Material*, would be submitted to permitting agencies to address impacts associated with the proposed action. Under these guidelines, dredged or fill materials should not be discharged into the aquatic ecosystem unless it can be demonstrated that the discharge will not have an unacceptable impact from either individual or in combination with known and/or probable impacts from other activities affecting the ecosystem. MOTCO would obtain all necessary permits for dredge removal and disposal of the dredged sediment including a RWQCB water quality certification permit and a USACE Section 404b permit.

The project site is in close proximity to the site of the ammunition ship explosion of 17 July 1944. Many different types of ordnance items were involved at the time of the accident, including high explosive and incendiary bombs, depth charges, pyrotechnics, and ammunition of various calibers. As a result of the Port Chicago Explosion, MEC may still be present in the subsurface around Piers 2 and 3. The project area, including areas to be dredged, is in the vicinity where past MEC has been found. However, the dredged material is of recent origin consisting of sedimentation since the berth was last dredged; therefore, the likelihood of the material to be dredged containing MEC is low. Further, the dredging associated with this action alternative is a maintenance requirement and would continue into the future at the current level if this action alternative is selected.

In the unlikely event MEC is discovered, it is possible the explosive rounds or munitions could detonate, adversely impacting surface water quality in the area. A wide range of organic (e.g. 2, 4, 6 trinitrotoluene [TNT]) and inorganic compounds (e.g. ammonium oxide) and mixtures of oxidizable materials may be present in the area and could be released into the water column if ignited. Chemicals typical of these materials include, but are not limited to, chromium, lead, mercury, phosphorous, zinc, phthalates, chlorates, and perchlorates. Saltwater conditions mixed with cohesive soils, such as those having a high percentage of clay, are more corrosive than predominantly sandy sediments. The Suisun Bay bottom in the vicinity of Piers 2 and 3 includes

clay and silty clay soils. For further discussion of the potential impacts from disturbing areas affected by the 1944 Port Chicago Explosion, see analysis of contaminated sites (Section 4.13).

Permit applications for the dredge and fill activities and water quality certification will be submitted once detailed engineering is performed.

In conclusion, the demolition and re-construction activities for Pier 2 and the repair activities for Pier 3 under Alternative 1 would result in moderate, temporary adverse impacts to water quality.

4.3.2.3 Wetlands and Floodplains

Consistent with EO 11990, *Protection of Wetlands*, the Army has determined there is no practicable alternative to locating Pier 2 outside wetlands habitat due to existing location of Pier 2. In determining the potential impacts to wetlands with the implementation of the proposed action, a 100-ft potential disturbance buffer was added around Pier 2 to account for the maneuvering of equipment and worker access during demolition and construction activities. Refer to Tables 4.3-1 and 4.3-2 for potential wetland impacts without and within the 100-foot buffer, respectively.

Table 4.3-1. Potential Direct Impacts to Wetlands from Implementation of Alternatives 1–3

Habitat	Pier 2				Pier 3
	Structure Removed (Possible Gain)[1]	Construction			
		Alternative 1	Alternative 2	Alternative 3	
Riverine/Palustrine Wetlands (acres)	0	0	0	0	0
Estuarine Intertidal Wetlands (acres)	0.084	-0.043	-0.043	-0.043	0
Total Acres	**0.084**	**-0.043**	**-0.043**	**-0.0433**	**0**

Note: 1. The numbers in this column represent the potential gain from the demolition of Pier 2; however, the overall gain/loss must be calculated taking into account the loss noted under the respective action alternatives.

As indicated in Table 4.3-1, implementation of the Pier 2 portion of Alternative 1 would not result in any net loss of wetlands. This is due mainly to the fact that the new Pier 2 footprint would be smaller than the existing Pier 2 footprint.

Table 4.3-2. Potential Short-Term Impacts to Wetlands from Implementation of Alternatives 1–3 (Within 100-Foot Buffer)

Habitat	Pier 2				Pier 3
	Structure Removed (Possible Gain)[1]	Construction			
		Alternative 1	Alternative 2	Alternative 3	
Riverine/Palustrine Wetlands (acres)	0.046	-0.034	-0.034	-0.034	0
Estuarine Intertidal Wetlands (acres)	0.6	-0.126	-0.101	-0.117	0
Total Acres	**0.646**	**-0.16**	**-0.135**	**-0.151**	**0**

Note: 1. The numbers in this column represent the potential gain from the demolition of Pier 2; however, the overall gain/loss must be calculated taking into account the loss noted under the respective action alternatives.

As indicated in Table 4.3-2, an additional 0.034 acres of riverine/palustrine wetlands and 0.126 acres of estuarine intertidal wetlands fall within the 100-foot disturbance buffer and could be temporarily impacted. The area of impact would occur at the west trestle, forklift trestle (former and relocated) and former pedestrian walkway (Figure 4-1). The State of California has a policy of no net loss of wetlands and requires all impacts to wetlands be mitigated under Section 404 of the CWA. The California Wetlands Policy (EO W-59-93) specifies that, in addition to the no net loss of wetlands, there should be a regional increase in both the acreage and quality of wetlands. To meet this requirement, it is proposed the 0.041 acres of estuarine intertidal wetlands within areas currently occupied by structures be restored. At the conclusion of the project, the wetlands located within the existing Pier 2 footprint and the wetlands located within the 100-foot buffer of the new Pier 2 footprint would be restored to appropriate native habitat with weed control. Refer to Section 4.5.1 for a discussion of potential impacts to habitat and species.

The demolition of the old pier structures and re-construction of the new pier structures will not impact the 100-year floodplain. The expansion of the Lot T-10 will also not impact the 100-year floodplain.

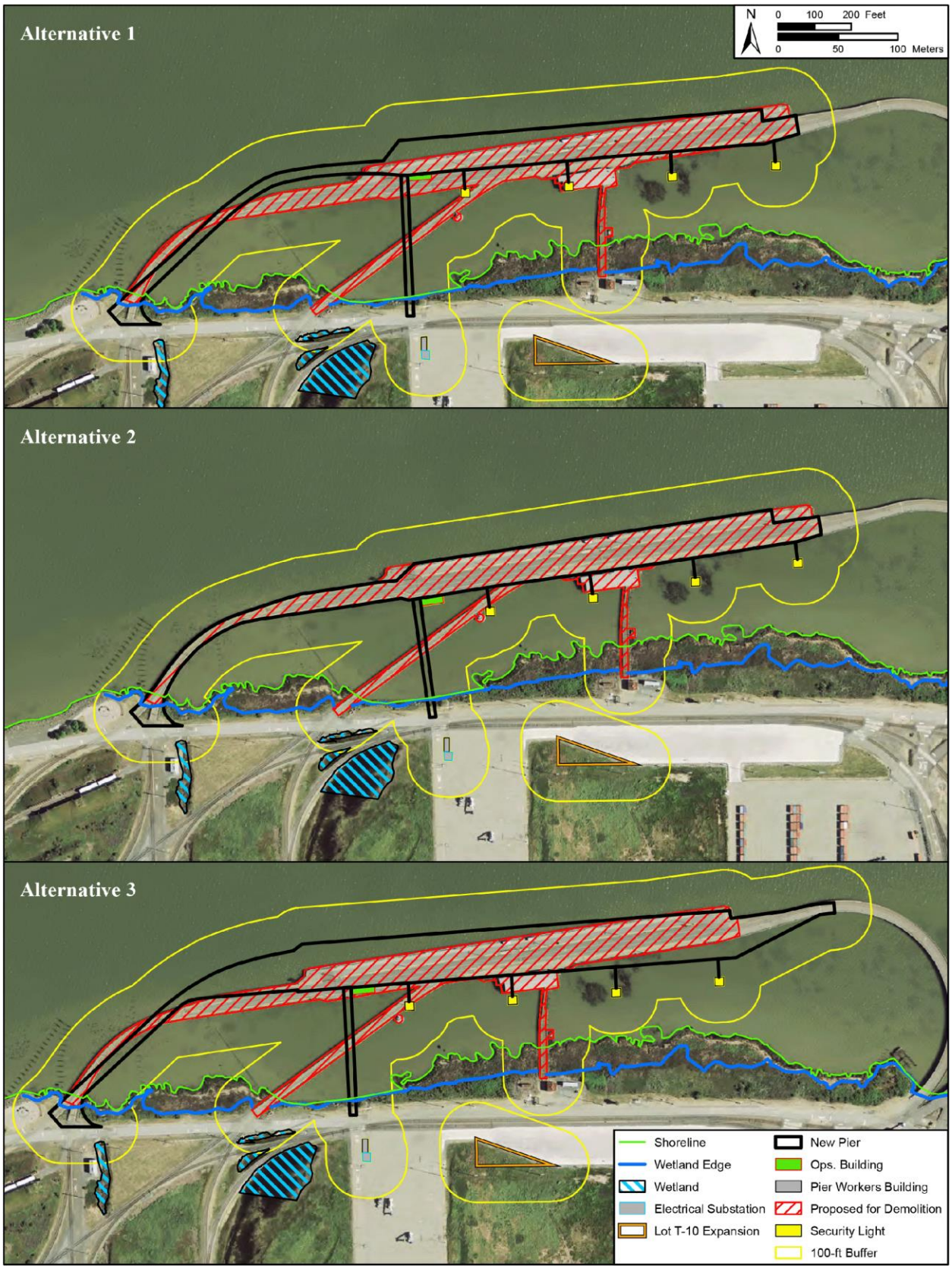


Figure 4-1. Potential Habitat Impacts Near Pier 2 from Alternatives 1, 2, and 3

4.3.3 Alternative 2

4.3.3.1 Hydrology

The impacts to hydrology from Alternative 2 are the same as those from Alternative 1.

4.3.3.2 Water Quality

The impacts to water quality are the same as those from Alternative 1 with the exception that Alternative 2 involves dredging of approximately 3,800 CY of shoal material from Suisun Bay.

With regards to the proposed dredging of the north side of the west trestle for Pier 2, two methods of dredging could be employed: hydraulic dredging (e.g., pipeline/cutterhead dredge) or mechanical dredging (e.g., clamshell bucket dredge). Typically, the choice of dredge type depends on the amount and type of dredge material to be removed, availability and cost of the dredge equipment, and the location and availability of dredge disposal sites. Selection and operation of the type of dredge equipment would affect the degree of adverse impacts to marine waters during dredging. However, the decision of which dredging method to employ would be made following the completion of the EIS. For the purposes of this EIS, the analysis assumed mechanical dredging using a traditional clamshell bucket would be used because it represents the worst-case scenario (i.e., maximum potential adverse effects in terms of marine water quality impacts) between the choice of hydraulic dredging versus mechanical dredging and is also the method historically used (refer to Table 3.2-1).

Clamshell (Bucket) Dredge

Hydraulic Pipeline Dredge with Cutterhead

Mechanical dredging excavates *in situ* sediments with a grab or bucket. Mechanical dredges operate best in consolidated, hard packed material since dredging buckets have difficulty retaining loose, fine (silty) material that is often washed away as the bucket is raised. Depending on the bucket characteristics, the water content of the dredged material is approximately 10 percent. Mechanical dredges are often used in tightly confined areas, such as harbors, around docks and piers, and in relatively protected channels. This type of dredge is not suitable for rough open seas and may not be suitable for areas of high vessel traffic where a stationary dredge and dredge scow may impede other vessels' movement. By using a number

of scows to receive the dredged material with one dredge, mechanical dredging can proceed continuously. As one scow is being filled, another can be towed to the placement site.

One of the most common types of mechanical dredges is the clamshell dredge, which is named for the type of bucket used in the dredging operation. Typically, a large barge is loaded with the bucket dredge and transported to the dredging site with tugs. The barge is then secured in place. The dredging process consists of lowering the bucket to the channel or basin floor, closing the bucket and raising it back to the water surface, and depositing the dredged material into a scow or, if appropriate, directly into an adjoining placement site. The efficiency and capacity of this type of dredging is determined by the capacity of the bucket, which varies between 1.5 and 25 CY, scow capacity, which typically varies from 130 and 3,300 CY, and the number of available scows. For planning purposes, it is estimated that the dredging could be completed in one week.

As discussed under Alternative 1, the primary physical impact from mechanical dredging involves a re-suspension of sediments and increased turbidity that could adversely affect marine life and water quality. Even under ideal conditions, substantial losses of loose and fine sediments will usually occur with mechanical dredging. Sediment loss during a typical mechanical bucket dredging operation occurs throughout the water column from the following specific sources: impact of the bucket on the bottom of the dredge area; material disturbance during bucket closing and removal from the bed; material spillage from the bucket during hoisting; material washed from the outer surfaces of the bucket during hoisting; leakage and dripping during bucket swinging; aerosol formation during bucket re-entry; and residual material washed during bucket lowering (SAIC 2001). An array of operational turbidity control measures would be implemented to prevent suspended sediments from exceeding water quality standards, and frequent monitoring during dredging to ensure the effectiveness of suspended sediment containment would be performed. Examples of operational controls for dredges include the following.

- Reducing the dredging rate to slow down the dredging operation (this is especially important with respect to bucket speed approaching the sediment surface and bucket removal from the surface after closing).
- Reducing bucket over-penetration, which can cause sediment to be expelled from the vents in the bucket or cause sediment to become piled on top of the bucket, then eroded during bucket retrieval.
- Eliminating overflow from barges during dredging or transport.
- Changing the method of operating the dredge, based on changing site conditions such as tides, waves, currents, and wind.
- Modifying the depth of the cutterhead for hydraulic dredging, rate of swing of the ladder and of the rotating cutterhead, and reducing the speed of advance of the dredge.

- Modifying the descent or hoist speed of a wire-supported bucket.
- Sequencing the dredging by moving upstream to downstream.
- Varying the number of dredging passes (vertical cuts) to increase sediment capture.
- Using properly sized tugs and support equipment.

Application of operational controls is potentially costly and can significantly reduce overall production rates and efficiency. Further, the improper use of controls can have direct negative impacts on a project and the environment by concentrating total suspended solids in a localized area, reducing visibility, and potentially reducing localized dissolved oxygen (DO). The degree of controls needed is a site-specific or area-specific decision. Therefore, such controls should be applied only when conditions clearly indicate their need and should not be set as a requirement solely because they can be applied (USACE 2005). With proper monitoring as established by RWQCB/USACE permits, the potential for the dredging portion of the project to have significant water quality impacts would be minor. Any exceedances of water quality standards would result in the interruption of the construction activities until the total suspended solids levels returned to acceptable levels. The sedimentation controls would prevent significant impacts to aquatic communities and water quality outside of the project area.

As with Alternative 1, sediment testing to assess the current contaminant levels of the material to be dredged will be conducted as part of the water quality certification process. An evaluation report based on Section 404(b)(1) of the CWA, *Guidelines for Specification of Disposal Sites for Dredged or Fill Material*, would be submitted to permitting agencies to address impacts associated with the proposed action. Under these guidelines, dredged or fill materials should not be discharged into the aquatic ecosystem unless it can be demonstrated that the discharge will not have an unacceptable impact from either individual or in combination with known and/or probable impacts from other activities affecting the ecosystem. MOTCO would obtain all necessary permits for dredge removal and disposal of the dredged sediment including a RWQCB water quality certification permit and a USACE Section 404b permit. For further discussion of the potential impacts from disturbing areas affected by the 1944 Port Chicago Explosion, see analysis of contaminated sites (Section 4.13).

The method of disposal is determined using a combination of engineering, cost, and environmental considerations. This EIS anticipates disposing the dredged material in the Montezuma Wetlands Project (MWP) across Suisun Bay near Collinsville. The MWP is an ongoing wetlands creation project with the capacity to receive up to 17 million CY of material for the creation of low and high intertidal marshes as well as other valuable habitat. Between 2003 and 2012, the MWP received approximately 3.6 million CY of dredged soil (CA RWQCB 2012). This project is consistent with the Long Term Strategy for the Placement of Dredged Material in San Francisco Bay Region and supports the California Wetlands Conservation Policy (EO W-59-93) for a region-wide increase in wetlands acreage and quality (CA RWQCB 2012). This

disposal option would be a beneficial re-use since the MWP relies on dredging projects in the San Francisco Bay area for its fill to raise the project elevations to create new wetlands and buffering upland areas. This disposal/beneficial re-use option may be available if the material to be dredged meets the standards for placement in the MWP and it is a practicable solution with respect to project costs. To be eligible for possible placement at the MWP, the sediment must be characterized using the BCDC Dredged Material Management Office (DMMO) as follows:

a. The DMMO guidance document, "Guidelines for Implementing the Inland Testing Manual in the San Francisco Bay Region" (Corps Public Notice 01-01, or most current version), with the exception that the water column bioassay simulating in-Bay unconfined aquatic disposal shall be replaced with the modified effluent elutriate test, as described in Attachment B of the Inland Testing Manual, for both water column toxicity and chemistry (DMMO suite of metals only); and
b. Regional Water Board May 2000 staff summary report, "Beneficial Reuse of Dredged Materials: Sediment Screening and Testing Guidelines," or most current revised version (CA RWQCB 2012).

The applicable criteria for contaminant levels in the material proposed for placement at the MWP are listed in Table 4-3.3. The actual sampling plan for the materials to be dredged will be prepared during the engineering phase of the proposed project. If the MWP site is chosen as the least environmentally damaging/beneficial alternative for the disposal of the dredged material no significant adverse effects from this method of dredged material placement would occur.

If the sediments are determined to be unacceptable for disposal at the MWP, the dredged materials would likely employ a clamshell dredge and scow with the offloading of the dredged materials into dump trucks and placement into a nearby upland disposal site. The closest upland disposal area is known as the Montezuma Hills site. The dump trucks' tailgates would be closed securely to prevent the material from pouring onto the roadway during transport to the upland disposal site. Daily inspections of the transport route would be conducted consistent with the project specific SWPPP.

Although the amount of sediments to be dredged is slightly more under Alternative 2, BMPs would be implemented to minimize adverse effects. Therefore, the demolition and re-construction activities for Pier 2 and the repair activities for Pier 3 under Alternative 2 would result in moderate, temporary adverse impacts to water quality.

Table 4.3-3. Montezuma Wetland Restoration Project Dredged Material Acceptance Criteria[1]

Constituent	Surface (Cover)	Foundation (Non-Cover)
Metals(mg/kg)		
Arsenic	15.3	70
Cadmium	0.33	9.6
Chromium	112	370
Copper	68.1	270
Lead	43.2	218
Mercury	0.43	[2]1.3
Nickel	112	[2]200
Selenium	0.64	[2]1.4
Silver	0.58	3.7
Zinc	158	410
Organochlorine, Pesticides, and PCBs (µg/kg)		
DDTs, sum	7.0	[2]100
Chlordanes, sum	2.3	4.8
Dieldrin	0.72	4.3
Total PCBs (sum of RMP 40	22.7	180
Total PAHs (sum of RMP 25	3,390	44,792

Notes:

[1]Surface and Foundation criteria taken from San Francisco Bay Regional Water Quality Control Board (SFBRWQCB), Beneficial Reuse of Dredged Materials: Sediment Screening and Testing Guidelines, Draft Staff Report, May 2000, except where otherwise noted.

[2]Foundation criteria for mercury, nickel, selenium, and DDT taken from original Montezuma WDR based on SFBRWQCB Sediment Screening Criteria and Testing Requirements for Wetland Creation and Upland Beneficial Reuse, Interim Final,
December 1992.

4.3.3.3 Wetlands and Floodplains

Consistent with EO 11990, *Protection of Wetlands*, the Army has determined there is no practicable alternative to locating Pier 2 outside wetlands habitat due to existing location of Pier 2. As indicated in Table 4.3-2, implementation of the Pier 2 portion of Alternative 2 would not result in any net loss of wetlands. As indicated in Table 4.3-3, an additional 0.034 acres of riverine/palustrine wetlands and 0.101 acres of estuarine intertidal wetlands fall within the 100-foot disturbance buffer and could result in short-term impacts. The area of impact would occur at the west trestle, forklift trestle (former and relocated) and former pedestrian walkway (Figure 4-1). As with Alternative 1, the previously disturbed wetlands, as well as the temporarily impacted wetlands would be restored to appropriate native habitat with weed control. Refer to Section 4.5.2 for a discussion of potential impacts to habitat and species.

There would be no impacts to floodplains with the implementation of Alternative 2.

4.3.4 Alternative 3

4.3.4.1 Hydrology

The impacts to hydrology from Alternative 3 are the same as Alternative 1.

4.3.4.2 Water Quality

Alternative 3 involves dredging approximately 1,450 CY of shoal material adjacent to Pier 2 using a bed-leveler device. The overall impacts to water quality from Alternative 3 are the same as Alternative 1.

4.3.4.3 Wetlands and Floodplains

Consistent with EO 11990, *Protection of Wetlands*, the Army has determined there is no practicable alternative to locating Pier 2 outside wetlands habitat due to existing location of Pier 2. As indicated in Table 4.3-2, implementation of the Pier 2 portion of Alternative 3 would not result in any net loss of wetlands. As indicated in Table 4.3-3, an additional 0.034 acres of riverine/palustrine wetlands and 0.1167 acres of estuarine intertidal wetlands fall within the 100-foot disturbance buffer and could result in short-term impacts. The area of impact would occur at the west trestle, forklift trestle (former and relocated) and former pedestrian walkway (Figure 4-1). As with Alternative 1, the previously disturbed wetlands, as well as the temporarily impacted wetlands would be restored to appropriate native habitat with weed control. Refer to Section 4.5.3 for a discussion of potential impacts to habitat and species.

There would be no impacts to floodplains with the implementation of Alternative 3.

4.4 AIR QUALITY

Air quality impacts within the affected environment were reviewed for significance in light of federal air pollution standards and regulations. Potential air quality impacts include: 1) exceeding the General Conformity Rule *de minimis* thresholds for the ozone precursors VOCs or NO_x, the $PM_{2.5}$ precursor SO_2, $PM_{2.5}$, or CO; or 2) increasing net mobile source emissions in excess of 250 tons per year for PM_{10}.

Pollutants considered in this analysis include the criteria pollutants, excluding lead (airborne emissions of lead are not included because there are no known significant lead emission sources in the region or associated with the Proposed Action). For PM_{10} emissions, 250 tons per year per pollutant was used as a comparative analysis threshold. This value is used by the EPA in their New Source Review Standards as an indicator for impact analysis for listed new major stationary sources in attainment areas. No similar regulatory threshold is available for mobile source emissions, which are the primary emission sources for the Proposed Action. Lacking any mobile source emissions thresholds, the 250 tons per year major stationary source threshold was used to equitably assess and compare mobile source PM_{10} emissions.

Air quality impacts were assessed by comparing the emissions generated by the demolition/construction activities to these defined thresholds. The demolition/construction emissions represent the additive short-term net change in emissions within the MOTCO environs as compared to the already existing operational emissions.

4.4.1 No Action Alternative

Under the No Action Alternative for this EIS, the air emissions generated by MOTCO would decrease as operations would be reduced significantly when Pier 3 can no longer be used for ammunition transshipment, resulting in a minor beneficial impact to air quality in the region. It is possible that some operations that MOTCO would be unable to perform would move to another installation, though alternate ports in Washington on the West Coast or North Carolina on the East Coast would not have the same capabilities as MOTCO. Air emissions at these secondary options for ammunition transshipment would increase commensurate with the level of mission events performed at these locations, presumably with some level of negative impact to the air quality of these regions.

4.4.2 Methodology for Air Quality Emissions Calculations

For the purposes of the analysis, it was anticipated that Pier 3 repairs would begin in 2014 followed by the demolition and reconstruction at Pier 2, which would be begin in 2016 and be completed in approximately two years.

4.4.2.1 Stationary Sources

There are no new stationary sources expected as part of the proposed action, which involves demolition, construction, and repair activities. Equipment used to perform these activities would be owned or leased and brought onsite by contractors who would be responsible for any permit requirements. Once Pier 2 is rebuilt, new operational equipment would be installed and would include two 2,011-horsepower emergency generators. These generators would serve as backup power sources, in the event of a power outage, for the two new gantry cranes that would be installed on Pier 2. The operation of these generators would be in accordance with CARB and the BAAQMD rules. MOTCO would coordinate with the BAAQMD to obtain all appropriate permits or registrations prior to operation of the generators.

4.4.2.2 Portable Sources

As of 1 January 2013, the Portable Engine Airborne Toxic Control Measure (ATCM) fleet standards went into effect. The ATCM requires owners of portable engines to submit a statement of compliance signed by a Responsible Official to the Air Resources Board by 1 March 2013. In addition to the statement of compliance, a summary that identifies each portable engine in the fleet and the associated emission rate must be included. Portable engines would likely be used onsite during construction, but would be under the ownership and control of

contractors performing the demolition, construction and repair work. Compliance with the ATCM will be the responsibility of the contractors.

4.4.2.3 Construction and Commuter Vehicle Emissions

The total estimated area for demolition at Pier 2 is 159,000 SF. The reconstruction varies by alternative as summarized in Table 2.5-1. Proposed demolition and construction activities would be spread out over multiple years.

Emissions from demolition and construction activities include temporary emissions from off-road heavy duty diesel-powered construction equipment, on-road vehicular traffic, and fugitive dust emissions generated during construction. It is anticipated that BMPs and California-required vehicle retrofits and emissions system modifications would be implemented by the contractors.

Emission estimate calculations for demolition and construction activities utilize information from California's mobile source emission inventory. Emissions for highway vehicles were estimated using the CARB's Emission Factor (EMFAC) model. For additional information on the methodology utilized to calculate emissions from construction equipment, watercraft, highway vehicles, and fugitive dust, refer to Appendix C.

4.4.3 Alternative 1

Under Alternative 1, Pier 3 would be repaired in 2014–2015 and Pier 2 would be demolished and rebuilt beginning in 2016. Implementation of Alternative 1 would require dredging to -32 feet MLLW (plus 2 feet overdepth) at Pier 2. Approximately 750 CY of dredged material adjacent to Pier 2 would be redistributed using a bed-leveler device. Emissions would be generated as the result of operating tugboats; diesel construction equipment; and a variety of highway vehicles, including construction trucks, dump trucks, delivery trucks, pickup trucks, tractor trailers, and a carpool van that would operate onsite to transport construction workers from the main gate to the work site. Estimated emissions are presented in Table 4.4-1. As shown in the table, VOC, CO, NO_x and $PM_{2.5}$ emissions are compared to the General Conformity Rule *de minimis* thresholds.

Table 4.4-1. Alternative 1 Estimated Air Emissions from Demolition and Construction Activities

Year	VOCs	CO	NO_x	[2]SO_2	PM_{10}	$PM_{2.5}$
2014	0.07	0.18	0.20	0.01	0.02	0.02
2015	0.03	0.09	0.10	0.01	0.01	0.01
2016	2.72	11.28	24.00	0.53	32.01	4.19
2017	0.82	4.53	8.94	0.19	15.73	1.84
[1]*de miminis* thresholds	100	100	100	100	250	100
Exceedance?	No	No	No	No	No	No

Notes: [1]40 CFR Section 93.153; [2]SO_2 is a precursor for $PM_{2.5}$

As indicated in Table 4.4-1, none of the pollutants would be emitted in excess of the impact thresholds for any year of construction. Therefore, a general conformity determination is not required. A Record of Non-Applicability (RONA) has been prepared (Appendix C).

Once construction is completed, operational air emissions are expected to be reduced over current levels due to new gantry cranes at Pier 2, which would result in the more efficient movement of cargo and associated reduced berth times for ships.

4.4.4 Alternative 2

Under Alternative 2, Pier 3 would be repaired in 2014–2015 and Pier 2 would be demolished and rebuilt beginning in 2016. Implementation of Alternative 2 would require dredging to -32 feet MLLW (plus 2 feet overdepth) at Pier 2. Approximately 3,800 CY of dredged material would be removed by mechanical dredge and placed in a barge for disposal at a suitable disposal site. For the purposes of the air quality analysis in this EIS, it was assumed the Montezuma Wetlands Complex would be the disposal site. Emissions would be generated as the result of operating tugboats, workboats and scows; diesel construction equipment, including the clamshell dredge; and a variety of highway vehicles, including construction trucks, dump trucks, delivery trucks, pickup trucks, tractor trailers, and a carpool van that will operate onsite to transport construction workers from the main gate to the work site. Estimated emissions are presented in Table 4.4-2. VOC, CO, NO_x and $PM_{2.5}$ emissions are compared to the General Conformity Rule *de minimis* thresholds.

Table 4.4-2. Alternative 2 Estimated Air Emissions from Demolition and Construction Activities

Year	VOCs	CO	NO_x	[2]SO_2	PM_{10}	$PM_{2.5}$
2014	0.07	0.18	0.20	0.01	0.02	0.02
2015	0.03	0.09	0.10	0.01	0.01	0.01
2016	2.72	11.28	24.00	0.53	32.01	4.19
2017	0.86	4.67	9.43	0.28	15.75	1.86
[1]*de miminis* thresholds	100	100	100	100	250	100
Exceedance?	No	No	No	No	No	No

Notes: [1]40 CFR Section 93.153; [2]SO_2 is a precursor for $PM_{2.5}$

As indicated in Table 4.4-2, none of the pollutants would be emitted in excess of the impact thresholds for any year of construction. Therefore, a general conformity determination is not required and a RONA has been prepared (Appendix C).

Once construction is completed, operational air emissions are expected to be reduced over current levels due to the new gantry cranes at Pier 2, which would result in the more efficient movement of cargo and associated reduced berth times for ships.

4.4.5 Alternative 3

Under Alternative 3, Pier 3 would be repaired in 2014–2015 and Pier 2 would be demolished and rebuilt beginning in 2016. Implementation of Alternative 3 would require mechanical leveling

of the substrate to -32 feet MLLW (plus 2 feet overdepth) at Pier 2. Approximately 1,450 CY of dredged material adjacent to Pier 2 would be redistributed using a bed-leveler device. Emissions would be generated as the result of operating tugboats; diesel construction equipment; and a variety of highway vehicles, including construction trucks, dump trucks, delivery trucks, pickup trucks, tractor trailers, and a carpool van that will operate onsite to transport construction workers from the main gate to the work site. Estimated emissions are presented in Table 4.4-3. VOC, CO, NO_x and $PM_{2.5}$ emissions are compared to the General Conformity Rule *de minimis* thresholds.

Table 4.4-3. Alternative 3 Estimated Air Emissions from Demolition and Construction Activities

Year	HC as VOCs	CO	NO_x	[2]SO_2	PM_{10}	$PM_{2.5}$
2014	0.07	0.18	0.20	0.01	0.02	0.02
2015	0.03	0.09	0.10	0.01	0.01	0.01
2016	3.10	13.39	28.05	0.62	32.16	4.33
2017	1.17	6.47	12.78	0.27	15.87	1.97
[1]*de miminis* thresholds	100	100	100	100	250	100
Exceedance?	No	No	No	No	No	No

Notes: [1]40 CFR Section 93.153; [2]SO_2 is a precursor for $PM_{2.5}$

As indicated in Table 4.4-3, none of the pollutants would be emitted in excess of the impact thresholds for any year of construction. Therefore, a general conformity determination is not required and a RONA has been prepared (Appendix C).

Once construction is completed, operational air emissions are expected to be reduced over current levels due to the new gantry cranes at Pier 2, which would result in the more efficient movement of cargo and associated reduced berth times for ships.

4.5 BIOLOGICAL RESOURCES

Impacts on biological resources would be considered significant if one or more of the following conditions would result.

- Substantial loss or degradation of habitat or ecosystem functions (natural features and processes) essential to the persistence of native plant and animal populations.
- Substantial loss or degradation of a sensitive habitat that support high concentrations of special status species or migratory birds.
- Disruption of a federally-listed species, its normal behavior patterns, or its habitat that substantially impedes MOTCO's ability either to avoid jeopardy or conserve and recover the species.
- Substantial loss of population or habitat for a state-protected or non-listed but special status species, increasing the likelihood of federal listing action to protect the species in the future.

The definition of "substantial" is dependent on the species and habitats in question and the regional context in which the impact would occur. Impacts may be considered more adverse if the action affects previously undisturbed habitat or if the impact would occur over a large portion of available habitat in the region.

Of note, sea level rise and climate change are likely to impact the biological resources in a similar manner under any of the alternatives. In particular, the shoreline and corresponding habitat zones are likely to move gradually upward and inland, narrowing the extent of tidal marsh seaward of White Road. With respect to the action alternatives, Pier 2 has not been fully designed, but it is anticipated the design would account for sea level rise and climate change. Since these elements would be addressed during design of Pier 2 and are similar for all alternatives, they are not discussed further in this section. Due to the nature of the Pier 3 maintenance repairs and its anticipated future usage, repairs would not account for sea level rise.

4.5.1 No Action Alternative

Under the No Action Alternative for this EIS, the modernization and repair of Pier 2 and the repair of Pier 3 at MOTCO would not occur. Missions would continue with growing restrictions at Pier 3 for as long as it maintains its limited operational capability (estimated to be 2019) and Pier 2 would continue to be non-operational. Both piers would gradually deteriorate in place over the course of an indeterminate number of years. The structures would eventually break apart, shedding debris that would sink and/or be carried away by the currents. Once missions cease, there would be diminished use and, presumably, maintenance of shoreline infrastructure including roads, parking lots, and rail spurs. Continued conservation and management measures that are part of the INRMP would be implemented to the most practical extent possible, but the long-term future use, conversion, or abandonment of the facilities is speculative and outside the focus of this EIS.

4.5.1.1 Habitats

Under the No Action Alternative, habitats would remain in their present configurations. Operations at MOTCO would continue but likely at decreasing levels due to increased infrastructure degradation and eventual decline in human activity if operations stopped. The gradual deterioration of pier infrastructure along the shoreline would release contaminants associated with the creosote-treated timber piles into the aquatic and benthic environments. Although creosote is generally not water-soluble, PAHs is known to leach from treated wood and migrate to sediments and/or accumulate in marine organisms. The release of PAHs into the environment would result in long-term adverse impacts.

4.5.1.2 Flora

Under the No Action Alternative, existing plant communities and species would remain as they are for the foreseeable future and no adverse impacts are anticipated to aquatic, terrestrial, or wetland vegetation.

4.5.1.3 Fauna

With No Action, there would likely be a gradual diminishing in the level of activity and the associated potential for disturbance to fish and wildlife. However, the level of disturbance associated with mission activities is very low, occurs in mostly disturbed and/or developed areas, and would not be considered significant in any case. As noted in Section 4.5.1.1, the release of PAHs into the aquatic environment is likely to increase under the No Action Alternative resulting in long-term adverse effects on aquatic species; such effects would be confined to a limited geographic area. Otherwise, the No Action Alternative would have no impact on invertebrates, fish and EFH, reptiles and amphibians, birds, or mammals.

4.5.1.4 Special Status Species

The reduction in activity associated with the No Action Alternative would have little to no effect on special status species due to the low level of ongoing activity, the concentration of activities within long-used disturbed and developed areas, and the low overlap of the areas of activity with special status species and their habitats. Dredging would only occur within the approved in-water work window and is therefore considered unlikely to adversely affect special status species. Other direct and indirect effects are considered further below. The release of PAHs under the No Action Alternative would affect a limited geographic area and is unlikely to affect special status fish species due to their limited occurrence in the project area.

4.5.2 Alternative 1

4.5.2.1 Habitats

As part of this EIS, a wetland delineation was conducted in May 2013 to determine the occurrence of wetlands within the project area (Cardno TEC et al. 2013). As part of the wetland delineation, potential impacts to all habitats (wetlands, subtidal, shoreline, graded/paved areas, and upland) were evaluated. For the purposes of determining the potential temporary impacts associated with equipment and workers during repair, construction, and demolition activities, a 100-foot potential disturbance buffer was established around areas of demolition and construction. Specific to Pier 3, no in-water repairs would occur on the east side of the pier (i.e., concrete approach); the above-water repairs that would be conducted on the east side of the pier would not result in wetland impacts. Therefore, a 100-foot buffer was not applied to that portion of Pier 3.

Figures 4-1 and 4-2 depict the potential habitat impacts with respect to the three action alternatives for Piers 2 and 3, respectively.

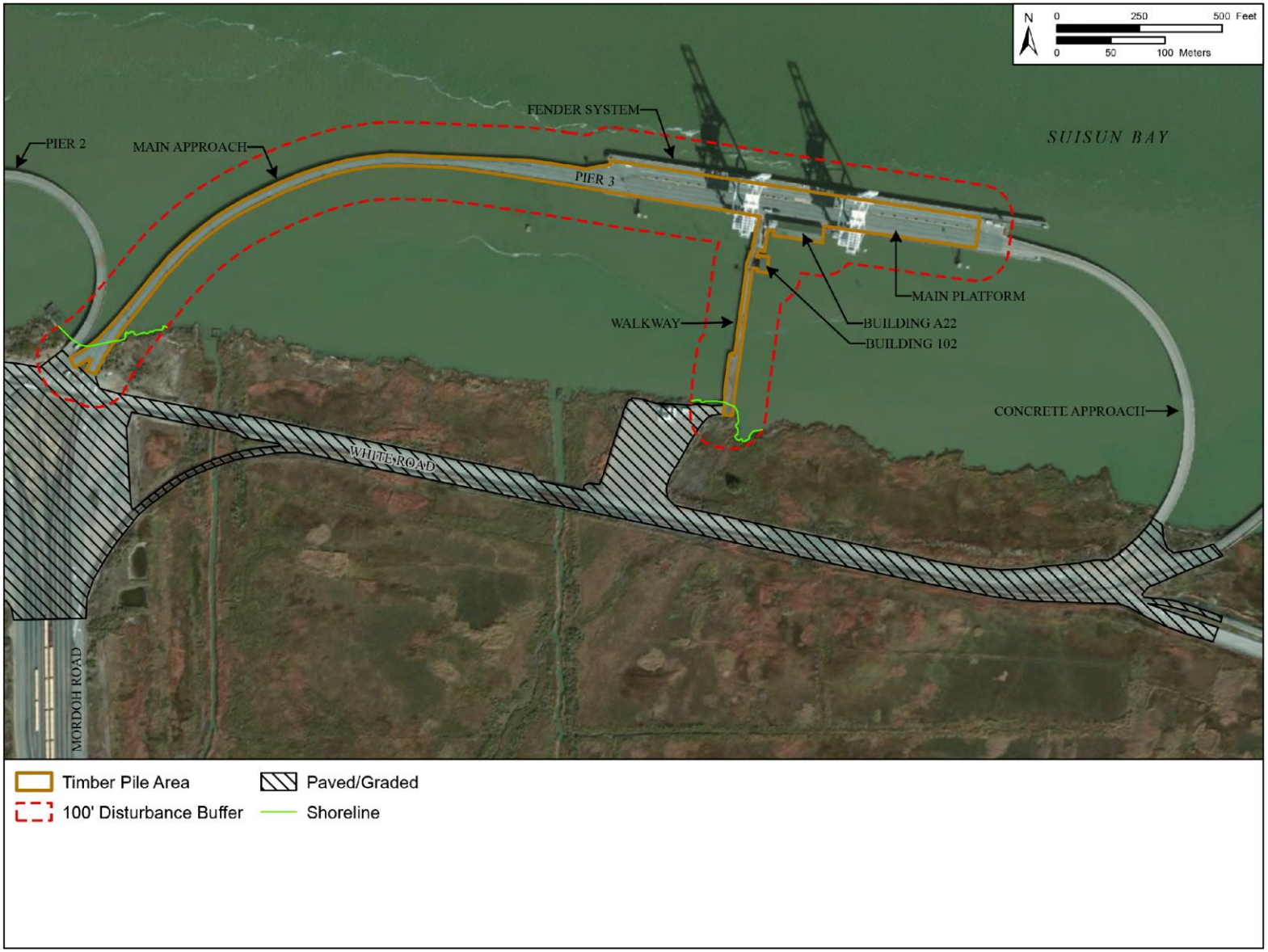


Figure 4-2. Potential Habitat Impacts Near Pier 3 from Alternatives 1, 2, and 3

As shown in Figure 4-1, there would be direct loss of wetlands (depicted in the areas located between the shoreline and wetlands edge) from construction of the new Pier 2, as well as temporary wetland impacts located within the 100-foot disturbance buffer. The areas impacted would be at the west trestle, forklift trestle (former and relocated), and former pedestrian walkway. However, it is anticipated the gain of wetlands from replacing the existing Pier 2 with a smaller structure would result overall in no net loss of wetlands. In addition, as shown in Figure 4-2, no direct or temporary impacts to wetlands are anticipated at Pier 3. The resulting habitat impact calculations for all three action alternatives are provided in Table 4.5-1.

Permanent impacts associated with Alternative 1 include a potential net gain of 0.041 acres of estuarine intertidal wetlands and a net gain of 0.781 acre of unshaded subtidal habitat due to the removal of existing Pier 2 and its replacement by a smaller structure. Small areas of bulrush (possibly low intertidal rather than subtidal) and pondweed are within the footprints of the new Pier 2 construction, but the net gain in uncovered surface would make additional habitat available for vegetated shallows, such that the overall impact would be negligible to minor. The net gain of estuarine intertidal wetlands would be contingent on successful habitat restoration within the areas currently occupied by structures. Although proposed restoration methods are subject to review by the Army and discussion with the regulatory agencies, methods should include establishing desired elevations for tidal marsh communities, and the removal of bordering stands of perennial pepperweed, including excavation of the roots and surface soil and seedbank. Native high marsh species such as alkali heath and gumplant would be reestablished in these areas using locally obtained material.

Impacts within the 100-foot disturbance buffer would be temporary and minor especially since the project would 1) minimize activity in non-essential areas; and 2) restore disturbed habitat to appropriate native habitat based on elevation (tidally influenced communities) or landscape position. It is not expected that SAV inshore of the piers would be adversely affected by the proposed action.

Utility upgrades and repairs along White Road would avoid wetlands; therefore, no impacts to wetlands would occur. Activities would occur within road fill and would not result in long-term impacts to native habitats. Areas that would be temporarily impacted would be stabilized and re-vegetated with appropriate native species immediately following completion of the project. Therefore, negligible impacts to habitats would occur from White Road infrastructure and repairs.

Based on the foregoing, the impacts on habitats from the implementation of Alternative 1 would be minor.

Table 4.5-1. Potential Habitat Impacts of Project Alternatives

Habitat	All Alternatives			Pier 2 Construction					
	Pier 2 Demolition		Pier 3 Repairs	Alternative 1		Alternative 2		Alternative 3	
	Structure Removed (Possible Gain)[1]	Within 100-ft Buffer[2]	Within 100-ft Buffer[2]	Direct Loss[3]	Within 100-ft Buffer[2]	Direct Loss[3]	Within 100-ft Buffer[2]	Direct Loss[3]	Within 100-ft Buffer[2]
Riverine/Palustrine Wetlands (acres)	0	0.046	0	0	-0.034	0	-0.034	0	-0.034
Riverine/Palustrine Wetlands Net Gain/Loss (acres)	*NA*	*NA*	*NA*	*0*	*0.012*	*0*	*0.012*	*0*	*0.012*
Estuarine Intertidal Wetlands (acres)	0.084	0.684	0	-0.043	-0.169	-0.043	-0.144	-0.043	-0.160
Estuarine Intertidal Wetlands Net Gain/Loss (acres)	*NA*	*NA*	*NA*	*0.041*	*0.515*	*0.041*	*0.54*	*0.041*	*0.524*
Estuarine Subtidal Habitat (acres)	3.898	11.032	-15.905	-3.117	-11.608	-3.347	-11.293	-5.011	-12.629
Estuarine Subtidal Habitat Net Gain/Loss (acres)	*NA*	*NA*	*-15.905*	*0.781*	*-0.576*	*0.551*	*-0.261*	*-1.113*	*-1.597*
Shoreline (feet)	0	0	-748	0	0	0	0	0	0
Shoreline Net Gain/Loss (feet)	*NA*	*NA*	*-748*	*0*	*0*	*0*	*0*	*0*	*0*
Graded or Paved (acres)	0.021	0.911	0	-0.113	-2.311	-0.113	-2.311	-0.110	-2.304
Graded or Paved Net Gain/Loss (acres)	*NA*	*NA*	*NA*	*-0.092*	*-1.4*	*-0.092*	*-1.4*	*-0.089*	*-1.393*
Upland (acres)	0	0.615	0	-0.219	-1.745	-0.219	-1.743	-0.219	-1.741
Upland Net Gain/Loss (acres)	*NA*	*NA*	*NA*	*-0.219*	*-1.13*	*-0.219*	*-1.128*	*-0.219*	*-1.126*

Notes: 1. The numbers in this column represent the potential gain from the demolition of Pier 2; however, the overall gain/loss must be calculated taking into account the loss noted under the respective action alternatives.
2. Habitat within the 100-ft buffer areas could be temporarily impacted; however, these areas would be restored to appropriate native habitat, including weed control as needed, following the repair, demolition, and construction activities.

3. Habitat within the new Pier 2 footprint would be lost; however, the amount of habitat directly lost would be offset by the gain associated with removal of the existing Pier 2 structure.

4.5.2.2 Flora

Aquatic Vegetation

As discussed in Section 4.5.2.1, the net increase in unshaded bay surface with the implementation of Alternative 1 would increase the availability of habitat for aquatic vegetation, which is considered a beneficial impact. This beneficial impact is anticipated to offset the small areas of adverse impacts associated with the new Pier 2 footprint.

Pondweed and California bulrush thrive in the turbid shallow waters of Suisun Bay. Temporary and localized impacts associated with turbidity would occur from the proposed Pier 2 demolition and construction, as well as Pier 3 repairs. However, a temporary increase in turbidity is unlikely to adversely impact aquatic vegetation because the natural turbidity levels near Piers 2 and 3 are high. In addition, with the net reduction in covered surface resulting from Alternative 1, a larger area suitable for colonization would be exposed. No effects on circulation patterns or the distribution of SAV and shoreline habitats are anticipated. Therefore, the slight, localized, and temporary increase in turbidity as a result of the proposed action would result in only a minor adverse impact.

Terrestrial and Wetland Vegetation

As discussed in Section 4.5.2.1, permanent impacts associated with Alternative 1 include a potential net gain of 0.041 acres of estuarine intertidal wetlands due to the removal of existing Pier 2 and its replacement by a smaller structure, as well as loss of 0.219 acres of upland vegetation. At the conclusion of the project, the wetlands located within the existing Pier 2 footprint and the wetlands located within the 100-foot buffer of the new Pier 2 footprint would be restored to appropriate native habitat with weed control as needed. Therefore, impacts to terrestrial and wetland vegetation would be minor with the implementation of Alternative 1.

4.5.2.3 Fauna

Invertebrates

Under Alternative 1, benthic invertebrates would experience localized mortality and displacement due to demolition, construction, and repair activities. Any impacts to benthic invertebrates would be discountable due to the small area of disturbance and the fact that the free-living larval stages of benthic invertebrates are a very minor constituent of the zooplankton the fish use as food. It is anticipated the affected areas would be recolonized within a short time, on the order of one to two years, following work completion. In addition, the net decrease in pier coverage of the Bay under Alternative 1 would incrementally increase circulation and sunlight penetration while reducing the amount of hard substrate that invertebrates could attach to. Therefore, implementation of Alternative 1 would have a minor adverse impact on invertebrates.

Fish and Essential Fish Habitat

Fish

Alternative 1 involves dredging approximately 750 CY of shoal material adjacent to Pier 2 using a bed-leveler device. Bed-leveler devices consist of a large customized plow or a box beam suspended from a work barge. Maintenance dredging would be achieved by towing a heavy steel blade or bar over the bottom in order to redistribute the sediment to deeper portions of Suisun Bay near Pier 2; bed-leveler devices do not use suction. The dredge depth would be to -32 feet MLLW with a 2 foot allowable overdredge. Impacts from dredging would result in increases in turbidity and a greater potential of prey removal. Because of the constant flushing that occurs within the area and the small area of prey removal in comparison to prey availability within Suisan Bay in general, no significant impacts to fish species would result from dredging under Alternative 1.

The pile driving that would occur with the modernization of Pier 2 under Alternative 1 (which includes 876 concrete piles and up to 125 reused 16-inch square concrete fender piles) would result in water column disturbance by way of re-suspension of bottom sediments and cause underwater noise disturbance to fish from elevated sound generated in the water column. The degree to which an individual fish exposed to underwater sound will be affected depends on a number of variables, including: 1) species of fish, 2) size of fish, 3) presence of a swim bladder, 4) physical condition of the fish, 5) maximum sustained sound pressure and frequency, 6) shape of the sound wave (rise time), 7) depth of the water, 8) depth of the fish in the water column, 9) amount of air in the water, 10) size and number of waves on the water surface, 11) bottom substrate composition and texture, 12) effectiveness of bubble curtain sound/pressure attenuation technology, 13) tidal currents, and 14) presence of predators. Depending on these factors, effects on fish can range from changes in behavior to immediate mortality. There has been no documented injury or mortality resulting from the use of vibratory pile drivers; however, fish injury from impact hammers has been documented. Therefore, an analysis of underwater noise from impact hammers was completed.

The Fisheries Hydroacoustic Working Group (FHWG) is a multi-agency group that includes members from Caltrans, Oregon Department of Transportation, the Washington State Department of Transportation (WSDOT), FHWA, NMFS, USFWS, CDFW, and USACE. This technical working group is responsible for generating underwater noise effects criteria for fish exposed to pile driving activities. The FHWG developed the Agreement in Principal for *Interim Criteria for Injury to Fish from Pile Driving Activities* that establishes a 206 dB_{peak} and 187 dB cumulative SEL for all fish except those that are less than 0.07 ounces (2 grams) in weight. In that case, the criterion for the cumulative SEL is 183 dB (FHWG 2008). (See Sections 3.10.1.1 and 3.10.1.2 for definitions of noise metrics.)

Based on available information from various other pile driving studies, a conservative approach was used to select source levels for analyzing impacts to fish. Given that the largest pile that will

be installed is a 24-inch concrete pile, acoustic measurements collected for a project at Berth 32 in Oakland, CA under similar conditions and water depths, using the same pile size and type (octagonal concrete), as well as the same type of pile driver (Delmag Pile Hammer D62-22 or equivalent) that would be used, were used to calculate distances to fish exposure thresholds described above (Caltrans 2012). The source levels used had the following unattenuated acoustic metrics: 185 dB Peak, 162 dB SEL, and 173 dB RMS (all referenced to 1 µPa), measured a distance of 32.8 feet (10 meters) from the pile.

A vibratory pile driver/extractor would also be used to install and/or extract piles. There is limited information on the underwater sound generated by the use of a vibratory pile driver/extractor on non-steel piles (NMFS 2010; Caltrans 2012), but a reduction of 10–20 dB from that produced by impact pile driving can reasonably be assumed (Caltrans 2009). The only data available on underwater sound from vibratory extraction are for 24- and 48-inch steel pipes from the Columbia River Test Pile Project in Washington State. That project measured a range of 167–176 dB_{RMS} re 1µPa, averaging 172 dB re 1µPa at 32.8 feet (10 meters) from the source (WSDOT 2011). When used on timber piles or concrete, a reduction of 10–20 dB can be anticipated (Caltrans 2009). Accordingly, a sound pressure level of 160 dB re 1µPa at 32.8 feet (10 meters) is assumed for vibratory pile driving or extraction.

A cushion block of wood or composite (Micarta) material would be used to reduce the noise generated by impact pile driving (BOEM 2013). The following ranges to fish sound criteria thresholds were calculated for the unattenuated condition and with the assumption of a 7 dB sound attenuation from the cushion block (Table 4.5-2). Vibratory pile driving/extraction have a low likelihood of causing injury and thus there are no established injury thresholds for this activity. However, the 150 dB_{RMS} behavioral effects threshold does apply to vibratory driving/extraction (Table 4.5-2).

Figure 4-3 shows the zones of potential impact from pile driving, based on Table 4.5-2. The injury criteria include a single strike injury threshold of 206 dB (peak SPL), which would not be reached and hence does not apply, and size-specific injury thresholds based on SELs accumulated by exposure to multiple strikes within a single day. These injury thresholds are 187 dB re- 1 μPa^2*sec for a fish greater than or equal to 0.07 ounces (2 grams) in weight and 183 dB cumulative SEL re 1 μPa^2*sec for a fish less than 0.07 ounces (2 grams) in weight. The threshold for the smaller fish would apply only to larval stages of the species of interest, which tend to remain in freshwater and are unlikely to occur in the action area. The threshold distances within which these SELs would be exceeded are conservatively based on a fish receiving underwater sound from 1,000 pile strikes within a single day. The 150 dB_{RMS} behavioral threshold assumes that any exposure to an SPL of 150 dB_{RMS} or greater would elicit a behavioral response that is conservatively considered to be an adverse effect (“take”) under the ESA.

Table 4.5-2. Maximum Range to Fish Sound Criteria Thresholds from Pile Driving and Extraction under Alternative 1

Type of Pile Driving	Criteria Threshold (distance given in feet [m])			
	206 dB_{peak} (injury)	187 dB Cumulative SEL for a fish≥2g (injury)	183 dB Cumulative SEL for fish <2g (injury)	150 dB_{RMS} (behavioral)
Pier 2 Installation of 24-inch Octagonal Concrete Piles				
Impact - unattenuated	0 ft (0 m)	72 ft (22 m)	131 ft (40 m)	1,119 ft (341 m)
Impact - attenuated 7 dB w/ cushion block	0 ft (0 m)	23 ft (7 m)	46 ft (14 m)	384 ft (117 m)
Vibratory driving or extraction	N/A	N/A	N/A	151 ft (46 m)

ft = feet; m = meters

Notes:

1. All sound pressure levels expressed in dB re 1 µPa; SEL are expressed in dB re 1 μPa^2*sec.
2. Practical spreading loss model (15 log R, or 4.5 dB per doubling of distance) used for calculations.
3. Cumulative SEL calculated as Single Strike SEL + 10 * log (# of pile strikes).
4. Assumes 1,000 pile strikes/day and installation of 4 piles per day.

The behavioral effect threshold is independent of fish size or the number of times a fish is exposed within a single day. Since the effectiveness of the pile cushion block may vary, Table 4.5-2 and Figure 4-3 show the distances at which these threshold values would be reached for both the unattenuated and 7 dB-attenuated conditions, and effects are considered likely to occur within the range between the attenuated and unattenuated condition. With the use of a vibratory driver/extractor, the behavioral effects threshold would be reached within a much smaller distance than for the attenuated or unattenuated impact pile driver (Table 4.5-2).

Based on the analysis, a fish in the larger size category would be injured if present for 1,000 pile strikes within a distance of 23–72 feet (7–22 meters), the range depending on the effectiveness of the pile cushion block. The corresponding injury threshold distance for the smaller stages (considered unlikely to occur) would be 46–131 feet (14–40 meters). The behavioral effects threshold distances are much larger, 384–1,119 feet (117–341 meters). It should be noted that a fish that moved out of or farther away from the area in response to pile driving would experience a smaller SEL and be less likely to be injured. For example, for a fish exposed to 100 pile strikes, which is more realistic than assuming it remains for 1,000 strikes, the injury threshold distances would be only 6–16 feet (2–5 meters) for adults, and 10–30 feet (3–9 meters) for larval fish. As such, the likelihood of injurious effects is low. Considering the potential for both behavioral and injurious effects, the most likely scenario is that fish would react behaviorally to pile driving noise by avoiding or swimming away from the area, and that such reactions would prevent the accumulated SEL from reaching the injury threshold.

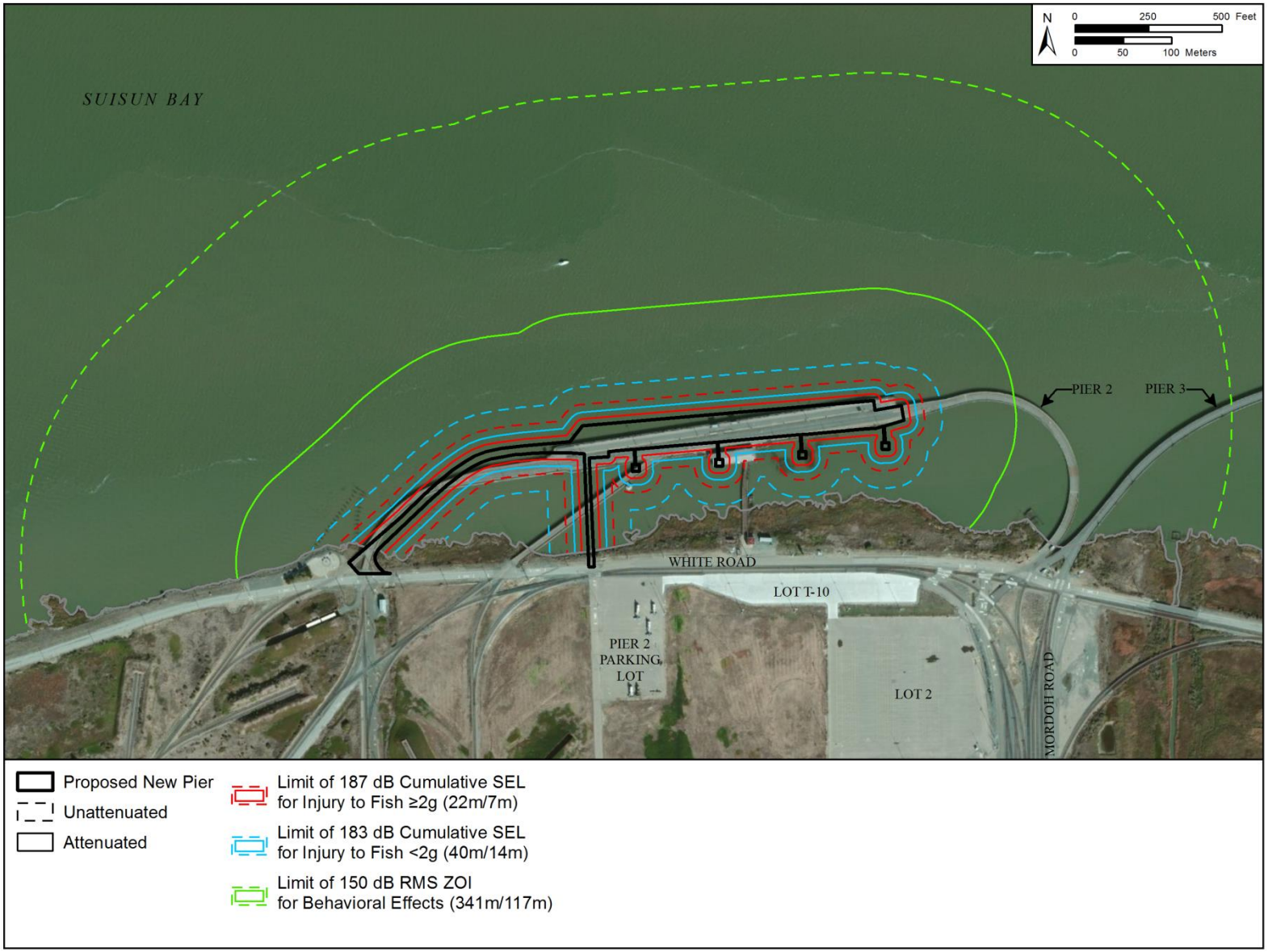


Figure 4-3. Maximum Range to Fish Sound Criteria Thresholds from Pile Driving Under Alternative 1

Such behavioral responses would still be considered adverse effects insofar as individuals may as a result expend additional energy in swimming, have reduced success in feeding, or experience increased predation risk.

In summary, the project would include an estimated 69 weeks (26 weeks for deck and pile removal and 43 weeks for pile driving) of impacts to water quality and benthic prey availability. However, these impacts would be temporary and localized to the area directly around each pile installed or removed. Pile driving activities would temporarily increase underwater noise above established thresholds for fish. Should individuals be present during pile driving, it is unlikely that they would be in close enough proximity to the construction activities for long enough periods of time to result in harmful sound pressure levels. Underwater noise would exceed established thresholds for fish behavioral disturbance, daily during the 43 weeks of pile driving and would adversely affect listed species only to the extent that the activity would extend outside of the in-water work window. However, the increase in underwater noise above thresholds for fish would be temporary. Should individuals be present during pile driving, it is unlikely that they would be in close enough proximity to the construction activities for long enough periods of time to result in harmful sound pressure levels. Impacts from vibratory extraction of timber piles would be negligible. Therefore, no significant impacts to fish would result with implementation of Alternative 1.

Essential Fish Habitat

Implementation of Alternative 1 would result in a long-term beneficial impact in improved quality and quantity of EFH and HAPC as a result of the removal of approximately 4,500 creosote-treated timber piles ranging from 55–75 feet long at Pier 2 and installing HDPE jackets on up to 4,066 creosote-treated timber piles at Pier 3. Creosote is obtained from high temperature distillation of coal tar, and hundreds of chemical components in creosote have been identified, including PAHs, phenol, and arsenic (ATSDR 2002; USEPA 2008). Although creosote is generally not water-soluble, PAH is known to leach from treated wood and migrate to sediments and/or accumulate in marine organisms. The release of PAH into the environment would result in long-term adverse impacts. The removal of timber piles at Pier 2 and the HPDE wrapping of piles at Pier 3 would eliminate a long-term source of PAHs. However, these activities would disturb the sediments around the piles or the piles themselves by cutting or abrasion, and are thereby likely to release PAHs into the water column. Because PAHs have low solubility and are denser than water, they would tend to settle out of suspension in the vicinity, and their bioavailability and potential to negatively affect fish would be correspondingly limited. Other contaminants such as metals may also be present in the sediments and be could be re-suspended, but would also be localized to the pile location and tend to settle out of suspension within a short time and distance.

Possible effects associated with implementation of the proposed action also include the removal of prey species and temporary increases in turbidity. These effects would be slight, localized, and temporary, and impacts to prey availability within Suisun Bay in general would be insignificant. In addition, natural turbidity levels near Piers 2 and 3 are high; therefore, the slight, localized, and temporary increase in turbidity as a result of the proposed action would result in only a minor adverse impact. No effects on circulation patterns or the distribution of SAV and shoreline habitats are anticipated.

In addition, the proposed configuration of Pier 2 would result in a net reduction in bay coverage by the overwater structure of the pier (as indicated in Table 4.5-1, implementation of Alternative 1 would reduce shading by 0.781 acres), and this is generally considered a beneficial effect to fish and other elements of the aquatic ecosystem, including SAV. The piles themselves do not appear to provide important food of cover resources for fish as they support only a sparse growth of green algae and invertebrates.

In conclusion, implementation of Alternative 1 would result in relatively minor, temporary adverse effects on EFH for federally managed fish species within the West Coast Salmon, Coastal Pelagic Species, and Pacific Coast Groundfish FMPs, and on estuarine HAPC for various federally managed fish species within the Pacific Coast Groundfish FMP. The use of BMPs and the high current velocities in the area would result in adequate flushing and minimal mobilization of sediments and any associated contaminants.

Reptiles and Amphibians

No impacts to reptiles and amphibians are associated with Alternative 1 due to the general absence of these species and habitats that could support them.

Birds

Demolition, construction, and repair activities would create localized disturbances due to noise, human presence, and turbidity, and these disturbances may disrupt individuals' foraging, resting, nesting, or movement between habitats. All native bird species that occur at MOTCO are protected under the MBTA. Modernization and repair of Piers 2 and 3 during the breeding season (1 February–31 August, for most species) could result in the incidental loss of eggs or nestlings, either directly through the destruction or disturbance of active nests or indirectly by causing the abandonment of nests. Many common bird species including marsh wrens (*Cistothorus palustris*), western meadowlarks (*Sturnella neglecta*), bushtits (*Psaltriparus minimus*), and northern mockingbirds (*Mimus polyglottos*) have been observed and may nest in vegetated areas the vicinity of Piers 2 and 3. Killdeer (*Charadrius vociferus*) have also been observed near Piers 2 and 3 and may nest on the ground, particularly in graveled areas. In addition to common bird species, Suisun song sparrows (*Melospiza melodia maxillaris*) and San Francisco common yellowthroats (*Geothlypis trichas sinuosa*), both of which are listed as California species of special concern, nest in varying densities in the Tidal Area, including the

outboard marshes of Piers 2 and 3 and Pier Marsh to the south of Pier 3 (HT Harvey and Associates 2011). Northern harriers (*Circus cyaneus*), also a California species of special concern, have been observed nesting in Middle Point Marsh in 2010 (HT Harvey and Associates 2011) and a pair likely nested in Pier Marsh in 2013. Cliff swallows (*Petrochelidon pyrrhonota*), barn swallows (*Hirundo rustica*), and black phoebes (*Sayornis nigricans*) will attach nests to artificial structures and have been observed nesting on Piers 2 and 3 during surveys for other species. House finches (*Haemorhous mexicanus*) may also nest on the horizontal areas or crevices on artificial structures and may nest on the piers.

Standard avoidance and minimization measures would be incorporated into the project to protect migratory birds, consistent with the INRMP's Migratory Bird Management Plan for MOTCO. Implementation of the proposed modernization and repair of Piers 2 and 3 would not adversely affect migratory bird populations with implementation of the following measures:

1. **Avoidance.** To the extent feasible, construction activities within or adjacent to (within 100 feet) vegetated marsh and upland habitats where migratory birds are likely to nest and within 300 feet of any known raptor nest should be scheduled to avoid the nesting season. If construction activities are scheduled to take place outside the nesting season, all impacts on nesting birds protected under the MBTA and California Fish and Game Code will be avoided. The nesting season for most birds in the vicinity of MOTCO extends from 1 February through 31 August.
2. **Pre-construction/Pre-disturbance Surveys.** Since the proposed Pier 3 repairs and Pier 2 demolition and construction are anticipated to occur year-round, pre-construction surveys for nesting birds would be conducted by a qualified ornithologist to ensure no nests will be disturbed. These surveys should be conducted no more than seven days prior to the initiation of construction activities. During this survey, the ornithologist will inspect all potential nesting habitats (e.g., trees, shrubs, ruderal grasslands, buildings) in and immediately adjacent to the impact areas for nests. If an active nest is found sufficiently close to work areas to be disturbed by these activities, the ornithologist will determine the extent of a construction-free buffer zone to be established around the nest (typically 300 feet for raptors and 100 feet for other species), to ensure that no nests of species protected by the MBTA and California Fish and Game Code will be disturbed during project implementation.
3. **Inhibition of Nesting.** If construction activities will not begin until after the start of the nesting season, all potential nesting substrates (e.g., bushes, trees, grasses, and other vegetation) that are scheduled to be removed by the project, would be removed prior to the start of the nesting season (i.e., prior to 1 February). This will preclude the initiation of nests in vegetated areas to be removed and prevent the potential project delays due to the presence of active nests in these substrates. Additionally, native birds, including cliff swallows, barn swallows, black phoebes, and house finches nest on the Pier 2 and 3

structures themselves. If avoidance of the breeding season is not feasible, nest deterrence (e.g., installation of netting, removal of nest starts) would be necessary to ensure that no nests of native birds will be impacted during construction.

Mammals

The impacts from implementation of Alternative 1 (apart from special status species discussed in the next section) are anticipated to be temporary and minor based on the limited use of the project area to mammals. Although demolition, construction, and repair activities would create localized disturbances due to noise, human presence, and turbidity, and these disturbances may disrupt individuals' foraging, resting, or movement between habitats, recolonization of the areas is anticipated following the repair and modernization efforts. No long-term adverse impacts are anticipated due to the net increase in acreage of more valuable habitats as discussed previously.

4.5.2.4 Special Status Species

As part of the analysis for special status species, two conclusions are included to reflect compliance with NEPA and ESA. The Army has initiated consultation with USFWS and NMFS regarding the Army's preliminary ESA determinations.

As part of the proposed action, the Army has submitted BAs to the USFWS and NMFS, respectively, in support of Section 7 of the ESA.

Federally-Listed Plant Species

Soft Bird's Beak

The project is not likely to adversely affect the soft bird's-beak. No work will occur within 0.5 miles of the nearest populations of this species, and establishment of a TEF between work areas and adjacent marsh habitat will reduce or eliminate the potential for direct loss of individuals or occupied habitat to occur. The project would result in a very small loss of salt marsh (i.e., 0.043 acres) that could be occupied by this species. However, the marsh to be impacted is of low quality for this species, and marsh restoration of the 0.084 acres gained by replacing the existing Pier 2 with a smaller structure would compensate for loss of unoccupied marsh habitat. Negligible impacts to soft bird's beak from implementation of Alternative 1 would occur. The Army has made a preliminary determination that implementation of Alternative 1 may affect, but is not likely to adversely affect soft bird's beak.

Other State Special Status or California Native Plant Society Plant Species

Delta Mudwort

Delta mudwort is not known to occur in the project area; therefore, no impacts to this species would occur from implementation of Alternative 1.

Mason's Lilaeopsis

The Piers 2 and 3 areas were re-assessed in May 2013 and it was determined habitat conditions had not changed significantly since the 2010 survey and thousands of Mason's lilaeopsis still occur along the shoreline of Piers 2 and 3 (Cardno TEC et al. 2013). Therefore, some areas occupied by Mason's lilaeopsis may be directly or incidentally (within the 100-foot buffer zone) impacted by the construction of shoreline components of Pier 2. However, the net increase of intertidal habitat associated with Alternative 1 would potentially offset these impacts, to the extent that the re-created intertidal habitat is suitable for this species. As part of the proposed action, existing locations of Mason's lilaeopsis would be protected, where possible, through the use of construction fencing; Mason's lilaeopsis plants and the substrate that supports them would be salvaged from areas that would otherwise be impacted; and habitat would be re-created using the salvaged plants and substrate where structures are removed from low-intertidal habitat. Successful reestablishment of Mason's lilaeopsis in an area equivalent to what is impacted would avoid a significant impact to this species.

Delta Tule Pea

The Piers 2 and 3 areas were re-assessed in May 2013. Although it was determined habitat conditions had not changed significantly since the 2010 survey, only one Delta tule pea was present by the eastern approach to Pier 3 (Cardno TEC et al. 2013). Based on the limited occurrence of Delta tule pea in the project area and the removal of the structure nearest to the only known occurrence at Pier 2, no impact to Delta tule pea is anticipated from Alternative 1. This one location of Delta tule pea near the eastern approach to Pier 3 would be flagged or fenced to avoid impacts by construction activities. Therefore, implementation of Alternative 1 would have no direct or indirect impacts to Delta tule pea.

Suisun Marsh Aster

The Piers 2 and 3 areas were re-assessed in May 2013. Although it was determined habitat conditions had not changed significantly since the 2010 survey, the 20–30 Suisun Marsh aster plants near the west approach to Pier 3 that were documented in 2010 were absent. However, the timing of the May 2013 survey may have been too early to detect this species (Cardno TEC et al. 2013). Any Suisun Marsh aster plants near the west approach to Pier 3 would be flagged or fenced to avoid impacts by construction activities. Therefore, implementation of Alternative 1 would have no direct or indirect impacts to Suisun Marsh aster.

<u>Federally Listed Fish Species</u>

Central California Coast Steelhead DPS, Central Valley Steelhead DPS, Central Valley Spring-run Chinook ESU, and Sacramento River Winter-run Chinook ESU

Dredging adjacent to Pier 2 would only occur within the approved work window, during which occurrences of steelhead and Chinook salmon are not anticipated.

Individuals of the Central Coast steelhead and Central Valley steelhead DPSs may experience localized, temporary, and relatively minor effects resulting from project-related noise and turbidity. Such effects would be manifested as individuals alter their movements and activities in response, with minor if any effect on energetics and survival. Injurious effects are not anticipated. Long-term effects on habitat would be beneficial, resulting from the removal of sources of contaminants and a net reduction in the area of overwater structures. Therefore, while potential adverse effects would be relatively minor, the Army has made a preliminary determination that implementation of Alternative 1 may affect, and is likely to adversely affect, the Central California Coast Steelhead DPS, Central Valley Steelhead DPS, Central Valley spring-run Chinook salmon ESU, and Sacramento River winter-run Chinook salmon ESU.

Critical habitat for the Sacramento River winter-run Chinook salmon ESU is designated in Suisun Bay (NMFS 1993). Based on the foregoing analysis, critical habitat would not be destroyed or adversely modified as a result of the action. All potential adverse effects would be temporary and localized to the immediate vicinity of the piers.

Green Sturgeon Southern DPS

Dredging adjacent to Pier 2 would be a temporary source of noise and increased turbidity, and would displace and remove benthic invertebrates that green sturgeon might feed on. Individual green sturgeon, if present, may as a result avoid or move away from the area, or they might opportunistically prey on invertebrates that are displaced by the dredge. These effects would be localized and temporary.

Individuals of the green sturgeon DPS may experience localized, temporary, and relatively minor effects resulting from project-related noise and turbidity and from prey removal and displacement. Such effects would be manifested by changes in behavior as individuals alter their movements and activities in response. Injurious effects are not anticipated. Long-term effects on habitat would be beneficial, resulting from the removal of sources of contaminants and a net reduction in the area of overwater structures. Impacts would be short-term and minor and would not result in significant impacts. Although potential adverse effects would be relatively minor, the Army has made a preliminary determination that implementation of Alternative 1 may affect, and is likely to adversely affect, individuals of the green sturgeon southern DPS.

Critical habitat for the green sturgeon DPS is designated in the waters adjacent to MOTCO (NMFS 2009). Based on the foregoing analysis, critical habitat would not be destroyed or adversely modified as a result of the action. All potential adverse effects would be temporary and localized to the immediate vicinity of the piers.

Delta Smelt

Individual delta smelt may experience localized, temporary, and relatively minor effects resulting from project-related noise and turbidity. Such effects would be manifested by changes in

behavior as individuals alter their movements and activities in response. Injurious effects are not anticipated. Long-term effects on habitat would be beneficial, resulting from the removal of sources of contaminants and a net reduction in the area of overwater structures. The project related effects would be short-term and minor and would not result in significant impacts. Although potential adverse effects would be relatively minor, the Army has made a preliminary determination that implementation of Alternative 1 may affect, and is likely to adversely affect, individuals of the delta smelt.

Other Special Status Fish Species

Central Valley Fall, Late-fall Chinook Salmon ESU

Impacts to the Central Valley fall, late-fall Chinook salmon ESU would be the same as those described for the federally listed Chinook species above. Temporary increases in turbidity and sound may result in avoidance of the area. However, these impacts would be short-term and minor and would not result in significant impacts to the Central Valley fall, late fall Chinook salmon ESU with implementation of Alternative 1.

Sacramento Splittail

Juvenile Sacramento splittail are likely to be present within Suisun Bay in late spring and early summer. Impacts to this species would be similar to those described above for federally listed species by way of turbidity and elevated noise within the project area. However, impacts would be temporary and minor. Therefore, no significant impacts to Sacramento splittail would result with implementation of Alternative 1.

Federally Listed Wildlife Species

California Clapper Rail

The project site is located within the range of the California clapper rail, near areas where the species has been recorded in the past, and thus it is concluded that the project may affect the California clapper rail. However, the species is not expected to occur in the Tidal Area of MOTCO due to an overall lack of tidal salt marsh or brackish marsh habitats. The Tidal Area lacks extensive salt marsh with Pacific cordgrass, marsh gumplant, and other salt marsh vegetation that clapper rails use for breeding. Therefore no loss of individuals or occupied habitat is expected. Nevertheless, because protocol-level surveys have not been conducted, the species cannot be determined absent from the vicinity of the project. Pre-construction surveys will be conducted as a precautionary measure and, if rails are found, avoidance of areas will be established within 700 feet of rail calling centers during the breeding season, in order to minimize any disturbance impacts to rails. Even with implementation of proposed avoidance and minimization measures for this species, the potential for disturbance of any rails present in the project area during the implementation of the proposed action cannot be discounted. Pending consultation with USFWS, Alternative 1 would have a negligible to minor adverse impact to the

California clapper rail. Therefore, the Army has made the preliminary determination that the proposed action may affect, and is likely to adversely affect, the California clapper rail.

California Least Tern

Although the species may occasionally disperse past MOTCO, least terns do not nest on or very near the MOTCO site. Moreover, disturbance to individuals is not expected because this species is not known to forage in the immediate vicinity of the MOTCO. No individuals are expected to experience loss of foraging opportunities as a result of the in-water work. Therefore, implementation of Alternative 1 would result in minor adverse impacts to the California least tern. The Army has made a preliminary determination that implementation of Alternative 1 may affect, but is not likely to adversely affect, the California least tern.

Salt Marsh Harvest Mouse

The project site is located within the range of the salt marsh harvest mouse, near areas where the species has been recorded in the past, and thus it is concluded that the project may affect the salt marsh harvest mouse. Salt marsh harvest mice are unlikely to occur in or adjacent to the mainly freshwater marsh habitats near Piers 2 and 3 due to a lack of salt marsh habitat. However, this species cannot be determined to be absent without conducting an extensive trapping study and thus it is determined that the project may result in minor to moderate adverse impacts with the implementation of Alternative 1. To avoid injury or mortality of harvest mice, marsh vegetation that would be permanently or temporarily impacted would be removed by hand under supervision of a biological monitor. Disturbance to individuals that are adjacent to work areas is unlikely given the low probability of occurrence of the species in the vicinity. The Army has made a preliminary determination that implementation of Alternative 1 may affect, and is likely to adversely affect, the salt marsh harvest mouse.

<u>State-Listed Threatened and Endangered Species</u>

California Black Rail

The occurrence of California black rails is limited to the inboard Pier 3 marsh area. Given no direct disturbance and limited activity on the shoreline of this area, negligible impacts to California black rails would occur from the implementation of Alternative 1.

<u>Other State Special Status Wildlife Species</u>

Northwestern Pond Turtle

Since Alternative 1 would have no direct or indirect impact on tidal creeks that could be inhabited by this species, no impacts are anticipated to the northwestern pond turtle.

Bird Species of Concern

Several bird species of concern may occur in the marshes inshore of Piers 2 and 3. With the implementation of measures described above for migratory birds, the disturbance of these

species would be largely avoided. No long-term adverse effects to habitat are anticipated. As a result, minor adverse impacts would occur to bird species of concern from the implementation of Alternative 1.

Marine Mammals

Marine mammals are considered very unlikely to occur within potential zones of influence for acoustic harassment. In particular, for impact pile driving, NMFS uses a threshold of 160 dB re 1 µPa for behavioral disturbance, and this distance would only be exceeded within a distance of 242.8 feet. Given the operation of equipment and human activity, it is very unlikely sea lions or harbor seals would approach the construction area this closely. Therefore, negligible to minor adverse impacts to marine mammals would occur from the implementation of Alternative 1.

4.5.3 Alternative 2

4.5.3.1 Habitats

Impacts of Alternative 2 would be very similar to those of Alternative 1 (Table 4.5-1, Figures 4-1 and 4-2) and potential impacts to habitats are anticipated to be minor, contingent on the successful restoration of tidal marsh in areas where structures would be removed.

4.5.3.2 Flora

Impacts of Alternative 2 would be similar to those discussed previously for Alternative 1.

4.5.3.3 Fauna

Invertebrates

Impacts of Alternative 2 would be similar to those discussed previously for Alternative 1.

Fish and Essential Fish Habitat

Fish

Under Alternative 2, impacts to fish would be similar to those described under Alternative 1. However, under Alternative 2, approximately 3,800 CY of dredged material would be removed by mechanical dredge (clamshell bucket) and placed in a barge for disposal at a suitable disposal site versus redistributed by a bed-leveler device. Similar to Alternative 1, no significant impacts to fish species would result from dredging under Alternative 2.

Acoustic impacts from pile driving are illustrated in Figure 4-4, and quantified in Table 4.5-3.

Table 4.5-3. Maximum Range to Fish Sound Criteria Thresholds from Pile Driving and Extraction under Alternative 2

Type of Pile Driving	Criteria Threshold (distance given in feet [m])			
	206 dB_{peak} (injury)	187 dB Cumulative SEL for a fish≥2g (injury)	183 dB Cumulative SEL for fish <2g (injury)	150 dB_{RMS} (behavioral)
Pier 2 Installation of 24-inch Octagonal Concrete Piles				
Impact - unattenuated	0 ft (0 m)	72 ft (22 m)	131 ft (40 m)	1,119 ft (341 m)
Impact - attenuated 7 dB w/ cushion block	0 ft (0 m)	23 ft (7 m)	46 ft (14 m)	384 ft (117 m)
Vibratory driving or extraction	N/A	N/A	N/A	151 ft (46 m)

ft = feet; m = meters

Notes:

1. All sound pressure levels expressed in dB re 1 µPa; SEL are expressed in dB re 1 μPa^2*sec.
2. Practical spreading loss model (15 log R, or 4.5 dB per doubling of distance) used for calculations.
3. Cumulative SEL calculated as Single Strike SEL + 10 * log (# of pile strikes).
4. Assumes 1,000 pile strikes/day and installation of 4 piles per day.

EFH

Under Alternative 2, impacts to groundfish EFH, coastal pelagic species EFH, and Pacific Coast salmon EFH would be similar to those described under Alternative 1 with the exception of impacts from dredging that would remove groundfish EFH within the affected area at the western end of the pier. The area removed is small in comparison to groundfish EFH availability within Suisun Bay in general. This would be considered a minor impact to the local groundfish population using that area for EFH as the area would be repopulated and utilized as EFH by groundfish species with no long-term impacts to groundfish EFH anticipated. The increase in turbidity within the dredge footprint would also impact coastal pelagic and Pacific coast salmon EFH. However, impacts would be short-term and temporary. Therefore, impacts to groundfish EFH would be minor and considered moderately adverse for coastal pelagic species and Pacific coast salmon EFH with implementation of Alternative 2.

Mammals

Impacts of Alternative 2 would be similar to those discussed previously for Alternative 1.

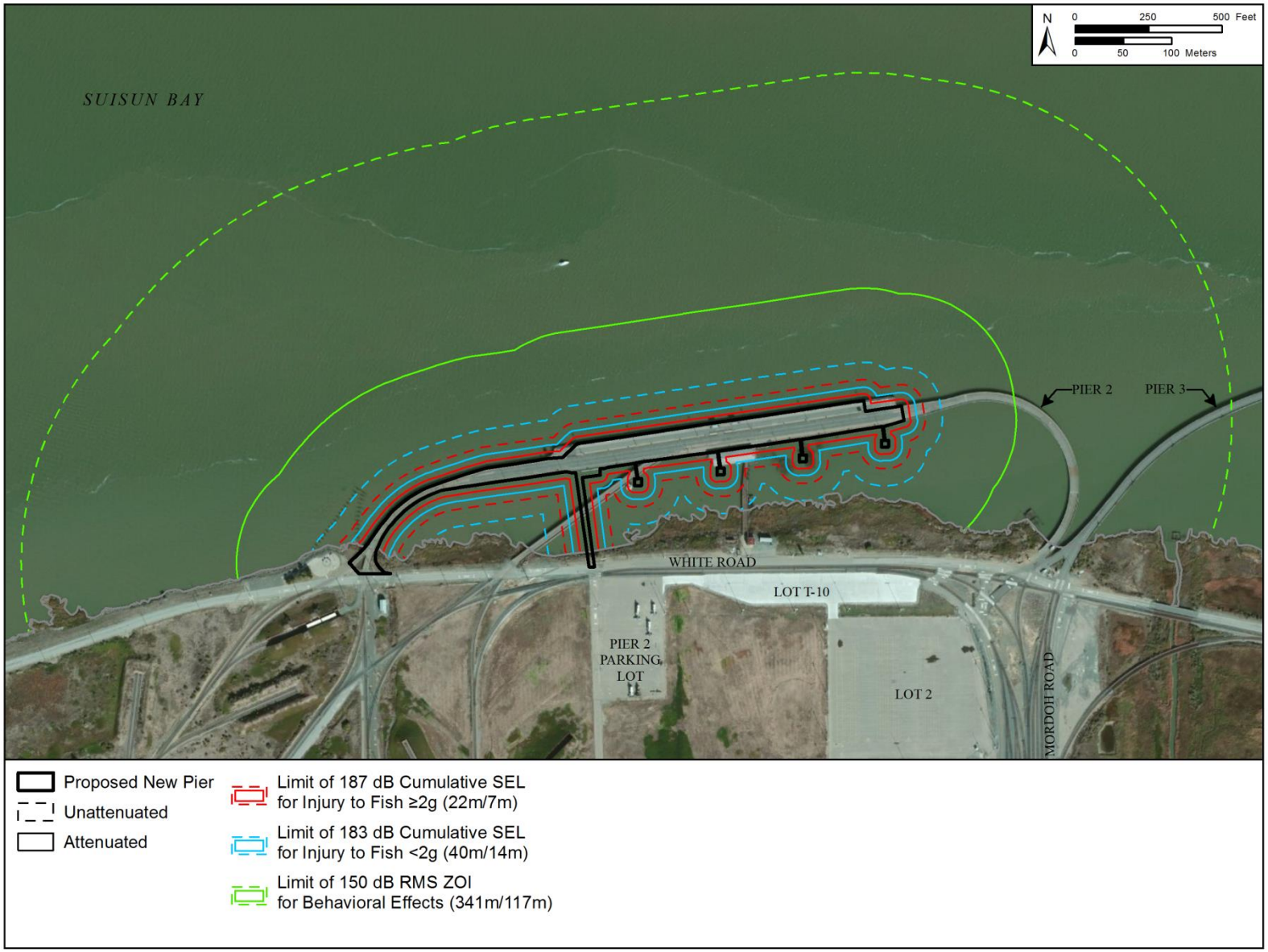


Figure 4-4. Maximum Range to Fish Sound Criteria Thresholds from Pile Driving Under Alternative 2

4.5.3.4 Special Status Species

Federally-Listed Plant Species

Impacts to federally-listed plant species under Alternative 2 would be similar to those described under Alternative 1. The Army has made a preliminary determination that implementation of Alternative 2 may affect, but is not likely to adversely affect, soft bird's beak.

Other State Special Status or California Native Plant Society Plant Species

Impacts to other state special status or CNPS plant species under Alternative 2 would be similar to those described under Alternative 1.

Federally-Listed Fish Species

Central California Coast Steelhead DPS, Central Valley Steelhead DPS, Central Valley Spring-run Chinook ESU, Sacramento River Winter-run Chinook ESU, Green Sturgeon Southern DPS, and Delta Smelt

Impacts to federally-listed threatened and endangered fish species would be similar to those described under Alternative 1. Dredging would be required under Alternative 2 and therefore increased turbidity within the dredging footprint and removal of benthic prey species would result at the western end of the main deck. However, these impacts would be localized and would not impact prey availability within Suisun Bay in general. Therefore, no significant impacts to federally listed threatened and endangered species would result with implementation of Alternative 2. The Army has made a preliminary determination that implementation of Alternative 2 may affect, and is likely to adversely affect, the Central California Coast Steelhead DPS, Central Valley Steelhead DPS, Central Valley spring-run Chinook salmon ESU, and Sacramento River winter-run Chinook salmon ESU, the green sturgeon southern DPS, and delta smelt.

Other Federal Special Status Fish Species

Central Valley Fall, Late-fall Chinook Salmon ESU, and Sacramento Splittail

Impacts to Central Valley Fall, late-fall Chinook salmon and Sacramento splittail would be similar to those described above for federally listed threatened and endangered fish species. Therefore, no significant impacts to these fish species would result with implementation of Alternative 2.

Federally Listed Wildlife Species

California Clapper Rail, California Least Tern, and Salt Marsh Harvest Mouse

Impacts to federally-listed threatened and endangered wildlife species would be similar to those described under Alternative 1. Implementation of Alternative 2 would not result in significant adverse impacts to the California clapper rail, California least tern, or salt marsh harvest mouse.

The Army has made a preliminary determination that implementation of Alternative 2 may affect, but is not likely to adversely affect the California least tern. Further, the Army made a preliminary determination that implementation of Alternative 2 may affect, and is likely to adversely affect, the California clapper rail and salt marsh harvest mouse.

State-Listed Threatened and Endangered Species

Impacts to the California black rail would be similar to those described under Alternative 1.

Other State Special Status Wildlife Species

Northwestern Pond Turtle and Bird Species of Concern

Impacts to the northwestern pond turtle and bird species of concern would be similar to those described under Alternative 1.

Marine Mammals

As stated for Alternative 1, it is very unlikely sea lions or harbor seals would approach the construction area closely. Therefore, negligible to minor adverse impacts to marine mammals would occur from the implementation of Alternative 2.

4.5.4 Alternative 3

4.5.4.1 Habitats

Impacts of Alternative 3 would be similar to those of Alternative 1 (Table 4.5-1, Figures 4-1 and 4-2). However, implementation of Alternative 3 would result in a net increase (1.113 acres) of covered bay surface, which would be coupled with a loss of bulrush and SAV in the shallow inshore areas. This impact on aquatic habitat would be considered significant and mitigation measures would need to be implemented to minimize adverse impacts. Proposed mitigation (subject to review by the Army and discussion with the regulatory agencies) could involve the removal of abandoned structures elsewhere along the MOTCO shoreline.

Similar to Alternative 1, implementation of Alternative 3 would result in a net benefit to tidal marsh habitat contingent on the successful restoration of tidal marsh in areas where structures would be removed.

4.5.4.2 Flora

Aquatic Vegetation

Alternative 3 would adversely impact Aquatic Vegetation by removing localized areas of SAV and bulrushes and by increasing the overall amount of shaded habitat which is unlikely to support SAV or bulrush. Recommended mitigation, subject to review by the Army in consultation with the regulatory agencies, could include removal of abandoned structures along the MOTCO shoreline to offset this impact.

Terrestrial and Wetland Vegetation

Alternative 3 would have the same impacts on Terrestrial and Wetland Vegetation as Alternatives 1 or 2.

4.5.4.3 Fauna

The impacts of Alternative 3 on fauna, with the exception of fish and EFH, would be similar to those of Alternative 1 or 2, except for the increased size of Pier 2. The larger Pier 2 would have a greater area that could be used for perching or resting by migratory birds, but the area of open-water foraging habitat would be incrementally reduced. These changes would be relatively small in relation to existing conditions along the MOTCO shoreline and are not considered significant.

Impacts to fish and EFH would be similar to those described under Alternative 1 with the exception of more piles driven (an increase of approximately 200 over approximately 50 days) and correspondingly larger areas of acoustic impact (Figure 4-5 and Table 4.5-4) and turbidity impacts. As described in Table 4.5-1, there would be a net increase in the area of bay surface covered by the pier under Alternative 3. However, impacts would be relatively minor and not likely to significantly impact fish and EFH with implementation of Alternative 3.

Table 4.5-4. Maximum Range to Fish Sound Criteria Thresholds from Pile Driving under Alternative 3

Type of Pile Driving	Criteria Threshold (distance given in feet [m])			
	206 dB_{peak} (injury)	187 dB Cumulative SEL for a fish≥2g (injury)	183 dB Cumulative SEL for fish <2g (injury)	150 dB_{RMS} (behavioral)
Pier 2 Installation of 24-inch Octagonal Concrete Piles				
Impact - unattenuated	0 ft (0 m)	72 ft (22 m)	131 ft (40 m)	1,119 ft (341 m)
Impact - attenuated 7 dB w/ cushion block	0 ft (0 m)	23 ft (7 m)	46 ft (14 m)	384 ft (117 m)
Vibratory driving or extraction	N/A	N/A	N/A	151 ft (46 m)

ft = feet; m = meters

Notes:

1. All sound pressure levels expressed in dB re 1 µPa; SEL are expressed in dB re 1 μPa^2*sec.
2. Practical spreading loss model (15 log R, or 4.5 dB per doubling of distance) used for calculations.
3. Cumulative SEL calculated as Single Strike SEL + 10 * log (# of pile strikes).
4. Assumes 1,000 pile strikes/day and installation of 4 piles per day.

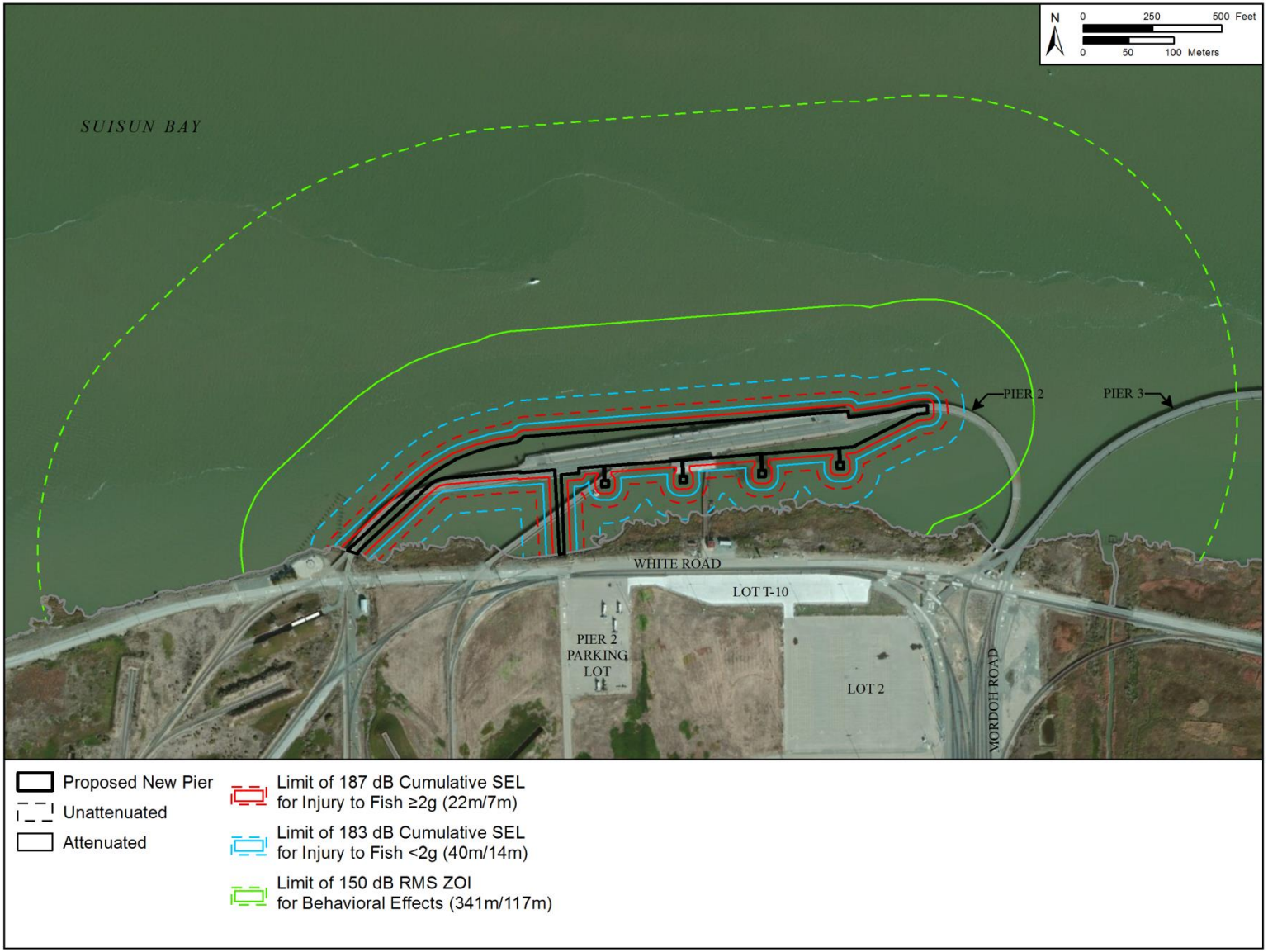


Figure 4-5. Maximum Range to Fish Sound Criteria Thresholds from Pile Driving Under Alternative 3

4.5.4.4 Special Status Species

Federally-Listed Plant Species

Impacts to federally-listed plant species under Alternative 3 would be similar to those described under Alternative 1. The Army has made a preliminary determination that implementation of Alternative 3 may affect, but is not likely to adversely affect, the soft bird's beak.

Other State Special Status or California Native Plant Society Plant Species

Impacts to other state special status or CNPS plant species under Alternative 3 would be similar to those described under Alternative 1.

Federally-Listed Fish Species

Central California Coast Steelhead DPS, Central Valley Steelhead DPS, Central Valley Spring-run Chinook ESU, Sacramento River Winter-run Chinook ESU, Green Sturgeon Southern DPS, and Delta Smelt

Impacts to federally-listed threatened and endangered fish species would be similar to those described under Alternative 1 with the exception of installing up to 200 more piles. This would likely result in a slightly longer pile driving duration and resulting noise and turbidity impacts within the localized water column. However, these impacts would be negligible and not likely to result in significant impacts to federally listed threatened and endangered fish species with implementation of Alternative 3. In accordance with the ESA, the Army finds that the proposed action may affect, and is likely to adversely affect, the Central California Coast Steelhead DPS, Central Valley Steelhead DPS, Central Valley spring-run Chinook salmon ESU, and Sacramento River winter-run Chinook salmon ESU, the green sturgeon southern DPS, and delta smelt.

Other Special Status Species

Central Valley Fall, Late-fall Chinook Salmon ESU and Sacramento Splittail

Impacts to Central Valley Fall, late-fall Chinook Salmon ESU and Sacramento Splittail would be similar to those described under Alternative 1 with the exception of a slightly longer pile driving duration required from installing up to 200 more piles. This would result in noise and turbidity impacts within the localized water column but would be short-term and temporary. Therefore, no significant impacts to these special-status species would result with implementation of Alternative 3.

Federally Listed Wildlife Species

California Clapper Rail, California Least Tern, and Salt Marsh Harvest Mouse

Impacts to federally-listed threatened and endangered wildlife species would be similar to those described under Alternative 1. Implementation of Alternative 3 would have a moderate adverse

impact to the California clapper rail, a minor adverse impact to the California least tern, and minor to moderate adverse impacts to the salt marsh harvest mouse. The Army has made a preliminary determination that implementation of Alternative 3 may affect, but is not likely to adversely affect, the California least tern. Further, the Army made a preliminary determination that implementation of Alternative 3 may affect, and is likely to adversely affect, the California clapper rail and salt marsh harvest mouse.

State-Listed Threatened and Endangered Species

Impacts to the California black rail would be similar to those described under Alternative 1.

Other State Special Status Wildlife Species

Northwestern Pond Turtle and Bird Species of Concern

Impacts to the northwestern pond turtle and bird species of concern would be similar to those described under Alternative 1.

Marine Mammals

As stated for Alternative 1, it is very unlikely sea lions or harbor seals would approach the construction area closely. Therefore, negligible to minor adverse impacts to marine mammals would occur from the implementation of Alternative 3.

4.6 LAND USE AND COASTAL ZONE MANAGEMENT

Impacts on land use would be considered significant if one or more of the following occurs within the proposed action area for any of the action alternatives.

- The action is substantially incompatible with surrounding land uses.
- The action changes land use in such a way that mission-essential operations are degraded.
- The action is substantially inconsistent or in conflict with the environmental goals, objectives, or guidelines of a community or county comprehensive plan for the affected area.

Impacts to the coastal zone would be significant if the implementation of one of the alternatives would not be consistent to the maximum extent practicable with the federally enforceable policies of the Coastal Management Program for San Francisco Bay.

4.6.1 No Action Alternative

4.6.1.1 Land Use

Under the No Action Alternative, the modernization and repair of Pier 2 and the repair of Pier 3 would not occur and no adverse impacts to land use are anticipated. Operations would continue with growing restrictions at Pier 3 for as long as it is structurally viable. The current land use

pattern in the Tidal Area would not change from existing conditions; however, onsite activities relating to missions would likely lessen in frequency and duration as Pier 3 operations are increasingly restricted as the condition of the pier continues to degrade.

4.6.1.2 Coastal Zone Management

Under the No Action Alternative, the modernization and repair of Pier 2 and the repair of Pier 3 would not occur. The Army would not need to make a consistency determination nor obtain BCDC concurrence with any consistency determination since the Army's pier facilities at MOTCO would not be altered.

4.6.2 Alternative 1

4.6.2.1 Land Use

Implementation of Alternative 1 would not result in any changes to land use as the proposed action would occur in areas consistent with their purpose. In addition, the proposed action is not expected to introduce incompatibilities with adjacent land use areas. Therefore, all elements related to the demolition and construction of Pier 2 and the repairs to Pier 3 would be consistent with existing land uses, management, and ownership and conform to plans and regulations. No reasonably foreseeable impacts to land use would occur from implementation of the proposed action under Alternative 1.

4.6.2.2 Coastal Zone Management

As detailed in Appendix D, the implementation of the proposed action would be consistent to the maximum extent practicable with the BCDC coastal management program for the San Francisco Bay segment of the California coastal zone.

In addition, the project would be routed through the BCDC's Engineering Criteria Review Board to ensure compliance with the seismic engineering criteria. The Army would complete this process once the design of Pier 2 has been funded. (Due to the nature of the Pier 3 maintenance repairs and its anticipated future usage, Pier 3 repairs would not involve seismic retrofitting.)

4.6.3 Alternative 2

4.6.3.1 Land Use

As discussed for Alternative 1, all elements related to the demolition and construction of Pier 2 and the repairs to Pier 3 would be consistent with existing land uses, management, and ownership and conform to plans and regulations. No reasonably foreseeable impacts to land use would occur from implementation of the proposed action under Alternative 2.

4.6.3.2 Coastal Zone Management

For the reasons described in Appendix D, implementation of the proposed action would be consistent to the maximum extent practicable with the BCDC coastal management program for the San Francisco Bay segment of the California coastal zone.

4.6.4 Alternative 3

4.6.4.1 Land Use

As discussed for Alternative 1, all elements related to the demolition and construction of Pier 2 and the repairs to Pier 3 would be consistent with existing land uses, management, and ownership and conform to plans and regulations. Negligible impacts to land use would occur from implementation of the proposed action under Alternative 3.

4.6.4.2 Coastal Zone Management

For the reasons described in Appendix D, implementation of the proposed action would be consistent to the maximum extent practicable with the BCDC coastal management program for the San Francisco Bay segment of the California coastal zone.

4.7 TRANSPORTATION AND UTILITIES INFRASTRUCTURE

The following criteria have been developed to assess road transportation impacts for each of the alternatives:

- No impact – no alterations of traffic patterns and trends would result from implementation of the proposed action.
- No significant impact – short- or long-term changes to the traffic patterns and LOS would not cause an intersection to fail, as a result of implementing the proposed action, beyond what is expected under the No Action Alternative. (An intersection is said to have failed when it reaches LOS E or LOS F.)
- Significant impact – an impact would be considered to be significant if an intersection that had not failed under the No Action Alternative fails under an action alternative.

The assessment of impacts to other forms of transportation and utilities is based on comparing baseline conditions to those found under the action alternatives. Impacts would be considered significant if the potential change in demand would adversely affect existing capacity.

4.7.1 No Action Alternative

Under the No Action Alternative, the modernization and repair of Pier 2 and the repair of Pier 3 would not occur. During a mission event averaging approximately 36 days, cargo handling truck traffic is estimated to be 55 trucks per day and stevedore truck/bus/POV traffic is estimated to be 45 vehicles per day (Personal communication, Cameron, P., 2013). The POVs would continue to be parked at the parking lot near Gate 1 and the workers shuttled to the Tidal Area. However, under the No Action Alternative, missions would continue with growing restrictions at

Pier 3 for as long as possible, so the estimated annual number of trucks and stevedore POVs coming to and from MOTCO on an annual basis would change in direct proportion to the number of missions days per year. No adverse impacts are anticipated to transportation or the existing utility infrastructure under the No Action Alternative.

4.7.2 Alternative 1

4.7.2.1 Road Transport

During construction and demolition activities, there would be temporary impacts to traffic flow from construction-related traffic in the vicinity of MOTCO. Construction-related traffic would include heavy equipment and transport vehicles, cranes, concrete trucks, dump/haul trucks, personnel transport vehicles, and others as necessary. During construction and demolition activities, it is anticipated that vehicular traffic would be routed through Gate 2. However, workers would park their POVs in the lot near Gate 1 and be shuttled to the Tidal Area. Therefore, temporary impacts near Port Chicago Highway and Taylor Boulevard, as well as along Kinne Boulevard, are likely. Construction crews would use the City of Concord's designated truck routes and obtain special permits from Contra Costa County as required. Traffic impacts would be short-term in nature, lasting approximately 47 weeks to repair Pier 3 and 27 months (108 weeks) to modernize Pier 2, and likely distributed evenly throughout normal working hours. In addition, there is the possibility of using water transport to haul construction materials and solid waste from the project site. Although the extent is unknown, the use of water transport would reduce the number of trips by construction and demolition vehicles to MOTCO. Table 4.7-1 summarizes the anticipated number of vehicular trips for the repair of Pier 3. (It is expected that Pier 3 repairs would be done prior to the work at Pier 2.)

Table 4.7-1. Anticipated Vehicular Truck for Pier 3

Material	Total Trips			
	No Action	Alt 1	Alt 2	Alt 3
Repair Activities				
Debris Removal	0	5	5	5
Construction Materials	0	5	5	5
Equipment/General Work Truck[1]	0	3	3	3
Worker Vehicles[2]	0	8,225-8,695	8,225-8,695	8,225-8,695
Number of Trips for Pier 3 Repairs Subtotal	0	8,238-8,708	8,238-8,708	8,238-8,708
Average Number of Trips Per Week	0	175-185	175-185	175-185
Average Number of Trips Per Day[3]	0	35-37	35-37	35-37

Notes: [1]Assume one trip to deliver the excavator for earth work activities, as well as two trucks to be left onsite throughout the duration of the project for various tasks.
[2]During repairs, it is anticipated there would be 35-37 workers at the job site every day for 47 weeks (assuming a five-day work week). This estimate assumes no carpooling or alternative modes of transportation would be taken.
[3] Assumed equal distribution over the entire repair period (i.e., 47 weeks).

Table 4.7-2 summarizes the anticipated number of vehicular and barge trips for each type of material that would be hauled away or brought to the project site for the work proposed at Pier 2.

Table 4.7-2. Anticipated Number of Vehicular and/or Barge Trips for Pier 2

Material	Total Trips			
	No Action	Alt 1	Alt 2	Alt 3
Demolition-Related Truck Trips				
Rail	0	16	16	16
Asphalt	0	106	106	106
Timber	0	1,042	1,042	1,042
Concrete	0	108	108	108
Miscellaneous Materials	0	28-78	28-78	28-78
Worker Vehicles[1]	0	1,550-3,100	1,550-3,100	1,550-3,100
Number of Trips for Pier 2 Demolition Subtotal	0	2,850-4,450	2,850-4,450	2,850-4,450
Average Number of Trips Per Week[2]	0	92-143	92-143	92-143
Average Number of Trips Per Day[3]	0	18-29	18-29	18-29
Construction-Related Truck Trips				
Concrete Mixer	0	1,627	1,613	2,472
Rebar	0	120	119	183
Rail (Railroad Rail and Crane Rails)	0	3	3	13
Dump Truck	0	269	269	269
Asphalt Truck	0	69	69	69
Worker Vehicles[4]	0	14,250	14,250	14,250
Number of Trips for Pier 2 Construction Subtotal	0	16,338	16,323	17,256
Average Number of Trips Per Week [5]	0	172	172	182
Average Number of Trips Per Day[3]	0	34	34	36
Construction-Related Barge Trips				
24-inch Octagonal Piles	0	18	18	22
16-inch and 18-inch Square Piles	0	3	3	3

Notes: [1]During demolition, it is anticipated there would be 10–20 workers at the job site every day for 31 weeks (assuming a five-day work week). This estimate assumes no carpooling or alternative modes of transportation would be taken.
[2] Assumed equal distribution over the entire demolition period (i.e., 31 weeks); excludes rail trips.
[3] Assumed a five-day week (i.e., no weekend work).
[4] During construction, is anticipated that there would be 30 workers at the site for 95 weeks. This estimate assumes no carpooling or alternative modes of transportation would be taken.
[5] Assumed equal distribution over the entire construction period (i.e., 95 weeks); excludes rail trips.

As shown in Table 4.7-1, there would be an increase in the number of vehicles during the repair of Pier 3. Specifically, for 47 weeks, there would be an average of 35–37 more vehicles than under existing conditions. These vehicles represent worker vehicles and assume none of the workers would carpool. It is expected the workers would park at the parking lot near Gate 1 and be shuttled to the work site. In addition, it is expected all trucks would access the Tidal Area using Gate 2. Gate 2 is located at Port Chicago Highway and Taylor Boulevard. As discussed in Section 3.7.1, the average daily traffic volumes on Port Chicago Highway near California Highway 4 in 2005 were between 21,005 and 27,119. The addition of 35–37 vehicles during the repair of Pier 3 would not result in alterations of traffic patterns or trends.

As shown in Table 4.7-2, there would be an increase in the number of vehicles during the demolition and construction of Pier 2. Specifically, during demolition, anticipated to last approximately 31 weeks, there would be an average of 18–29 more vehicles than under existing conditions. In addition, during construction, anticipated to last approximately 95 weeks, there would be an average of 34–36 more vehicles than under existing conditions. It is anticipated that some demolition and construction activities would overlap to compress Pier 2 demolition and construction to 27 months. During this period of time, the average number of additional vehicles would increase to 52–65 more vehicles. In addition, it is expected all trucks would access the Tidal Area using Gate 2. Gate 2 is located at Port Chicago Highway and Taylor Boulevard. As stated previously, the average daily traffic volumes on Port Chicago Highway near California Highway 4 in 2005 were 21,005–27,119 vehicles per day. The addition of up to 65 vehicles during the demolition and construction of Pier 2 would not result in alterations of traffic patterns or trends.

The number of average vehicular trips typically made during mission events was used as a basis of comparing vehicular trips associated with the proposed action. During a mission averaging approximately 36 days, cargo handling truck traffic is estimated to be 55 trucks per day and stevedore truck/bus/POV traffic is estimated to be 45 vehicles per day. As described above, the POVs would park at the parking lot near Gate 1 and the workers would be shuttled to the Tidal Area. During a mission event, approximately 100 more vehicles access MOTCO for an average of 36 days per mission event.

Although implementation of Alternative 1 would result in short-term changes to the traffic patterns, the implementation of this alternative would not cause roadways to operate below LOS benchmarks. While the total demolition and construction duration is anticipated to be approximately 31 months, some demolition and construction activities are expected to occur concurrently; therefore, the total demolition and construction duration is estimated at 27 months. The overall average amount of truck traffic would likely be less than the number of vehicular trips associated with mission events.

Implementation of Alternative 1 would be consistent with EO 13514, *Federal Leadership in Environmental, Energy, and Economic Performance.* This EO requires the advancement of

regional and local integrated planning through the participation in regional transportation planning and recognizing existing community transportation infrastructure. In addition, trucks would adhere to the City of Concord's designated truck route for vehicles exceeding a maximum gross weight of 3 tons, and would obtain a permit from Contra Costa County if needed. Therefore, short-term minor impacts to road transport would occur from implementation of Alternative 1.

4.7.2.2 Mass Transit

No changes to area mass transit would occur from implementation of Alternative 1.

4.7.2.3 Rail Transport

The use of rail transportation is not anticipated during demolition and construction activities as materials will be shuttled using either trucks or barges. However, if it is determined rail transport is needed, the total number of trips would be negligible especially considering the duration of the entire project.

4.7.2.4 Water Transport

It is possible that MOTCO's location on the Suisun Bay would allow for water transport to bring construction supplies and take away waste during construction and demolition activities. It is anticipated there would be approximately 18 barge trips to bring in new pre-stressed concrete piles during construction. However, any use of the Suisun Bay during construction and demolition activities would be short-term and consistent with the various port activities that occur around the San Francisco Bay. Therefore, negligible impacts are anticipated to water transport during construction and demolition activities under Alternative 1.

Currently, there is an interim rule that establishes a safety zone, as well as a security zone (33 CFR Section 165.1199) for military onloads and offloads at MOTCO. The safety zone and security zone are meant to protect persons and vessels from the dangers associated with military onload and offload operations. Specifically, the safety zone prevents persons and vessels from anchoring or otherwise loitering within the safety zone between 500 and 3,000 yards of Pier 2; the Captain of the Port of San Francisco would notify the maritime community of periods during which the safety zone would be enforced (Department of Homeland Security, Coast Guard 2013). The security zone encompasses the navigable waters of Suisun Bay, extending from the surface to the sea floor, within 500 yards of the three piers at MOTCO. Persons and vessels are permitted to transit these zones, but must obtain permission prior to transiting through the safety or security zones. Implementation of Alternative 1 would not affect the safety or security zones; rather, these zones would continue to be enforced during military onload and offload operations as currently done. Therefore, negligible impacts are anticipated to water transport under Alternative 1.

4.7.2.5 Sanitary Sewer

Under Alternative 1, construction of the new 1,500 SF Operations Building / Breakroom would require a sanitary sewer connection. Sanitary sewer infrastructure has been installed to serve current development in the majority of the Tidal Area, and under Alternative 1, a new sewage lift station would be constructed. Any potential additional demand would fall within the capability of the Delta Diablo Sanitation District, and negligible impacts are anticipated to the sanitary sewer from the implementation of Alternative 1.

4.7.2.6 Natural Gas

Natural gas is currently supplied to MOTCO, and any demand for natural gas would be met through the existing support infrastructure. Negligible impacts are anticipated to natural gas from implementation of Alternative 1.

4.7.2.7 Potable Water

Under Alternative 1, construction of the new 1,500 SF Operations Building / Breakroom would require a potable connection; however, potable water is already available for the Tidal Area and demand would fall within the existing support infrastructure and capacity of the CCWD and East Bay Municipal Utility District. Therefore, negligible impacts are anticipated from the implementation of Alternative 1.

4.7.2.8 Electricity

Under Alternative 1, a 12-kilovolt electrical substation and two 1500-kilowatt diesel generators would be installed to support container cranes. Since future demand can be met through the installation of this substation and generators and adequate capacity exists, negligible impacts are anticipated.

4.7.2.9 Telecommunications

Telecommunication lines are currently supplied to MOTCO and any new requirements would be met through the existing support infrastructure. Negligible impacts are anticipated to telecommunications from implementation of Alternative 1.

4.7.2.10 Solid Waste

Table 4.7-3 lists the anticipated amount of construction and demolition debris for Pier 2. In regards to Pier 3, the repairs are considered routine in nature; however, portions of the pier structure would be removed in addition to general construction debris. Anticipated debris to be generated includes deteriorated or damaged pile sections and pile cap sections, handrails and supports, rotten deck planks, timber fascia, and old pile wraps. To the maximum extent possible, at least 50 percent of non-hazardous solid waste generated through construction and demolition activities would be diverted in accordance with the requirements set forth in EO 13423, EO 13514, CAL Green Sections 4.408 and 5.408, and the City of Concord construction

and demolition materials ordinance. Demolition materials eligible for recycling include concrete, asphalt, and steel.

Table 4.7-3. Anticipated Amount of Demolition Debris for Pier 2

Material	Amount of Debris			
	No Action	Alt 1	Alt 2	Alt 3
Demolition-Related Debris				
Creosote-Treated Timber Piles (55-75 ft)	0	4,514	4,514	4,514
Timber Pile Cap Beams (20 ft)[1]	0	1,549	1,549	1,549
Concrete Piles	0	254	254	254
Concrete	0	1,300 CY	1,300 CY	1,300 CY
Reinforcing Steel	0	200 tons	200 tons	200 tons
Stringers (6 in X 14 in to 8 in X 16 in)	0	112,500 ft	112,500 ft	112,500 ft
Deck Boards (6 in X 16 in X 12 ft)	0	13,500	13,500	13,500
Asphalt	0	1,895 CY	1,895 CY	1,895 CY
Building A-21	0	5,782 SF	5,782 SF	5,782 SF
Building 160	0	576 SF	576 SF	576 SF
Construction-Related Debris				
Operations Office/Break Room	0	1,500 SF	1,500 SF	1,500 SF

Notes: [1]Many of the concrete piles are slated to be reused; CY = cubic yards; ft = feet; in = inch; SF = square feet

According to the USEPA, the average demolition debris generation rate for nonresidential structures is 158 lbs of debris per SF and the construction debris generation rate for nonresidential structures is 4.34 lbs of debris per SF (USEPA 2005). Using this USEPA debris generation estimate, proposed demolition of Buildings A-21 and 160 would yield approximately 502 tons of debris prior to solid waste diversion. In addition, the proposed construction of Buildings A-21 and 160 would yield approximately 3 tons of debris prior to solid waste diversion.

Many of the building and pier materials to be demolished may contain ACM, LBP, PCB paint, or creosote. The contractor would be responsible for testing suspected building materials for ACM, LBP, PCB, and mercury; based on the results of the sampling, the contractor would be required to dispose of the waste in accordance with federal and state regulations (refer to Section 4.13 for additional information). With respect to the creosote-TWW (e.g., piles, timber decking, stringers, and pile cap beams), if the wood contains less than 50 ppm creosote it may be reused or recycled. Otherwise, the creosote treated piles are considered TWW, which is further discussed in section 4.13.

In 2011, Contra Costa County disposed of a total of 721,079 tons of solid waste at Acme or Keller Canyon Landfill (CalRecycle 2013a). Acme Landfill has a maximum permitted throughput of 1,500 tons per day and remaining capacity of 175,000 CY (CalRecycle 2013b). In addition to non-recyclable waste, Acme Landfill can recycle and/or reuse asphalt, concrete, clean fill, and untreated wood debris (Contra Costa County 2013a). Keller Canyon Landfill has a maximum permitted throughput of 3,500 tons per day and a remaining capacity of 63,408,410 CY (CalRecycle 2013c). In addition to non-recyclable waste, Keller Canyon Landfill can recycle and/or reuse asphalt, concrete, clean fill, and untreated wood (Contra Costa County 2013b).

Construction and demolition activities would result in a temporary increase in the amount of solid waste disposed of at landfills; however, the overall increase is within the permitted annual disposal rates for the nearby landfills. Since nearby municipal waste landfills have adequate capacity for this one time increase in debris, and at least 50 percent of non-hazardous solid waste generated through construction and demolition activities would be diverted, minor impacts to solid waste from implementation of Alternative 1 is expected.

4.7.3 Alternative 2

The impacts to road transport, mass transit, rail and water transport, sanitary sewer, natural gas, potable water, electricity, telecommunications, and solid waste under Alternative 2 would be the same as those described for Alternative 1.

4.7.4 Alternative 3

The impacts to road transport, mass transit, rail and water transport, sanitary sewer, natural gas, potable water, electricity, and telecommunications under Alternative 3 would be the same as those described for Alternative 1. Since the pier would be 62,200 SF larger under Alternative 3 than Alternatives 1 and 2, it is anticipated the amount of construction-related debris would be slightly higher under Alternative 3. However, materials eligible for recycling would be recycled and nearby municipal waste landfills have adequate capacity. Therefore, minor impacts to solid waste from implementation of Alternative 3 is expected.

4.8 VISUAL RESOURCES

Impacts to visual resources would be considered significant if one or more of the following criteria are met.

- Changes at the site, including changes to form, line, color, and/or texture that substantially degrade an existing viewshed or alter the character of a viewshed by the introduction of anomalous structures or elements.
- Changes at the site would result in changes in the expectations of viewers (measured against the relative importance of those views) and result in a negative impression of the viewshed. The emphasis of this criterion is on views from public view areas.

4.8.1 No Action Alternative

Under the No Acton Alternative, baseline conditions would remain and there would be no change to the visual environment from baseline conditions.

4.8.2 Alternative 1

Potential impacts to the visual setting associated with the Port Chicago Naval Magazine National Memorial, a NRHP listed property, is discussed in Section 4.12. Under Alternative 1, the only substantive change to the visual environment would be the addition of two container gantry cranes to Pier 2. These cranes would be very similar in appearance to the existing two container gantry cranes currently in place at Pier 3. While the addition of the two cranes would be a new element within the existing viewshed, this is not considered a significant impact to the point of either degrading the viewshed or creating a negative impression of the viewshed. Cranes similar to those at MOTCO's Pier 3 can be seen at other pier facilities on Suisun Bay and are a common component of the shipping industry. Therefore, views of Suisun Bay and Los Medanos Hills by sensitive viewers would not be expected to be negatively impacted by the proposed action. Vegetation and topographic obstruction would continue to screen views from sensitive viewers at neighboring Clyde, Shore Acres, Pittsburg communities, and the Diablo Creek Golf Course. Therefore, negligible impacts are anticipated to visual resources from implementation of Alternative 1.

4.8.3 Alternative 2

Impacts associated with Alternative 2 would be the same as those described for Alternative 1.

4.8.4 Alternative 3

Impacts associated with Alternative 3 would be the same as those described for Alternative 1.

4.9 RECREATIONAL RESOURCES

Impacts to recreational resources would be considered significant if a large portion of a particular type of recreational need was lost, and could not be suitably substituted with a similar activity, or if demand could not be met by similar facilities or natural areas.

4.9.1 No Action Alternative

Under the No Acton Alternative, baseline conditions as described in Section 3.8.1 would remain unchanged and there would be no alteration to the recreational resources located at or near MOTCO. Access to the Port Chicago Naval Magazine National Memorial and the safety zone in the navigable waters of Suisun Bay near MOTCO would continue as currently prescribed.

4.9.2 Alternative 1

Under this alternative, modernization and repair activities associated with Piers 2 and 3 could result in restrictions being placed on access to the Port Chicago Naval Magazine National

Memorial on Thursdays and Fridays. However, in most cases, the Memorial would still be accessible on Saturdays, unless work crews were scheduled to work on the weekends. Moreover, once the demolition and construction activity is over, access to the Memorial would return as under baseline conditions. The safety zone into Suisun Bay that encompasses the shipping channel is normally left open, with recreational boater traffic being diverted during military onload and offload operations. MOTCO security boats or the U.S. Coast Guard enforce the safety zone. Due to the fact that much of the Pier 2 demolition and construction would take place in the water, the frequency of times when recreational boaters would be diverted could increase.

It is also possible that ESQD arcs, determined through preparation of an Explosives Safety Submission, may extend over the shipping channel, Port Chicago Naval Magazine National Memorial, and other adjacent areas. In those instances, additional restrictions could result. However, the preparation of an Explosives Safety Submission is still underway and the Army would ensure recreational areas would be made available to the maximum extent possible during all phases of the Pier 3 repairs and demolition and construction activities at Pier 2.

The potential access restrictions for the Port Chicago Naval Magazine National Memorial and the safety zone in the navigable waters of Suisun Bay near MOTCO would be temporary, not lasting more than the duration of the Pier 3 repairs and Pier 2 demolition and construction. Therefore, while there might be a temporary disruption in access to recreational resources, there would be a long-term beneficial impact associated with more efficient pier operations, as missions would last for a shorter period of time. As such, there would be minor short-term adverse impacts and beneficial long-term impacts to recreational resources as a result of the implementation of Alternative 1.

4.9.3 Alternative 2

Impacts associated with Alternative 2 would be the same as those described for Alternative 1.

4.9.4 Alternative 3

Impacts associated with Alternative 3 would be the same as those described for Alternative 1.

4.10 NOISE

The impact analysis for noise focuses on construction noise during modernization and repair activities in conjunction with current and future missions. According to OSHA standards (29 CFR Section 1910.95), employees should not be subjected to continuous noise exceeding 90 dBA for durations lasting more than 8 hours per day. For non-workers, research has indicated that about 87 percent of the population is not highly annoyed by outdoor sound levels below 65 DNL (FICUN 1980). Therefore, for the purposes of this analysis, impacts would be considered significant if sound levels at a sensitive receptor exceed 90 dBA for more than 8 hours per day.

For the purposes of this analysis, the locations listed in Table 4.10-1 were deemed sensitive receptors.

Table 4.10-1. Sensitive Receptors

Sensitive Receptor	Location	Distance
Residential Home	Highland Court, Off of Port Chicago Highway	1.9 miles from White Road at the west end of Pier 2
Residential Home	Jill Avenue and Driftwood Drive	2.1 miles from White Road at the east end of Pier 3
Residential Home	Port Chicago Highway and Wharf Drive	2.1 miles from White Road at the east end of Pier 3
Rio Vista Elementary School	Wharf Drive and Pacifica Avenue	2.4 miles from White Road at the east end of Pier 3
Shore Acres Elementary School	Marina Road and Oceanview Drive	2.5 miles from White Road at the east end of Pier 3
Riverview Middle School	Inlet Drive and Pacifica Avenue	2.7 miles from White Road at the east end of Pier 3

4.10.1 No Action Alternative

Under the No Action Alternative, baseline conditions would continue. However, under the No Action Alternative, missions would continue with growing restrictions at Pier 3 for as long as possible, so the noise generated from mission-related activities would decline in direct proportion to the number of missions.

4.10.2 Alternative 1

Typical construction assumes standard construction and demolition practices. This would include the use of some heavy equipment over a temporary period. As shown in Table 4.10-2, construction-related noise emissions can range from 74 to 101 dBA when measured 50 feet from the respective piece of equipment.

The noise associated with construction and demolition activities would be most likely confined to general working hours (7:00 a.m.–5:00 p.m.) and are unlikely to adversely alter the surrounding noise environment. Using the Washington State Department of Transportation methodology (WSDOT 2011), the standard attenuation rate for hard site conditions (e.g., water, concrete, or hard-packed soil) is 6 dB per doubling of distance for point source noise (i.e., noise that remains in one place) (WSDOT 2011).

Table 4.10-2. In-Air Construction-Related Noise Emissions

Equipment Description	Actual Measured L_{max} at 50 feet (dBA)	Equipment Description	Actual Measured L_{max} at 50 feet (dBA)
Flat Bed Truck	74	Pumps	81
Welder/Torch	74	Dozer	82
Man Lift	75	Horizontal Boring Hydraulic Jack	82
Dump Truck	76	Vacuum Street Sweeper	82
Paver	77	Boring Jack Power Unit	83
Backhoe	78	Compactor (ground)	83
Compressor (air)	78	Gradall	83
Slurry Plant	78	Warning Horn	83
Concrete Mixer Truck	79	Auger Drill Rig	84
Drill Rig Truck	79	Chain Saw	84
Front End Loader	79	Scraper	84
Rivet Buster/Chipping Gun	79	Pneumatic Tools	85
Ventilation Fan	79	Vacuum Excavator	85
Drum Mixer	80	Vibrating Hopper	87
Roller	80	Jackhammer	89
Slurry Trenching Machine	80	Concrete Saw	90
Vibratory Concrete Mixer	80	Mounted Impact Hammer (hoe ram)	90
Concrete Pump Truck	81	Sheers (on backhoe)	96
Crane	81	Impact Pile Driver	101
Excavator	81	Vibratory Pile Driver	101
Generator	81		

Source: FHWA 2006

Noise attenuation model results are shown in Table 4.10-3. As shown, construction noise levels associated with point source equipment likely to be used during construction, such as pile drivers measured at 101 dBA at 50 feet, would attenuate below the OSHA 8-hour exposure limit of 90 dBA within approximately 200 feet (0.04 miles) and attenuate to 65 dBA within 3,200 feet (0.61 miles).

Table 4.10-3. Noise Attenuation Table for Proposed Pier Construction

Distance (feet [miles])	Point Source Equipment Noise Level on Hard Site (dBA)
50 (0.01)	101
100 (0.02)	95
200 (0.04)	89
400 (0.08)	83
800 (0.15)	77
1,600 (0.30)	71
3,200 (0.61)	65
6,400 (1.21)	59
12,800 (2.42)	53
25,600 (4.84)	47

Note that noise from multiple sources at the same location results in louder levels than a single source alone; however, the loudness is measured on a logarithmic scale. Since the majority of the other construction and demolition equipment would be 10 dBA or less than the sound

produced by the impact drivers, the noise level is not expected to differ (Table 4.10-4). Therefore, the noise attenuation presented in Table 4.10-3 is expected to present the worst case scenario.

Table 4.10-4. Noise Attenuation Table for Typical Construction

When two decibel values differ by:	Add the following to the higher decibel value:
0 or 1 dBA	3 dBA
2 or 3 dBA	2 dBA
4-9 dBA	1 dBA
10 dBA or more	0 dBA

Source: WSDOT 2011

Underwater noise from pile driving is unlikely to create any impacts to humans; however, the potential for impacts to protected species, marine mammals, and fish exists. These potential impacts are discussed in Section 4.5.

In conclusion, noise associated with construction and demolition would not adversely affect sensitive receptors since the noise would attenuate to 65 dBA or less at all areas. Therefore, implementation of Alternative 1 would result in minor impacts during construction and demolition activities.

4.10.3 Alternative 2

Impacts under Alternative 2 would be the same as those for Alternative 1; therefore, there would be minor noise impacts under Alternative 2.

4.10.4 Alternative 3

Impacts under Alternative 3 would be the same as those for Alternative 1; therefore, there would be minor noise impacts under Alternative 3.

4.11 Socioeconomics and Environmental Justice

The socioeconomic impact analysis focuses on the local economic benefit associated with the proposed repairs, demolition, and construction activities. Economic impacts include direct effects, such as changes to employment and expenditures and indirect effects, which result from spending and re-spending in response to direct effects.

This analysis also addresses potential disproportionately high and adverse impacts to minority and/or low income populations consistent with EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, and environmental health and safety risks to children consistent with EO 13045, *Protection of Children from Environmental Health Risks and Safety Risks.* For the purpose of this evaluation, minority refers to people who identified themselves in the Census as Black or African American, Asian or Pacific Islander, American Indian or Alaskan Native, other non-White races, or as being of

Hispanic or Latino origin. Persons of Hispanic and Latino origin may be of any race (CEQ 1997). In CEQ (1997), groups are identified as minority populations when either 1) the minority population of the affected area exceeds 50 percent, or 2) the minority population percentage in the affected area is meaningfully greater than the minority population percentage in the general population or appropriate unit of geographical analysis. While not defined by the CEQ, the term "meaningfully greater" has been interpreted to mean 20 percent greater than the geographic region of comparison (most often the state of which the affected area is part). The geographical unit for comparison in this analysis is the state of California.

The U.S. Census Bureau determines poverty status by using a set of dollar-value thresholds that vary by family size and composition. If a family's total income is less than the dollar value of the appropriate threshold, then that family and every individual in it are considered to be in poverty. Similarly, if an unrelated individual's total income is less than the appropriate threshold, then that individual is considered to be in poverty. The poverty thresholds do not vary geographically. They are updated annually to allow for changes in the cost of living (inflation factor) using the Consumer Price Index (U.S. Census Bureau 2013).

As discussed in Section 3.11.2, the two census tracts that include MOTCO have greater proportions of minority and low-income populations as compared to Contra Costa County as a whole. Significant impacts to environmental justice populations would occur if there were increased, disproportionately high, and/or adverse risks for any minority or low-income populations. Significant impacts to children would occur if there were an increased, disproportionate environmental, health, or safety risk to children. This analysis focuses on noise and traffic impacts associated with Alternatives 1, 2, and 3 since they have the potential to disproportionately affect minority and low-income populations, as well as the environmental health and safety of children.

4.11.1 No Action Alternative

4.11.1.1 Socioeconomics

Under the No Action Alternative, the proposed Alternatives 1, 2, or 3 would not occur. Under this alternative, the existing conditions would continue and there would be no disproportionate socioeconomic impacts to minority or low-income populations.

4.11.1.2 Environmental Justice

Under the No Action Alternative, the proposed Alternatives 1, 2, or 3 would not occur. Under this alternative, the existing conditions would continue and there would be no disproportionate environmental justice impacts to minority or low-income populations or impacts that would adversely impact children's health and safety.

4.11.2 Alternative 1

4.11.2.1 Socioeconomics

Repairs to Pier 3 are expected to be done in advance of work at Pier 2. Repairs to Pier 3 would be completed within 13 months of continuous construction; this timeframe includes 7 weeks for above water work (general repairs) and 47 weeks for in-water work. It is anticipated that the demolition and construction of Pier 2 would take approximately 27 months.

For the Pier 3 repairs, there would be approximately 10–12 workers associated with the above-deck general maintenance repairs and 25 workers associated with the pile wrapping. Therefore, the total number of workers at the job site would be approximately 35–37. Following repair of Pier 3, demolition and construction would begin at Pier 2. During demolition, there would be 10–20 workers at the job site every day. When all three construction activities are concurrent (i.e., pile driving, formwork, and pouring), there would be at least 30 workers at the site (in addition to any crew associated with the demolition of Pier 2).

The increase in construction spending would result in a small short-term demand for construction and secondary jobs; however, not all construction labor and materials would be procured locally. The regional labor force would be expected to absorb the increased demand for direct construction jobs, as well as any associated secondary jobs. No in-migration to the area would be expected as a result of construction spending. Additional taxes would accrue to federal, state, and local governments as a result of the increase in construction activities; however, these impacts would be minor and temporary. Construction spending would result in minor short-term beneficial impacts to the local region.

It is not anticipated that post construction traffic levels, long-term employment, or long-term impacts to regional income would change from existing conditions.

Therefore, there would be short-term beneficial socioeconomic impacts to the local region as a result of implementation of Alternative 1.

4.11.2.2 Environmental Justice

As discussed in Section 4.10, there are no populations that would be adversely affected by noise during construction and demolition activities. During construction and demolition activities, it is anticipated vehicular traffic would be routed through Gate 2. Therefore, temporary impacts near Port Chicago Highway and Taylor Boulevard are likely. Construction crews will use the City of Concord’s designated truck routes and obtain special permits from Contra Costa County, as required. Traffic impacts would be short-term in nature, lasting no more than the duration of the Pier 3 repairs and Pier 2 demolition and re-construction. As discussed in Section 4.7, the average daily traffic volumes on Port Chicago Highway near California Highway 4 in 2005 were 21,005–27,119. The addition of 35–37 vehicles during the repair of Pier 3 and up to 65 vehicles during the demolition and construction of Pier 2 would not result in alterations of traffic patterns

or trends. Therefore, there would be no disproportionate impacts to minority or low-income populations or impacts that would adversely impact children's health and safety with the implementation of Alternative 1.

4.11.3 Alternative 2

4.11.3.1 Socioeconomics

Under Alternative 2, socioeconomic impacts would be the same as those described for Alternative 1; therefore, there would be no disproportionate impacts to minority or low-income populations with regard to noise or traffic with the implementation of Alternative 2.

4.11.3.2 Environmental Justice

The same construction and demolition activities proposed under Alternative 1 are proposed under Alternative 2; therefore, there would be no disproportionate impacts to minority or low-income populations or impacts that would adversely affect children's health and safety with the implementation of Alternative 2.

4.11.4 Alternative 3

4.11.4.1 Socioeconomics

Under Alternative 3, socioeconomic impacts would be the same as described for Alternative 1; therefore, there would be no disproportionate impacts to minority or low-income populations with regard to noise or traffic with the implementation of Alternative 3.

4.11.4.2 Environmental Justice

The same construction and demolition activities proposed under Alternative 1 are proposed under Alternative 3; therefore, there would be no disproportionate impacts to minority or low-income populations or impacts that would adversely affect children's health and safety with the implementation of Alternative 3.

4.12 CULTURAL RESOURCES

The term "historic property" refers to cultural resources that have been found eligible for listing, or are listed, in the National Register of Historic Places. Section 106 of the NHPA of 1966, as amended, outlines the process in which federal agencies are required to determine the effects of their undertakings on historic properties. Any adverse effects on historic properties are considered to be significant. Effects are considered to be adverse if they alter, directly or indirectly, any of the characteristics of a cultural resource that qualify that resource for the NRHP so that the integrity of the resource's location, design, setting, materials, workmanship, feeling, or association is diminished. Analysis of the potential impacts was based on evaluation of the changes to the existing historic properties that would result from implementation of the project. In making a determination of the effects to historic properties, consideration was given to:

- specific changes in the characteristics of historic properties in the study area;
- the temporary or permanent nature of changes to historic properties;
- the introduction of visual, atmospheric, or audible elements that diminish the integrity of the property's historical features; and
- the existing integrity considerations of historic properties in the study area and how the integrity was related to the specific criterion that makes a historic property eligible for listing in the NRHP.

The threshold also applies to any cultural resource that has not yet been evaluated for its eligibility to the NRHP or if the proposed action disturbs a traditional cultural property. Analysis of potential impacts to cultural resources considers both direct and indirect impacts. Direct impacts may be the result of physically altering, damaging, or destroying all or part of a resource, altering characteristics of the surrounding environment by introducing visual or audible elements that are out of character for the period the resource represents, or neglecting the resource to the extent that it deteriorates or is destroyed. Indirect impacts are those that may occur as a result of the completed project, such as increased vehicular or pedestrian traffic in the vicinity of a resource. Any adverse effects on cultural resources that are listed or eligible for listing in the NRHP are considered to be significant. Effects are considered to be adverse if they alter, directly or indirectly, any of the characteristics of a cultural resource that qualify that resource for the NRHP so that the integrity of the resource's location, design, setting, materials, workmanship, feeling, or association is diminished.

4.12.1 No Action Alternative

Under the No Action Alternative, the modernization and repair of Pier 2 and the repair of Pier 3 would not occur. The Port Chicago Naval Magazine National Memorial would continue to operate as a unit of the national park system and access to the Memorial would continue as described in Section 3.9.1. In accordance with Section 106 of the NHPA, the Port Chicago Naval Magazine Explosion Site and potential submerged cultural resources at MOTCO would not be affected under the No Action Alternative. No effects to historic properties would occur under the No Action Alternative.

4.12.2 Alternative 1

The location of the Port Chicago Naval Magazine Explosion Site has been found eligible for listing in the NRHP due to the influence the Port Chicago Disaster had in leading to the desegregation of the U.S. Armed Forces, its impact on safety practices in the Navy, and its association with the "Port Chicago 50," who were tried and convicted of mutiny after the explosion. The Port Chicago Naval Magazine Explosion Site is located underwater and may undergo physical disturbance under Alternative 1. Visible above water and near the shore, the remaining Pier 1 pilings are a contributing element to the Port Chicago Naval Magazine Explosion Site. Although the Pier 1 pilings are within the proposed 100-foot potential

disturbance buffer area for demolition and construction activities under Alternative 1, the Pier 1 pilings would be avoided during demolition and construction and would not be physically disturbed. The overall integrity of setting, feeling, and association, characteristics that qualify the site for eligibility for listing in the NRHP would not be diminished, resulting in no adverse effect and no significant impacts to the Port Chicago Naval Magazine Explosion Site.

The Port Chicago Naval Magazine National Memorial, a NRHP listed property, commemorates the tragedy of the Port Chicago Disaster and is located in the Tidal Area within the proposed 100-foot potential disturbance buffer area for demolition and construction activities under Alternative 1 (Figure 4-6). The Memorial and remaining Pier 1 pilings would not be physically disturbed; the demolition and construction contractor will be directed to avoid the Pier 1 pilings during all aspects of Pier 2 work. In regards to visual, atmospheric, or audible impacts, the visual setting, which includes the remains of Pier 1 and the area surrounding the Memorial, are contributing characteristics to the integrity of the historic character of the Memorial. Although the western portions of Piers 2 and 3 were constructed as timber structures in the 1940s, the concrete apron and eastern approach were added to both piers in 1966. Further, upgrades and repairs have occurred periodically as needed. Other pier facilities on Suisun Bay associated with the shipping industry can be seen from MOTCO; therefore, the proposed modernizations and repairs under Alternative 1 would be consistent with the current visual and atmospheric conditions of transshipments facilities located near MOTCO. Although temporary visual, atmospheric, and audible impacts are anticipated during demolition and construction activities, these impacts would not diminish the integrity of the Memorial or remaining Pier 1 pilings.

A submerged cultural resources survey indicated that unidentified underwater debris may be associated with the Port Chicago Disaster. Although the unidentified underwater debris could be associated with the Port Chicago Explosion Site, they are not contributing features to the characteristics that make the site eligible for listing in the NRHP and have been determined not eligible for listing in the NRHP. Additionally, the initial cleanup and removal of debris after the Port Chicago Explosion and repeated dredging activities in the decades following the explosion around the original location of Pier 1 has resulted in extensive disturbance of any remaining material from the explosion or debris from operation of the transshipment facility. The piers and supporting buildings and structures at MOTCO have been determined not eligible for listing in the NRHP. As a result, underwater resources associated with the operation of the transshipment facility at MOTCO would also not be eligible for listing in the National Register of Historic Places. Therefore, in accordance with Section 106 of the NHPA, there would be no adverse effect to NRHP-eligible underwater resources from the implementation of Alternative 1. In addition there would be no significant impacts to cultural resources.

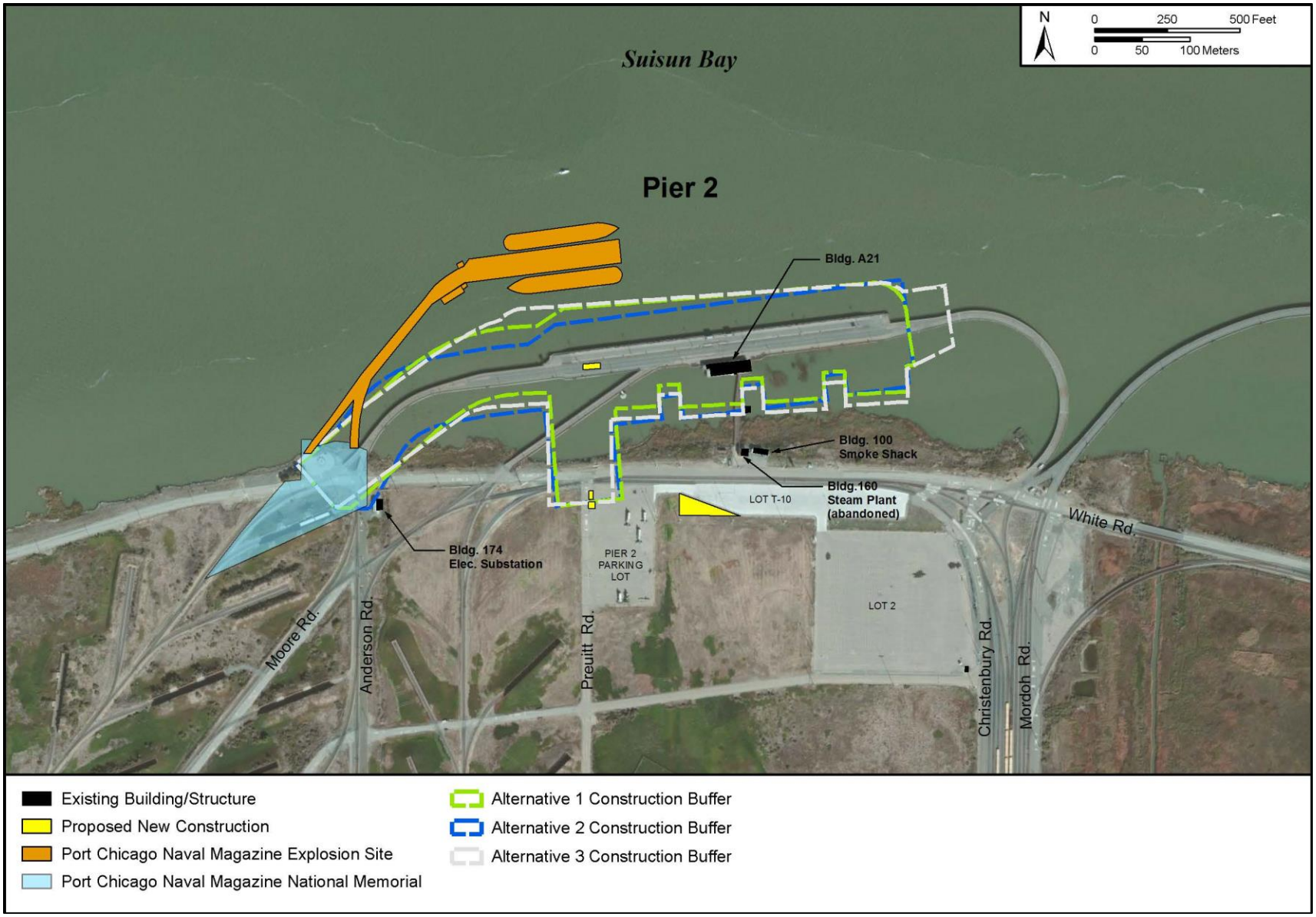


Figure 4.6. Potential Cultural Resources Impacts Near Pier 2 from Alternatives 1, 2, and 3

4.12.3 Alternative 2

Effects associated with Alternative 2 would be the same as those for Alternative 1. The alignment of Pier 2 would remain within the existing footprint, and dredging activities and other construction activities might occur within the boundary of the NRHP-eligible Port Chicago Naval Magazine Explosion Site, and the NRHP-listed Port Chicago Naval Magazine National Memorial (Figure 4-6). As with Alternative 1, this would not result in adverse effects and no significant impacts to cultural resources.

4.12.4 Alternative 3

Effects associated with Alternative 3 would be the same as those for Alternative 1. Work occurring within the boundary of the NRHP-eligible Port Chicago Naval Magazine Explosion Site and the NRHP-listed Port Chicago Naval Magazine National Memorial would not result in adverse effects to the integrity or characteristics that make the NRHP-listed and eligible properties significant and would not result in adverse effects or significant impacts to these historic properties and cultural resources (Figure 4-6).

4.13 Hazardous Materials, Hazardous Waste, Toxic Substances, and Contaminated Sites

The nature and magnitude of potential impacts associated with HM, HW, and toxic substances depends on the toxicity, storage, use, transportation, and disposal of these substances. Impacts associated with contaminated sites could include disruption of existing characterization, containment, or cleanup activities resulting in the potential for increased contamination exposure, transport, or danger to workers or the environment. The threshold for significant impacts to HM, HW, toxic substances, and contaminated sites is met if the storage, use, handling, or disposal of these substances or disruption of contaminated areas substantially increases the risk to human health due to direct exposure, substantially increases the risk of environmental contamination, or violates applicable federal, state, and local regulations.

4.13.1 No Action Alternative

Under the No Action Alternative, implementation of the proposed action would not occur. Operations at MOTCO would continue but likely at decreasing levels due to increased infrastructure degradation. All regulations and plans that pertain to HM, HW, toxic substances, and contaminated sites would continue to be followed. Therefore, no adverse impacts to HM, HW, toxic substances, or contaminated sites would be expected from implementation of the No Action Alternative.

4.13.2 Alternative 1

4.13.2.1 Hazardous Materials

Procedures for HM management established for MOTCO would continue to be followed during all Pier 3 repairs and Pier 2 construction and demolition activities. To minimize the potential for impacts from hazardous or regulated materials, all POL and solvents required to maintain the equipment used to perform the proposed action would be stored away from the construction zone. Any spill of such materials would be immediately reported to the MOTCO Fire Department, DPW, and Environmental Compliance Office to ensure response actions are appropriate and in accordance with the MOTCO SWPPP, SPCC, and OHSSPRP (MOTCO 2001; MOTCO 2013). Thus, there are negligible potential effects from HM expected from the implementation of Alternative 1.

4.13.2.2 Hazardous Waste

Established HW procedures would continue to be followed during Pier 3 repairs and Pier 2 construction and demolition activities, and MOTCO would continue to operate within its small quantity generator HW permit conditions. All HW generated through the use of construction equipment would be managed by the construction contractors in accordance with the terms of the work authorization, MOTCO HWMP (MOTCO 2012), and RCRA regulations. There are no significant quantities of HW associated with pier demolition or construction activities. Thus, there are negligible potential effects from HW expected with the implementation of Alternative 1.

4.13.2.3 Toxic Substances

The ACM found within Buildings A-21 and 160 would be properly removed and disposed of by EPA-certified personnel prior to demolition in accordance with applicable laws and regulations (e.g. 40 CFR Sections 61.140 through 157). (Building 100 would be moved from its present location on the north side of White Road to the Pier 2 parking area south of White Road.) Prior to demolition of any structure the potential presence of lead-based or PCB paint, as expected to occur in Buildings A-21 and 160, would be evaluated by a qualified inspector. Where lead-based or PCB paint is present, required abatement and waste management planning and control measures would be implemented in accordance with federal and California law. All fluorescent light tubes/bulbs and high-intensity discharge lamps requiring removal would be considered a non-RCRA hazardous waste (i.e., universal waste) and would be removed and sent to an approved recycling facility; however, any broken or crushed fluorescent and high-intensity discharge lamps would be managed as HW. In addition, any mercury-containing thermostats would be sent to an approved recycling facility or disposed of as HW. In addition, it is suspected that PCBs are in the transformer oil that would be replaced during the proposed Tidal Area infrastructure upgrades. The removal of toxic substances as part of demolition activities would be conducted in accordance with all applicable regulations. Therefore, negligible to minor

impacts from toxic substances are anticipated from the removal of ACM, LBP, mercury, or PCBs / PCB paint from proposed demolition under Alternative 1.

Under Alternative 1, 4,514 creosote-treated wood pilings would be replaced with approximately 1,001 pre-stressed concrete piles at Pier 2. Pier 3 renovations would include the installation of HDPE protective jackets on 4,066 existing, creosote-treated timber piles. The 4,514 removed piles at Pier 2 and other wooden decking material would be stockpiled onsite, cut into smaller pieces using sawdust capture and recovery BMPs, and disposed of in a landfill facility as required for TWW per CCR Title 22, Section 67386. As concrete is mostly inert and thus is not likely to leach hazardous chemicals into the environment, replacing the creosote-treated timber pilings with pre-stressed concrete and wrapping Pier 3 pilings with HDPE jackets is likely to reduce transport of hazardous and toxic materials into the environment.

Thus, a negligible beneficial impact from toxic substances from the removal and proper disposal or management of creosote-treated pilings is anticipated under Alternative 1.

4.13.2.4 Contaminated Sites

Figure 3-12 depicts the locations of DERP and MMRP sites in proximity to the project area. There are no IRP sites, USTs, areas of concern, or pipelines within or near to the project area. No direct or indirect effects are expected to occur to or from IRP sites, USTs, areas of concern, or pipelines from any proposed activity at Piers 2 or 3 that would occur in the pier-side, landside, or waterside areas.

As a result of the Port Chicago disaster, MEC explosive risk may still be present in the subsurface around Piers 2 and 3 and could be encountered by construction crews during pile removal, pile driving, maintenance activities, or dredging activities. The site has not undergone a formal MEC clearance operation although it is currently being investigated (RI phase) through the MMRP. Extensive reconnaissance prior to restoration at Pier 2 in 2003 revealed that pile driving and other repairs could proceed with a low risk of encountering MEC (NAVFAC 2003).

However, MEC and UXO have been encountered and safely removed during recent remedial projects in the Tidal Area, increasing to moderate the risk of encountering MEC in some locations within the Tidal Area (USACE 2009). Demolition and construction contractors would follow all scheduling, coordination, security, safety, permitting, and other matters pertinent to work accomplishment in accordance with DOD Manual 6055.09, *DOD Ammunition and Explosives Safety Standards*. Specifically, an Explosives Safety Submission would be required prior to the start of activities to minimize serious injury, loss of life, and damage to property. In addition, the contractor would be required to prepare, submit, and follow other safety plans including an UXO Anomaly Avoidance Plan / UXO Support During Construction Activities Plan; Environmental Protection Plan; Quality Control Plan; Hazard Analysis; and Safety and Health Plan. Therefore, impacts associated with MMRP sites under Alternative 1 are considered minor.

4.13.3 Alternative 2

Under Alternative 2, impacts to HM, HW, toxic substances, and contaminated sites would be similar to those described under Alternative 1. No effects to or from HW and IRP sites; negligible effects from HM and toxic substances; and potentially moderate effects from MMRP sites are expected under Alternative 2.

4.13.4 Alternative 3

Under Alternative 3, impacts to HM, HW, toxic substances, and contaminated sites would be similar to those described under Alternative 1. No effects to or from HW and IRP sites; negligible effects to or from HM and toxic substances; and potentially moderate effects from MMRP sites are expected under Alternative 3.

4.14 COMPARISON OF ENVIRONMENTAL CONSEQUENCES

A summary of environmental consequences for all alternatives analyzed in this EIS is provided in Table 4.14-1.

4.15 OTHER CONSIDERATIONS

4.15.1 Unavoidable Adverse Environmental Effects

Avoidance, minimization, or mitigation of adverse effects to natural, cultural, and other environmental resources were integrated into the proposed action to the greatest extent possible and practicable; however, all impacts may not be completely avoided and/or mitigated. Unavoidable adverse environmental effects and associated management measures are further discussed in Section 6.

4.15.2 Relationship between Short-Term Use of Man's Environment and Maintenance and Enhancement of Long-Term Productivity

NEPA requires analyzing the relationship between a project's short-term impacts on the environment and the effects those 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. Choosing one option may reduce future flexibility in pursuing other options or committing a resource to a certain use may eliminate the possibility for other uses of that resource.

As discussed in this section, implementation of Alternatives 1, 2, or 3 would result in both short- and long-term environmental effects. However, implementation of Alternatives 1, 2, or 3 is not expected to result in the types of impacts that would reduce environmental productivity, affect biodiversity, permanently narrow the range of beneficial uses of the environment, or pose long-term risks to human safety or the general welfare of the public.

4.15.3 Irreversible and Irretrievable Commitments of Resources

An irreversible effect is the result of the permanent use (and subsequent loss) of a nonrenewable resource (e.g., minerals or energy). An irretrievable resource commitment involves the loss in value of an affected resource that cannot be restored as a result of an action (e.g., disturbance of a cultural site) or consumption of a renewable resource that is not permanently lost (e.g., old growth forests, wetlands). Secondary impacts could also result from environmental accidents, such as fires.

Implementation of Alternatives 1, 2, or 3 would involve irretrievable commitments of nonrenewable and renewable resources. With regard to construction and demolition activities, resources such as capital, labor, fuels, and construction materials would be committed. The total amount of construction materials (e.g., pilings, concrete, insulation, wiring, etc.) required for this action is relatively small when compared to the resources available in the region. The construction materials and energy required for construction and missions are not in short supply; their use would not have an adverse impact on the continued availability of these resources and the energy resource commitment is not anticipated to be excessive in terms of region-wide usage.

To the extent possible, all construction would comply with EO 13423, *Strengthening Federal Environmental, Energy, and Transportation Management* and EO 13514, *Federal Leadership in Environmental, Energy, and Economic Performance*. Executive Order 13423 set goals for Federal agencies in energy efficiency, renewable energy, toxic chemical reduction, recycling, sustainable buildings, electronics stewardship, and water conservation. Executive Order 13514 expands on the requirements set forth in EO 13423 and requires that all new construction comply with the *Guiding Principles for Federal Leadership in High Performance and Sustainable Buildings*. This includes employing design and construction strategies that increase energy efficiency, eliminate solid waste, and reduce stormwater runoff. One strategy for reducing stormwater runoff is implementing low impact development (LID) technologies. The goal of LID technologies is to maintain or restore the natural hydrologic functions of a site and reduce the runoff rate, filter out pollutants, and facilitate the infiltration of water into the ground. Following improvement-related activities at the project area, military operations would continue to use nonrenewable resources, such as fuel, at similar present levels. The energy required for these improvements is not in short supply. This energy use would not have an adverse impact on the continued availability of these resources and is not anticipated to be excessive in terms of region-wide usage. Furthermore, compliance with the requirements set forth in EOs 13423 and 13514 would minimize any irreversible or irretrievable effects to multiple non-renewable and renewable resources.

In terms of greenhouse gases and global climate change, EO 13423 sets as a goal for all federal agencies the improvement of energy efficiency and the "reduction of greenhouse gas emissions of the agency, through reduction of energy intensity by i) 3 percent annually through

the end of fiscal year 2015, or ii) 30 percent by the end of fiscal year 2015, relative to the baseline of the agency's energy use in fiscal year 2003." The U.S. Army Energy Strategy for Installations contains strategies to reduce energy waste and improve efficiency. The proposed action does not represent a net incremental addition to the global climate change problem. Furthermore, the Army's continued compliance with EO 13423 would minimize any irreversible effects from greenhouse gas emissions.

Table 4.14-1. Comparison of Environmental Consequences

Resource	Alternative 1	Alternative 2	Alternative 3	No Action
Earth Resources	• No impacts to geology or seismology. • Negligible impacts to topography. • Minor adverse impacts to soil and sediments. • Existing management programs such as best management practices would continue and minimize adverse impacts.	• Same as Alternative 1.	• Same as Alternative 1.	• No impacts to geology, seismology, or topography. • Minor erosional damage to the existing rock revetment adjacent to Pier 2 west trestle would potentially result in long-term adverse impacts.
Water Resources	• No adverse impacts to hydrology or floodplains. • No net loss of wetlands. • Temporary moderate adverse impacts to water quality. • Standard erosion and sedimentation controls, spill prevention plans, and Stormwater Pollution Prevention Plan would minimize adverse impacts to water quality.	• Same as Alternative 1.	• Same as Alternative 1.	• No impacts to hydrology, wetlands, or floodplains. • Potential moderate to severe adverse impacts to water quality
Air Quality	• Minor air emissions associated with repairs, demolition, and construction activities would not affect air quality. • A general conformity determination is not	• Same as Alternative 1.	• Same as Alternative 1.	• Minor beneficial impact to regional air quality.

Resource	Alternative 1	Alternative 2	Alternative 3	No Action
	required.			
Biological Resources	• Repairs, demolition, and construction would occur in previously developed areas. • No loss of Riverine / Palustrine wetlands; net gain of 0.041 acres of estuarine intertidal wetlands; net gain of 0.781 acres of estuarine subtidal habitat; and net loss of 0.219 acres of upland habitat. Therefore, minor adverse impact to terrestrial and wetland vegetation. • Slight, localized, and temporary increase in turbidity would result in a minor adverse impact to aquatic vegetation. • No adverse impacts to reptiles and amphibians; minor, temporary adverse impacts to invertebrates, essential fish habitat, and mammals; and moderate, temporary adverse impacts to fish. • No adverse effects to migratory birds anticipated; standard avoidance and minimization measures would be incorporated into the project to protect migratory birds.	• Same as Alternative 1, but: – Net gain of 0.041 acres of estuarine intertidal wetlands; net gain of 0.551 acres of estuarine subtidal habitat; and net loss of 0.219 acres of upland habitat.	• Same as Alternative 1, but: – Net gain of 0.041 acres of estuarine intertidal wetlands; net loss of 1.113 acres of estuarine subtidal habitat; and net loss of 0.219 acres of upland habitat.	• Long-term adverse impacts to habitats would occur from release of polycyclic aromatic hydrocarbons. • No adverse impacts to flora, fauna, or special status species.

Resource	Alternative 1	Alternative 2	Alternative 3	No Action
	• May affect, and is likely to adversely affect, the following species under the purview of the NMFS: southern green sturgeon, Central California Coast steelhead DPS and Central Valley Steelhead DPS, Central Valley spring-run Chinook salmon ESU, and Sacramento River winter-run Chinook salmon ESU. • May affect, and is likely to adversely affect, the following species under the purview of the USFWS: delta smelt, California clapper rail, and salt marsh harvest mouse. • May affect, but is not likely to adversely affect, the following species under the purview of the USFWS: soft bird's beak and California least tern.			
Land Use and Coastal Zone Management	• No adverse impacts to land use. • Consistency, to the maximum extent practicable, with the BCDC coastal management program. • When Pier 2 design is funded, the project would be routed through BCDC's Engineering	• Same as Alternative 1.	• Same as Alternative 1.	• Current land use pattern would not change from existing conditions; however, onsite activities would lessen in frequency over the long term.

Resource	Alternative 1	Alternative 2	Alternative 3	No Action
	Criteria Review Board to ensure compliance with the seismic engineering criteria.			
Transportation and Utilities Infrastructure	• Negligible short-term construction traffic impacts associated with repairs, demolition, and construction activities; no changes to area mass transit; and negligible impacts to rail transport and water transport. • Demand for utilities infrastructure would be within infrastructure capacity and negligible impacts are anticipated to sanitary sewer, natural gas, potable water, electricity, and telecommunications; and minor adverse impacts to solid waste.	• Same as Alternative 1.	• Same as Alternative 1.	• No adverse impacts anticipated.
Visual Resources	• Negligible impacts anticipated.	• Same as Alternative 1.	• Same as Alternative 1.	• Existing conditions would remain.
Recreational Resources	• Minor, short-term adverse impacts associated with potential access restrictions to the Port Chicago Naval Magazine Memorial and navigable waters of Suisun Bay. • Long-term beneficial impacts associated with more efficient pier	• Same as Alternative 1.	• Same as Alternative 1.	• Existing conditions would remain.

Resource	Alternative 1	Alternative 2	Alternative 3	No Action
	operations.			
Noise	• Minor, short-term adverse impacts.	• Same as Alternative 1.	• Same as Alternative 1.	• Noise would be generated as under existing conditions, but the noise generated would decline in proportion to the number of missions.
Socioeconomics and Environmental Justice	• No change in short- or long-term population, employment, income, or housing. • Spending for repairs, demolition, and construction activities not expected to result in noticeable regional economic impacts. • No disproportionate high and adverse human health or environmental effects on minority and low-income populations. • No disproportionate environmental health and safety risks to children.	• Same as Alternative 1.	• Same as Alternative 1.	• Existing socioeconomic conditions would continue. • No disproportionate environmental justice impacts to minority or low-income populations, or impacts that would adversely impact children's health and safety.
Cultural Resources	• The Port Chicago Naval Magazine National Memorial would continue to operate as a unit of the national park system and would not be affected. • The Port Chicago Naval Magazine Explosion Site and potential submerged cultural resources at	• Same as Alternative 1.	• Same as Alternative 1.	• The Port Chicago Naval Magazine National Memorial would continue to operate as a unit of the national park system and would not be affected. • The Port Chicago Naval Magazine Explosion Site and potential submerged cultural resources at

Resource	Alternative 1	Alternative 2	Alternative 3	No Action
	MOTCO would not be affected. • No effects to historic properties would occur.			MOTCO would not be affected. • No effects to historic properties would occur.
Hazardous Materials, Hazardous Waste, Toxic Substances, and Contaminated Sites	• Established procedures for the management of hazardous materials would be followed during repair, demolition, and construction activities; therefore, negligible impacts are anticipated. • Established procedures for the management of hazardous waste would be followed during repair, demolition, and construction activities; therefore, negligible impacts are anticipated. • Prior to demolition, surveys would be conducted for toxic substances (asbestos-containing materials, lead-based paint, polychlorinated biphenyls, and mercury); all toxic substances would be removed and properly disposed and negligible impacts are anticipated. • Munitions and explosives of concern explosive risk may still be present in the subsurface around Piers 2 and 3. The contractor would follow all	• Same as Alternative 1.	• Same as Alternative 1.	• Existing programs for management of hazardous materials, hazardous waste, toxic substances, and contaminated sites would continue.

Resource	Alternative 1	Alternative 2	Alternative 3	No Action
	scheduling, coordination, security, safety, permitting, and other matters pertinent to work accomplishment in accordance with DOD Manual 6055.09, *DOD Ammunition and Explosives Safety Standards*. In addition, the contractor would be required to prepare, submit, and follow other safety plans including an unexploded ordnance (UXO) Anomaly Avoidance Plan / UXO Support During Construction Activities Plan; Environmental Protection Plan; and Quality Control Plan, Hazard Analysis, and Safety/Health Plan. Therefore, impacts associated with Military Munitions Response Program site are considered minor.			

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5.0 CUMULATIVE IMPACTS

5.1 DEFINITION OF CUMULATIVE IMPACTS

The approach taken in the analysis of cumulative impacts follows the objectives of NEPA, CEQ regulations, and CEQ guidance. Cumulative impacts are defined in 40 CFR Section 1508.7 as follows:

> The impact on the environment that results from the incremental impact of the action when added to the other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

To determine the scope of environmental impact statements, agencies shall consider ….[c]umulative actions, which when viewed with other proposed actions have cumulatively significant impacts and should therefore be discussed in the same impact statement (40 CFR Section 1508.25).

In addition, CEQ and the USEPA have published guidance addressing implementation of cumulative impact analyses—*Guidance on the Consideration of Past Actions in Cumulative Effects Analysis* (CEQ 2005) and *Consideration of Cumulative Impacts in EPA Review of NEPA Documents* (USEPA 1999). CEQ guidance entitled *Considering Cumulative Impacts Under NEPA* (1997) states that cumulative impact analyses should "...determine the magnitude and significance of the environmental consequences of the proposed action in the context of the cumulative impacts of other past, present, and future actions...identify significant cumulative impacts…[and]...focus on truly meaningful impacts."

Cumulative impacts are most likely to arise when a relationship or synergism exists between a proposed action and other actions expected to occur in a similar location or during a similar time period. Actions overlapping with or in close proximity to the proposed action would be expected to have more potential for a relationship than those more geographically separated. Similarly, relatively concurrent actions would tend to offer a higher potential for cumulative impacts. To identify cumulative impacts, the analysis needs to address the following three fundamental questions.

1. Does a relationship exist such that impacts to affected resource areas by the proposed action might interact with the impacts to resources of past, present, or reasonably foreseeable actions?
2. If so, what would the combined impact be?
3. Are there any potentially significant impacts not identified when the proposed action is considered alone?

5.2 POTENTIAL CUMULATIVE EFFECTS BY RESOURCE

The Army uses a process for cumulative effects analysis that follows the nine steps identified by CEQ. Step 1 identifies the significant issues associated with the proposed action and defines assessment goals. Step 2 establishes the geographic scope of the analysis. Step 3 establishes the analysis time frame. Step 4 identifies other actions affecting the resources included for analysis in this EIS. Steps 5 and 6 characterize the resources identified in steps 1-4 and their responses to environmental changes. Step 7 defines the baseline condition for the resources. Step 8 identifies the important cause-and effect relationships between human activities and the resources. Step 9 determines the magnitude of cumulative effects on the selected resource. The following cumulative effects analysis follows this nine-step process.

5.2.1 Step 1: Identification of Significant Issues and Assessment Goals

The assessment goal is to determine the appropriate level of cumulative analysis for each resource area and to determine whether there are incremental impacts of the proposed action on nearby resources, ecosystems, and human communities. The cumulative impacts analysis applies to all three action alternatives unless otherwise specified. CEQ guidance states, “it is not practical to analyze how the cumulative effects of an action interact with the universe; the analysis of environmental effects must focus on the aggregate effects of past, present, and foreseeable future actions that are truly meaningful. Thus, analysts must narrow the focus of the cumulative effects analysis to effects of significance to the proposal for agency action and its alternatives, based on thorough scoping” (CEQ 2005). Therefore, this cumulative impacts analysis focuses on those resource areas that are expected to have significant direct or indirect effects, as well as those resources that are of concern in the MOTCO region (previously discussed in Chapters 3 and 4).

For the purposes of this EIS, the proposed action was found to result in no, negligible, or minor direct/indirect adverse impacts to the following resource areas: topography; soils/sediments; surface water; groundwater; wetlands; floodplains; land use and coastal zone management; transportation and utilities infrastructure; visual resources; recreational resources; noise; socioeconomics and environmental justice; cultural resources; and hazardous materials, hazardous waste, toxic substances, and contaminated sites. Since the direct and/or indirect impacts to these resource areas are localized and temporary, and the respective resources are anticipated to recover within a short period of time (as described at the beginning of Chapter 4), another action would need to occur in the same localized area at the same time for cumulative impacts to be possible. (As will be discussed in this chapter, based on the geographic and temporal scope of the cumulative impacts analysis, there is no potential for significant cumulative impacts to these resource areas.) Therefore, these resource areas are not carried forward in the cumulative impacts analysis.

5.2.2 Step 2: Geographic Scope of Analysis

The overall geographic scope of analysis consists of Contra Costa County, which includes the cities of Concord and Pittsburg and unincorporated communities of Bay Point and Clyde. For various resource areas, however, the geographic scope is dependent on the characteristics and location of affected resources. These areas may be smaller or larger than the overall geographic scope and are defined in subsequent sections for each of the respective resource areas.

5.2.3 Step 3: Analysis Time Frame

By definition, the time frame for the analysis must include the past, present, and future. For most resource areas, the period within the last five years at MOTCO marks the past temporal boundary for the cumulative effects analysis. The future temporal boundary includes the life of the proposed action (i.e., 2014–2018) and other reasonably foreseeable actions within the overall timeframe. The temporal boundary for the present is defined by actions in detailed planning, under construction, or that have been recently initiated. Since the potential effects to resources carried forward in the cumulative impacts analysis may require several years to recover following the end of Pier 2 construction (estimated to be the second quarter of 2018), the future temporal boundary is bound by activities that can be reasonably foreseen, which is approximately 10 years.

5.2.4 Step 4: Other Actions Affecting the Resources of Concern

Other past, present, and reasonably foreseeable actions that could influence the resource areas carried forward for further analysis from Step 1 are addressed here. This includes consideration of the other past and present actions and their locations, the extent of their direct and indirect effects, any likely future actions, and their relative contribution to cumulative impacts on the specific resource.

5.2.4.1 Past Actions

In accordance with CEQ's guidance, past actions are relevant and useful in analyzing whether or not the reasonably foreseeable effects of the proposed action may have a continuing, additive, and significant relationship to those effects. CEQ guidance emphasizes a focus on the current aggregate effects of past actions without delving into the historical details of individual past actions unless such information is necessary to describe the cumulative impact of all past actions combined. A list of past actions, along with the status of the NEPA analysis (if applicable) is provided in Table 5.2-1.

Table 5.2-1. Cumulative Action Evaluation

Action	Level of Analysis Completed	Decision Document	Lead Agency
Past Actions			
Pier 4 Structural Repair Project	CATEX	REC (March 2009)	Army
Repair Damaged Pilings at Piers 3 and 4	CATEX	REC (January 2011)	Navy
IR Program Remedial Actions	ESA Consultation	NA	Army
Military Munitions Response Program	ESA Consultation	NA	Army
Present and Reasonably Foreseeable Actions			
Construction and Operation of a U.S. Army Reserve Center at MOTCO Inland Area	EA	FNSI (August 2012)	Army
Security Boat Ramp Repair and Upgrade Project	CATEX	REC	Army
San Francisco Bay Area Water Trail	EIR	NOD (March 2011)	California State Coastal Conservancy
Real Property Master Plan Projects	EA	FNSI (June 2013)	Army
Concord Reuse/Redevelopment	EIR	NOD (April 2011)	City of Concord
Concord Reuse/Redevelopment	EIS	EIS In Progress	Army
City of Concord's Off-Site Street Improvement Program Update	NA	NA	City of Concord

Notes: CATEX = Categorical Exclusion; EA = Environmental Assessment; EIR = Environmental Impact Report; EIS = Environmental Impact Statement; FNSI = Finding of No Significant Impact; NA = Not applicable; NOD = Notice of Determination; REC = Record of Environmental Consideration

Pier 4 Structural Repair Project

MOTCO's Pier 4 was damaged as the result of a collision with Hyundai Merchant Marine's vessel, *Pacific Success*, on 10 September 2006. When the collision occurred, this commercial ship was traversing the Stockton Deepwater Shipping Channel, located approximately 300 feet from the pier, for purposes unrelated to MOTCO missions. The collision damage to Pier 4 was located at the west end of the berth. In 2009, the Army implemented a structural repair project that spanned 132 feet of the 1,220-foot long pier. The repair involved demolition and construction including the following:

- Removal and replacement of damaged concrete deck members;
- Removal and replacement of four damaged 18-inch diameter pre-stressed concrete pilings and associated pile caps;
- Removal and replacement of 19 damaged timber fender pilings and associated timber elements; and
- Removal and replacement of damaged portions of the existing electrical system under the damaged portion of the deck.

The Army completed a Record of Environmental Consideration (REC) for this project in March 2009, concluding the proposed action qualified for a CATEX. The conclusion was based on evaluation of the proposed action as a standard repair to an existing structure resulting in minor degradation of environmental conditions limited to the construction phase. The project was not anticipated to have significant adverse direct, indirect, or cumulative effects to public health, safety, or the environment. Consultation with USFWS and NMFS was completed in accordance with Section 7 of the ESA on threatened and endangered species and EFH. It was concluded the proposed action may affect, but was not likely adversely affect the southern green sturgeon, central California coast steelhead, Central Valley steelhead, Central Valley spring-run Chinook salmon, Sacramento River winter-run Chinook salmon, and delta smelt. In addition, a Section 404 permit was obtained from the USACE and a Section 401 Water Quality Certification was obtained from the RWQCB. In addition, BCDC concurred the proposed action was consistent with the CZMA.

Repair Damaged Pilings at Piers 3 and 4

The Navy completed consultation with USFWS and NMFS and permitting for the removal and replacement of one damaged concrete piling at Pier 3 and one damaged timber piling at Pier 4. With adherence to the work window (1 September–30 November) and other permit requirements, negligible environmental impacts were anticipated. As a result, the Navy concluded the proposed action qualified for a CATEX.

IR Program Remedial Actions

As discussed in Section 3.13, the IRP identified 32 potentially contaminated areas, which are divided into 16 management sites in various DERP stages. None of the sites are within the vicinity of the proposed action. However, there have been a number of remedial actions within the Tidal Area that have been evaluated for potential impacts to threatened and endangered species, most notably at Site 1, Tidal Area Landfill and Site 30, Taylor Boulevard Bridge Disposal Area (both located southwest of Pier 2). At the Site 1, Tidal Area Landfill, the Army completed construction of the landfill cap in June 2012. At the Site 30, contaminated soil was removed and site restoration activities were completed in 2009. In addition to EPA oversight, ESA Section 7 and BCDC consultation occurred for this project. Surveys were conducted for California clapper rail, California black rail, and the salt marsh harvest mouse resulting in sporadic observation of California clapper rail and more regular observations of California black rail with no detection of salt marsh harvest mouse at these sites.

Military Munitions Response Program

There are three MMRP MRS at MOTCO, two of which are located within the proposed action area: MRS 8, Port Chicago Tidal Area and MRS 10, Suisun Bay Impact Area. A RI/FS was conducted August through October 2013 to retrieve ferrous material from 55 location in Suisun Bay within MRS 10 using a barge-mounted, crane-operated electromagnet; the MMRP MRS

project area was located within the deeper waters adjacent to the proposed Piers 2 and 3 project areas. Ferrous items picked up by the electromagnet were visually inspected by UXO technicians on the barge. Due to potential concerns that the remedial action could cause sedimentation and disturbance to biological resources, the Army coordinated with EPA and other agencies including NPS, USFWS, NMFS, BCDC, DTSC, and the RWQCB prior to commencement of work. BCDC did not object to the Army's negative determination, and the Army had training to determine what debris would be considered archaeologically significant. Furthermore, the Army made the preliminary determination the project may affect, but would not adversely affect the following ESA-listed species: green sturgeon, California Central Valley steelhead, Central Valley spring-run Chinook salmon, delta smelt, and Sacramento River winter-run Chinook salmon.

5.2.4.2 Present and Reasonably Foreseeable Actions

Present actions include those that are in detailed planning phases, under construction, or which have been recently initiated.

Construction and Operation of a U.S. Army Reserve Center at MOTCO Inland Area

The U.S. Army Reserve recently constructed and is now operating a Reserve Center and supporting facilities on an approximate 15-acre site in the Inland Area as part of the Grow the Army program. The Reserve Center accommodates 13 new U.S. Army Reserve units, which includes 10 full-time staff and 200–300 Reservists on drill weekends. The Reserve Center includes a 64,382 SF training building; a 9,634 SF Organizational Maintenance Shop; a 4,254 SF unheated storage building; and 25,910 square yards of organizational vehicle parking. The Reserve Center provides an 800-member training facility with administrative, educational, assembly, library, learning center, vault, weapons simulator, and physical fitness areas for the new units. The Organizational Maintenance Shop will provide administrative offices and work bays and washracks for maintenance operations. The proposed action would provide adequate unit storage, military equipment parking, and POV parking areas.

An EA was completed for this action in July 2010 resulting in a Finding of No Significant Impact (Vernadero Group Incorporated 2010). The construction and operation of the Reserve Center was determined to have the potential for minor, adverse impacts to land use; topography, geology, and soils; hydrology and water resources; biological resources; air quality; visual resources; utilities; transportation; hazardous and toxic substances; human health and safety; and the noise environment. However, these effects were determined to be less than significant. No impacts to cultural resources were found. In addition direct, beneficial impacts to the local economy were identified.

Security Boat Ramp Repair and Upgrade Project

The Army has proposed to upgrade an existing security boat ramp located just east of the Barge Pier in the MOTCO Tidal Area. The project footprint would be within the footprint of the existing

boat ramp that extends from high tide to 5 feet below MLLW with a total surface area of approximately 2,500 SF. The boat ramp improvements would replace the deteriorated sections of the existing ramp with a base layer of geotextile fabric, three inches of crushed gravel, 1-inch thick steel plates, and sheets of perforated steel landing mat. In addition, the project would include installation of a high mast light pole, gangway, and floating docks in Suisun Bay. The floating docks would be anchored to the Barge Pier by metal rings and rollers that would allow them to float with the tides. The 100-SF gangway would be installed over the floating docks. The foundation for the high mast light pole would occur above high tide and reach approximately 15 feet below ground surface.

The Army consulted with NMFS on potential ESA and EFH impacts in June 2009 (NMFS 2009) and concluded that the proposed project is not likely to adversely affect listed anadromous salmonids or the southern Distinct Population Segment of green sturgeon and is not likely to adversely affect essential physical or biological features associated with designated or proposed critical habitat for these species. Avoidance and minimization measures incorporated into this project include sedimentation control measures, in-water work window of 1 August–30 November, and management of materials including fuels, waste oils, and solvents. The new docks would increase shading in the area by approximately 1,152 SF. It was determined that the enlarged dock area may adversely affect EFH and recommended that 30 to 50 percent of the surface of the floating docks be constructed of grated material to allow transmission of light to the underlying habitat.

San Francisco Bay Area Water Trail

The California State Coastal Conservancy prepared an Environmental Impact Report (EIR) to analyze the potential impacts associated with implementing the Water Trail Plan. The San Francisco Bay Area Water Trail project would implement the Water Trail Plan through an access site designation process designed to support improved and safer non-motorized small boat access to San Francisco Bay and protect environmental resources (California State Coastal Conservancy 2011). Waters adjacent to MOTCO are part of the planned San Francisco Bay Area Water Trail. One existing (CC1) and one planned (CC22) launch site are proposed for designation near MOTCO. CC1 is in Martinez Marina, which is west of MOTCO; CC22 is located in the Bay Point Regional Shoreline, which is east of MOTCO (Figure 5-1).

Figure 5-1. Water Trail Plan Access Points Near MOTCO

Implementation of the Water Trail Plan would consist of the following five primary tasks:

1. Designation of access points;
2. Development of water trail signage;
3. Funding of select water trail-related facility improvements;
4. Coordination of education, outreach, and stewardship programs for non-motorized small boat users; and
5. Development and distribution of water trail information (California State Coastal Conservancy 2011).

It was noted in the EIR that boaters must maintain a distance of 100 yards at all times from MOTCO's three existing piers and 500 yards from MOTCO's three existing piers during periods when military shipments are moored (California State Coastal Conservancy 2011).

The EIR identified potentially significant impacts to recreation, navigation, aesthetics, biological resources, cultural resources, hydrology and water quality, as well as traffic, circulation, and parking. Mitigation measures identified in the EIR would reduce all of these impacts to a less than significant level (California State Coastal Conservancy 2011).

Real Property Master Plan Projects

In June 2013, the Army issued a Final EA and signed a Finding of No Significant Impacts for the implementation of several MOTCO RPMP projects. Short-term projects slated to be implemented within the next 7 years include six RPMP projects that are estimated for funding from FY13–19, demolition of up to 50 structures with estimated timeline of FY12 and beyond, proposed livestock grazing/fire management/upland invasive species control and management, cantonment area wildlife control, perennial pepperweed control and management, and inventory and evaluation of cultural resources at MOTCO.

Among the six RPMP projects, one is noted with the potential for cumulative impact when considered with this project. The Gate 5 Truck Inspection Station, funding for which is anticipated for FY15, would serve as the primary truck inspection location for the installation. The infrastructure associated with this project includes approximately 6,200 SF of facilities to include a guard booth, gatehouse, over-watch location, entrance canopy, and police substation with a Visitor Control Center. In addition, there would be approximately 100,000 SF of paved surfaces for POV parking, truck parking / queuing area, search areas, and dual-lane entrance and exit roads. Also included are sidewalks, security control devices and barriers, fencing, lighting, and landscaping. Additional utility service infrastructure would be installed to connect with existing systems.

When the facility is completed, truck and stevedore-related traffic would be shifted from Gate 2 to Gate 5, which would reduce the overall traffic at Gate 2 during MOTCO missions and increase safety and efficiency. During major missions, POVs would arrive and depart the Gate 5 area according to the mission-specific work schedule. These vehicles would park in the Gate 5 area (outside the ESQD arcs) and personnel would be shuttled to/from the work site. During a mission event, averaging approximately 36 days, cargo handling truck traffic is estimated to be 55 trucks per day and stevedore truck/bus/POV traffic is estimated to be 45 vehicles per day. In addition, daily internal truck traffic (estimated at 25–35 trucks per day) and construction-related truck traffic would be halted for the duration of any mission involving net explosive weight. For the purposes of this EIS, it is anticipated that Gate 5 would not be used during the Pier 3 repairs and Pier 2 demolition and construction activities.

Concord Community Reuse Redevelopment Project Plan

In January 2010, the City of Concord released the *Final Environmental Impact Report for the Concord Community Reuse Redevelopment Project Plan* (City of Concord 2010). The Final EIR addressed the potential environmental consequences of implementing a plan for the reuse of a 5,028-acre site in the Inland Area of former NWSSBD Concord (refer to Figure 1-3). The site is crossed by SR 4, east of its interchanges with I-680 and SR 242, and is crossed by Willow Pass Road and Bailey Road. Two alternatives were analyzed, the Clustered Villages Alternative and the Concentration and Conservation Alternative; the former was designated as the preferred alternative. The Clustered Villages Alternative focuses on a series of villages connected by transit, and would accommodate up to 12,272 residential units and 6.2 million SF of commercial and retail uses. The Concentration and Conservation Alternative concentrates development north of Willow Pass Road, and maximizes open space conservation by minimizing development south of Willow Pass Road and east of Mt. Diablo Creek. Under this alternative, the new land use would accommodate up to 10,203 residential units and 4.8 million SF of commercial and retail uses (City of Concord 2010).

The EIR analyzed impacts the proposed action would have on 14 resources areas: land use; transportation; visual resources; earth resources; hydrology; biological resources; cultural

resources; HM; air quality; noise and vibration; population, housing, and employment; public services; recreation; and utilities. The EIR determined the preferred alternative would result in significant impacts to land use, transportation, visual resources, biological resources, cultural resources, HM, air quality, noise and vibration, and utilities. With exception of impacts to land use, transportation, visual resources, air quality, and noise and vibration, impacts to previously mentioned resources could be mitigated to a level that was less than significant. In addition, the project would result in cumulative air quality and transportation impacts that are significant and unavoidable (City of Concord 2010; 2012).

The City of Concord prepared the *Final Environmental Impact Report Addendum* and *Initial Study of Environmental Significance for the Concord Reuse Project Area Plan* in January 2011 and January 2012 (City of Concord 2011; 2012). The documents were prepared to determine whether and to what extent the Reuse Plan Final EIR is sufficient for addressing impacts and providing mitigations for the Concord Reuse Project Area Plan.

The Navy is preparing an EIS to analyze the potential environmental consequences of the disposal of this NWSSBD Concord property and its subsequent reuse in a manner consistent with the Concord Reuse Project Area Plan, as adopted by the City of Concord on January 24, 2012 (City of Concord 2012; Navy 2013). A NOI was published in the *Federal Register* on 14 March 2013, and two public scoping meetings were held in April (Navy 2013). The Navy will analyze two property reuse alternatives and the no action alternative. Alternative 1 is defined as the reuse of the 5,038-acre property in a manner consistent with the Concord Reuse Project Area Plan and Alternative 2 consists of a greater amount of residential and mixed-use development.

Under Alternative 1, approximately 69 percent of the surplus property at the former NWSSBD Concord property would be maintained as conservation, parks, or recreational land uses and 31 percent would be mixed-use development, including a mix of office, retail, residential, community facilities, light industrial, and research and development/educational land uses. Development of the site would involve up to a maximum of 12,272 housing units and 6.1 million SF of commercial space, contributing to a total development footprint of approximately 1,545 acres. The remaining portion of the property would be used for conservation, parks or recreational land uses, including a 2,537-acre regional park, which would encompass the east side of the property along the ridgeline of the Los Medanos Hills (Navy 2013).

Under Alternative 2, approximately 60 percent of the property would be maintained as conservation, parks, or recreational land uses, and approximately 40 percent would be mixed-use development, including a mix of office, retail, hotel, residential, and community/institutional land uses. Development on the site would involve up to a maximum of 13,000 housing units and 7.9 million SF of commercial space over a total development footprint of approximately 2,000 acres (Navy 2013).

The Navy's EIS addresses potential direct, indirect, short-term, long-term, and cumulative impacts on topography, geology, and soils; water resources; biological resources; air quality; greenhouse gases and climate change; noise; infrastructure and utilities; transportation, traffic, and circulation; cultural resources; land use; socioeconomics and environmental justice; hazards and hazardous substances; and public services (Navy 2013). The Draft EIS is anticipated in the Fall/Winter of 2013.

City of Concord Off-Site Street Improvement Program Update

In January 2013, Kimley-Horn and Associates, Inc. prepared a final report detailing the Off-Site Improvement Program (OSIP) for the city of Concord (Kimley-Horn and Associates 2013). The purpose of this report was to update the OSIP fee on new development to fund the transportation facilities required to accommodate growth through 2030 and maintain the LOS established in the General Plan. This 2013 final report did not account for the Concord Reuse Project; a separate fee would be negotiated to mitigate any offsite transportation impacts from the reuse project. The City of Concord estimates Contra Costa County's Transportation Sales Tax Program, Measure J, will provide the funds to improve local roadway projects. In addition, other sources of funds have been identified to improve local roadway projects. Projects near MOTCO listed in the final report include the following.

- Arnold Industrial Place/SR 4 Eastbound ramps: install a new traffic signal.
- Arnold Industrial Way/SR 4 Westbound ramps: install a new traffic signal.
- Bates Avenue/Commercial Circle (east): install a new traffic signal.
- Bates Avenue – Industrial Way to Mason Circle (east): widen Bates Avenue to four lanes.
- Citywide: install traffic signal and/or other improvements/upgrades.
- Port Chicago Highway – Bates Avenue to UPRR crossing: widen Port Chicago Highway to four lanes.

5.2.5 Steps 5 and 6: Characterization of Resources and Their Responses to Change

Cumulative impacts analysis Steps 5 and 6 characterize the resource areas (identified in Steps 1 through 4) carried forward for further analysis in terms of their responses to change and capacity to withstand stresses affecting these resources, ecosystems, and human communities and their relation to regulatory thresholds.

- Water Quality and Wetlands as assessed in Section 4.3
- Air Quality as assessed in Section 4.4
- Biological Resources as assessed in Section 4.5.

5.2.6 Steps 7 and 8: Baseline Condition and Cause- and Effect Relationship between Human Activities and the Resources

The baseline conditions for the resources identified above that were carried forward in this cumulative impacts analysis are discussed in the following respective sections.

- Water Quality and Wetlands as assessed in Section 3.3
- Air Quality as assessed in Section 3.4
- Biological Resources as assessed in Section 3.5.

5.2.7 Step 9: Determination of the Magnitude and Significance of Cumulative Effects on the Selected Resource

The magnitude of cumulative impacts depends on compiled information for the individual resource areas and the Step 8 results. The significance thresholds in the respective Chapter 4 resource analysis sections are carried forward for this cumulative impacts analysis and are reiterated below for ease of reference followed by the cumulative effects analysis for each resource area.

5.2.7.1 Water Quality

Description of Geographic Study Area

Impacts to water resources are typically localized. Therefore, the study area considered in the cumulative analysis for this resource area is limited to projects that may occur at or in very close proximity to the proposed action area.

Relevant Past, Present, and Future Actions

The construction projects planned by the Army within the Tidal Area (as listed in Table 5.2-1) are relevant in that they could impact surface waters and the coastal zone. These actions include the pier work, security boat ramp repairs and upgrades, and MMRP program. It is not anticipated the San Francisco Bay Area Water Trail would result in any potential for cumulative impacts as it would involve access points for non-motorized small boats.

Cumulative Impact Analysis

Under the proposed action, implementation of Alternatives 1, 2, or 3 would result in short-term localized impacts to water quality from increased turbidity. However, implementation of the action alternatives would require permitting under both Section 10 of the Rivers and Harbors Act of 1899 and Section 404 of the CWA for “incidental fallback” that may occur during demolition and construction. A Section 401 Water Quality Certification from the RWQCB would include assurances that BMPs would be used to minimize potential impacts to water quality. This permitting process would ensure that state water quality standards would not be affected by implementation of these demolition or construction activities.

To minimize the impacts from temporary elevated turbidity, control floating debris, and to ensure that floating creosote-related contamination is constrained to the construction site, floating booms would be in place during the duration of the demolition and construction for both piers where feasible and effective. The replacement of the two damaged piles (one at Pier 3 and one at Pier 4), MMRP activities, and security boat ramp repair and upgrade would result in a negligible to minor impact on water quality, as the environmental resource would recover quickly. The Army secured permits for the Pier 4 repair project and the security boat ramp repair and upgrade to ensure impacts to water quality were minimized.

Natural turbidity levels within the Tidal Area are high, and it is anticipated all projects would be separated in time. Individually, all projects would be result in short-term and localized impacts to water quality, and it is expected the environment would recover. Moreover, permit requirements would minimize individual project impacts to the fullest extent possible. As a result, no significant adverse cumulative impacts are anticipated from the implementation of Alternatives 1, 2, or 3.

5.2.7.2 Air Quality

Description of Geographic Study Area

The study area considered in the cumulative impacts analysis for air quality includes areas in and near MOTCO. Refer to Section 5.2.7.3 for a discussion on cumulative impacts for GHGs.

Relevant Past, Present, and Future Actions

The local construction projects planned by the Army and the City of Concord (as listed in Table 5.2-1) are relevant in that they would produce emissions that would be additive to those produced by implementation of the proposed action.

Cumulative Impact Analysis

In terms of short-term cumulative impacts, the proposed action and other regional projects could produce short-term additive amounts of emissions if they are concurrent. As part of the air quality analysis in this EIS, a General Conformity applicability analysis was performed to determine if maximum annual direct and indirect emissions from the proposed action would exceed *de minimis* thresholds. Based on the air quality analysis performed for the proposed action, the maximum estimated emissions would be below conformity *de minimis* levels. Therefore, it is not anticipated that air emissions from other past, present, and future actions, when considered incrementally with Alternatives 1, 2 or 3, would exceed any regulatory standards. In terms of long-term cumulative impacts, Section 4.4 includes a complete discussion of emissions due to repair, demolition, construction, and mission activities associated with the proposed action. Operational emissions after construction would be expected to decline somewhat due to operational efficiencies associated with the replacement of aging equipment with new replacements. No other long-term emission sources have been identified for this

cumulative impact analysis. Therefore, no significant cumulative impacts to air quality are expected from implementation of Alternatives 1, 2, or 3.

5.2.7.3 Greenhouse Gases Emissions and Climate Change

Description of Geographic Study Area

Individual sources of GHG emissions are not large enough to have an appreciable effect on climate change. Since the potential effects of proposed GHG emissions on climate change are by nature global, the study area for this aspect is not defined.

Relevant Past, Present, and Future Actions

There are numerous local construction projects planned by the Army and the City of Concord, but these projects are not considered relevant because GHG emissions on climate change are by nature global. As discussed below, the proposed action has a negligible impact when compared to California and U.S. GHG emissions.

Cumulative Impact Analysis

Greenhouse gases are produced from the burning of fossil fuels, as well as through industrial and biological processes. There are no published NEPA thresholds of significance for GHG emissions resulting from a proposed action and formulation of thresholds is difficult when attempting to identify what level of emissions would substantially contribute to global climate change. In the absence of science-based significance thresholds, the Army continues to assess possibilities for GHG reductions, including use of alternative fuels and/or other renewable energy sources that may be available and suitable for these applications.

The cumulative effects for GHG emissions were evaluated for the proposed demolition and construction activities, which would produce emissions for a specific period of time. The presented GHG emissions are based on calculated GHG emissions for construction equipment, watercraft, and various highway vehicles.

Table 5.2-2 compares the net change in annual GHG emissions for Alternative 3, the action alternative with the greatest emissions, to the most recent U.S. and California GHG inventories (EPA 2013; CARB 2013).

Table 5.2-2. Comparison of Alternative 3, California, and U.S. GHG Emissions

Alternative 3	CO_2e per Year in Metric Tons	[1]Percent of California 2010 CO_2e Emissions	[2]Percent of U.S. 2011 CO_2e Emissions
2014	47	0.00001	0.0000007
2015	23	0.000005	0.0000003
2016	1,872	0.0004	0.00003
2017	1,013	0.0002	0.00001

Notes: [1]2010 gross emissions of 451,600,000 metric tons (CARB 2013)
[2]2011 gross emissions of 6,708,300,000 metric tons (USEPA 2013)

As shown in Table 5.2-2, the maximum GHG emissions from implementation of Alternative 3 is less than a thousandth of 1 percent of the total GHG emissions generated in California in 2010 and less than a hundred thousandth of 1 percent of GHG emissions generated in the United States in 2011.

Individual sources of anthropogenic GHG emissions are not large enough to have an appreciable effect on climate change. For this reason, emissions of GHGs from implementation of the proposed action alone would not cause appreciable global warming that would lead to climate change. These emissions would increase the atmosphere's concentration of GHGs, and, in combination with past and future emissions from all other sources, contribute incrementally to the global warming that produces the adverse effects of climate change. Therefore, an appreciable impact on global climate change would, if currently accepted predictions are accurate, only occur when proposed GHG emissions combine with other GHG emissions from other man-made activities on a global scale.

5.2.7.4 Biological Resources

Description of Geographic Study Area

The study area considered in the cumulative impacts analysis for biological resources includes the area located in proximity to Piers 2 and 3. Biological resources discussed include habitats, flora, fauna, and special status species. As discussed in Section 4.5, no net loss of wetlands is anticipated, nor are any adverse impacts to reptiles and amphibians or migratory birds from implementation of Alternatives 1, 2, or 3. In addition, implementation of the proposed action would result in minor adverse impacts to terrestrial, wetland, and aquatic vegetation; invertebrates; EFH; and mammals. Therefore, this section analyzes the potential cumulative impacts to fish and special status species. The limits of the study area for cumulative impacts encompass the area within which biologically meaningful changes in the environment of these resources would occur as a result of the project. This includes consideration of the project's effects on habitats, water quality, and underwater and airborne noise and how these effects may interact with those of other projects to impact biological resources.

Since the biological resources of the Bay-Delta region are mobile, they may experience impacts of the types caused by the proposed action but relatively far from MOTCO. Accordingly, consideration is given to whether the project's impacts would contribute to cumulative effects that are occurring to the species and habitats of interest on a regional scale from diffuse activities.

Relevant Past, Present, and Future Actions

The construction projects planned by the Army within the Tidal Area (as listed in Table 5.2-1) are relevant in that they could impact surface waters and the coastal zone. These actions include the pier work, security boat ramp repairs and upgrades, and MMRP program. It is not anticipated the San Francisco Bay Area Water Trail would result in any potential for cumulative

impacts as it would involve access points for non-motorized small boats. The INRMP provides general ecosystem benefits and a framework for the Army's future cooperation and collaboration with the resource agencies.

Cumulative Impact Analysis

The project's impacts to habitats would involve temporary disturbance of upland, intertidal, shallow water, and deep water habitats, with a long-term net reduction in overwater structures for Alternatives 1 and 2, generally considered a beneficial impact to fisheries and aquatic species of concern in the Delta, but a net increase for Alternative 3, generally considered a negative impact (NMFS 2011). NMFS notes a variety of potential cumulative effects caused by overwater structures in the Bay-Delta, including (but not limited to) shading effects on primary production; the fragmentation and destabilization of SAV habitats; habitat disturbance by vessels and anchors, and the potential for shipping activities to introduce non-native invasive species. NMFS considers water quality and noise effects associated with the construction of overwater structures to be important on the project-specific level, but not to have potential cumulative effects (NMFS 2011). Potential cumulative effects on habitats due to Alternatives 1 and 2 would be beneficial or negligible because both alternatives would reduce the extent of manmade structures in aquatic habitats at MOTCO, while operational activities under either alternative would not change. Alternative 3 would contribute to the negative cumulative impacts of overwater structures in the Bay-Delta.

Under the proposed action, implementation of Alternatives 1 through 3 would result in short-term impacts to water quality from increased turbidity. There would also be releases of contaminants from creosote-treated timber piles that undergo power washing and removal; and from disturbance to the sediments around the piles, which are presumed to contain PAHs leached from the piles, and may contain other contaminants deposited during use of the piers. The use of floating booms and nets to capture woody debris and floating hydrocarbons around pile washing and pile removal activities would contain and allow the removal of these contaminants, but would not prevent fine sediments from being dispersed out of the immediate area by tidal currents. The use of BMPs and the high current velocities in the immediate area would tend to flush and minimize mobilization of sediments and any associated creosote-related contaminants (e.g., PAHs). It was determined the replacement of the two damaged piles (one at Pier 3 and one at Pier 4) would result in a negligible to minor impact on water quality, as the environmental resource would recover quickly. The Army secured permits for the Pier 4 repair project and the security boat ramp repair and upgrade to ensure impacts to water quality were minimized. Furthermore, natural turbidity levels within the Tidal Area are high, and it is anticipated all relevant projects would be separated in time. Individually, all projects would be result in short-term and localized impacts to water quality, and it is expected the environment would recover to its original state prior to being potentially affected again. Moreover, permit

requirements would minimize individual project impacts to the fullest extent possible by mandating project-specific BMPs.

In-water noise would also be generated from the proposed action and other relevant actions in the area. As part of the proposed action, it is anticipated a cushion block of wood or composite (Micarta) material would be used to reduce the noise generated by pile driving by up to 7 dB. Based on the analysis in Sections 4.5.2.3, 4.5.3.3, and 4.5.4.3, a fish weighing greater than or equal to 0.07 oz. would be injured if present for 1,000 pile strikes within a distance of 23–72 feet (7–22 meters). The corresponding injury threshold distance for a smaller fish would be 46–131 feet (14–40 meters). The behavioral effects threshold distances, considered to be independent of size, are much larger, 384–1,119 feet (117–341 meters).

It is unlikely that fish, including special status species or those with EFH in the project area, would remain close to the construction activities long enough to experience harmful sound pressure levels. The most likely effects would be behavioral avoidance of the noise source. Fish reacting in this manner would be expected to move relatively short distances while remaining in similar habitats, incurring minor if any energetic costs (increased swimming / reduced feeding,) or changes in predation risk. Such localized, temporary behavioral effects would not be expected to contribute to cumulative effects on populations in the Bay-Delta. In addition, the replacement of the two damaged piles (one at Pier 3 and one at Pier 4), MMRP activities, and security boat ramp repair and upgrade would be completed during the work window when special status species are limited in numbers. These relevant projects, as well as the Pier 4 repair project and proposed action, would result in impacts that are localized and temporary. Water quality and in-water sound levels are anticipated to recover to baseline conditions prior to a subsequent potential impact. As a result, no significant adverse cumulative impacts are anticipated to fish or special status aquatic species from the implementation of Alternatives 1, 2, or 3.

Effects of any of the proposed action alternatives on special status terrestrial species would be minimized by the avoidance of occupied habitats; protective fencing and restoration of potential habitat (i.e. marsh) that would be subject to temporary impacts; requiring setbacks between noise-generating activities and occupied habitats; and (for salt marsh harvest mouse) protective monitoring to minimize the likelihood of harm to individuals. Given the limited extent and low likelihood of potential impacts due to the project, combined cumulative effects to local populations of special status terrestrial species are not expected.

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6.0 MITIGATION MEASURES

6.1 INTRODUCTION AND DEFINITION OF MITIGATION MEASURES

Mitigation is a specific NEPA term that refers to additional action taken to avoid, minimize, rectify, reduce/eliminate, or provide compensation for an adverse impact resulting from implementation of an action alternative. In 40 CFR Section 1508.20, mitigation includes the following:

- avoiding the impact altogether by not taking a certain action or parts of an action;
- minimizing impacts by limiting the degree or magnitude of the action and its implementation;
- rectifying the impact by repairing, rehabilitating, or restoring the affected environment;
- reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action; and
- compensating for the impact by replacing or providing substitute resources or environments.

6.2 BEST MANAGEMENT PRACTICES AND STANDARD OPERATING PROCEDURES

As discussed in Chapter 4, there are management actions such as BMPs and standard operating procedures (SOPs) that the Army implements on an ongoing basis to provide environmental protection. BMPs and SOPs are distinguished from mitigation measures in this EIS because they are 1) existing requirements for the proposed action, 2) ongoing, regularly occurring practices, and 3) not specific to the proposed action. Table 6.2-1 provides a summary of the relevant BMPs and SOPs to the proposed action analyzed in this EIS. The table indicates the BMP and/or SOP that would be applied, what phase of the project the BMP and/or SOP would be applied, and the primary resource areas that would benefit from the BMP and/or SOP. Implementation, monitoring of effectiveness, and revisions and updates of BMPs and SOPs are part of the Army's overall environmental management system cycle of continual improvement.

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Table 6.2-1. Summary of Relevant Best Management Practices and/or Standard Operating Procedures

Item	BMP/SOP	Description	Activity		Resource Area			
			Design	Construction	Geology and Soil	Water Resources	Biological Resources	Cultural Resources
1.	Erosion Control	A range of BMPs would control erosion during construction and operations to eliminate and/or minimize nonpoint source pollution in surface waters due to sediment. Erosion control BMPs include, but are not limited to, the following practices and procedures. **Construction:** • Erosion control through site approval process (whereby the proposed project site is reviewed for its erosion potential). • Topsoil removed from the site would be placed in the immediate area and reused for re-compaction purposes (if appropriate). • Soil exposed near water as part of the project would be protected from erosion with erosion control blankets (organic or synthetic fibers held together with net to cover disturbed areas) after exposure and stabilized as soon as practicable (with vegetation matting, hydroseeding, etc.). • Silt-containment (silt fences and other physical barriers that intercept runoff from drainage areas). • Re-vegetate as soon as possible after any ground disturbance or grading. • Minimize construction and grading during inclement weather. • Soil piles and exposed slopes covered during inclement weather. • Stockpiling of excavated materials behind impermeable berms and away from the influence of water bodies and runoff. • Implement a re-vegetation program to ensure graded benches are fully vegetated as landfills mature. • Vegetation/mulch stabilization (applying coarse plant residue to cover soil surface. The vegetation/mulch should be free of invasive species viable reproductive parts, such as rhizomes, seeds, and plants). • Level spreader (non-erosive outlet for runoff to disperse flow uniformly across slope). • Rock outlet protection (rock protection placed at end of culverts).		X	X	X	X	

Table 6.2-1. Summary of Relevant Best Management Practices and/or Standard Operating Procedures

Item	BMP/SOP	Description	Activity		Resource Area			
			Design	Construction	Geology and Soil	Water Resources	Biological Resources	Cultural Resources
		• Sediment basin (barrier that retains sediment from runoff).						
2.	Stormwater Management Plan (SWMP)	In compliance with the CWA under Section 401, the proposed action will require a SWMP. A SWMP is a document that describes the minimal procedures and practices used to reduce the surface flow and subsequent discharge of pollutants to storm drainage systems. Elements of a SWMP include structural and non-structural practices such as: • Check dams (small temporary stone dam across drainage). • Diversion dike/swale (berm or ditch that channels water to desired location). • Lined waterway (lined outlet for drainage). • Storm drain inlet protection (permeable barrier around inlets reducing sediment let into storm drain). • Stormwater ponds and wetlands. • Infiltration practices (capture/temporarily store water before infiltrating into the soil). • Use of groundwater recharge wells and infiltration basins, where applicable. • Filtering practices (capture/temporarily store water and pass through filter beds of sand, organic matter, soil, or other media).	X	X	X	X	X	
3.	Stormwater Pollution Prevention Plan (SWPPP)	• A SWPPP is a self-implementing plan for compliance with an installation's stormwater permit. • Facilities would be required to comply with the SWPPP during construction and then during day-to-day operations to ensure that stormwater remains free of contaminants. • The SWPPP requires development of pollution prevention measures to reduce and control pollutants in stormwater discharge.		X	X	X	X	
4.	Water Quality Monitoring Plan (WQMP)	• Monitoring plans identify ambient or control conditions at a particular site and capture deviations from those conditions resulting from a project or operations of a facility. • A WQMP may range in complexity from visual inspections for sedimentation and protection measure failure to laboratory or field analysis of chemical and biological effects on water quality or organisms (acute/chronic bioassay), dependent on a given water		X	X	X	X	

Table 6.2-1. Summary of Relevant Best Management Practices and/or Standard Operating Procedures

Item	BMP/SOP	Description	Activity		Resource Area			
			Design	Construction	Geology and Soil	Water Resources	Biological Resources	Cultural Resources
		resource.						
5.	Leadership in Energy and Environmental Design (LEED) Certification	LEED is a voluntary point system tool that measures the degree of sustainability features incorporated into a development. Some LEED requirements include: • Reduction of electrical energy use in buildings by 10 percent to save power. • Increased water efficiency. • Renewable energy use. • The sustainability/LEED initiatives would help reduce potable water use and should have a positive effect on demand for wastewater treatment.	X	X	X	X	X	

6.	Low Impact Development (LID) Design Technology	Examples of LID design include:
		• Grassed vegetation maintained on berms.
		• Native plant landscaping.
		• Avoidance of pesticides and fertilizers.
		• Watershed-based management.
		• A watershed protection management approach could consider:
		  • Participating in the development of a watershed management plan.
		  • Implementing and adopting specific watershed protection strategies.
		  • Designing land use planning techniques that reduce or shift impervious cover and enhance percolation.
		  • Work towards achieving important water resource goals.
			X	X	X	X	X	

7.	Energy Policy Act (EPACT)	Energy Policy Act compliance includes energy use analysis and life-cycle cost analysis using a simulated model and the following energy conservation measures: • Buildings achieve an energy consumption level that is 30 percent below the level achieved by ASHRAE Standard 90.1. • Use low energy consuming products that are either Energy Star-qualified or Federal Energy Management Program-recommended. • Optimize building orientation to reduce cooling loads or energy loads to cool the buildings.	X	X	X	X	X	

Table 6.2-1. Summary of Relevant Best Management Practices and/or Standard Operating Procedures

Item	BMP/SOP	Description	Activity		Resource Area			
			Design	Construction	Geology and Soil	Water Resources	Biological Resources	Cultural Resources
		• Optimize building insulation. • Seal building envelope for air tightness. • Incorporate “cool roof” building designs. • Use motion detectors to reduce lighting and to setback cooling in unoccupied buildings. • Natural lighting.						
8.	Water Conservation Plan	Water Conservation Plans include the use of: • Low-flow faucets. • Ultra-low-consumption toilets/urinals with electric flush sensors. • Water-efficient cooling systems. • Rainwater collection and reuse. • Meters installed at all facilities and key locations within the water distribution system that can significantly improve the ability to quickly identify leaks and take corrective action.	X	X		X		
9.	Hazardous Materials Management Plan (HMMP)	HMMPs describe implementation procedures for the transportation, storage, use, and disposal of HM. HMMPs would also include waste minimization plans that provide protocols designed to encourage and promote the efficient use of HM, substitute products that are less toxic whenever feasible, minimization of their use, and promote recycling and reuse of HM. HMMPs would contain procedures such as: • Hazardous materials spill/release control (use of secondary containment and leak detection methods in operations involving liquid hazardous substances). • Construction materials and all construction-related materials should be free of leachable pollutants. • Train personnel (DOD personnel and contractors in proper labeling, container, storage, staging, and transportation requirements for hazardous substances. Also, they are trained in accordance with spill prevention, control, and cleanup methods). • Perform all vehicle maintenance activities at existing DOD maintenance shops. • Ensure that all personnel and contractors store, handle, and dispose of all POL per all applicable local and federal laws, regulations, and requirements.		X	X	X	X	

Table 6.2-1. Summary of Relevant Best Management Practices and/or Standard Operating Procedures

Item	BMP/SOP	Description	Activity		Resource Area			
			Design	Construction	Geology and Soil	Water Resources	Biological Resources	Cultural Resources
		• Temporary equipment laydown or construction staging areas would be located in previously disturbed (e.g., paved) areas.						
10.	Hazardous Waste Management Plan (HWMP)	HWMPs include waste minimization plans that provide protocols designed to encourage the efficient use of HW, substitute products that are less toxic whenever feasible, minimize their use, and promote recycling and reuse of HW. HWMPs include the following recommendations: • Update and implement the existing HWMP to include procedures for the transportation, storage, use, handling, and disposal of HW. • Modify project-specific HW disposal protocol as appropriate. • Ensure personnel and contractor training regarding project- and facility-specific HW plans. • The use of spill/release control (use of secondary containment and leak detection methods in operations involving liquid hazardous substances). • Ensure appropriate housekeeping protocol (improving overall HW housekeeping practices, keeping area swept, wiping up spills, etc.) • Perform all maintenance activities at existing DOD maintenance shops. • Ensure all federal, state, and DOD laws and regulations are being observed via inspections/audits/surveillances and implement corrective actions as necessary. Also ensure that all personnel and contractors manage, store, handle, transport, and dispose of HW in accordance with applicable federal and state regulations. • Temporary equipment laydown or construction staging areas would be located in previously disturbed (e.g., paved) areas. • When new construction occurs on sites where contamination and/or MEC has been identified, ensure that the risk of human/ecological exposure is minimized via the use of site-specific health and safety plans, engineering and administrative controls, and PPE in accordance with 29 CFR Section 1910.120 (HW operations and emergency response operations). These site-specific health and safety plans must specifically address how		X	X	X	X	

Table 6.2-1. Summary of Relevant Best Management Practices and/or Standard Operating Procedures

Item	BMP/SOP	Description	Activity		Resource Area			
			Design	Construction	Geology and Soil	Water Resources	Biological Resources	Cultural Resources
		these controls would be implemented to ensure the protection of human health and the environment.						
11.	Spill Prevention Control and Countermeasures Plans (SPCC) and Facility Response Plans (FRPs)	• Update and implement existing SPCC plan to assess and respond to hazardous substance spills and/or releases. • Update and implement existing FRPs for responding to releases, leaks, or spills of hazardous substances. • Ensure DOD personnel are trained as to proper labeling, container, storage, staging, and transportation requirements for hazardous substances. Also, ensure they are trained in accordance with spill prevention, control, and cleanup methods. • Ensure POL fuel transfers kept away from water bodies and a response/contingency plan is in place in the event of any releases, leaks, or spills. • Ensure proper labeling of all hazardous substance containers to prevent inappropriate storage or use. • Contaminant migration control (e.g., reducing contaminant migration pathways by preventing releases to drains, pipelines, and sewers and the use of absorbent pads and materials to prevent and control spills and releases). • Ensure that contaminants (e.g., oils, greases, lubrication fluids for heavy equipment) are properly stored at work sites and temporary construction staging areas to avoid spills, releases, and leaks. • Ensure that emergency response plans are in place for responding to releases, leaks, or spills of hazardous substances. • Minimize the risk of uncontrolled leaks, spills, and releases through industry and Army accepted methods for spill prevention, containment, control, and abatement. • Minimize the risk of human exposure to contaminated media through the use of a site-specific health and safety plan, engineering and administrative controls, and appropriate personal protective equipment (PPE) (e.g., indicating where eye-wash stations, fire extinguishers, etc., are located).		X	X	X	X	

Table 6.2-1. Summary of Relevant Best Management Practices and/or Standard Operating Procedures

Item	BMP/SOP	Description	Activity		Resource Area			
			Design	Construction	Geology and Soil	Water Resources	Biological Resources	Cultural Resources
12.	Munitions and Explosives of Concern (MEC)	• Comply with all applicable MEC protocol, procedures, and guidance. • Reduce the potential exposure to UXO through surveys or other means to identify and remedy this hazard prior to building upon a site. Work would be conducted by qualified UXO specialists. • Implement all applicable DOD MEC operations guidance to minimize or eliminate potential MEC explosion hazards and other adverse impacts. • Train construction crews on identifying and responding to MECs encountered in the field. UXO personnel would be available to monitor earthmoving activities.		X		X	X	X
13.	Natural Resources Management (Terrestrial Focused)	• Comply with Migratory Bird Treaty Act requirements. • Achieve INRMP obligations.		X		X	X	
14.	Natural Resources Management (Marine Focused)	Minimize contamination of the marine environment from project-related activities through actions such as: • Contractors are required to have and to implement a contingency plan to control and contain toxic spills, including petroleum products. Appropriate materials to contain and clean potential spills would be maintained and readily available at the work site. • All construction project-related materials and equipment placed in the water would be free of pollutants. The project manager and heavy equipment operators would perform daily pre-work equipment inspections for cleanliness and leaks. All heavy equipment operations would be postponed or halted should a leak be detected, and would not proceed until the leak is repaired and equipment cleaned. This information is written into the construction contract conditions. • Fueling of construction project-related vehicles and equipment would take place at least 50 feet away from the water, preferably over an impervious surface. With respect to construction equipment that cannot be fueled out of the water, spill prevention booms would be employed to contain any potential spills. Any fuel spilled would be cleaned up		X		X	X	

Table 6.2-1. Summary of Relevant Best Management Practices and/or Standard Operating Procedures

Item	BMP/SOP	Description	Activity		Resource Area			
			Design	Construction	Geology and Soil	Water Resources	Biological Resources	Cultural Resources
		immediately. • A plan would be developed and implemented to prevent construction debris from entering or remaining in the marine environment during the project.						
15.	Transportation Specific	Roadway project construction BMPs include the following recommendations: • Temporary equipment laydown or construction staging areas would be located in previously disturbed (e.g., paved) areas. • Material from demolition of existing road pavements would be stored in previously disturbed areas whenever possible. • An Erosion and Sediment Control Plan for roadway construction/work would be prepared and implemented in construction plans and practices to the maximum extent practicable. • Prevent leaks or spills of contaminants by ensuring all temporary equipment laydown or construction staging areas are constructed with secondary containment for storage of any hazardous or petroleum products. • Locate temporary equipment laydown or construction staging areas in previously disturbed (e.g., paved) areas.		X	X	X	X	
16.	Noise Abatement	BMPs to abate noise from roadway construction include the following: • Ensure that all equipment items have the manufacturers' recommended noise abatement measures, such as mufflers, engine enclosures, and engine vibration isolators, intact and operational. • Inspect all construction equipment at periodic intervals to ensure proper maintenance and presence of noise control devices (e.g., mufflers and shrouding). • Turn off idling equipment. • Implement a construction noise monitoring program to limit potential impacts. • Plan noisier operations during times least sensitive to receptors. • Avoid scheduling construction during nighttime hours (10:00 p.m. to 7:00 a.m.) and on weekends. • Keep noise levels relatively uniform and avoid impulsive noises.		X			X	

Table 6.2-1. Summary of Relevant Best Management Practices and/or Standard Operating Procedures

Item	BMP/SOP	Description	Activity		Resource Area			
			Design	Construction	Geology and Soil	Water Resources	Biological Resources	Cultural Resources
		• Maintain good public relations with the community to minimize objections to the unavoidable construction impacts. • Provide frequent activity updates of all construction activities.						
17.	Cultural Resources	• Archaeological monitoring during construction in consultation with the SHPO. • For post-review discoveries, an assessment would be made for NRHP eligibility in consultation with the SHPO.		X	X			X
18.	Seismic Design	• During project design and construction, hazards associated with earthquakes and fault rupture would be minimized.	X	X	X			
19.	USACE 401 and 404 Permit Conditions	Compliance with USACE 404 and 401 permit conditions such as: • The installation of silt curtains in nearshore shallow water areas to control turbidity. • Dredging operations may be suspended during inclement weather to prevent accidental release of dredged material and to ensure the integrity of silt curtains or other containment barriers, if utilized. • Water quality monitoring. • Adjustments resulting from water quality monitoring such as slowing or stopping operations.		X		X	X	

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6.3 MITIGATION MEASURES INCLUDED IN THIS EIS

The BMPs and SOPs included in Chapter 4 and summarized in Section 6.2 will continue to minimize overall effects associated with the proposed action. Separately, the Army has entered into consultation concerning the proposed action as required by Section 106 of the NHPA regarding the Army's determination that the proposed action would have no adverse effect on cultural resources or historic properties. The Army has also entered into consultation with NMFS and USFWS as required by Section 7 of the ESA regarding the Army's determination that the proposed action may affect threatened and endangered species. Table 6.3-1 identifies the avoidance, minimization, and/or compensation measures identified during the development of regulatory consultation documents. These measures are considered within DOD control and would be implemented by the DOD. These measures will be refined as part of the consultation process and documented in the Final EIS and ROD.

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Table 6.3-1. Proposed Mitigation Measures

Proposed Mitigation Measure
General Avoidance and Minimization Measures
A qualified biologist will conduct mandatory contractor/worker awareness training for construction personnel. The awareness training will be provided to all construction personnel to brief them on the need to avoid effects to listed species and their habitat and the potential for any special-status wildlife species to occur on the site. If new construction personnel are added to the project, the contractor will ensure that the personnel receive the mandatory training before starting work. A representative will be appointed during the employee education program to be the contact for any employee or contractor who might inadvertently kill or injure a listed species or who finds a dead, injured, or entrapped species. The representative's name and telephone number will be provided to USFWS prior to the initiation of any demolition or construction activity.
Project personnel will be directed to use BMPs where applicable, such as for prevention of soil erosion and sedimentation of aquatic habitats and introduction and spread of invasive plant species. These measures will be identified prior to construction and incorporated into the construction operations.
Vehicular traffic will be confined to existing roads and the proposed access routes.
No pets will be permitted in the project area to avoid harassment, killing, or injuring of wildlife.
Access roads, staging areas, and in-water work areas shall be clearly identified in the field using orange construction fence, signage, buoys, or similar as appropriate. Work shall not be conducted outside designated work areas.
The project site will be maintained trash-free, and food refuse will be contained in secure bins and removed daily during construction.
Nighttime work near tidal marsh habitat will be avoided to the extent feasible. If nighttime work cannot be avoided, lighting will be directed to the work area, minimizing the lighting of tidal marsh habitat.
No vehicles or equipment will be refueled within 100 feet of wetlands or aquatic habitats unless a bermed and lined refueling area is constructed. Any vehicles driven and/or operated within or adjacent to wetlands or aquatic habitats will be checked and maintained daily to prevent leaks of materials.
Use of chemicals, fuels, lubricants, or biocides will be in compliance with all local, state, and federal regulations. This is necessary to minimize the possibility of contamination of habitat or poisoning of wildlife. All uses of such compounds will observe label and other restrictions mandated by the U.S. Environmental Protection Agency, California Department of Food and Agriculture, and other state and federal legislation.

Table 6.3-1. Proposed Mitigation Measures

Proposed Mitigation Measure
Species Specific Avoidance and Minimization Measures
Soft Bird's-Beak
Prior to construction within or adjacent to tidal marsh habitats, TEF will be installed between the work area and any remaining marsh vegetation adjacent to the project footprint immediately to prevent encroachment by construction vehicles and personnel. The TEF would be a temporary, plastic mesh-type fence (Tensor Polygrid or equivalent) at least 4 feet tall. A qualified biologist will determine the exact location of the fencing. The fencing will be strung tightly on posts set at maximum intervals of 10 feet and will be checked and maintained as needed until construction is complete.
No grading, clearing, storage of equipment or machinery, or other disturbance or activity will occur within or adjacent to tidal marsh habitats until the TEF has been installed and approved by the qualified biologist.
California Clapper Rail
Activities within or adjacent to tidal marsh habitat will be avoided during the California clapper rail breeding season from February 1 through August 31 each year until protocol surveys are conducted and either 1) clapper rails are determined not to occur in the action area; or 2) any clapper rail territories discovered in the surveys will be avoided. The surveys will be conducted according to the most recent survey protocol issued by the USFWS (dated 7 December 2009), unless an updated protocol is released prior to survey initiation. The 2009 protocol entails conducting four passive surveys of 2-hour duration at each survey station, with no taped playback being used during any of the four surveys. Surveys will be conducted between 15 January and 15 April; surveys are to be initiated between 15 January and 1 February with at least two to three weeks between each survey to ensure surveys are conducted throughout the optimal calling period. For each survey, stations will be established 656 feet apart along White Road, which parallels the tidal marshes, adjacent to project activities at Piers 2 and 3. All potential clapper rail nesting habitat within 700 feet of project work areas will be surveyed.
If breeding clapper rails are determined to be present, activities will not occur within 700 feet of an identified calling center. If the intervening distance across a major slough channel or across a substantial barrier between the clapper rail calling center and any activity area is greater than 200 feet, then it may proceed at that location within the breeding season.
If protocol surveys detect California clapper rails in the project action area as defined above, activities within or adjacent to California clapper rail habitat (salt marsh wetlands) will not occur within two hours before or after extreme high tides (6.5 feet or above, as measured at the Golden Gate Bridge), when the marsh plain is inundated. This measure is appropriate because protective cover for California clapper rails is limited and activities could prevent them from reaching available cover.

Table 6.3-1. Proposed Mitigation Measures

Proposed Mitigation Measure
Salt Marsh Harvest Mouse
Where marsh vegetation representing potentially suitable habitat for salt marsh harvest mice is present and needs to be removed, work will be conducted using hand-held tools in a manner to enable and encourage wildlife to escape from the construction area. Vegetation shall be removed only with non-mechanized hand tools (i.e., trowel, hoe, rake, and shovel). No motorized equipment, including weed whackers or lawn mowers, shall be used to remove this vegetation. Vegetation will be removed to bare ground. Vegetation shall be removed under the supervision of a USFWS-approved biologist. If a mouse that could potentially be this species is observed within the areas being removed of vegetation, the USFWS shall be notified. Vegetation removal may begin when no mice are observed and shall start at the edge farthest from highest quality habitat, or the poorest habitat, and work its way towards any higher quality habitat.
To prevent salt marsh harvest mice from moving into the project site during construction, a TEF will be installed between the work area and any remaining marsh vegetation adjacent to the project footprint immediately after the vegetation removal and prior to the start of any other construction activities. The TEF will be made of a heavy plastic sheeting material that does not allow salt marsh harvest mice to pass through or climb, and the bottom should be buried to a depth of 2 inches so that these species cannot crawl under the fence. The TEF height will be at least 12 inches higher than the highest adjacent vegetation with a maximum height of 4 feet. The TEF will be removed after all construction is complete.
No materials or supplies that could potentially entrap salt marsh mice will be stored in salt marsh vegetation. These include pipes, storage containers, landscaping materials, plastic sheeting, or other materials that small animals could use for cover. All equipment will be stored at designated staging areas, which consists of existing lots devoid of vegetation.
A USFWS-approved biologist will monitor all construction activities within potentially suitable habitat. The on-site biologist(s) will possess a working cellular telephone, and this phone number will be provided to the USFWS. The USFWS-approved biologist will also be the contact for any employee or contractor who might inadvertently injure a salt marsh harvest mouse, or find an injured or entrapped salt marsh harvest mouse.
The USFWS-approved biologist will look for salt marsh harvest mice immediately prior to and during all construction activities. If a salt marsh harvest mouse, or any mouse that the biologist or construction personnel believe may be this species, is encountered, all work that could result in direct injury, disturbance, or harassment of the individual animal will immediately cease, and the foreman and USFWS-approved biologist will be immediately notified. The USFWS-approved biologist will monitor it until he/she determines that the animal(s) is not imperiled by predators or other dangers. The USFWS-approved biologist will notify the USFWS within one working day following any encounters with a potential salt marsh harvest mouse during construction via electronic mail and telephone.

Table 6.3-1. Proposed Mitigation Measures

Proposed Mitigation Measure
Prior to the start of daily construction activities, the USFWS-approved biologist will inspect the salt marsh harvest mouse TEF to ensure that it is neither ripped nor has holes and that the base is still buried. The fenced area will also be inspected to ensure that no mice are trapped in it. Any mice found along and outside the fence will be closely monitored until they move away from the construction area.
Any contractor, employee, or agency personnel who inadvertently kills or injures a salt marsh harvest mouse will immediately report the incident to the USFWS-approved biologist. The USFWS-approved biologist will contact the USFWS to report the dead or injured animal via electronic mail and telephone within one working day.
Delta Smelt, Green Sturgeon, Central California Coast Steelhead DPS, Central Valley Steelhead DPS, Central Valley Spring-run Chinook ESU, and Sacramento River Winter-run Chinook ESU
With exception of maintenance dredging, once work begins, it would proceed to completion as efficiently as possible, with repair, demolition, and construction activities overlapping where practicable to minimize the overall duration of in-water activities occurring outside of work windows. Dredging would only occur within the approved delta smelt work window (1 August through 30 November).
Cushion blocks made of wood or a composite material such as Micarta will be used to reduce impact pile driving noise.
To minimize potential effects caused by the mobilization of material that may contain toxins, silt curtains would be employed where practicable and effective to surround the immediate work area and confine sediment dispersion as much as possible to the inshore areas of the piers.
The Army will investigate the use of a vibratory hammer to drive the concrete piles and will use the vibratory hammer to the extent practicable to reduce underwater sound from impact pile driving.
No equipment or vehicles will be stored on the piers when not in use to reduce the potential for any spills or debris entering the water column.
All vehicles and equipment will be properly maintained to reduce the potential for spills of petroleum-based products. Containment booms and sorbent materials will be available during the activity and will be deployed immediately in the event of a spill to limit its spread.
To minimize the potential for impacts from hazardous or regulated materials, all fuel, waste oils, and solvents will be stored well away from the construction zone. Any spill of such materials will be immediately contained in accordance with the Spill Prevention, Control, and Countermeasure Plan.
To minimize disruption of the sediment layer, piles will be carefully removed via the “vibratory hammer” or “direct pull” methods. The vibratory hammer method involves dislodging the pile, and then slowly lifting the pile (in its entirety) from the sediments. The direct

Table 6.3-1. Proposed Mitigation Measures

Proposed Mitigation Measure
pull method involves placing a choker around the pile and slowly pulling upward with a crane or other equipment.
If timber pile breakage occurs (World War II-era piles may be more vulnerable), the stub will be removed utilizing a hydraulic shear and crane or other equipment in attempts to cleanly pull out the stub. If the stub cannot be removed, it will be cut 2 feet below the mudline.
Minimal cutting and boring will occur over the water; if necessary, tarps or other capture devices will be used to reduce the likelihood of materials entering the water.
A floating surface boom will be placed around the work area to ensure that debris that falls in the water will be captured and promptly removed. The upper part of the boom will consist of sorbent material to capture floating hydrocarbons that may be associated with the creosote piles.
All debris and damaged piles will be slowly lifted from the water and placed on the work surface of the barge within a containment basin that is constructed with durable plastic sheeting and designed to contain all sediment, without attempting to clean or remove any adhering sediment. The cut up piling, sediments, construction residue, and plastic sheeting will then be disposed of properly offsite in a manner that does not expose or affect aquatic resources.
The proposed action would increase the amount of unshaded, shallow water habitat that is suitable for submerged aquatic vegetation (SAV) - consisting of pondweed (*Stuckenia* spp.), as well as low-intertidal bulrush (*Schoenoplectus* spp.), and would impact only a small portion of the area occupied by these species at Piers 2 and 3. A post-construction survey will be conducted for comparison with the 2013 survey data to quantify any changes in the extent of pondweed and bulrush, and to determine, in consultation with the National Marine Fisheries Service (NMFS) and USFWS whether compensatory mitigation may be warranted.
During the design phase of this project, further efforts will be made to reduce project related effects to listed species by modifying, to the extent possible, construction methodology and implementing design refinements. Coordination with NMFS and USFWS will continue throughout the design and construction phases.
Compensation for Habitat
Habitat within the areas currently occupied by structures would be restored to include establishing desired elevations for tidal marsh communities, and the removal of bordering stands of perennial pepperweed, including excavation of the roots and surface soil and seedbank. Native high marsh species such as alkali heath and gumplant will be reestablished in these areas using locally obtained material.

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7.0 REFERENCES

Chapter 1 Introduction

KCI Technologies, Inc. 2013. MOTCO Pier 3 Special Inspection Report Facility Number: 00101, Military Ocean Terminal Concord, California. March.

Chapter 2 Description of Proposed Action and Alternatives

Enright, C. and S. D. Culberson. 2010. Salinity Trends, Variability, and Control in the Northern Reach of the San Francisco Estuary. San Francisco Estuary and Watershed Science 7(2).

KCI Technologies, Inc. 2013. MOTCO Pier 3 Special Inspection Report, Facility Number: 00101, Military Ocean Terminal Concord, California. March.

_____. 2012. MOTCO Barge Pier Routine Inspection Report, Facility Number: 00126, Military Ocean Terminal Concord, California. February.

Moffatt & Nichol. 2013a. MOTCO Pier 2 Modernization Constructability Memo. June.

_____. 2013b. MOTCO Pier 3 Renovation Constructability Memo. June.

_____. 2013c. MOTCO Pier 2 Concept Design Report. June.

U.S. Army Corps of Engineers (USACE). 2012. MOTCO Pier 2 Routine Inspection Report. February.

_____. 1995. Historic San Francisco Bay Region Maintenance Dredging Quantities. 28 September.

_____. 1975. Final Composite Environmental Statement for Maintenance Dredging of Existing Navigation Projects, San Francisco Bay Region, California. December.

Chapter 3 Affected Environment

3.1 Port Operations

Army. 2013. Army Techniques Publication 4-12, Army Container Operations. http://armypubs.army.mil/doctrine/DR_pubs/dr_a/pdf/atp4_12.pdf (12 September 2013). May.

Personal communication, email from P. Cameron, MOTCO Operations to C. Everson, Cardno TEC regarding MOTCO Missions. 24 July 2013.

3.2 Earth Resources

California Division of Oil, Gas, and Geothermal Resources (DOGGR). 2003. Map of Drill Locations. Department of Conservation. ftp://ftp.consrv.ca.gov/pub/oil/maps/dist6/612/Map612.pdf.

California Geological Survey. 2002. California Fault Parameters.

Contra Costa County. 2005. Contra Costa County General Plan 2005-2020. January.

MOTCO. 2011. Final Real Property Master Plant for Military Ocean Terminal Concord, California. May.

San Francisco Bay Regional Water Quality Control Board (SFBRWQCB). 1986. Order Number 86-54, An Order Amending Order Number 85-111, Waste Discharge Requirements for U.S. Army Corps of Engineers; Thomas A. Stark Court Appointed Receiver for Golden State Home Loans; Rich Island Duck Club; Department of the Navy, Naval Weapons Station; and Crowley Maritime Association, Contra Costa and Solano Counties. 16 July.

U.S. Army Corps of Engineers (USACE). 1995. Historic San Francisco Bay Region Maintenance Dredging Quantities. 28 September.

_____. 1975. Final Composite Environmental Statement for Maintenance Dredging of Existing Navigation Projects, San Francisco Bay Region, California. December.

U.S. Geological Survey (USGS). 2006. Maps of Quaternary Deposits and Liquefaction Susceptibility in the Central San Francisco Bay Region, California. Geology by Robert C. Witter, Keith L. Knudsen, Janet M. Sowers, Carl M. Wentworth, Richard D. Koehler, and Carolyn E. Randolph and digital database by Carl M. Wentworth, Suzanna K. Brooks, and Kathleen D. Gans.

3.3 Water Resources

Cowardin, L. M., V. Carter, F. C. Golet, and E. T. LaRoe. 1979. Classification of Wetlands and Deepwater Habitats of the United States. December.

MOTCO. 2011. Final Real Property Master Plant for Military Ocean Terminal Concord, California. May.

Personal communication, email from John Audinis, Environmental Compliance, MOTCO. 25 March 2013.

U.S. Environmental Protection Agency (USEPA). 1998. Coastal Water Fact Sheets-Nearshore Waters and Your Watershed. http://water.epa.gov/type/oceb/fact3.cfm (2 April 2013).

_____. 2010. Watershed Assessment, Tracking, and Environmental Results. http://iaspub.epa.gov/tmdl_waters10/attains_watershed.control?p_huc=18050001&p_cycle=&p_report_type=T (2 April 2013).

USEPA and U.S. Army Corps of Engineers (USACE). 2008. Clean Water Act Jurisdiction Following the U.S. Supreme Court's Decision in Rapanos v. United States and Carabell v. United States. 2 December.

3.4 Air Quality

U.S. Environmental Protection Agency (USEPA). 2009. Mandatory Reporting of Greenhouse Gases; Final Rule. 74 FR 56260–56519.

_____. 2007. Control of Emissions of Hazardous Air Pollutants from Mobile Sources; Final Rule. 72 FR 8428–5870.

_____. 2001. Control of Emissions of Hazardous Air Pollutants from Mobile Sources; Final Rule. 66 FR 17230–17273.

3.5 Biological Resources

American Bird Conservancy. 2009. http://www.enature.com/partners/abc/localguide/localguide_abc_display.asp?curGroupID=1&zipcode=94585&ibaID=337 (12 November 2009).

Atlantis. 2009. Rediscovering Our Lost World: Western Pond Turtle (*Clemmys marmorata*). http://www.atlantismagazine.com/bettelheim/pondturtle.html (14 October 2009).

Audubon Society. 2009. #8 Common Bird in Decline Loggerhead Shrike (*Lanius ludovicianus*). http://stateofthebirds.audubon.org/cbid/profile.php?id=8 (14 October 2009).

Bay-Delta Conservation Plan (BDCP). 2008. Draft Document Covered Species Accounts: Suisun Marsh Aster. Appendix A.28. November.

Bay Institute. 2005. Ecological Scorecard Fish Index: Indicator Analysis and Evaluation. http://www.bay.org/assets/Fish.pdf (13 November 2009).

Baye, P. R., Faber, P. M., and Grewell, B. 1999. Tidal Marsh Plants of the San Francisco Estuary. In - Goals Project. 1999. Baylands Ecosystem Habitat Goals. A report of habitat recommendations prepared by the San Francisco Bay Area Wetlands Ecosystem Goals Project. U.S. Environmental Protection Agency, San Francisco, Calif./S.F. Bay Regional Water Quality Control Board, Oakland, Calif. 435 pp.

Brandes P. L., J. S McLain. 2001. Juvenile Chinook salmon abundance, distribution, and survival in the Sacramento-San Joaquin Estuary. In: Brown RL, editor. Contributions to the Biology of Central Valley Salmonids. *Fish Bulletin* 179(2). Sacramento (CA): California Department of Fish and Game. pp 39-136.

California Department of Fish and Wildlife (CDFW). 2013a. Chinook Salmon. http://www.dfg.ca.gov/fish/Resources/Chinook/ (3 April 2013).

_____. 2013b. Delta Smelt Larvae Survey for March 18–19, 2013. Fish Distribution Map

_____. 2013c. State and Federally Listed Endangered and Threatened Animals of California. January.

_____.2012. Delta Smelt Larvae Survey for March 19–20, 2012. Fish Distribution Map.

_____.2010a. A Comprehensive Monitoring Plan for Steelhead in the California Central Valley. Fisheries Branch. Administrative Report Number. 2010-2. October.

_____. 2010b. Review of Present Monitoring Programs in the California Central Valley May 2008. Fisheries Branch. Administrative Report Number. 2010-1. October.

California Department of Water Resources (CDWR). 2013. Suisun Marsh. http://www.water.ca.gov/suisun/dataReports/docs/SEW/aqintro.cfm (8 April 2013).

_____. 2009. Appendix E. Central Valley Spring-Run Chinook Salmon and Steelhead in the Sacramento River Basin. Background Report.

_____. 1994. Summary of Sensitive Plant and Wildlife Resources in Suisun Marsh During Water Years 1984–1994. Environmental Services Office.

California Native Plant Society (CNPS). 2013. Inventory of Rare and Endangered Plants (online edition, v8-01a). California Native Plant Society. Sacramento, CA. http://www.cnps.org/inventory (9 April 2013).

California Natural Diversity Database (CNDDB). 2013. Sacramento, California.

_____. 2008. Sacramento, California.

Cardno TEC, H.T. Harvey and Associates, and Tierra Data Inc. 2013. Draft Natural Resources Survey Report for the Modernization and Repair of Piers 2 and 3 at Military Ocean Terminal Concord, CA. August.

Collins, P. W. 1998. Terrestrial Mammal Species of Special Concern in California, B.C. Ed. Salt Marsh Wandering Shrew (*Sorex vagrans halicoetes*).

Cuetera, J. I., J. R. Burau, and D. H. Schoellhamer. 2001. Hydrodynamic and Suspended-Solids Concentration Measurements in Suisun Bay, California, 1995. U.S. Geological Survey. Water-Resources Investigations Report 01-4086.

Downard, G. T., P. Guertin, and M. Morrison. 1999. Characterization of Wildlife and Plant Communities for Naval Weapons Station Seal Beach, Detachment Concord. The University of Arizona Advanced Resource Technology Group, School of Renewable Natural Resources.

East Contra Costa County (ECCC) Habitat Conservation Plan (HCP) Association. 2006. Habitat Conservation Plan /Natural Community Conservation Plan Species Accounts: Big Tarplant (*Blepharizonia plumosa*), Western Pond Turtle (*Clemmys marmorata*), Western Burrowing Owl. Foothill Yellow-Legged Frog (*Rana boylii*). Western Pond Turtle (*Clemmys marmorata*). October.

Goals Project. 2000. Baylands Ecosystem Species and Community Profiles: Life histories and environmental requirements of key plants, fish and wildlife. Prepared by the San Francisco Bay Area Wetlands Ecosystem Goals Project. P.R. Olofson, editor. San Francisco Bay Regional Water Quality Control Board, Oakland, CA.

_____. 1999. Baylands Ecosystem Habitat Goals. A report of habitat recommendations prepared by the San Francisco Bay Area Wetlands Ecosystem Goals Project. U.S. Environmental Protection Agency, San Francisco, Calif./S.F. Bay Regional Water Quality Control Board, Oakland, CA.

Golovanova, G. and B. Holzman. 2009. San Francisco State University – Geography 316 – Biogeography. The Biogeography of the Salt Marsh Harvest Mouse (*Reithrondonomys raviventris*).

Good, T. P., R. S. Waples, and P. Adams. 2005. Updated status of federally listed ESUs of West Coast salmon and steelhead. U.S. Department of Commerce, NOAA Technical Memorandum, NMFS-SWFSC-66, 598 pp.

Green, M. 2008. California Department of Fish and Game – California Interagency Wildlife Task Group.

California Wildlife Habitat Relationships: Common Yellowthroat (*Geothlypis trichas)*. February.

Groot, C. and L. Margolis. 1991 Pacific Salmon Life Histories. Department of Fisheries and Oceans, Biological Sciences Branch, Pacific Biological Station, Nanaimo. British Columbia, Canada. 564 pp.

Harris, J. 2009. http://www.sibr.com/mammals/M003.html (15 October 2009).

Herbold, B., A. D. Jassby and P. B. Moyle. 1992. San Francisco Estuary Project: Status and trends report on aquatic resources in the San Francisco Estuary. San Francisco Estuary Project, Oakland, California. 257 pp.

Hickman, J. C. Ed. 1993. *The Jepson Manual: Higher Plants of California.* University of California Press. Berkeley, California.

HT Harvey and Associates. 2011. Special-Status Species Surveys Military Ocean Terminal Concord Real Property Master Plan Improvements Project Concord, California. Project No. 3126-01. 15 February.

Interagency Ecological Program. 2008. Pelagic Organism Decline Progress Report: 2007 Synthesis of Results. Interagency Ecological Program Pelagic Organism Decline Management Team. January.

Kjelson, M. A., P. F. Raquel, and F. W. Fisher. 1982. Life History of Fall-Run Juvenile Chinook Salmon, Oncorhynchus Tshawytscha, in the Sacramento-San Joaquin Estuary, California. 16pp.

LSA Associates, Inc. 2009. Solano County Water Agency. Administrative Draft Solano HCT. Special Management Species Accounts: Suisun Song Sparrow, Suisun Marsh Aster, Suisun Thistle (*Cirsium hydrophilum var. hydrophilum*), Tricolored Blackbird (*Agelaius tricolor*), and Salt Marsh Harvest Mouse (*Reithrodontomys raviventris*). April.

_____. 2007. Solano HCT/NCCT. Solano County Water Agency. Species Descriptions: Delta Tule Pea *(Lathyrus jepsonii).* http://www.scwa2.com/Documents/hcp/Final%20Draft%202.2/Appendix%20B/Coastal%20Mars h/Plants/DeltaTule%20Pea.pdf (14 October 2009).

_____. 2004. Solano HCT/NCCT. Solano County Water Agency. Species Descriptions: California Black Rail, California Red-Legged Frog (*Rana aurora draytonii*).Foothill Yellow-Legged Frog (*Rana boylii*), Saltmarsh Common Yellowthroat (*Geothylpis trichas*

sinuosa), Descriptions: Western Pond Turtle (*Clemmys marmorata*). Suisun Shrew (*Sorex ornatus sinuosus*). Short-eared Owl (*Asio flammeus*).

MacFarlane, R. B. and E. C. Norton. 2002. Physiological ecology of juvenile chinook salmon (*Oncorhynchus tshawytscha*) at the southern end of their distribution, the San Francisco Estuary and the Gulf of the Farallones, California. *Fishery Bulletin* 100:244–257.

Merkel and Associates, Inc. 2004. Baywide eelgrass inventory of San Francisco Bay: Pre-survey screening model and eelgrass survey report. Report to California Department of Transportation and NMFS.

Morrison, M., G. T. Downard, and P. Guertin. 1999. Characterization of wildlife and plant communities for Naval Weapons Station Seal Beach, Detachment Concord. The University of Arizona Advanced Resource Technology Group. Prepared for Department of Navy, Natural Resources Management Branch, Engineering Field Activity West, NAVFAC, San Bruno, CA.

Moyle, P. B. 2002. Inland fishes of California. University of California Press, Berkeley, CA. 502 pp.

Moyle, P. B., R. M. Yoshiyama, J. E. Williams, and E. D. Wikramanayake. 1995. Fish Species of Special Concern in California. Second edition. Final Report to CA Department of Fish and Game, contract 2128IF.

National Audubon Society. 2013. Important Bird Areas Program. http://web4.audubon.org/bird/iba/ (4 April 2013).

National Marine Fisheries Service (NMFS). 2013a. Fisheries Management Plan (FMP) Species Distributions in San Francisco, San Pablo and Suisun Bays. Online at http://swr.nmfs.noaa.gov/hcd/HCD_webContent/EFH/sanfran_fmp.htmj (13 August).

_____. 2013b. Steelhead trout. NOAA Fisheries, Office of Protected Resources. http://www.nmfs.noaa.gov/pr/species/fish/steelheadtrout.htm (3 April 2013).

_____. 2013c. Green Sturgeon (*Acipenser medirostris*). NOAA Fisheries, Office of Protected Resources. http://www.nmfs.noaa.gov/pr/species/fish/greensturgeon.htm (3 April 2013).

_____. 2012. Endangered and Threatened Species; Initiation of 5-Year Review for the Southern Distinct Population Segment of North American Green Sturgeon. 77 FR 64959–64960.

_____. 2011a. Central Valley Recovery Domain; 5-Year Review: Summary and Evaluation of Sacramento River Winter-run Chinook Salmon ESU. Southwest Region, Long Beach, CA.

_____. 2011b. Central Valley Recovery Domain; 5-Year Review: Summary and Evaluation of Central Valley Spring-run Chinook salmon ESU. Southwest Region, Long Beach, CA.

_____. 2011c. Habitat Areas of Particular Concern. NMFS Southwest Regional Office. Website last updated 3 August 2011.

_____. 2009. Endangered and Threatened Wildlife and Plants: Final Rulemaking to Designate Critical Habitat for the Threatened Southern Distinct Population Segment of North American Green Sturgeon. Final Rule. 74 FR 52300–52351.

_____. 2008a. Fisheries Off West Coast States; West Coast Salmon Fisheries; Amendment 14; Essential Fish Habitat Descriptions for Pacific Salmon. Final Rule. 73 FR 60987–60994.

_____. 2008b. Humpback Whale (*Megaptera novaeangliae*) Stock Assessment. NMFS.

_____. 2007. Report on the Subtidal Habitats and Associated Biological Taxa in San Francisco Bay. Santa Rosa Office. August.

_____. 2006a. Endangered and Threatened Species: Final Listing Determinations for 10 Distinct Population Segments of West Coast Steelhead. Final Rule. 71 FR 834–862.

_____. 2006b. Endangered and Threatened Wildlife and Plants: Threatened Status for Southern Distinct Population Segment of North American Green Sturgeon. 71 FR 17757–17766.

_____. 2005a. Endangered and Threatened Species: Final Listing Determinations for 16 ESUs of West Coast Salmon, and Final 4(d) Protective Regulations for Threatened Salmonid ESUs. Final Rule. 70 FR 37160–37204.

_____. 2005b. Endangered and Threatened Species; Designation of Critical Habitat for Seven Evolutionarily Significant Units of Pacific Salmon and Steelhead in California. Final Rule. 70 FR 52488–52627.

_____. 2005c. Green Sturgeon (*Acipenser medirostris*) Status Review Update. Biological Review Team, Santa Cruz Laboratory, Southwest Fisheries Science Center.

_____. 1997. Status Update for West Coast Steelhead from Washington, Idaho, Oregon, and California. Memorandum date 7 July 1997 from the Biological Review Team to the National Marine Fisheries Service Northwest Office.

_____. 1993. Designated Critical Habitat; Sacramento River Winter-Run Chinook Salmon. Final Rule. 58 FR 33212–33219.

_____. 1991. Final Recovery Plan for the Humpback whale (*Megaptera novaeangliae*). NOAA Office of Protected Resources. November.

National Oceanic and Atmospheric Administration (NOAA). 2004. Preparing Essential Fish Habitat Assessments: A Guide for Federal Action Agencies, Version 1. http://www.habitat.noaa.gov/pdf/preparingefhassessments.pdf (6 August). February.

NatureServe. 2013. NatureServe Explorer: An online encyclopedia of life [web application]. Version 7.1. NatureServe, Arlington, Virginia. http://www.natureserve.org/explorer (18 September 2013).

Orsi, J., R. Baxter, S. DeLeon, K. Fleming. 1999. Report on the 1980–1995 Fish, Shrimp, and Crab Sampling in the San Francisco Estuary, California. California Department of Fish and Game IEP Technical Report 63.

Pacific Fishery Management Council (PFMC). 2012. Pacific Coast Salmon Fishery Management Plan, for Commercial and Recreational Salmon Fisheries Off the Coasts of Washington, Oregon, and California as Revised through Amendment 17. October.

_____. 2011a. Pacific Coast Groundfish Fishery Management Plan for the California, Oregon, and Washington Groundfish Fishery.

_____. 2011b. The Coastal Pelagic Species Fishery Management Plan; As Amended Through Amendment 13.

_____. 2011c. Fishery Management Plan for the U.S. West Coast Fisheries For Highly Migratory Species as Amended through Amendment 2.

_____. 2006. Pacific Coast Groundfish Fishery Management Plan for the California, Oregon and Washington Groundfish Fishery, as Amended through Amendment 19. PFMC, Portland, OR. November.

_____. 2005. Pacific Coast Groundfish Fishery Management Plan, for the California, Oregon, and Washington Groundfish Fishery. Appendix B, Part 4 Habitat Suitability Probability Maps for Individual Groundfish Species and Life History Stages.

_____. 2000. Amendment 14 to the Pacific Coast Salmon Plan (1997), Incorporating the Regulatory Impact Review/Initial Regulatory Flexibility Analysis and Final Supplemental Environmental Impact Statement. May.

_____. 1998. Appendix D: Description and Identification of Essential Fish Habitat for the Coastal Pelagic Species Fishery Management Plan. A component of Amendment 8 (to the Northern Anchovy Fishery Management Plan) Incorporating a Name Change to the *Coastal Pelagic Species Fishery Management Plan*.

Personal communication, email from Katharyn Boyer, Associate Professor of Biology, San Francisco State University regarding *Stuckenia* research in Suisun Bay. 21 June 2013.

Reuven, Y. 1996. Loggerhead Shrike (Lanius ludovicianus), The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online: http://bna.birds.cornell.edu/bna/species/231.

San Francisco Estuary Institute (SFEI). San Francisco Bay Area EcoAtlas. 2013. http://gis.sfei.org/geofetch/catalog/main/home.page (8 April 2013)

Shuford, W. D., and T. Gardali., editors. 2008. California Bird Species of Special Concern: A ranked assessment of species, subspecies, and distinct populations of birds of Immediate conservation concern in California. Studies of Western Birds 1. Western Field

Spautz, H. and N. Nur. 2008. Studies of Western Birds California Bird Species of Special Concern Species Accounts: Suisun Song Sparrow (*Melospiza melodia maxillaries*).

Spautz, H., N. Nur, and D. Stralberg. 2005. California Black Rail (*Laterallus jamaicensis coturniculus*) Distribution and Abundance in Relation to Habitat and Landscape Features in the San Francisco Bay Estuary. USDA Forest Service General Technical Report. PSW-GTR-191. Pgs. 465–468.

U.S. Army Corps of Engineers (USACE). 2011. Military Ocean Terminal Concord Integrated Natural Resources Management Plan Update. 834th Transportation Battalion, Military Ocean Terminal Concord, California. Prepared for U.S. Army Military Surface Deployment and Distribution Command.

U.S. Fish and Wildlife Service (USFWS). 2012a. Endangered and Threatened Wildlife and Plants; 12-Month Finding on A Petition to List the San Francisco Bay-Delta Population of the Longfin Smelt as Endangered or Threatened; Proposed Rule. 77 FR 19756.

_____. 2012b. Bay Delta Fish & Wildlife Office, species account, California clapper rail, *Rallus longirostris obsoletus*. Online at http://www.fws.gov/sfbaydelta/species/ca_clapper_rail.pdf.

_____. 2010a. 5-Year Review, Short form Summary. Delta smelt. Endangered and Threatened Wildlife and Plants; 12-Month Finding on a Petition to Reclassify the Delta Smelt from Threatened to Endangered throughout its Range. 75 FR 17667–17680.

_____. 2010b. Endangered and Threatened Wildlife and Plants; 12-month Finding on a Petition to list the Sacramento Splittail as Endangered or Threatened. 75 FR 62070–62095.

_____. 2009. Species Profile: Salt Marsh Harvest mouse (*Reithrodontomys raviventris*). http://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?spcode=A03Y (20 October 2009).

_____. 2008. Birds of Conservation Concern 2008. United States Department of Interior, Fish and Wildlife Service, Division of Migratory Bird Management, Arlington, Virginia. 85 pp. http://www.fws.gov/migratorybirds.

_____. 2006. California least tern (*Sternula antillarum browni*) 5-year review summary and evaluation. Carlsbad Fish and Wildlife Office, Carlsbad, California.

_____. 1993. Endangered and Threatened Wildlife and Plants; Determination of Threatened Status for the Delta Smelt. Final Rule. 58 FR 12854–12864.

_____. 1994. Endangered and Threatened Wildlife and Plants; Critical Habitat Determination for the Delta Smelt. Final Rule. 59 FR 65256–65279.

_____. 1985. Revised California Least Tern Recovery Plan. Region 1, U.S. Fish and Wildlife Service. Portland, Oregon.

_____. 1970. Appendix D – United States list of endangered native fish and wildlife. Federal Register 35:16047–16048.

U.S. Geological Survey (USGS). 2006. Maps of Quaternary Deposits and Liquefaction Susceptibility in the Central San Francisco Bay Region, California. Geology by Robert C. Witter, Keith L. Knudsen, Janet M. Sowers, Carl M. Wentworth, Richard D. Koehler, and Carolyn E. Randolph and digital database by Carl M. Wentworth, Suzanna K. Brooks, and Kathleen D. Gans.

Williams, T. H., S. T. Lindley, B. C. Spence, and D. A. Boughton. 2011. Status Review Update for Pacific Salmon and Steelhead Listed Under the Endangered Species Act: Southwest. 20 May 2011. 106 pp.

WRA. 2010. 2010 Black Rail Nesting Survey Results, Military Ocean Terminal Concord (MOTCO), Sites 32 and 33, Contra Costa County, California. Prepared for Tetra Tech EM, Inc.

Wyllie-Echeverria, S. and M. Fonseca. 2003. Eelgrass (*Zostera marina L.*) research in San Francisco Bay, California from 1920 to present: literature review. National Centers for Coastal Ocean Science San Francisco Bay Eelgrass (*Zostera marina*) Project. Retrieved from: http://mapping2.orr.noaa.gov/portal/subtidal/pdfs/projectreports/partnership_seagrassrev_fin.pdf (22 September 2009).

3.6 Land Use and Coastal Zone Management

No References Cited.

3.7 Transportation and Utilities Infrastructure

Amtrak. 2013. Schedule Query for North- and South-bound Trains between Antioch, California (Pittsburgh) and Martinez, California. http://tickets.amtrak.com/itd/amtrak (1 April 2013).

Army. 2012. Environmental Assessment for Implementation of Real Property, Natural Resources, and Cultural Resources Management Programs at Military Ocean Terminal Concord.

_____. 2011. Final Real Property Master Plant for Military Ocean Terminal Concord, California. May.

California Department of Transportation. 2011. 2011 Annual Average Daily Truck Traffic on the California State Highway System. http://traffic-counts.dot.ca.gov/truck2011final.pdf (2 April 2013).

CalRecycle. 2013a. Solid Waste Information System (SWIS) Facility/Site Listing. http://www.calrecycle.ca.gov/SWFacilities/Directory/SearchList/List?COUNTY=Contra+Costa&FAC=Disposal&REGSTATUS=Permitted (1 April 2013).

_____. 2013b. 2011 Landfill Summary Tonnage Reports. http://www.calrecycle.ca.gov/SWFacilities/Landfills/Tonnages/Default.aspx (1 April 2013).

_____. 2013c. Facility/Site Summary Details: Acme Landfill (07-AA-002). http://www.calrecycle.ca.gov/SWFacilities/Directory/07-AA-0002/Detail/ (1 April 2013).

_____. 2013d. Facility/Site Summary Details: Keller Canyon Landfill (07-AA-032). http://www.calrecycle.ca.gov/SWFacilities/Directory/07-AA-0032/Detail/ (1 April 2013).

_____. 2013e. Local Government Construction and Demolition Guide, Frequently Asked Questions.

http://www.calrecycle.ca.gov/LGCentral/Library/canddmodel/instruction/faq.htm (1 April 2013).

City of Concord. 2013a. 2005 and 2008 Traffic Counts. http://www.ci.concord.ca.us/pdf/living/traffic.pdf (28 March 2013).

_____. 2013b. Concord 2030 General Plan, amended through July 10, 2012. http://www.cityofconcord.org/citygov/dept/planning/zoningupdate.htm (1 April 2013).

_____. 2013c. City of Concord Truck Routes. http://www.cityofconcord.org/living/trafficinfo.aspx (28 March 2013).

_____. 2013d. City of Concord Truck Routes. http://www.cityofconcord.org/permits/building/cdordinance.aspx (3 April 2013).

Contra Costa County. 2013. Transportation Permits. http://www.co.contra-costa.ca.us/DocumentCenter/Home/View/7252 (3 April 2013).

Delta Diablo Sanitation District. 2013. About Delta Diablo Sanitation District. http://www.ddsd.org/index.aspx?page=2 (1 April 2013).

HDR, Inc. 2005. Railroad Track Inspection. Military Ocean Terminal Concord (MOTCO), California. Contract No. DACA45-01-D-0003 (DO 16). Prepared for USACE Sacramento and MOTCO. November.

Metropolitan Transportation Commission (MTC) and the San Francisco Bay Conservation and Development Commission (BCDC). 2012. San Francisco Bay Area Support Plan. January.

Naval Facilities Engineering Command Southwest (NAVFAC SW). 2008. Greater NAVFAC SW AOR Sewer System Management Plan (SSMP). Naval Weapons Station Seal Beach, Detachment Concord, Concord, CA. June.

Personal communication, email from P. Cameron, MOTCO Operations to C. Everson, Cardno TEC regarding MOTCO Missions. 24 July 2013.

U.S. Environmental Protection Agency (USEPA). 2013. Greening EPA – Waste Diversion. http://www.epa.gov/oaintrnt/waste/index.htm (14 May 2013).

World Port Source. 2013. San Francisco Bay Waterway System Port Map. http://www.worldportsource.com/waterways/systems/maps/San_Francisco_Bay_Waterway_System_8.php (1 April 2013).

3.8 Visual Resources

No References Cited.

3.9 Recreational Resources

National Park Service. 2013. Port Chicago Naval Magazine. http://www.nps.gov/poch/index.htm (1 April 2013).

Personal communication, email from John Audinis, Environmental Compliance, MOTCO. Port Chicago Naval Magazine National Memorial Trips. 2 April 2013.

Department of Homeland Security, Coast Guard. 2013. Interim Rule: Safety Zone; Military Ocean Terminal Concord Safety Zone, Suisun Bay, Military Ocean Terminal Concord, CA. *Federal Register*, Vol. 78, No. 18, pp. 5717-5720. 28 January 2013.

3.10 Noise

Berglund, B. and T. Lindvall (Eds). 1995. Community Noise. Archives of the Center for Sensory Research, 2(1), 1–195.

Federal Interagency Committee on Urban Noise (FICUN). 1980. Guidelines for Considering Noise in Land Use Planning and Control. Prepared by U.S. Department of Transportation, U.S. Environmental Protection Agency, U.S. Department of Housing and Urban Development, Department of Defense, and Veterans Administration, Washington, DC. June.

Occupational Safety and Health Administration (OSHA). 2012. §1910.95 Occupational Noise Exposure. http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=1062 (27 March 2013).

U.S. Environmental Protection Agency (USEPA). 1971. Noise from Construction Equipment and Operations, Building Equipment and Home Appliances.

Washington State Department of Transportation (WSDOT). 2011. Biological Assessment Preparation – Advanced Training Manual. Part Noise – Noise Impact Assessment.

3.11 Socioeconomics and Environmental Justice

U.S. Bureau of Economic Analysis. 2013. Regional Economic Information System. CA25N Total full-time and part-time employment by NAICS industry, Contra Costa, CA, (number of jobs). http://www.bea.gov/iTable/iTable.cfm?reqid=70&step=1&isuri=1&acrdn=5#reqid=70&step=30&isuri=1&7028=-1&7040=-1&7083=Levels&7031=06000&7022=11&7023=7&7024=NAICS&7025=4&7026=06013&7027=2011&7001=711&7029=33&7090=70&7033=-1 (1 April 2013).

U.S. Census Bureau. 2011. Table 1. The Most Populous Counties and Incorporated Places in 2010 in California: 2000 and 2010 based on Table PL1, and 2010 Census Redistricting Data (Public Law 94-171) Summary File, Table P1.

_____. 2010. Table PL1, and 2010 Census Redistricting Data (Public Law 94-171) Summary File, Table P1.

_____. 2009. American Community Survey.

U.S. Environmental Protection Agency (USEPA). 2013. San Francisco Bay Delta Community Successes. http://www2.epa.gov/sfbay-delta/community-successes (1 April 2013).

_____. 2009: The East County Environmental Justice Collaborative-CARE Level I Final Report. http://www.epa.gov/CARE/documents/calbaypointlatinoreport.pdf (1 April 2013).

3.12 Cultural Resources

JRP Historical Consulting Services. 2009. Update Report Historic Building Inventory and Evaluation, Inland Area, Concord Naval Weapons Station, Contra Costa County, California. Prepared for the Department of the Navy.

_____. 1998. Inventory and Evaluation of National Register Eligibility of Cold War Era and Selected Other Buildings and Structures, Naval Weapons Support Facility, Seal Beach Detachment, Concord, Contra Costa County, California. Prepared for the Department of the Navy.

MOTCO. 2011. Final Military Ocean Terminal Concord Integrated Cultural Resources Management Plan Update (2011–2016). May.

National Parks Service (NPS). 1998. Natural Register Bulletin #38, *Guidelines for Evaluating and Document Traditional Cultural Properties.*

Rosenthall, J. S., R. Milliken, and S. Mikesell. 2002. *Integrated Cultural Resources Management Plan (2002–2007).*

U.S. Army Corps of Engineers (USACE). 2012. Update Report Historic Building Inventory and Evaluation, Military Ocean Terminal Concord, Contra Costa County, California. Prepared for U.S. Army Military Surface Deployment and Distribution Command.

_____. 2010. Memorandum for Record: Cultural Resources Assessment of the Proposed Pier 2 Replacement at Military Ocean Terminal Concord, Contra Costa County, California. Prepared for U.S. Army Military Surface Deployment and Distribution Command.

William Self Associates. 1993. Cultural Resources Overview, Naval Weapons Station Concord, Contra Costa County, California. Prepared for the Department of the Navy.

3.13 Hazardous Materials and Waste

Agency for Toxic Substances and Disease Registry (ATSDR). 2002. Toxicological Profile for Creosote. September.

Personal communication, email from John Audinis, Environmental Compliance, MOTCO. Contra Costa Health Service Waste Disposal Fees for 2011. February.

California Environmental Protection Agency (CA EPA). 2012. List of Regional Water Quality Control Board (RWQCB)-Approved Treated Wood Waste (TWW) Landfills. May. http://www.dtsc.ca.gov/HazardousWaste/upload/lanfillapr11PDATED1.pdf (27 May 2012).

_____. 2011. Treated Wood Waste Management in California, AB 1353 Implementation Report. June.

California Department of Toxic Substances Control (CA DTSC). 2011a. Hazardous Waste Handler (HWH) Summary Report. http://hwts.dtsc.ca.gov/download/temp_0165680627111065437187.pdf (27 June 2011).

_____. 2008. Fact Sheet: Requirements for Generators of Treated Wood Waste (TWW). December.

Castagna, M. 1961. Shipworms and Other Marine Borers. Marine Fisheries Review, Vol 35 No. 8 / MFR Paper 995.

Department of Defense (DOD). 2001. Policy on Land Use Controls Associated with Environmental Restoration Activities. January.

Louisiana State University (LSU) Agricultural Center. 2012. Marine Wood Borers. October. http://www.lsuagcenter.com/en/environment/forestry/forest_products/Marine-Wood-Borers.htm (27 March 2013).

Military Ocean Terminal Concord (MOTCO). 2013a. Spill Prevention, Control, and Countermeasures Plan (SPCC). March.

_____. 2013b. 2013 CUPA Packet: Hazardous Waste Generator Reporting Form, Calendar Year 2012. February.

_____. 2013c. Army Remedial Project Manager Update for the Restoration Advisory Board Meeting. 06 March.

_____. 2013d, Environmental Assessment for Implementation of Real Property, Natural Resources, and Cultural Resources Management Programs at Military Ocean Terminal Concord.

_____. 2012a. Hazardous Waste Management Plan, Draft. February.

_____. 2012b. Building A-21 Asbestos Re-Inspection. 24 July.

_____. 2012c. MOTCO Restoration Advisory Board Site Tour. 1 August.

_____. 2011a. Asbestos Summary Results. 20 June.

_____. 2011b. Lead-Based Paint Summary Results. 29 June.

_____. 2011c. Military Ocean Terminal Concord: Update Fact Sheet. March.

_____. 2010. Final Historical Records Review. May.

_____. 2001. Storm Water Pollution Prevention Plan. August.

Naval Facilities Engineering Command (NAVFAC). 2003. Final After Action Report Underwater MEC Survey in Support of Pier 2 Repair: MOTCO. 16 May. TetraTech EMI. 2011. Military Ocean Terminal Concord Site Management Plan (SMP) Annual Schedule. 03 March.

_____. 2007. Minutes from February 7, 2007 Restoration Advisory Board Meeting. 19 March.

U.S. Army Corps of Engineers (USACE). 2011. Final Real Property Master Plan for Military Ocean Terminal Concord. May.

_____. 2009. Final After Action Report Underwater MEC Survey in Support of Pier 2 Repair: MOTCO. 16 May.

U.S. Environmental Protection Agency (USEPA). 2012. Superfund Site Overview: Concord Naval Weapons Station. 18 January. http://yosemite.epa.gov/r9/sfund/r9sfdocw.nsf/7508188dd3c99a2a8825742600743735/cc5e3a0397848397882570070 05e93f3!OpenDocument (3 April 2013).

_____. 2008a. Creosote and its Use as a Wood Preservative. November. http://www.epa.gov/pesticides/factsheets/chemicals/creosote_main.htm (26 May 2013).

_____. 2008b. Reregistration Eligibility Decision for Creosote (Case 0139). EPA 739-R-08-007. September. http://www.epa.gov/oppsrrd1/reregistration/REDs/creosote_red.pdf (26 March 2013).

Chapter 4 Environmental Consequences

4.1 Port Operations

No References Cited.

4.2 Earth Resources

Naval Facilities Engineering Command (NAVFAC) Western Division. 1973. Engineering Study of Containerization of Port Facilities for Ammunition Handling, Naval Weapons Station Concord, California. Contract Number N62474-73-C-5391. San Bruno, California.

4.3 Water Resources

Bohlen, W. Frank. 1979. A Comparison Between Dredge Induced Sediment Resuspension and That Produced by Natural Storm Events. University of Connecticut, Avery Point Marine Sciences Department. Groton, Conn.

California Regional Water Quality Control Board (RWQCB). 2012. California Regional Water Quality Control Board San Francisco Bay Region. http://www.waterboards.ca.gov/sanfranciscobay/board_info/agendas/2012/October/MWRP/TO.pdf (October).

Herbich, J. B. 2000. Handbook of Dredging Engineering. 2nd Edition. McGraw-Hill, New York, NY.

KCI Technologies, Inc. 2013. MOTCO Pier 3 Special Inspection Report Facility Number: 00101, Military Ocean Terminal Concord, California. March.

LaSalle, M. W., D. G. Clarke, J. Homziak, J. D. Lunz, and T. J. Fredette. 1991. A framework for assessing the need for seasonal restrictions on dredging and disposal operations. Technical Report D-91-1, U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS.

Military Ocean Terminal Concord (MOTCO). 2001. Storm Water Pollution Prevention Plan. August.

National Oceanic and Atmospheric Administration (NOAA). 2008. Impacts to Marine Fisheries Habitat from Nonfishing Activities in the Northeastern United States. NOAA Technical Memorandum NMFS NE 209. February.

SAIC. 2001. Review of Various Dredging Techniques and their Effects on Water Column Characteristics. SAIC Report No. 538. 20 May.

U.S. Army Corps of Engineers (USACE). 2006. Biological Assessment for Research and Compilation of Baseline Data for the Use of Bed-Leveling Devices at Port Canaveral, Brevard County, Florida. January.

_____. 2005. Silt Curtains as a Dredging Project Management Practice. ERDC TN-DOER-E21. September.

_____. 1998. Environmental Windows Associated with Dredging Operations. Technical Note DOER-E2. December.

U.S. Environmental Protection Agency (USEPA). 2009. Technical Guidance on Implementing the Stormwater Runoff Requirements for Federal Projects under Section 438 of the Energy Independence and Security Act. http://www.epa.gov/oaintrnt/documents/epa_swm_guidance.pdf (December).

4.4 Air Quality

No References Cited.

4.5 Biological Resources

Agency for Toxic Substances and Disease Registry (ATSDR). 2002. Toxicological Profile for Creosote. September.

Bureau of Ocean Energy Management (BOEM). 2013. Quieting technologies for reducing noise during seismic surveying and pile driving: information synthesis. February 4.

California Department of Transportation (Caltrans). 2012. Updated Appendix I Compendium of Pile Driving Sound Data. From the Technical Guidance for Assessment and Mitigation of Hydroacoustic Effects of Pile Driving on Fish. http://www.dot.ca.gov/hq/env/bio/fisheries_bioacoustics.htm. October.

_____. 2009. Technical Guidance for Assessment and Mitigation of Hydroacoustic Effects of Pile Driving on Fish. February.

Cardno TEC, HT Harvey and Associates, and Tierra Data Inc. 2013. Draft Natural Resources Survey Report for the Modernization and Repair of Piers 2 and 3 at Military Ocean Terminal Concord, CA. August.

City of Concord. 2010. Concord Community Reuse Plan Final Environmental Impact Report.

Fisheries Hydroacoustic Working Group (FHWG). 2008. Memorandum of agreement in principle for interim criteria for injury to fish from pile driving. In coordination with the Federal Highway Administration.

HT Harvey and Associates. 2011. Special-status species surveys, Military Ocean Terminal Concord Real Property Master Plan Improvements Project. Concord, California. Prepared for TEC Inc., Golden, CO.

National Marine Fisheries Services (NMFS). 2010. Takes of Marine Mammals Incidental to Specified Activities: Piling and Structure Removal in Woodard Bay Natural Resources Conservation Area, Washington. Federal Register 75:48941-48947. 12 August.

_____. 2009. Endangered and Threatened Wildlife and Plants: Final Rulemaking to Designate Critical Habitat for the Threatened Southern Distinct Population Segment of North American Green Sturgeon. Final Rule. 74 FR 52300–52351.

_____. 1993. Designated Critical Habitat; Sacramento River Winter-Run Chinook Salmon. Final Rule. 58 FR 33212–33219.

U.S. Environmental Protection Agency (USEPA). 2008. Creosote and its Use as a Wood Preservative. November. http://www.epa.gov/pesticides/factsheets/chemicals/creosote_main.htm (26 May 2013).

U.S. Fish and Wildlife Service (USFWS). 2005. Draft list of bird species to which the Migratory Bird Treaty Act does not apply. 70 FR 372–377.

Washington State Department of Transportation (WSDOT). 2011. Columbia River Crossing Test Pile Project Vibratory Extraction Sound Levels. Prepared by J. Coleman, David Evans and Associates. 1 August 2011.

4.6 Land Use and Coastal Zone Management

No References Cited.

4.7 Transportation and Utilities Infrastructure

Allied Waste. 2013. Contra Costa Transfer Station – What is Not Accepted? http://www.pleasanthillbayshoredisposal.com/disposal_sites_contracosta.cfm (5 June 2013).

CalRecycle. 2013a. 2011 Landfill Summary Tonnage Reports. http://www.calrecycle.ca.gov/SWFacilities/Landfills/Tonnages/Default.aspx (1 April 2013).

_____. 2013b. Facility/Site Summary Details: Acme Landfill (07-AA-002). http://www.calrecycle.ca.gov/SWFacilities/Directory/07-AA-0002/Detail/ (1 April 2013).

_____. 2013c. Facility/Site Summary Details: Keller Canyon Landfill (07-AA-032). http://www.calrecycle.ca.gov/SWFacilities/Directory/07-AA-0032/Detail/ (1 April 2013).

Contra Costa County. 2013a. Acme Landfill. http://www.cccounty.us/depart/cd/recycle/options/v6115.htm (5 June 2013).

_____. 2013b. Keller Canyon Landfill. http://www.cccounty.us/depart/cd/recycle/options/v6254.htm (5 June 2013).

Department of Homeland Security, Coast Guard. 2013. Interim Rule: Safety Zone; Military Ocean Terminal Concord Safety Zone, Suisun Bay, Military Ocean Terminal Concord, CA. 78 FR 5717–5720. 28 January 2013.

Personal communication, email from P. Cameron, MOTCO Operations to C. Everson, Cardno TEC regarding MOTCO Missions. 24 July 2013.

U.S. Environmental Protection Agency (USEPA). 2005. Characterization of Building-Related Construction and Demolition Debris in the United States. December.

4.8 Visual Resources

No References Cited.

4.9 Recreational Resources

No References Cited.

4.10 Noise

California Department of Transportation (CalTrans). 2009. Technical Guidance for Assessment and Mitigation of the Hydroacoustic Effects of Pile Driving on Fish. February.

Federal Highway Administration (FHWA). 2006. Construction Noise Handbook, Appendix A FHWA Roadway Construction Noise Model User's Guide, A-1. http://www.fhwa.dot.gov/environment/noise/construction_noise/rcnm/index.cfm.

Washington State Department of Transportation (WSDOT). 2011. Biological Assessment Preparation – Advanced Training Manual. Part Noise – Noise Impact Assessment.

4.11 Socioeconomics and Environmental Justice

No References Cited.

4.12 Cultural Resources

CEQ. 1997. Environmental Justice Guidance Under the National Environmental Policy Act. 10 December.

U.S. Census Bureau. 2013. How the Census Bureau Measures Poverty. http://www.census.gov/hhes/www/poverty/about/overview/measure.html (18 September).

4.13 Hazardous Materials and Waste.

Military Ocean Terminal Concord (MOTCO). 2013. Spill Prevention, Control, and Countermeasures Plan (SPCC). March.

_____. 2012. Hazardous Waste Management Plan (HWMP), Draft. February.

_____. 2001. Storm Water Pollution Prevention Plan. August.

Naval Facilities Engineering Command (NAVFAC). 2003. Final After Action Report Underwater MEC Survey in Support of Pier 2 Repair: MOTCO. 16 May.

U.S. Army Corps of Engineers (USACE). 2009. Final Explosives Safety Submission Munitions and Explosives of Concern MOTCO, Concord, CA. April.

Chapter 5 Cumulative Impacts

California Air Resources Board. 2013. Documentation of California's 2000-2010 GHG Inventory – Index. http://www.arb.ca.gov/cc/inventory/doc/doc_index.php (27 June 2013).

California State Coastal Conservancy. 2011. Final Environmental Impact Report for the San Francisco Bay Area Water Trail Plan. http://scc.ca.gov/webmaster/project_sites/watertrail/wtdreir/FEIR_volume_I.pdf. March.

City of Concord. 2012. Final Environmental Impact Report Addendum and Initial Study of Environmental Significance for the Concord Reuse Project Area Plan. http://www.concordreuseproject.org/pdf/Final_EIR_Addendum.pdf (20 May 2013). January.

_____. 2011. Final Environmental Impact Report Addendum and Initial Study of Environmental Significance for the Concord Community Reuse Redevelopment Project Plan. http://www.concordreuseproject.org/pdf/EIR_Addendum.pdf (20 May 2013). January.

_____. 2010. Final Environmental Impact Report Addendum and Initial Study of Environmental Significance. http://www.concordreuseproject.org/news/deir_Jan2010.asp (20 May 2013). January.

Council on Environmental Quality (CEQ). 2005. Guidance on the Consideration of Past Actions in Cumulative Effects Analysis. http://ceq.hss.doe.gov/nepa/regs/Guidance_on_CE.pdf (5 April 2013). 24 June.

Kimley-Horn and Associates, Inc. 2013. Final Report for the Off-Site Street Improvement Program (OSIP) Update. Prepared for the City of Concord Community and Economic Development Department. http://www.cityofconcord.org/pdf/citygov/agendas/committees/pdio/2013/osip.pdf (21 May 2013).

National Marine Fisheries Service (NMFS). 2011. Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Consultation: United States Army Corps of Engineers, South Pacific Division, San Francisco District Construction of New and Replacement Overwater Structures in the San Francisco Bay Area. NMFS Southwest Region. October 11. Available at

http://swr.nmfs.noaa.gov/hcd/efh/Santa%20Rosa%20OW%20Structure%20Programmatic%2010_11_2011.pdf

_____. 2009. Letter from Rodney McInnis, Regional Administrator, National Marine Fisheries Service, Southwest Region, Long Beach California to Hess Rouhafza, Facilities Engineer, Military Ocean Terminal Concord. 11 June.

Navy. 2013. Notice of Intent to Prepare an Environmental Impact Statement for the Disposal and Reuse of the Naval Weapons Station Seal Beach Detachment Concord, City of Concord, California and to Announce Public Scoping Meetings. 78 FR 16255–16257.

Tetra Tech EM Inc. 2010. Draft First Five-Year Review for Site 1 Tidal Area Landfill Military Ocean Terminal Concord, Concord, California. September.

U.S. Environmental Protection Agency (USEPA). 2013. Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990–2011. 12 April.

_____. 1999. Consideration of Cumulative Impacts in EPA Review of NEPA Documents, EPA 315-R-99-002. http://www.epa.gov/compliance/resources/policies/nepa/cumulative.pdf (5 April 2013). May.

Vernadero Group Incorporated. 2010. Environmental Assessment, Construction and Operation of a U.S. Army Reserve Center at the Military Ocean Terminal Concord, California. Prepared for Headquarters, 63D Regional Support Command, Department of Public Works Environmental Division, Moffett Field, California. July.

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Table 8.0-3. Key Moffatt and Nichol List of Preparers

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APPENDIX A
AGENCY CORRESPONDENCE

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PRE-SCOPING AGENCY LETTERS

RESPONSE FROM THE NATIONAL MARINE FISHERIES SERVICE A-5

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UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southwest Region
777 Sonoma Ave., Room 325
Santa Rosa, CA 95404-4731

February 29, 2012

In response, refer to:
SWR/F/SWR3:GS

Malcolm Charles
Director of Public Works
Department of the Army
Military Ocean Terminal Concord
843th Transportation Battalion
410 Norman Avenue
Concord, California 94520-1142

Dear Mr. Charles:

Thank you for your letter of January 23, 2012, regarding revisions to the Department of Army's (Army) proposed Pier 2 Replacement Project at the Military Ocean Terminal, Concord (MOTCO). The Army is proposing to demolish and replace Pier 2 located within Suisun Bay at the MOTCO facility in Concord, Contra Costa County, California.

NOAA's National Marine Fisheries Service (NMFS) has reviewed the revised project description provided with your letter of January 23, 2012. Based on this information, the list of threatened and endangered species, and recommended best management practices provided in the NMFS' October 18, 2011, remain current (copy enclosed).

Please contact Gary Stern, (707) 575-6060, or by electronic mail at Gary.Stern@noaa.gov if you have questions regarding the above comments or require additional information.

Sincerely,

Dick Butler
North Central Coast Office Supervisor
Protected Resources Division

Enclosure

cc: Greg Brown, USACE, San Francisco, CA
Mario Parker, USACE, Sacramento, CA
Copy to File Administrative Record # 151422SWR2010SR00448

-ENCLOSURE-

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southwest Region
777 Sonoma Ave., Room 325
Santa Rosa, CA 95404-4731

October 18, 2011

In response, refer to:
2010/05172

Malcolm Charles
Director of Public Works
Department of the Army
Military Ocean Terminal Concord
843th Transportation Battalion
410 Norman Avenue
Concord, California 94520-1142

Dear Mr. Charles:

Thank you for your letter of September 30, 2011, regarding the presence of Federally listed (or proposed for listing) threatened or endangered species or critical habitat that may be affected by the Military Ocean Terminal, Concord (MOTCO), Pier 2 Replacement Project. The Department of the Army is proposing to demolish and replace Pier 2 located within Suisun Bay at the MOTCO facility in Concord, Contra Costa County, California. The new pier will be upgraded, and widened [redacted]

Available information indicates that the following listed species (Evolutionarily Significant Units or Distinct Population Segments) may occur in the project areas:

Sacramento River winter-run Chinook salmon ESU (*Oncorhynchus tshawytscha*)
endangered (70 FR 37160; June 28, 2005)
critical habitat (58 FR 33212; June 16, 1993);
Central Valley spring-run Chinook salmon ESU (*Oncorhynchus tshawytscha*)
threatened (70 FR 37160; June 28, 2005);
Central California Coast steelhead DPS (*Oncorhynchus mykiss*)
threatened (71 FR 834; January 5, 2006);
Central Valley steelhead DPS (*Oncorhynchus mykiss*)
threatened (71 FR 834; January 5, 2006);
North American green sturgeon southern DPS (*Acipenser medirostris*)
threatened (71 FR 17757; April 7, 2006)
critical habitat (74 FR 52300; October 9, 2009).

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The project site is also located within an area identified as essential fish habitat (EFH) for various life stages of fish species managed with the following Fishery Management Plans (FMP) under the Magnuson-Stevens Fishery Conservation and Management Act (MSA):

> **Pacific Groundfish FMP** – various species of rockfishes, flatfishes, sharks, etc.,
> **Coastal Pelagics FMP** - northern anchovy, Pacific sardine, jack mackerel,
> **Pacific Coast Salmon FMP** – Chinook and coho salmon.

In addition, Suisun Bay is designated as coastal estuary Habitat Area of Particular Concern (HAPC), and eelgrass (*Zostera marina*) within San Francisco Bay is designated as seagrass HAPC, for various federally-managed fish species within the Pacific Groundfish FMP. HAPC are described in the regulations as subsets of EFH that are rare, particularly susceptible to human-induced degradation, especially ecologically important, or located in an environmentally stressed area. Designated HAPC are not afforded any additional regulatory protection under MSA; however, federal projects with potential adverse impacts to HAPC are more carefully scrutinized during the consultation process. Further information about EFH and these fish species is available at our website at http://swr.nmfs.noaa.gov.

Your letter of September 30, 2011, also requested comments on the project description and measures to avoid minimize and/or mitigate impacts to listed species, critical habitat, and EFH. Federal regulations implementing section 7 of the Endangered Species Act require the preparation of a biological assessment for "major construction activities" (50 CFR §402.12(b)). A construction project of this scale requires a biological assessment and an EFH assessment. The following information will enable NOAA's National Marine Fisheries Service (NMFS) to access potential project impacts to listed species, designated critical habitat, and EFH:

Site Conditions:

- Depth of the water at existing pier, depth of the water at new pier;
- Presence/absence and extent of aquatic vegetation;
- Nature of sediment in project area: grain size, presence of contaminants.

Project Descriptions:

- Duration of Project activities (number of days of in-water work for each construction activity);
- Existing footprint of Pier 2 vs. footprint of replacement pier.

Assessment of Project Effects: The project's biological assessment should include an evaluation of potential impacts associated with in-water pile driving. NMFS currently uses a dual metric criteria of 206 decibels (dB) re one micropascal peak sound pressure level for any single strike and 187 dB re one micropascal squared-second for an accumulated sound exposure level (SEL) to correlate physical injury to fish from underwater sound produced during the installation of piles with impact hammers (Caltrans 2009). An assessment of pile driving effects requires information regarding:

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1. Number and size of piles by type (*i.e.*, wood, steel, concrete);
2. Number driven per day (clock resets after 12 hours of no activity);
3. Time to drive one pile per size class;
4. Number of blows per pile for each size class;
5. Specifications of the pile driving hammer (impact and vibratory);
6. Maximum energy per blow (ft-lbs);
7. Average rate per blow (seconds/blow);
8. Environmental timing window for use of vibratory hammer;
9. Environmental timing window for use of impact hammer; and
10. Use of air bubble curtain, low tide restrictions, or other measures to reduce potential effects of elevated sound levels on fish.

Recommended Avoidance, Minimization and Mitigation Measures:

- Develop methods for demolished materials to be handled and contained so they are not discharged into the waters of Suisun Bay.
- Develop measures to ensure no release of contaminants during demolition and construction activities.
- Develop measures to ensure no release of contaminants during future operations at Pier 2.
- In-water work activities be confined to the period between June 1 and November 30.
- Use of bubble curtains during pile driving.
- For shallow water areas, in-water work be confined to periods of low tide.
- Pre- and post-construction surveys for eelgrass in project vicinity.
- Use of silt curtain for activities that disturb the bay bottom to contain suspended sediments and turbidity.
- If eelgrass may be affected, recommend transplanting, or mitigation.
- Removal of creosote pilings.

Long-term Operation Effects:

- Description of future post-construction activities at Pier 2;
- Evaluation of potential effects on fish and aquatic habitat from activities at Pier 2 (noise, risk of contaminant spills, vessel traffic, etc.).

Please contact Lael A. Will, (707) 578-8554 or by electronic mail at Lael.Will@noaa.gov if you have questions regarding the above comments or require additional information.

Sincerely,

Dick Butler
North Central Coast Office Supervisor
Protected Resources Division

4

cc: Greg Brown, USACE, San Francisco Regulatory Division
Mario Parker, USACE, Sacramento, CA
Korie Schaeffer, NMFS Santa Rosa, CA
Copy to File Administrative Record # 151422SWR2010SR00448

Literature Cited

Caltrans. 2009. Technical Guidance for Assessment and Mitigation of the Hydroacoustic Effects of Pile Driving on Fish. Prepared for Caltrans by ICF Jones and Stokes, and Illingworth and Rodkin, Inc. February 2009. 298 pp. [Document available at http://www.dot.ca.gov/hq/env/bio/files/Guidance_Manual_2_09.pdf]

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Sacramento Fish and Wildlife Office
2800 Cottage Way, Room W-2605
Sacramento, California 95825-1846

In Reply Refer To:
81420-2010-TA-1007-1

FEB 22 2012

Malcolm Charles
Director of Public Works
Department of the Army
Military Surface Deployment and Distribution Command
834th Transportation Battalion
Concord, California 94520

Subject: Technical Assistance for the Proposed Military Ocean Terminal Concord Pier 2 Replacement Project, Concord, California

Dear Mr. Charles:

This is in response to your January 23, 2012, request for technical assistance from the U.S. Fish and Wildlife Service (Service) on the Proposed Military Ocean Terminal Concord (MOTCO) Pier 2 Replacement Project, in Concord, California. We received your letter on January 25, 2012. At issue are the potential effects of the proposed project on the endangered salt marsh harvest mouse (*Reithrodontomys raviventris*), the endangered California clapper rail (*Rallus longirostris obsoletus*), the threatened Delta smelt (*Hypomesus transpacificus*) and its critical habitat, and the endangered soft bird's-beak (*Chloropyron molle ssp. molle*). This document is issued under the authority of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq.*) (Act).

This document is based on: (1) your January 23, 2012, request for technical assistance; (2) a site visit on February 24, 2011; (3) other electronic mail and telephone conversations between MOTCO, and the Service; and (4) other information available to the Service.

The Proposed Action includes three distinct components:

- Demolition of the existing Pier 2 and construction of a new pier;
- Construction of associated infrastructure and improvements on the new pier; and,
- Shore-side construction and improvements associated with infrastructure.

Demolition of Existing/New Construction of Pier 2

The existing pier would be demolished with the aid of a barge, which will be used to minimize the effects to shoreline vegetation. The timber portions (and certain minor concrete portions) of the existing pier and trestles would be removed including the deck, piles, pile caps, bents, fender system, and utilities. The potential release of sediment into the water column during pile extraction will be minimized by the taper on the timber piles that once released, are expected to come out cleanly, and by the use of a "skirt" placed around the pile at the bed to capture any puff of sediment that may be generated when the pile is released.

The proposed pier head construction (totaling 95,000 square feet) would have a 1,000-foot long by 95-foot wide working area for container handling and break-bulk loading and offloading all on one level. The existing pier has two levels (a main deck and a platform level), which interferes with efficient container handling.

The construction of the new pier would include replacement of the west approach trestle and repair of the east approach trestle. The approach trestles provide access to the pier for trucks. The pier would be equipped with two 80-long ton capacity 80-foot gage Container Cranes (CC).

From either a barge or by means of "over-the-top" construction, the new pier would be constructed using pre-stressed concrete piles and a reinforced concrete deck. The west approach trestle would have similar construction. All of the new construction would be designed to allow container handling equipment (including chassis/bomb carts) to operate on the pier.

The proposed plan rotates the new pier head around the east end of the pier so that the west end is pushed further offshore (approximately 75 feet) into deeper water. This was done to substantially reduce the berth dredging requirement (including future maintenance) since historical records indicate shoaling occurs primarily at the west end of the pier. The plan also decreases the berth length on account of the conversion to CC operation, which generates the largest share of the overall decrease in footprint. Also, two existing access trestles and an on-dock operations building are to be removed and replaced by a single trestle and smaller building to further reduce the overall footprint. The west approach trestle would be reconstructed and the existing east approach trestle repaired, producing a small net decrease in footprint. Finally, it is estimated that 600 concrete piles would be installed (driven by a Delmag Pile Hammer or equivalent) in exchange for the removal of about 3500 timber piles.

The new pier would have a fender system that can accommodate container vessels as well as other vessel types that may berth on the pier. In addition, the new pier would be provided with adequate mooring hardware. Multiple sections along the berth would be equipped with removable bull-rail.

In order to control runoff from the pier deck, the impervious concrete deck will be sloped to drainage catch-basins that will intercept the runoff before it flows to the Bay. Drainage piping will connect the catch basins to a treatment device that will remove settleable and floatable contaminants in the runoff before ultimately discharging the treated water to the bay. The

treatment device could also include filtration if necessary. The degree of treatment will be determined to fully comply with water quality requirements.

A review of these changes indicates a net decrease in overall footprint of about 15,000 sf for the pier (resulting from the proposed upgrades), which results in an overall reduction in overwater footprint covering shallower water habitat areas (depth <12 feet) while the footprint covering deeper water habitat areas increases slightly. As a result of these changes, this upgrade to the pier can be considered a positive since shallow water habitat is generally recognized as more environmentally beneficial than deeper water habitat.

Construction of Associated Infrastructure and Improvements for the New Pier 2

The existing roads leading to and from the access trestles (at the ends of the new pier) will be reused. The east approach trestle (concrete) would be repaired (to extend its useful life) to match the new Pier.

A small operations building would be constructed on the westerly end of the pier to provide both office space and restrooms. This operations building would be provided with a climate control (Heating, Ventilation, and Air Conditioning (HVAC) equipment) system. To safely access the operations building from the shoreline, a new pedestrian trestle would be constructed, which will extend from the shore (Pier 2 parking lot located onshore) to the operations building. Where the new trestle intersects the shoreline, some vegetation may be disturbed. However, the demolition of the two existing trestles would permit the replacement of shoreline vegetation at approximately a 2:1 ratio.

To accommodate night operations, four high mast light poles (with high pressure sodium floodlights) would be constructed on the back side (approximately 150 feet back from the face of the pier) of the pier to provide the necessary lighting. These light poles would be provided with maintenance friendly lowering devices to allow for the replacement of flood lights from the pole platform level.

Landside Construction and Improvements Associated with Infrastructure

- On the new approach to the West Trestle, the entrance turn would be widened to provide safer turning for trucks entering the pier from White Road. This portion of the shoreline is disturbed and has existing rock revetment.

- The existing Lot T-10 would be expanded with additional paving near the western end of the lot to provide more room for handling containers.

- The new approach to the East Trestle would be rebuilt to remove the existing rail tracks, which are no longer required. This portion of the shoreline is disturbed and has existing rock revetment.

- A new 12KV to 4.16KV Substation would be constructed on shore at the existing Pier 2 parking lot. It would be sized for the electrical requirements of the two cranes.

- The existing Pier 2 trailer building would be relocated to the Pier 2 Parking lot.

Other Information Related to Demolition and Reconstruction Activities

It is anticipated that the demolition and reconstruction of Pier 2 would commence in the 2016/2017 timeframe. The construction duration for the pile driving activity (estimated 600 piles) is estimated to take about 10 to 12 months. Demolition and construction of the entire Pier 2 project would likely require about 24 months as the work of demolition, pile driving, and deck construction could take place concurrently (in a phased manner) with work progressing from one end of the pier to the other. It is estimated that the duration of the overall contract could run in-excess of 30 months (with allowances for contractor mobilization, submittals, demobilization).

Daily construction activities would commence no earlier than 0700 hours and end no later than 2000 hours during Daylight Savings Time. During Standard Time, daily construction activities would commence no earlier than 0700 hours and end no later than 1700 hrs.

In-water construction activities would include the use of equipment such as cranes, barges, pile drivers, tugboats, and tending boats. Land-based equipment used during construction would include pile drivers, mobile cranes, excavators, front-end loaders, paving machine, roller, water trucks, fork lift, and heavy-haul transporters. At the height of construction activities, it is estimated that 50-70 personnel would be on-site. However, the average number of personnel (over the duration of the construction period) may be substantially less.

The staging areas (lay-down, equipment, and material) would remain within the actual project site; either at areas devoid of vegetation (such as nearby parking lots, paved parking) or in disturbed areas (where there is barren dirt/gravel or non- native invasive plant species).

Both waste and wood materials would be disposed of at an appropriate landfill site by an approved Department of Army contractor using Best Management Plans (BMPs) to reduce potential adverse effects during construction. BMPs and conservation measures would be implemented during construction and operation of the proposed facilities.

Avoidance and Minimization Measures

In addition to the conservation measures described in your January 23, 2012 letter, the Service proposes the following measures to avoid and minimize potential effects on listed species within the action area:

Salt Marsh Harvest Mouse Avoidance and Minimization Measures

1. Where salt marsh vegetation removal is required, work will be conducted using hand-held tools in a manner to enable and encourage wildlife to escape from the construction area. Vegetation shall be removed only with non-mechanized hand tools (i.e. trowel, hoe, rake, and shovel). No motorized equipment, including weed wackers or lawn mowers, shall be used to remove this vegetation. Vegetation will be removed to bare ground. Vegetation shall be removed under the supervision of the Service-approved biologist. If a mouse of any species is observed within the areas being removed of vegetation, the Service shall be notified. Vegetation removal may begin when no mice are observed and shall start at the edge farthest from the salt marsh or the poorest habitat and work its way towards the salt marsh or the better salt marsh habitat.

2. To prevent salt marsh harvest mice from moving through the project site during construction, Temporary Exclusion Fencing (TEF) will be installed immediately after the vegetation removal and prior to the start of any other construction activities. The TEF should be made of a heavy plastic sheeting material that does not allow salt marsh harvest mice to pass through or climb, and the bottom should be buried to a depth of 2 inches so that these species cannot crawl under the fence. TEF height will be at least 12 inches higher than the highest adjacent vegetation with a maximum height of 4 feet. TEF will be removed after all construction is complete.

3. A Service-approved biologist with previous salt marsh harvest mouse experience will be on-site during all construction activities, including vegetation removal and the installation of the mouse-proof fence. The Service-approved biologist will document compliance with the project permit conditions and avoidance and conservation measures. The Service-approved biologist has the authority to stop project activities if any of the requirements associated with these measures is not being fulfilled. If the Service-approved biologist has requested work stoppage due to take of any of the listed species, the Service will be notified within one working day via email or telephone.

4. No materials or supplies that could potentially entrap salt marsh mice will be stored in salt marsh vegetation.

5. A Service-approved biologist will monitor all construction activities daily. The Service-approved biologist will look for listed species during all construction activities. If a salt marsh harvest mouse, or any mouse that construction personnel may believe is this species, is encountered during project construction, all work that could result in direct injury, disturbance, or harassment of the individual animal will immediately cease, the foreman and Service-approved biologist will be immediately notified. The Service-approved biologist will monitor it until he/she determines that the animal(s) is not imperiled by predators or other dangers. The Service-approved biologist will notify the Service within one working day following any encounters with a potential salt marsh harvest mouse during construction via electronic mail and telephone.

6. If the Service-approved biologist(s) exercises this authority, the Service will be notified by telephone and electronic mail within one working day. The Service-approved biologist will be the contact for any employee or contractor who might inadvertently injure a salt marsh harvest mouse, or find an injured or entrapped salt marsh harvest mouse. The on-site biologist(s) will possess a working cellular telephone, and this phone number will be provided to the Service.

7. Prior to the start of daily construction activities, the Service-approved biological monitor will inspect the salt marsh harvest mouse proof boundary fence to ensure that it is neither ripped nor has holes and that the base is still buried. The fenced area will also be inspected to ensure that no mice are trapped in it. Any mice found along and outside the fence will be closely monitored until they move away from the construction area.

8. Any contractor, employee, or agency personnel who inadvertently kills or injures a salt marsh harvest mouse will immediately report the incident to the Service-approved biologist. The Service-approved biologist will contact the Service to report the dead or injured animal via electronic mail and telephone within one working day.

California Clapper Rail Avoidance and Minimization Measures

1. To minimize or avoid the loss of individual California clapper rails, activities within or adjacent to tidal marsh areas will be avoided during the California clapper rail breeding season from February 1 through August 31 each year unless surveys are conducted to determine clapper rail locations and California clapper rail territories can be avoided. If breeding clapper rails are determined to be present, activities will not occur within 700 feet of an identified calling center. If the intervening distance across a major slough channel or across a substantial barrier between the clapper rail calling center and any activity area is greater than 200 feet, then it may proceed at that location within the breeding season.

2. To minimize or avoid the loss of individual California clapper rails, activities within or adjacent to California clapper rail habitat (salt marsh wetlands) will not occur within two hours before or after extreme high tides (6.5' or above, as measured at the Golden Gate Bridge), when the marsh plain is inundated, because protective cover for California clapper rails is limited and activities could prevent them from reaching available cover.

Soft Bird's Beak Avoidance and Minimization Measures

1. A complete botanical survey of the action area will be completed using the USFWS's *Guidelines for Conducting and Reporting Botanical Inventories for Federally Listed, Proposed and Candidate Plants* (September 23, 1996) and California Department of Fish and Game *Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities* (November 24, 2009) during the appropriate blooming season for soft bird's beak.

2. Locations of soft bird's beak in proposed construction areas will be recorded using a global positioning system (GPS) unit and flagged.

3. If initial screening by a qualified biologist identifies the potential for special-status plant species to be directly or indirectly affected by a specific project, the biologist will establish an adequate buffer area to exclude activities that would directly remove or alter the habitat of an identified special-status plant population or result in indirect adverse effects on the species.

4. The project proponents will oversee installation of a temporary, plastic mesh–type construction fence (Tensor Polygrid or equivalent) at least 1.2 meters (4 feet) tall around any established buffer areas to prevent encroachment by construction vehicles and personnel. A qualified biologist will determine the exact location of the fencing. The fencing will be strung tightly on posts set at maximum intervals of 3 meters (10 feet) and will be checked and maintained weekly until all construction is complete. The buffer zone established by the fencing will be marked by a sign stating:

   This is habitat of [the special-status species being protected], a [identify the species' status] plant species, and must not be disturbed. This species is protected by [the Endangered Species Act of 1973, as amended/California Endangered Species Act/California Native Plant Protection Act]. Violators are subject to prosecution, fines, and imprisonment.

5. No construction activity, including grading, will be allowed until this condition is satisfied.

6. No grading, clearing, storage of equipment or machinery, or other disturbance or activity will occur until all temporary construction fencing has been inspected and approved by the qualified biologist.

Delta Smelt Avoidance and Minimization Measures

1. All in-water construction activities will occur during the appropriate work window, between August 1 and November 30 of any given year.

2. To minimize the effects on delta smelt caused by the mobilization of bottom material that may contain toxins, the use of silt trapping devices shall be employed during all in-water work, where appropriate.

Please contact the Service if you agree to include these measures in your project description. If you have any questions regarding this opinion on the Proposed MOTCO Pier 2 Replacement Project, in Concord, California, please contact Andrew Raabe or Ryan Olah at the letterhead address, telephone (916) 414-6600, or electronic mail at Andrew_Raabe@fws.gov or Ryan_Olah@fws.gov.

Sincerely,

for Eric Tattersall
Deputy Assistant Field Supervisor

cc:
Scott Wilson, California Department of Fish and Game, Yountville, California

APPENDIX B
PUBLIC INVOLVEMENT

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1.0 INTRODUCTION

This appendix presents a summary of the public participation efforts for the *Environmental Impact Statement (EIS) for the Modernization and Repair of Piers 2 and 3 at Military Ocean Terminal Concord (MOTCO)*. Many opportunities have been available for public participation in the environmental analysis process, including a scoping session and comment period and agency notification and consultation. These efforts were used to identify issues addressed in the EIS.

2.0 THE SCOPING PROCESS

The scoping period for the EIS for the Modernization and Repair of Piers 2 and 3 at MOTCO began when the Notice of Intent (NOI) was published in the *Federal Register* on 5 April 2013 (Attachment A). The closing date for the scoping period was set for 4 June 2013. The Army's intent during the scoping process was to provide the greatest level of opportunity for government agencies, special interest groups, and the general public to learn about the alternatives being evaluated in the EIS and to offer several ways for those interested to express their comments regarding the proposal. Newspaper advertisements (Attachment B) were placed in the *Contra Costa Times* and *Contra Costa Post* announcing the Army's intent to prepare an EIS and information about the public scoping meeting (see Table B-1). The advertisements provided the time, date, and location of the public scoping meeting. Public comment was solicited in these advertisements, as well as at the scoping meeting.

Table B-1 Publication Ad Schedule

Publication	Publication Date
Contra Costa Post	April 5-8, 2013 April 22-24, 2013
Contra Costa Times (online)	April 5-7 and 10, 2013 April 19-21 and 24, 2013

2.1 Interagency and Intergovernmental Coordination

As part of the public involvement process, interagency and intergovernmental coordination letters were sent to the following federal, state, and local governmental agencies and representatives.

Federal

National Marine Fisheries Service

U.S. Congressional Representative for California's 11th District

U.S. Fish and Wildlife Service

U.S. Senators for California

Wintun Environmental Protection Agency

State

California Department of Fish and Wildlife

California State Representative for District 14

California State Senator for District 7

Office of Historic Preservation

San Francisco Bay Conservation and Development Commission

San Francisco Bay Regional Water Quality Control Board

State Regional Water Quality Control Board

State Water Resources Control Board

Local

Mayor, City of Concord

Contra Costa County Board of Supervisors District IV Supervisor

Contra Costa County Board of Supervisors District V Supervisor

2.2 Scoping Meetings

The scoping meetings were conducted in an "open house" format to create a comfortable atmosphere for attendees—one in which they could converse individually with Army personnel. Attendees were welcomed at the entrance by Army representatives. After ensuring attendees signed in, Army representatives provided an overview of the scoping meeting layout. Displays were designed to provide the public with information regarding the NEPA process, the proposed action and alternatives, how the Army will assess environmental impacts, and the public's role in shaping the proposed action. Army personnel encouraged attendees to review the displays and ask questions. They were also encouraged to formulate and submit comments.

The Army held one scoping meeting on Wednesday, 24 April 2013 in the Concord High School Multipurpose Room, 4200 Concord Blvd, Concord, CA from 5:00 pm to 8:30 pm. The number of attendees and comments received throughout the comment period are summarized in Table B-2 below.

Table B-2 Number of Scoping Attendees and Comments Received

Element	Number of Attendees/Comments
Total Attendees	5
Comments Received at the Meeting	1
Comments Received Via E-Mail	2
Comments Received Via Mail	2
Total Comments Received	**5**

During the official scoping period, the Army received five comments from agencies, organizations, and individuals. The majority of comments received were related to air quality and biological resources. Comments were also received on scope of impacts, hazardous waste sites, dredging, water quality, safety, climate change, cultural resources, land use, traffic issues, noise, and general support of the proposed action. All comments submitted were reviewed and applicable issues addressed in the EIS.

3.0 DISTRIBUTION OF THE DRAFT EIS

Upon release of the Draft EIS, a Notice of Availability/Notice of Public Meetings will be published in the *Federal Register.* The Draft EIS will then be distributed to the agencies, organizations, and individuals and be made available for general review at the Concord Public Library, 2900 Salvio Street, Concord, CA 94519 and at the Bay Point Library, 205 Pacifica Avenue, Bay Point, CA 94565. A public meeting will be held following the release of the Draft EIS to seek additional public comment on the document.

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ATTACHMENT A NOTICE OF INTENT

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Federal Register / Vol. 78, No. 66 / Friday, April 5, 2013 / Notices 20623

For Further Information or To Submit Comments Contact: Barry S. Lineback, Telephone: (703) 603–7740, Fax: (703) 603–0655, or email *CMTEFedReg@AbilityOne.gov.*

SUPPLEMENTARY INFORMATION: This notice is published pursuant to 41 U.S.C. 8503(a)(2) and 41 CFR 51–2.3. Its purpose is to provide interested persons an opportunity to submit comments on the proposed actions.

Additions

If the Committee approves the proposed additions, the entity of the Federal Government identified in this notice will be required to procure the products listed below from the nonprofit agency employing persons who are blind or have other severe disabilities.

The following products are proposed for addition to the Procurement List for production by the nonprofit agency listed:

Products

Gloves, Mechanics, Men's and Women's, Black

NSN: 8415–01–497–5381—small
NSN: 8415–01–497–5384—medium
NSN: 8415–01–497–5989—large
NSN: 8415–01–497–5987—xlarge
NSN: 8415–01–501–1557—xxlarge
NPA: South Texas Lighthouse for the Blind, Corpus Christi, TX
Contracting Activity: GENERAL SERVICES ADMINISTRATION, FORT WORTH, TX
Coverage: B-List for the Broad Government Requirement as aggregated by the General Services Administration.

Deletions

The following services are proposed for deletion from the Procurement List:

Services

Service Type/Location: Document Processing Service, Bureau of Alcohol, Tobacco, Firearms & Explosives, National Training Center, 244 Needy Road, Martinsburg, WV
NPA: Jeanne Bussard Center, Inc., Frederick, MD
Contracting Activity: DEPARTMENT OF THE TREASURY, WASHINGTON, DC

Service Type/Location: Janitorial/Custodial Service, U.S. Army Reserve Center: Wilkes-Barre, 1001 Highway 315, Wilkes-Barre, PA
NPA: United Rehabilitation Services, Inc., Wilkes-Barre, PA
Contracting Activity: DEPT OF THE ARMY, W6QM MICC–FT DIX (RC–E), FORT DIX, NJ

Barry S. Lineback,

Director, Business Operations.

[FR Doc. 2013–07985 Filed 4–4–13; 8:45 am]

BILLING CODE 6353–01–P

DEPARTMENT OF DEFENSE

Department of the Army

Environmental Impact Statement for Modernization and Repair of Piers 2 and 3, Military Ocean Terminal Concord, CA

AGENCY: Department of the Army, DoD.

ACTION: Notice of Intent.

SUMMARY: The Department of the Army announces its intent to conduct public scoping under the National Environmental Policy Act to gather information to prepare an Environmental Impact Statement (EIS) related to the critically-needed modernization and repairs of Piers 2 and 3, Military Ocean Terminal Concord (MOTCO) due to structural decay caused by severe deterioration, wide-spread marine borer damage, and fungal decay. Piers 2 and 3 are used to transport military supplies in the Pacific region. There may be significant impacts to threatened and endangered species. The following other resource areas may be impacted: water quality, noise, terrestrial and marine species, and traffic. For example, the proposed action will replace a large number of piles; this work will likely result in water quality issues and an increase in noise. The Department of the Army will use the analysis in the EIS to determine whether and how to implement the proposed action.

ADDRESSES: Written comments should be forwarded to Mr. Malcolm Charles, Directorate of Public Works, Attention: SDAT–CCA–MI (Charles), 410 Norman Ave, Concord, CA 94520; email: *usarmy.motco.sddc.mbx.list-eis@mail.mil* or fax (925) 246–4171.

FOR FURTHER INFORMATION CONTACT: Please contact Mr. Malcolm Charles, Directorate of Public Works, 410 Norman Ave, Concord, CA 94520; fax (925) 246–4171; email: *usarmy.motco.sddc.mbx.list-eis@mail.mil.*

SUPPLEMENTARY INFORMATION: The decision to be made by the Army is whether and how to modernize and repair Piers 2 and 3 at the MOTCO. The EIS will assess the direct, indirect, and cumulative environmental impacts associated with various proposed facility modernization and repair options to meet safety, operational, facilities management, land use, and cultural resources management objectives.

Piers 2 and 3 at MOTCO need to be repaired and modernized in order to maintain ammunition out load capabilities at this ocean terminal. Pier 2 is the westernmost of three main wharves and is currently inoperable due to its poor condition. The pier requires major rehabilitation and modernization in order to restore its function and bring it to current containerization standards. The deterioration is due to a combination of marine borer, fungal decay, and overloading.

Pier 3 is currently the primary operational wharf at MOTCO. While it is in fair condition overall, it has localized areas of severe deterioration, wide-spread marine borer damage, and fungal decay. Consequently, work at the pier is subject to loading restrictions, and recent engineering assessments estimate that it has approximately five years of practical service life remaining.

The proposed action consists of the modernization and repair of the critically-needed piers. A range of reasonable alternatives, including a No Action Alternative, will be developed and analyzed in the EIS. Alternatives to be considered include (1) Fully implement repairs to Piers 2 and 3 with Pier 2 re-oriented to align/rotate the west end to meet a more modernized configuration, (2) fully implement repairs to Piers 2 and 3 leaving the Pier 2 footprint in its present location, and (3) fully implement repairs to Piers 2 and 3, reorienting Pier 2 to meet a more modernized configuration (same as in Alternative 1) but with a larger deck surface and heavier carrying capacity. Other reasonable alternatives raised during the scoping process and capable of meeting the project purpose and need and criteria will be considered for evaluation in the EIS.

Scoping and public comments: Federally recognized Tribes, federal, state, and local agencies, organizations, and the public are invited to be involved in the scoping process for the preparation of this EIS by participating in scoping meetings and/or submitting written comments. The scoping process will help identify possible alternatives, potential environmental impacts, and key issues of concern to be analyzed in the EIS. Written comments will be accepted within 60 days of publication of the NOI in the **Federal Register**. Scoping meetings will be held in Concord, CA. Notification of the times and locations for the scoping meetings will be locally published.

Brenda S. Bowen,

Army Federal Register Liaison Officer.

[FR Doc. 2013–07880 Filed 4–4–13; 8:45 am]

BILLING CODE 3710–08–P

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ATTACHMENT B NEWSPAPER ADVERTISEMENT

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The United States Army announces its intent to prepare an Environmental Impact Statement (EIS) to address the potential environmental consequences that may result from the modernization and repairs of Piers 2 and 3 at Military Ocean Terminal Concord (MOTCO), California. The EIS will assess the direct, indirect, and cumulative environmental impacts associated with various proposed facility modernization and repair options to meet safety, operational, facilities management, land use, and cultural and natural resources management objectives. A reasonable range of alternatives for the proposed action, as well as the No-Action alternative are being evaluated in the EIS.

The Army **is holding a public scoping meeting** to help identify environmental issues and community concerns with respect to this proposal. There will be no formal presentation, but Army representatives will be available to answer questions and provide information about the proposed action at the meeting. Please plan to attend **at your convenience anytime between 5:00 pm and 8:30 pm.** The open house meeting is being held on the following date, at the following location:

Wednesday, April 24, 2013	**Concord High School, Multipurpose Room** **4200 Concord Blvd** **Concord, CA 94521**

All comments should be postmarked or submitted no later than June 4, 2013 to ensure their consideration in the EIS analysis. Comments may be submitted through fax to (925) 246-4171, electronically by emailing them to usarmy.motco.sddc.mbx.list-eis@mail.mil or through the mail by sending them to:

Mr. Malcolm Charles
Directorate of Public Works
Attention: SDAT-CCA-MI (Charles)
410 Norman Ave
Concord, CA 94520

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APPENDIX C
RECORD OF NON-APPLICABILITY AND AIR EMISSION MODELING

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RECORD OF NON-APPLICABILITY
FOR CLEAN AIR ACT CONFORMITY
Military Ocean Terminal Concord, CA

The proposed action falls under the Record of Non-Applicability (RONA) category and is documented with this RONA.

Project/Action Name: Modernization and Repair of Piers 2 and 3 at Military Ocean Terminal Concord (MOTCO)

Project/Action Point of Contact: Lt. Col Kenneth Sheets
Commanding Officer
834th Transportation Battalion

Begin Date: 2014

End Date: 2018

General Conformity under the Clean Air Act (CAA), Section 176 has been evaluated for the project described above according to the requirements of 40 CFR Part 93, Subpart B. The General Conformity Rule applies to federal actions occurring in regions designated as being in nonattainment for the National Ambient Air Quality Standards (NAAQS) or attainment areas subject to maintenance plans (maintenance areas). Threshold (*de minimis)* rates of emissions have been established for federal actions with the potential to have significant air quality impacts. If a project/action located in an area designated as non-attainment or maintenance exceeds these *de minimis* levels, a general conformity determination is required. Contra Costa County is designated as a marginal ozone (8-hour) (O_3) non-attainment area, a nonattainment area for the 24-hour particulate matter less than or equal to 2.5 microns aerodynamic diameter ($PM_{2.5}$) standard, and a maintenance area for carbon monoxide (CO). Because ozone and $PM_{2.5}$ form or can form from other emissions, the analysis focuses on O_3 precursors, volatile organic compounds (VOCs) and nitrogen oxides (NO_x), as well as sulfur dioxide (SO_2) as a precursor for $PM_{2.5}$. The region is in attainment for other criteria pollutants.

A General Conformity applicability analysis of this project/action was performed to assess the air emissions associated with the proposed action to determine if maximum annual direct and indirect emissions from this project/action would exceed *de minimis thresholds.* Total emissions resulting from construction activities have been estimated using available project data, general air quality assumptions, and California Air Resources Board (CARB) and the United States Environmental Protection Agency (USEPA) emission factors. There are no operational air emissions. Based on the air quality analysis for the proposed action, the maximum estimated emissions would be below conformity *de minimis* levels (Table 1).

Table 1. Proposed Action Emissions Compared to General Conformity Rule *de Minimis*

Year	HC as VOCs	CO	NO_x	[2]SO_2	$PM_{2.5}$
2014	0.13	0.29	0.40	0.03	0.03
2015	0.06	0.14	0.20	0.01	0.02
2016	3.08	13.30	27.93	0.61	4.32
2017	1.17	6.47	12.78	0.27	1.97
[1]de miminis thresholds	100	100	100	100	100
Exceedance?	No	No	No	No	No

Attached to this RONA is a summary of the calculations, methodology, and data including the estimated construction emissions due to implementation of the Proposed Action.

CONCLUSION

The project area is a maintenance area for CO and a nonattainment area for the $PM_{2.5}$ and the 8-hour O_3 NAAQS. Sulfur dioxide is a precursor to the formation of $PM_{2.5}$ and VOCs and NO_x are precursors to the formation of O_3. Emissions associated with construction activities for the proposed action were calculated based on standardized methodologies. Emissions were then compared with *de minimis* thresholds for the Bay Area Air Quality Management District.

The U.S. Army concludes that *de minimis* thresholds for applicable criteria pollutants would not be exceeded as a result of implementation of the proposed action. The emissions data supporting that conclusion is shown in Table 1, which is a summary of the calculations, methodology, and data attached to this RONA. Therefore, the U.S. Army concludes that formal Conformity Determination procedures are not required, resulting in this RONA.

RONA APPROVAL

To the best of my knowledge, the information presented in this RONA is correct and accurate, and I concur in the finding that the proposed action does not require a formal CAA Conformity Determination.

_____ _____

Lt. Col Kenneth Sheets Date
Commanding Officer
834th Transportation Battalion

AIR EMISSIONS ESTIMATION METHODOLOGY

The following is a discussion of the assumptions and methods used to perform the air emission estimate calculations. The methodology for calculation of greenhouse gases (GHG) emissions is listed separately from the criteria pollutant calculation methodology.

CONSTRUCTION ACTIVITIES

Air quality impacts were estimated for construction activities associated with the proposed action. The following is a discussion of the assumptions, references, and methods used to perform the air emission estimate calculations.

Information on project footprints, duration and equipment were provided in MOTCO Pier 2 Modernization Constructability Memo (Moffat & Nichol 2013a) and MOTCO Pier 3 Renovation Constructability Memo (Moffat & Nichol 2013b). Additional clarification on equipment usage was provided in an email from Moffat & Nichol dated 27 June 2013 (Fidell, personal communication 2013).

Off-Road Construction Equipment

Construction equipment diesel emissions were calculated as follows (including dredge equipment):

$E_{pollutant} = EF \times HP \times LF \times h$

$E_{pollutant}$ = emissions per pollutant
EF = Emission Factor
HP = engine horse power
LF = engine load factor
h = total hours operated

EF = Zh+dr*Ch

Zh = zero-hour emission rate when the equipment is new
Dr = deterioration rate or the increase in zero-hour emissions as the equipment is used
Ch = cumulative hours or total number of hours accumulated on the equipment; maximum value is equal to 12,000 hours

Hydrocarbon emissions are converted to volatile organic compounds (VOCs) using the diesel factor of 1.053 from the United States Environmental Protection Agency's (USEPA's) Conversion Factors for Hydrocarbon Emission Components (USEPA 2010).

Data on average life expectancy for equipment, load factors and average cumulative hours, along with zero hour and deterioration emission rates are from the following:

- California In-Use Off-Road Equipment (Construction, Industrial, Ground Support and Oil Drilling 2011 Inventory Model) (CARB 2011);

- Appendix D: OSM and Summary of Off-Road Emissions Inventory Update, from Staff Report: Initial Statement of Reasons for Proposed Rulemaking, Proposed Amendments to the Regulation for In-Use Off-Road Diesel-fueled Fleets and the Off-Road Large Spark-Ignition Fleet Requirements (CARB 2010); and
- Appendix E: Emissions Inventory Methodology and Results, from Technical Support Document: Proposed Regulation for In-Use Off-Road Diesel Vehicles (CARB 2007).

Table 1. Construction Equipment Parameters

Equipment	Cumul. Hrs	Ave Age	Model Yr	HP
Pile Driver	6767	14	2002	1320
Pile Hammer	6767	14	2002	180
Concrete Pump	6767	14	2002	50
Barge Crane	8517	18	1998	130
RT Crane	8517	18	1998	240
Excavator	6513	9	2007	290
Dozer	12000	22	1994	307
Paver	4700	11	2005	187
Grader	1200	18	1998	145
Roller	4000	11	2005	154
Welder	6767	14	2002	58
Generator	6767	14	2002	13
Forklift	3024	12	2005	103
Loader	12000	14	2002	262
dredge	1200	8	2008	2500
[1]Excavator	7456	11	2005	232
skid steer loader	2246	5	2011	197
Barge Crane	7992	18	1998	800

[1]Excavator data applied for both Pier 2 and Pier 3 equipment.

Sulfur dioxide (SO_2) emissions calculated from Equation 7 of Exhaust and Crankcase Emission factors for Non-road Engine Modeling - Compression-Ignition (USEPA 2010):

SO_2 = (BSFC * (1 - soxcnv) - HC) * 0.01 * soxdsl * 2
BSFC = in use adjusted fuel consumption
Soxcnv = the fraction of fuel sulfured converted to direct PM
HC = the in-use adjusted hydrocarbon emissions
0.01 = conversion factor from weight percent to weight fraction
Soxdsl = the episodic weight percent of sulfur in non-road diesel fuel
2 = grams of SO_2 formed from a gram of sulfur

Watercraft

Watercraft emissions were calculated as follows:

$E_{pollutant} = Zh * F * (1 + dh * A/UL) * HP * LF * h$

Zh = model year, horsepower and engine use (propulsion or auxiliary) specific zero hour emission factor (when the engine is new)
F = fuel correction factor (for nitrogen oxides [NO_x] and particulate matter [PM]) which accounts for emission reductions from burning cleaner fuel
dh= horsepower and pollutant specific engine deterioration factor, which is the percent increase of emission factors at the end of the useful life of the engine
A = the age of the engine when the emissions are estimated
UL=the vessel type and engine use specific engine useful life
HP=rated horsepower of the engine
LF=vessel type and engine use specific engine load factor
h=number of operating hours of the engine

This method was used to calculated emissions for work boats, tugs, and self-propelled scows.

Hydrocarbon emissions are converted to VOCs using the diesel factor of 1.053 from USEPA's Conversion Factors for Hydrocarbon Emission Components (USEPA 2010).

The tugboat used in the demolition phase of Pier 2 is assumed to be equipped with a single 500-HP propulsion engine. All other (larger) tugboats are assumed to be equipped with two engines. This is based on the California Harbor Craft Emission Inventory Database which indicates that the average number of propulsion engines for tugboats is 1.92.

Sulfur dioxide emissions calculated from Appendix B: Emissions Estimation Methodology for Commercial Harbor Craft Operating in California, from Technical Support Document for Rulemaking to Consider the Adoption of Proposed Regulations to Reduce emissions from Diesel Engines on Commercial Harbor Craft Operated Within California Waters and 24 Nautical Miles of the California Baseline (CARB 2007):

$F_c = HP \times LF \times h \times BSFC$

F_c = fuel consumed
HP = rated horsepower of engine
h = number of operating hours
LF = load factor
BSFC = brake specific fuel consumption rate; 184 g/hp-hr was estimated from manufacturers' marine engine data

Appendix B and the following other references were used to calculate watercraft emissions:

- California Commercial Harbor Craft Emissions Inventory Database (CARB 2013a), and
- California Barge and Dredge Emissions Inventory Database (CARB 2013b).

On-Road Vehicles

On-road engine emissions were calculated as follows:

$E_{pollutant} = D \times EF$

D = Total distance driven in miles
EF = pollutant emission factor in pounds/mile

Distance is calculated based upon assumptions presented in MOTCO Pier 2 Modernization Constructability Memo (Moffat & Nichol 2013a) and MOTCO Pier 3 Renovation Constructability Memo (Moffatt & Nichol 2013b).

Fugitive Dust

Emission rates for fugitive dust were estimated using guidelines outlined in the Western Regional Air Partnership (WRAP) Fugitive Dust Handbook (Countess Environmental 2006). These guidelines assume standard dust mitigation best practices activities of 50 percent from wetting. The WRAP handbook offers several options for selecting factors for particulate matter less than or equal to 10 microns aerodynamic (PM_{10}) (coarse PM) depending on what information is known.

After PM_{10} is estimated, the fraction of fugitive dust emitted as $PM_{2.5}$ is estimated based on data in *Analysis of the Fine Fraction of Particulate Matter in Fugitive Dust* (Midwest Research Institute 2005), which recommends the use of a fractional factor of 0.10 to estimate the $PM_{2.5}$ portion of the PM_{10}.

For site preparation activities, the emission factor was obtained from Table 3-2 of the WRAP Fugitive Dust Handbook (Countess Environmental 2006). The areas of disturbance and approximate durations were used in conjunction with the scale of land-disturbing activities occurring, resulting in the selection of the first factor conditions for use in the analysis, which does not include large-scale earth moving activities (average conditions used).

Greenhouse Gas Emissions

Greenhouse gas emissions for all equipment were calculated using data from Documentation of California's Greenhouse Gas Emission Inventory - Index, Category: Energy, Fuel Combustion Activities, Transport (CARB 2013). Within Transport, the following subcategories were used:

- Not Specified Transportation - Distillate
- Cars, On Road: Light-duty Vehicles - Gasoline
- Heavy-duty Trucks and Buses, On Road: Heavy-duty Vehicles: Heavy-duty Trucks, Buses & Motorhomes - Gasoline
- Water-borne Navigation, Domestic Water-borne Navigation, Intrastate: Harborcraft -

Distillate

Construction and watercraft GHG emissions were calculated as follows:

E_{GHG} = h X HP X LF X EF X 1 gal/3785 cc X 1 cc/0.85 g diesel X BSFC/1000

h = hours of operation

HP = horsepower

LF = load factor

EF = emission factor from California GHG Inventory Index

cc = cubic centimeters

BSFC = brake specific fuel consumption rate; 184 g/hp-hr was estimated from manufacturers' marine engine data; 166 g/hp-hr for construction equipment > 100 HP and 185 hp-hr for construction equipment < 100 HP; construction equipment BSFC from Exhaust and Crankcase Emission Factors for Non-road Engine Modeling - Compression Ignition (USEPA 2010).

On-road vehicle GHG emissions were calculated as follows:

E_{GHG} = D/FE X EF/1000

D = Total distance
FE = fuel efficiency for vehicle type
EF = emission factor from California GHG Inventory Index

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Annual Summary of Emissions for Piers 2 and 3

Table 1. Alternative 1 Emissions Summary

YEAR	VOC T/yr	CO T/yr	NOx T/yr	SO2 T/yr	PM10 T/yr	PM2.5 T/yr	CO_2e MT/yr
2014	0.07	0.18	0.20	0.01	0.02	0.02	34
2015	0.03	0.09	0.10	0.01	0.01	0.01	17
2016	2.72	11.28	24.00	0.53	32.01	4.19	1,569
2017	0.82	4.53	8.94	0.19	15.73	1.84	715

Table 2. Alternative 2 Emissions Summary

YEAR	VOC T/yr	CO T/yr	NOx T/yr	SO2 T/yr	PM10 T/yr	PM2.5 T/yr	CO_2e MT/yr
2014	0.07	0.18	0.20	0.01	0.02	0.02	34
2015	0.03	0.09	0.10	0.01	0.01	0.01	17
2016	2.72	11.28	24.00	0.53	32.01	4.19	1,569
2017	0.86	4.67	9.43	0.28	15.75	1.86	765

Table 3. Alternative 3 Emissions Summary

YEAR	VOC T/yr	CO T/yr	NOx T/yr	SO2 T/yr	PM10 T/yr	PM2.5 T/yr	CO_2e MT/yr
2014	0.07	0.18	0.20	0.01	0.02	0.02	34
2015	0.03	0.09	0.10	0.01	0.01	0.01	17
2016	3.10	13.39	28.05	0.62	32.16	4.33	1,887
2017	1.17	6.47	12.78	0.27	15.87	1.97	1,013

Pier 2 Demolition Emissions (2016)

Table 1. Mobilization

On-road Equipment	Hours of Operation	Engine HP	Speed (mph)	ROG lb/mile	CO lb/mile	NO_x lb/mile	SO_2 lb/mile	PM_{10} lb/mile	$PM_{2.5}$ lb/mile	CH_4 g/gal fuel	N_2O g/gal fuel	CO_2 g/gal fuel
Pickup Truck	50	180	45	6.33E-04	5.76E-03	0.001	1.07E-05	9.39E-05	6.13E-05	0.703	0.561	9,172
Delivery Truck	85	380	45	1.61E-03	7.05E-03	1.89E-02	3.95E-05	9.44E-04	7.84E-04	0.240	0.332	10,206

Off-road Equipment	ROG lb	CO lb	NO_x lb	SO_2 lb	PM lb	$PM_{2.5}$ lb	CH_4 kg	N_2O kg	CO_2 kg
Pickup Truck	1.42	12.96	1.25	0.02	0.21	0.14	0.09	0.07	1,214
Delivery Truck	6.16	26.95	72.19	0.15	3.61	3.00	0.14	0.20	6,006
Tons/year:	**0.00**	**0.02**	**0.04**	**0.00**	**0.00**	**0.00**			
CO_2e Metric tons/year:									**7.31**

Table 2. Pile and Superstructure Removal

Off-road Equipment	Hours of Operation	Engine HP	Load Factor	HC-ZH g/hp-hr	HC-DR g/hp-hr^2	CO-ZH g/hp-hr	CO-DR g/hp-hr^2	NOx-ZH g/hp-hr	NOx-DR g/hp-hr^2	SO_2 g/hp-hr	PM_{10}-ZH g/hp-hr	PM_{10}-DR g/hp-hr^2	CH_4 g/gal fuel	N_2O g/gal fuel	CO_2 g/gal fuel
Excavator	2,800	232	0.38	1.32	6.11E-05	4.40	1.16E-04	14.00	3.24E-04	0.0048	0.77	5.60E-05	0.41	0.08	10,206
Barge (Crane)	1,300	800	0.42	0.68	2.37E-05	2.70	5.35E-05	8.17	1.36E-04	0.0049	0.38	2.02E-05	0.41	0.08	10,206

Off-road Equipment	HC lb	CO lb	NO_x lb	SO_2 lb	PM lb	$PM_{2.5}$ lb	CH_4 kg	N_2O kg	CO_2 kg
Excavator	971.11	2,879.53	8,978.27	2.64	649.50	597.54	5.31	1.06	130,993
Barge (Crane)	837.23	3,011.80	8,914.26	4.68	521.40	479.68	9.36	2.07	230,641
Tons/year:	**0.90**	**2.95**	**8.95**	**0.00**	**0.59**	**0.54**			
CO_2e Metric tons/year:									**363**

On-road Equipment	Hours of Operation	Engine HP	Speed (mph)	ROG lb/mile	CO lb/mile	NO_x lb/mile	SO_2 lb/mile	PM_{10} lb/mile	$PM_{2.5}$ lb/mile	CH_4 g/gal fuel	N_2O g/gal fuel	CO_2 g/gal fuel
Dump Truck	161	450	45	1.61E-03	7.05E-03	1.89E-02	3.95E-05	9.44E-04	7.84E-04	0.24	0.332	10,206

Table 2. Pile and Superstructure Removal Cont.

Off-road Equipment	ROG lb	CO lb	NO_x lb	SO_2 lb	PM lb	$PM_{2.5}$ lb	CH_4 kg	N_2O kg	CO_2 kg
Dump Truck	11.67	51.05	136.74	0.29	6.84	5.68	0.27	0.37	11,376
Tons/year:	**0.01**	**0.03**	**0.07**	**0.00**	**0.00**	**0.00**			
CO_2e Metric tons/year:									**11**

Table 3. Barge Pier Activity

Off-road Equipment	Hours of Operation	Engine HP	Load Factor	HC-ZH g/hp-hr	HC-DR g/hp-hr^2	CO-ZH g/hp-hr	CO-DR g/hp-hr^2	NOx-ZH g/hp-hr	NOx-DR g/hp-hr^2	SO_2 g/hp-hr	PM_{10}-ZH g/hp-hr	PM_{10}-DR g/hp-hr^2	CH_4 g/gal fuel	N_2O g/gal fuel	CO_2 g/gal fuel
Loader	700	197	0.37	0.10	2.50E-05	2.70	7.14E-05	2.45	3.20E-05	0.0049	0.14	1.00E-05	0.41	0.08	10,206

Off-road Equipment	HC lb	CO lb	NOx lb	SO2 lb	PM10 lb	PM2.5 lb	CH_4 kg	N_2O kg	CO_2 kg
Loader	17.49	320.45	282.53	0.55	18.20	16.74	1.09	0.22	26,832
Tons/year:	**0.01**	**0.16**	**0.14**	**0.00**	**0.01**	**0.01**			
CO_2e Metric tons/year:									**27**

On-road Equipment	Hours of Operation	Engine HP	Speed (mph)	ROG lb/mile	CO lb/mile	NOx lb/mile	SO_2 lb/mile	PM10 lb/mile	PM2.5 lb/mile	CH_4 g/gal fuel	N_2O g/gal fuel	CO_2 g/gal fuel
Dump Truck	161	450	45	1.61E-03	7.05E-03	1.89E-02	3.95E-05	9.44E-04	7.84E-04	0.24	0.332	10,206
Onsite Semi- Truck	700	380	15	1.61E-03	7.05E-03	1.89E-02	3.95E-05	9.44E-04	7.84E-04	0.24	0.332	10,206

Off-road Equipment	ROG lb	CO lb	NO_x lb	SO_2 lb	PM lb	$PM_{2.5}$ lb	CH_4 kg	N_2O kg	CO_2 kg
Dump Truck	11.67	51.05	136.74	0.29	6.84	5.68	0.10	0.37	11,376
Onsite Semi- Truck	16.91	73.98	198.17	0.41	9.92	8.24	0.39	0.54	16,487
Tons/year:	**0.01**	**0.06**	**0.17**	**0.00**	**0.01**	**0.01**			
CO_2e Metric tons/year:									**13**

Table 4. Stockpile Area Activity

Off-road Equipment	Hours of Operation	Engine HP	Load Factor	HC-ZH g/hp-hr	HC-DR g/hp-hr^2	CO-ZH g/hp-hr	CO-DR g/hp-hr^2	NOx-ZH g/hp-hr	NOx-DR g/hp-hr^2	SO_2 g/hp-hr	PM_{10}-ZH g/hp-hr	PM_{10}-DR g/hp-hr^2	CH_4 g/gal fuel	N_2O g/gal fuel	CO_2 g/gal fuel
Excavator	1,450	232	0.38	1.32	6.11E-05	4.40	1.16E-04	14.00	3.24E-04	0.0048	0.77	5.60E-05	0.41	0.08	10,206
Loader	725	170	0.37	0.10	2.50E-05	2.70	7.14E-05	2.45	3.20E-05	0.0049	0.14	1.00E-05	0.41	0.08	10,206

Off-road Equipment	HC lb	CO lb	NO_x lb	SO_2 lb	PM_{10} lb	$PM_{2.5}$ lb	CH_4 kg	N_2O kg	CO_2 kg
Excavator	502.90	1,491.19	4,649.46	1.37	336.35	309.44	2.75	0.55	67,836
Loader	15.64	286.41	252.51	0.49	16.27	14.97	0.97	0.19	23,982
Tons/year:	**0.26**	**0.89**	**2.45**	**0.00**	**0.18**	**0.16**			
CO_2e Metric tons/year:									**92**

Table 5. Watercraft

Off-road Equipment	Hours of Operation	Engine HP	Load Factor	HC-ZH g/hp-hr	HC-DR g/hp-hr^2	CO-ZH g/hp-hr	CO-DR g/hp-hr^2	NOx-ZH g/hp-hr	NOx-DR g/hp-hr^2	Fc g	PM10 g/hp-hr	PM10-ZH g/hp-hr^2	CH_4 g/gal fuel	N_2O g/gal fuel	CO_2 g/gal fuel
Tug - propulsion	1,400	500	0.50	0.68	0.44	3.73	0.25	5.10	0.21	64400000	0.15	0.67	0.41	0.08	10,206
Launch Boat	2,800	50	0.45	1.80	0.51	3.73	0.41	5.32	0.06	11592000	0.15	0.44	0.41	0.08	10,206

Off-road Equipment	HC lb	CO lb	NO_x lb	SO_2 lb	PM_{10} lb	$PM_{2.5}$ lb	CH_4 kg	N_2O kg	CO_2 kg
Tug - propulsion	634.64	3,220.79	4,103.70	425.94	122.14	112.37	8.29	1.66	204,272
Launch Boat	310.72	619.21	720.50	76.67	20.16	18.55	1.49	0.30	36,769
Tons/year:	**0.47**	**1.92**	**2.41**	**0.25**	**0.07**	**0.07**			
CO_2e Metric tons/year:									**242**

Table 6. Onsite Vehicles

On-road Equipment	Hours of Operation	Speed (mph)	ROG lb/mile	CO lb/mile	NO_x lb/mile	SO_2 lb/mile	PM_{10} lb/mile	$PM_{2.5}$ lb/mile	CH_4 g/gal fuel	N_2O g/gal fuel	CO_2 g/gal fuel
Pickup Truck	620	45	0.001	0.006	0.001	1.07E-05	9.39E-05	6.13E-05	0.703	0.561	9,172
Off-road Equipment	**ROG** lb	**CO** lb	**NO_x** lb	**SO_2** lb	**PM** lb	**$PM_{2.5}$** lb	**CH_4** kg	**N_2O** kg	**CO_2** kg		
Pickup Truck	17.65	160.65	15.53	0.30	2.62	1.71	1.15	0.92	15,053		
Tons/year:	**0.01**	**0.08**	**0.01**	**0.00**	**0.00**	**0.00**					
CO_2e Metric tons/year:									**15**		

Table 7. Fugitive Dust

Year	PM_{10} tons/acre/mo	acres	days of disturbance	PM_{10} Total	$PM_{2.5}$/ PM_{10} Ratio	$PM_{2.5}$ Total
2016	0.11	1	140	15.4	0.1	1.5

Table 8. Construction Worker POVs - Each Year

Vehicles	# trips	# days	mi/day	ROG lb/mi	CO lb/mi	NO_x lb/mi	SO_2 lb/mi	PM_{10} lb/mi	$PM_{2.5}$ lb/mi	CH_4 g/gal fuel	N_2O g/gal fuel	CO_2 g/gal fuel
Carpool Van	8	140	2	0.001	0.006	0.001	1.07E-05	9.39E-05	6.13E-05	0.703	0.561	9172
Off-road Equipment	**ROG** lb	**CO** lb	**NO_x** lb	**SO_2** lb	**PM_{10}** lb	**$PM_{2.5}$** lb	**CH_4** kg	**N_2O** kg	**CO_2** kg		
Carpool Van	1.42	12.90	1.25	0.02	0.21	0.14	0.05	0.04	604		
Tons/year:	**0.00**	**0.01**	**0.00**	**0.00**	**0.00**	**0.00**					
CO_2e Metric tons/year:									**1**		

Table 9. Annual Demolition Emissions Summary

YEAR	VOC T/yr	CO T/yr	NO_x T/yr	SO_2 T/yr	PM_{10} T/yr	$PM_{2.5}$ T/yr	CO_2e MT/yr
2016	1.77	6.11	14.23	0.26	16.26	2.33	771

Pier 2 Construction Emissions (2016-2017)

Table 1. Watercraft Pile Delivery, Alternatives 1 and 2

Off-road Equipment	Hours of Operation	Engine HP	Load Factor	HC-ZH g/hp-hr	HC-DR g/hp-hr^2	CO-ZH g/hp-hr	CO-DR g/hp-hr^2	NO_x-ZH g/hp-hr	NO_x-DR g/hp-hr^2	Fc g	PM_{10} g/hp-hr	PM_{10}-ZH g/hp-hr^2	CH_4 g/gal fuel	N_2O g/gal fuel	CO_2 g/gal fuel
Tug - propulsion	351	375	0.50	0.68	0.44	3.73	0.25	5.10	0.21	1.21E+07	0.15	0.67	0.41	0.08	10,206
	351	375	0.50	0.68	0.44	3.73	0.25	5.10	0.21	1.21E+07	0.15	0.67	0.41	0.08	10,206

Off-road Equipment	HC lb	CO lb	NO_x lb	SO_2 lb	PM_{10} lb	$PM_{2.5}$ lb	CH_4 kg	N_2O kg	CO_2 kg
Tug - propulsion	119.23	605.11	770.98	80.02	22.95	21.11	1.56	0.31	38,378
	119.23	605.11	770.98	80.02	22.95	21.11	1.56	0.31	38,378
Tons/year:	**0.12**	**0.61**	**0.77**	**0.08**	**0.02**	**0.02**			
CO_2e Metric tons/year:									**77**

Table 2a. Watercraft Used in Construction, Alternatives 1 and 2

Off-road Equipment	Hours of Operation	Engine HP	Load Factor	HC-ZH g/hp-hr	HC-DR g/hp-hr^2	CO-ZH g/hp-hr	CO-DR g/hp-hr^2	NO_x-ZH g/hp-hr	NO_x-DR g/hp-hr^2	Fc g	PM_{10} g/hp-hr	PM_{10}-ZH g/hp-hr^2	CH_4 g/gal fuel	N_2O g/gal fuel	CO_2 g/gal fuel
Tug - propulsion	1,105	375	0.50	0.68	0.44	3.73	0.25	5.10	0.21	3.81E+07	0.15	0.67	0.41	0.08	10,206
	1,105	375	0.50	0.68	0.44	3.73	0.25	5.10	0.21	3.81E+07	0.15	0.67	0.41	0.08	10,206
Work Boat	1,700	250	0.45	0.68	0.28	3.73	0.16	5.10	0.14	3.52E+07	0.15	0.44	0.41	0.08	10,206

Table 2b. Watercraft Used in Construction, Alternatives 1 and 2 Cont.

Off-road Equipment	HC lb	CO lb	NO_x lb	SO_2 lb	PM_{10} lb	$PM_{2.5}$ lb	CH_4 kg	N_2O kg	CO_2 kg
Tug - propulsion	375.68	1,906.59	2,429.24	252.14	72.30	66.52	4.91	0.98	120,922
	375.68	1,906.59	2,429.24	252.14	72.30	66.52	4.91	0.98	120,922
Work Boat	329.21	1,705.92	2,189.62	232.74	62.38	57.39	4.53	0.91	111,620
Tons/year:	**0.54**	**2.76**	**3.52**	**0.37**	**0.10**	**0.10**			
CO_2e Metric tons/year:									**355**

Table 3a. Construction Equipment, Alternatives 1 and 2

Off-road Equipment	Hours of Operation	Engine HP	Load Factor	HC-ZH g/hp-hr	HC-DR g/hp-hr[2]	CO-ZH g/hp-hr	CO-DR g/hp-hr[2]	NO_x-ZH g/hp-hr	NO_x-DR g/hp-hr[2]	SO_2 g/hp-hr	PM_{10}-ZH g/hp-hr	PM_{10}-DR g/hp-hr[2]	CH_4 g/gal fuel	N_2O g/gal fuel	CO_2 g/gal fuel
Pile Driver	2210	1320	0.42	0.32	1.12E-05	2.70	5.35E-05	6.25	1.04E-04	0.0049	0.15	7.96E-06	0.41	0.08	10,206
Pile Hammer	2210	180	0.42	0.32	1.48E-05	0.92	2.43E-05	6.25	1.45E-04	0.0049	0.15	7.96E-06	0.41	0.08	10,206
Concrete Pump	490	50	0.42	1.45	1.85E-04	4.10	4.20E-04	5.55	1.03E-04	0.0053	0.60	4.65E-05	0.41	0.08	10,206
Barge Crane	3400	130	0.29	0.68	3.15E-05	2.70	7.14E-05	6.9	1.60E-04	0.0049	0.38	2.76E-05	0.41	0.08	10,206
RT Crane	840	240	0.29	0.32	1.48E-05	2.70	7.14E-05	6.25	1.45E-04	0.0049	0.15	7.96E-06	0.41	0.08	10,206
Excavator	180	290	0.38	0.10	2.50E-05	0.92	1.82E-05	2.45	3.18E-05	0.0049	0.11	5.55E-06	0.41	0.08	10,206
Dozer	460	307	0.40	0.68	2.37E-05	2.70	5.35E-05	8.17	1.36E-04	0.0049	0.38	2.02E-05	0.41	0.08	10,206
Paver	450	187	0.42	0.12	2.40E-05	0.92	2.43E-05	4.38	6.33E-05	0.0049	0.11	5.79E-06	0.41	0.08	10,206
Grader	430	145	0.41	0.68	3.15E-05	2.70	7.14E-05	6.9	1.60E-04	0.0049	0.38	2.76E-05	0.41	0.08	10,206
Roller	880	154	0.38	0.16	2.57E-05	2.70	7.14E-05	4.44	6.46E-05	0.0049	0.16	1.18E-05	0.41	0.08	10,206
Welder	840	58	0.42	0.99	4.58E-05	3.49	9.23E-05	6.9	1.60E-04	0.0054	0.69	5.02E-05	0.41	0.08	10,206
Gen Set	840	13	0.42	1.45	1.85E-04	4.10	4.20E-04	5.55	1.03E-04	0.0053	0.60	4.65E-05	0.41	0.08	10,206
Forklift	700	103	0.20	0.28	2.92E-05	3.14	8.33E-05	5.22	8.40E-05	0.0049	0.29	2.12E-05	0.41	0.08	10,206
Loader	150	262	0.37	0.14	2.22E-05	4.20	8.32E-04	4.51	6.32E-05	0.0049	0.11	6.03E-06	0.41	0.08	10,206

Table 3b. Construction Equipment, Alternatives 1 and 2 Cont.

Off-road Equipment	HC lb	CO lb	NO_x lb	SO_2 lb	PM_{10} lb	$PM_{2.5}$ lb	CH_4 kg	N_2O kg	CO_2 kg
Pile Driver	1,057.39	8,180.51	18,577.6	13.01	544.65	501.07	25.96	5.19	639,861
Pile Hammer	153.06	395.07	2,634.4	1.77	74.27	68.33	3.54	0.71	87,254
Concrete Pump	60.62	155.76	140.2	0.12	20.52	18.88	0.24	0.05	5,974
Barge Crane	266.22	928.71	2,319.7	1.36	172.67	158.86	2.73	0.55	67,239
RT Crane	57.12	423.59	958.4	0.62	27.89	25.66	1.24	0.25	30,668
Excavator	11.55	45.64	116.8	0.21	6.42	5.91	0.43	0.09	10,526
Dozer	118.69	411.31	1,206.4	0.60	76.60	70.47	1.20	0.24	29,477
Paver	17.94	79.70	360.5	0.38	10.57	9.73	0.75	0.15	18,458
Grader	40.33	156.50	398.4	0.27	23.21	21.35	0.55	0.11	13,455
Roller	29.46	334.69	526.7	0.55	23.23	21.37	1.09	0.22	26,848
Off-road Equipment	**HC** lb	**CO** lb	**NO_x** lb	**SO_2** lb	**PM_{10}** lb	**$PM_{2.5}$** lb	**CH_4** kg	**N_2O** kg	**CO_2** kg
Welder	58.00	183.59	356.2	0.24	45.94	42.27	0.48	0.10	11,880
Gen Set	27.86	71.59	64.4	0.06	9.43	8.68	0.11	0.02	2,746
Forklift	11.77	108.37	174.9	0.16	11.31	10.41	0.31	0.06	7,652
Loader	12.98	452.86	168.2	0.16	5.82	5.36	0.31	0.06	7,647
Tons/year:	**0.96**	**5.96**	**14.00**	**0.01**	**0.53**	**0.48**			
CO_2e Metric tons/year:									**963**

Table 4. On Road Vehicles, Alternatives 1 and 2

On-road Equipment	Hours of Operation	Total Miles Traveled	Speed (mph)	ROG lb/mile	CO lb/mile	NO_x lb/mile	SO_2 lb/mile	PM_{10} lb/mile	$PM_{2.5}$ lb/mile	CH_4 g/gal fuel	N_2O g/gal fuel	CO_2 g/gal fuel
Dump Truck	502	4,652	25	1.32E-03	6.05E-03	1.53E-02	3.93E-05	1.40E-03	1.20E-03	0.24	0.332	10,206
Concrete Truck	2,929	22,778	25	1.32E-03	6.05E-03	1.53E-02	3.93E-05	1.40E-03	1.20E-03	0.24	0.332	10,206
Pickup Truck	2,536	63,400	25	5.72E-04	5.03E-03	4.73E-04	1.07E-05	9.49E-05	6.23E-05	0.70	0.561	9172
Water Truck	600	6,000	10	1.32E-03	6.05E-03	1.53E-02	3.93E-05	1.40E-03	1.20E-03	0.24	0.332	10,206
Asphalt Truck	186	4,140	25	1.32E-03	6.05E-03	1.53E-02	3.93E-05	1.40E-03	1.20E-03	0.24	0.332	10,206
Semi- Truck	332	7,380	25	1.32E-03	6.05E-03	1.53E-02	3.93E-05	1.40E-03	1.20E-03	0.24	0.332	10,206
Carpool Van	NA	12768	NA	5.72E-04	5.03E-03	4.73E-04	1.07E-05	9.49E-05	6.23E-05	0.70	0.561	9172

Off-road Equipment	ROG lb	CO lb	NO_x lb	SO_2 lb	PM lb	$PM_{2.5}$ lb	CH_4 kg	N_2O kg	CO_2 kg
Dump Truck	6.13	28.13	71.01	0.18	6.49	5.59	0.17	0.24	7,304
Concrete Truck	30.00	137.74	347.69	0.90	31.79	27.35	0.84	1.16	35,765
Pickup Truck	36.25	318.83	29.99	0.68	6.02	3.95	2.62	2.09	34,206
Water Truck	7.90	36.28	91.58	0.24	8.37	7.20	0.22	0.31	9,421
Asphalt Truck	5.45	25.04	63.19	0.16	5.78	4.97	0.15	0.21	6,500
Semi- Truck	9.72	44.63	112.65	0.29	10.30	8.86	0.27	0.38	11,588
Carpool Van	7.30	64.21	6.04	0.14	1.21	0.80	0.53	0.42	6,889
Tons/year:	**0.05**	**0.33**	**0.36**	**0.00**	**0.03**	**0.03**			
CO_2e Metric tons/year:									**113**

Table 5. Maintenance Dredging Emissions for Alternative 1

Off-road Equipment	Hours of Operation	Engine HP	Load Factor	HC-ZH g/hp-hr	HC-DR g/hp-hr[2]	CO-ZH g/hp-hr	CO-DR g/hp-hr[2]	NOx-ZH g/hp-hr	NOx-DR g/hp-hr[2]	Fc g	PM10 g/hp-hr	PM10-ZH g/hp-hr[2]	CH_4 g/gal fuel	N_2O g/gal fuel	CO_2 g/gal fuel
Tug - propulsion	24	375	0.50	0.68	0.44	3.73	0.25	5.10	0.21	828000	0.15	0.67	0.41	0.08	10,206
	24	375	0.50	0.68	0.44	3.73	0.25	5.10	0.21	828000	0.15	0.67	0.41	0.08	10,206

Off-road Equipment	HC lb	CO lb	NOx lb	SO2 lb	PM10 lb	PM2.5 lb	CH_4 kg	N_2O kg	CO_2 kg
Tug - propulsion	8.16	41.41	52.76	5.48	1.57	1.44	0.11	0.02	2,626
	8.16	41.41	52.76	5.48	1.57	1.44	0.11	0.02	2,626
Tons/year:	**0.01**	**0.04**	**0.05**	**0.01**	**0.00**	**0.00**			
CO_2e Metric tons/year:									**5**

Table 6. Fugitive Dust, Alternatives 1, 2 and 3

Year	PM 10 tons/acre/mo	acres	days of disturbance	PM 10 Total	PM $_{2.5}$/PM $_{10}$ Ratio	PM $_{2.5}$ Total
2016	0.11	2	70	15.4	0.1	1.5
2017	0.11	2	70	15.4	0.1	1.5

Table 7. Alternative 1 Annual Construction Emissions Summary

YEAR	VOC T/yr	CO T/yr	NO_x T/yr	SO_2 T/yr	PM_{10} T/yr	$PM_{2.5}$ T/yr	CO_2e MT/yr
2016	0.94	5.13	9.71	0.27	15.76	1.87	792
2017	0.82	4.53	8.94	0.19	15.73	1.84	715

Table 8a. Alternative 2 Dredging

Off-road Equipment	Hours of Operation	Engine HP	Load Factor	HC-ZH g/hp-hr	HC-DR g/hp-hr^2	CO-ZH g/hp-hr	CO-DR g/hp-hr^2	NO_x-ZH g/hp-hr	NO_x-DR g/hp-hr^2	SO_2 g/hp-hr	PM_{10} g/hp-hr	PM_{10}-ZH g/hp-hr^2	CH_4 g/gal fuel	N_2O g/gal fuel	CO_2 g/gal fuel
Clamshell Dredge	45	2500	0.51	0.12	2.36E-05	0.92	1.82E-05	4.29	5.81E-05	3.30E-03	0.11	5.79E-06	0.41	0.08	10,206
Tug Boat - propulsion	23	1000	0.45	0.17	0.44	0.92	0.25	4.51	0.21	4.97E+06	0.11	0.67	0.41	0.08	10,206
	23	1000	0.45	0.17	0.44	0.92	0.25	4.51	0.21	4.97E+06	0.11	0.67	0.41	0.08	10,206
Bottom Dump Scow	23	250	0.45	0.68	0.28	3.73	0.16	5.10	0.14	1.24E+06	0.15	0.44	0.41	0.08	10,206
Work Tug - propulsion	23	375	0.50	0.68	0.44	3.73	0.25	5.10	0.21	1.21E+07	0.15	0.67	0.41	0.08	10,206
	23	375	0.50	0.68	0.44	3.73	0.25	5.10	0.21	1.21E+07	0.15	0.67	0.41	0.08	10,206

Table 8b. Alternative 2 Dredging Cont.

Off-road Equipment	HC lb	CO lb	NO_x lb	SO_2 lb	PM_{10} lb	$PM_{2.5}$ lb	CH_4 kg	N_2O kg	CO_2 kg
Clamshell Dredge	51	144.00	630.84	0.42	22.70	20.89	1.23	0.25	30,295
Tug Boat - propulsion	4.78	23.77	108.40	12.60	2.72	2.50	0.25	0.05	6,041
	4.78	23.77	108.40	12.60	2.72	2.50	0.25	0.05	6,041
Bottom Dump Scow	4.45	23.08	29.62	3.15	0.84	0.78	0.06	0.01	1,510
Work Tug - propulsion	7.82	39.68	50.56	80.02	1.50	1.38	0.10	0.02	2,517
	7.82	39.68	50.56	80.02	1.50	1.38	0.10	0.02	2,517
Tons/year:	**0.04**	**0.15**	**0.49**	**0.09**	**0.02**	**0.01**			
CO_2e Metric tons/year:									**49**

Table 9. Alternative 2 Annual Construction Emissions Summary

YEAR	VOC T/yr	CO T/yr	NO_x T/yr	SO_2 T/yr	PM_{10} T/yr	$PM_{2.5}$ T/yr	CO_2e MT/yr
2016	0.95	5.17	9.77	0.28	15.76	1.87	798
2017	0.86	4.67	9.43	0.28	15.75	1.86	765

Table 10a. Watercraft Pile Delivery, Alternative 3

Off-road Equipment	Hours of Operation	Engine HP	Load Factor	HC-ZH g/hp-hr	HC-DR g/hp-hr^2	CO-ZH g/hp-hr	CO-DR g/hp-hr^2	NO_x-ZH g/hp-hr	NO_x-DR g/hp-hr^2	Fc g	PM_{10} g/hp-hr	PM_{10}-ZH g/hp-hr^2	CH_4 g/gal fuel	N_2O g/gal fuel	CO_2 g/gal fuel
Tug - propulsion	418	375	0.50	0.68	0.44	3.73	0.25	5.10	0.21	1.21E+07	0.15	0.67	0.41	0.08	10,206
	418	375	0.50	0.68	0.44	3.73	0.25	5.10	0.21	1.21E+07	0.15	0.67	0.41	0.08	10,206

Table 10b. Watercraft Pile Delivery, Alternative 3 Cont.

Off-road Equipment	HC lb	CO lb	NO_x lb	SO_2 lb	PM_{10} lb	$PM_{2.5}$ lb	CH_4 kg	N_2O kg	CO_2 kg
Tug - propulsion	141.94	720.36	917.84	80.02	27.32	25.13	1.85	0.37	45,688
	141.94	720.36	917.84	80.02	27.32	25.13	1.85	0.37	45,688
Tons/year:	**0.14**	**0.72**	**0.92**	**0.08**	**0.03**	**0.03**			
CO_2e Metric tons/year:									**92**

Table 11. Watercraft Used in Construction, Alternative 3

Off-road Equipment	Hours of Operation	Engine HP	Load Factor	HC-ZH g/hp-hr	HC-DR g/hp-hr^2	CO-ZH g/hp-hr	CO-DR g/hp-hr^2	NO_x-ZH g/hp-hr	NO_x-DR g/hp-hr^2	Fc g	PM_{10} g/hp-hr	PM_{10}-ZH g/hp-hr^2	CH_4 g/gal fuel	N_2O g/gal fuel	CO_2 g/gal fuel
Tug - propulsion	1,588	375	0.50	0.68	0.44	3.73	0.25	5.10	0.21	5.48E+07	0.15	0.67	0.41	0.08	10,206
	1,588	375	0.50	0.68	0.44	3.73	0.25	5.10	0.21	5.48E+07	0.15	0.67	0.41	0.08	10,206
Work Boat	2,443	250	0.45	0.68	0.28	3.73	0.16	5.10	0.14	5.06E+07	0.15	0.44	0.41	0.08	10,206

Off-road Equipment	HC lb	CO lb	NO_x lb	SO_2 lb	PM_{10} lb	$PM_{2.5}$ lb	CH_4 kg	N_2O kg	CO_2 kg
Tug - propulsion	539.92	2,740.10	3,491.25	362.37	103.91	95.60	7.05	1.41	173,786
	539.92	2,740.10	3,491.25	362.37	103.91	95.60	7.05	1.41	173,786
Work Boat	467.00	2,432.46	3,125.03	334.49	87.95	80.92	6.51	1.30	160,418
Tons/year:	**0.77**	**3.96**	**5.05**	**0.53**	**0.15**	**0.14**			
CO_2e Metric tons/year:									**510**

Table 12. Construction Equipment, Alternative 3

Off-road Equipment	Hours of Operation	Engine HP	Load Factor	HC-ZH g/hp-hr	HC-DR g/hp-hr^2	CO-ZH g/hp-hr	CO-DR g/hp-hr^2	NO_x-ZH g/hp-hr	NO_x-DR g/hp-hr^2	SO_2 g/hp-hr	PM_{10}-ZH g/hp-hr	PM_{10}-DR g/hp-hr^2	CH_4 g/gal fuel	N_2O g/gal fuel	CO_2 g/gal fuel
Pile Driver	3,176	1320	0.42	0.32	1.12E-05	2.70	5.35E-05	6.25	1.04E-04	0.00487	0.15	7.96E-06	0.41	0.08	10,206
Pile Hammer	3,176	180	0.42	0.32	1.48E-05	0.92	2.43E-05	6.25	1.45E-04	0.004869	0.15	7.96E-06	0.41	0.08	10,206
Concrete Pump	704	50	0.42	1.45	1.85E-04	4.10	4.20E-04	5.55	1.03E-04	0.005346	0.60	4.65E-05	0.41	0.08	10,206
Barge Crane	4,886	130	0.29	0.68	3.15E-05	2.70	7.14E-05	6.90	1.60E-04	0.004853	0.38	2.76E-05	0.41	0.08	10,206
RT Crane	1,207	240	0.29	0.32	1.48E-05	2.70	7.14E-05	6.25	1.45E-04	0.004868	0.15	7.96E-06	0.41	0.08	10,206
Excavator	259	290	0.38	0.1	2.50E-05	0.92	1.82E-05	2.45	3.18E-05	0.004874	0.11	5.55E-06	0.41	0.08	10,206
Dozer	661	307	0.40	0.68	2.37E-05	2.70	5.35E-05	8.17	1.36E-04	0.004853	0.38	2.02E-05	0.41	0.08	10,206
Paver	647	187	0.42	0.12	2.40E-05	0.92	2.43E-05	4.38	6.33E-05	0.004875	0.11	5.79E-06	0.41	0.08	10,206
Grader	618	145	0.41	0.68	3.15E-05	2.70	7.14E-05	6.90	1.60E-04	0.00486	0.38	2.76E-05	0.41	0.08	10,206
Roller	1,265	154	0.38	0.16	2.57E-05	2.70	7.14E-05	4.44	6.46E-05	0.004874	0.16	1.18E-05	0.41	0.08	10,206
Welder	1,207	58	0.42	0.99	4.58E-05	3.49	9.23E-05	6.90	1.60E-04	0.005388	0.69	5.02E-05	0.41	0.08	10,206
Gen Set	1,207	13	0.42	1.45	1.85E-04	4.10	4.20E-04	5.55	1.03E-04	0.005346	0.60	4.65E-05	0.41	0.08	10,206
Forklift	1,006	103	0.20	0.28	2.92E-05	3.14	8.33E-05	5.22	8.40E-05	0.004871	0.29	2.12E-05	0.41	0.08	10,206
Loader	216	262	0.37	0.14	2.22E-05	4.20	8.32E-04	4.51	6.32E-05	0.00487	0.11	6.03E-06	0.41	0.08	10,206

Table 12. Construction Equipment, Alternative 3 Cont.

Off-road Equipment	HC lb	CO lb	NO_x lb	SO_2 lb	PM_{10} lb	$PM_{2.5}$ lb	CH_4 kg	N_2O kg	CO_2 kg
Pile Driver	1,519.66	11,756.81	26,699.3	18.70	782.75	720.13	37.30	7.46	919,592
Pile Hammer	219.98	567.78	3,786.08	2.55	106.74	98.20	5.09	1.02	125,399
Concrete Pump	87.13	223.86	201.44	0.17	29.49	27.14	0.35	0.07	8,586
Barge Crane	382.60	1,334.72	3,333.75	1.96	248.16	228.31	3.92	0.78	96,634
RT Crane	82.08	608.78	1,377.42	0.90	40.08	36.87	1.79	0.36	44,075
Excavator	16.60	65.60	167.83	0.31	9.23	8.49	0.61	0.12	15,128
Dozer	170.58	591.12	1,733.74	0.86	110.09	101.28	1.72	0.34	42,363
Paver	25.78	114.54	518.06	0.54	15.20	13.98	1.08	0.22	26,527
Grader	57.95	224.91	572.61	0.39	33.36	30.69	0.78	0.16	19,338
Roller	42.34	481.00	756.94	0.79	33.38	30.71	1.57	0.31	38,586
Off-road Equipment	**HC** lb	**CO** lb	**NO_x** lb	**SO_2** lb	**PM_{10}** lb	**$PM_{2.5}$** lb	**CH_4** kg	**N_2O** kg	**CO_2** kg
Welder	83.36	263.84	511.88	0.35	66.03	60.75	0.69	0.14	17,074
Gen Set	40.04	102.88	92.58	0.08	13.56	12.47	0.16	0.03	3,946
Forklift	16.91	155.75	251.35	0.22	16.26	14.96	0.45	0.09	10,997
Loader	18.65	650.84	241.74	0.22	8.37	7.70	0.45	0.09	10,990
Tons/year:	**1.38**	**8.57**	**20.12**	**0.01**	**0.76**	**0.70**			
CO_2e Metric tons/year:									**1,384**

Table 13. On Road Vehicles, Alternative 3

On-road Equipment	Hours of Operation	Total Miles Traveled	Speed (mph)	ROG lb/mile	CO lb/mile	NO_x lb/mile	SO_2 lb/mile	PM_{10} lb/mile	$PM_{2.5}$ lb/mile	CH_4 g/gal fuel	N_2O g/gal fuel	CO_2 g/gal fuel
Dump Truck	502	4,652	25	1.32E-03	6.05E-03	1.53E-02	3.93E-05	1.40E-03	1.20E-03	0.24	0.332	10,206
Concrete Truck	2,472	22,778	25	1.32E-03	6.05E-03	1.53E-02	3.93E-05	1.40E-03	1.20E-03	0.24	0.332	10,206
Pickup Truck	3,645	91,117	25	5.72E-04	5.03E-03	4.73E-04	1.07E-05	9.49E-05	6.23E-05	0.70	0.561	9,172
Water Truck	862	8,623	10	1.32E-03	6.05E-03	1.53E-02	3.93E-05	1.40E-03	1.20E-03	0.24	0.332	10,206
Asphalt Truck	186	4,140	25	1.32E-03	6.05E-03	1.53E-02	3.93E-05	1.40E-03	1.20E-03	0.24	0.332	10,206
Semi- Truck	529	7,380	25	1.32E-03	6.05E-03	1.53E-02	3.93E-05	1.40E-03	1.20E-03	0.24	0.332	10,206
Carpool Van	NA	12768	NA	5.72E-04	0.005	4.73E-04	1.07E-05	9.49E-05	6.23E-05	0.70	0.561	9,172

Off-road Equipment	ROG lb	CO lb	NO_x lb	SO_2 lb	PM lb	$PM_{2.5}$ lb	CH_4 kg	N_2O kg	CO_2 kg
Dump Truck	6.13	28.13	71.01	0.18	6.49	5.59	0.17	0.24	7,304
Concrete Truck	30.00	137.74	347.69	0.90	31.79	27.35	0.84	1.16	35,765
Pickup Truck	52.10	458.21	43.10	0.98	8.65	5.68	3.77	3.01	49,160
Water Truck	11.36	52.15	131.62	0.34	12.03	10.35	0.32	0.44	13,540
Asphalt Truck	5.45	25.04	63.19	0.16	5.78	4.97	0.15	0.21	6,500
Semi- Truck	9.72	44.63	112.65	0.29	10.30	8.86	0.27	0.38	11,588
Carpool Van	7.30	64.21	6.04	0.14	1.21	0.80	0.53	0.42	6,889
Tons/year:	**0.06**	**0.41**	**0.39**	**0.00**	**0.04**	**0.03**			
CO_2e Metric tons/year:									**133**

Table 14. Alternative 3 Dredging

Off-road Equipment	Hours of Operation	Engine HP	Load Factor	HC-ZH g/hp-hr	HC-DR g/hp-hr[2]	CO-ZH g/hp-hr	CO-DR g/hp-hr[2]	NOx-ZH g/hp-hr	NOx-DR g/hp-hr[2]	Fc g	PM10 g/hp-hr	PM10-ZH g/hp-hr[2]	CH_4 g/gal fuel	N_2O g/gal fuel	CO_2 g/gal fuel
Tug - propulsion	52	375	0.50	0.68	0.44	3.73	0.25	5.10	0.21	828000.00	0.15	0.67	0.41	0.08	10,206
	52	375	0.50	0.68	0.44	3.73	0.25	5.10	0.21	1.79E+06	0.15	0.67	0.41	0.08	10,206

Off-road Equipment	HC lb	CO lb	NOx lb	SO2 lb	PM10 lb	PM2.5 lb	CH_4 kg	N_2O kg	CO_2 kg
Tug - propulsion	17.68	89.72	114.32	5.48	3.40	3.13	0.23	0.05	5,690
	17.68	89.72	114.32	11.87	3.40	3.13	0.23	0.05	5,690
Tons/year:	**0.02**	**0.09**	**0.11**	**0.01**	**0.00**	**0.00**			
CO_2e Metric tons/year:									**11**

Table 15. Alternative 3 Annual Construction Emissions Summary

YEAR	VOC T/yr	CO T/yr	NO_x T/yr	SO_2 T/yr	PM_{10} T/yr	$PM_{2.5}$ T/yr	CO_2e MT/yr
2016	1.33	7.28	13.81	0.36	15.90	2.00	1,116
2017	1.17	6.47	12.78	0.27	15.87	1.97	1,013

Pier 3 Repair Emissions

Table 1. Watercraft Used in Pier 3 Repair Activities

Off-road Equipment	Hours of Operation	Engine HP	Load Factor	HC-ZH g/hp-hr	HC-DR g/hp-hr^2	CO-ZH g/hp-hr	CO-DR g/hp-hr^2	NO_x-ZH g/hp-hr	NO_x-DR g/hp-hr^2	Fc g	PM_{10} g/hp-hr	PM_{10}-ZH g/hp-hr^2	CH_4 g/gal fuel	N_2O g/gal fuel	CO_2 g/gal fuel
Work Boat	1,856	40	0.45	1.84	0.51	3.65	0.41	8.14	0.06	6.15E+06	0.72	0.31	0.41	0.08	10,206

Off-road Equipment	HC lb	CO lb	NO_x lb	SO_2 lb	PM_{10} lb	$PM_{2.5}$ lb	CH_4 kg	N_2O kg	CO_2 kg
Work Boat	172.11	327.18	586.55	40.66	49.52	45.56	0.79	0.16	19,498
Tons/year:	**0.09**	**0.16**	**0.29**	**0.02**	**0.02**	**0.02**			
CO_2e Metric tons/year:									**20**

Table 2. Construction Equipment Used in Pier 3 Repair Activities

Off-road Equipment	Hours of Operation	Engine HP	Load Factor	HC-ZH g/hp-hr	HC-DR g/hp-hr^2	CO-ZH g/hp-hr	CO-DR g/hp-hr^2	NO_x-ZH g/hp-hr	NO_x-DR g/hp-hr^2	SO_2 g/hp-hr	PM_{10}-ZH g/hp-hr	PM_{10}-DR g/hp-hr^2	CH_4 g/gal fuel	N_2O g/gal fuel	CO_2 g/gal fuel
Excavator	10	138	0.38	0.1	0.000025	0.92	0.0000182	2.45	0.0000318	0.0049	0.11	0.000006	0.414	0.0828	10206

Off-road Equipment	HC lb	CO lb	NO_x lb	SO_2 lb	PM_{10} lb	$PM_{2.5}$ lb	CH_4 kg	N_2O kg	CO_2 kg
Excavator	0.31	1.21	3.09	0.01	0.17	0.16	0.01	0.00	278
Tons/year:	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**			
CO_2e Metric tons/year:									**0**

Table 3. On Road Vehicles Used in Pier 3 Repair Activities

On-road Equipment	Hours of Operation	Total Miles Traveled	Speed (mph)	ROG lb/mile	CO lb/mile	NO_x lb/mile	SO_2 lb/mile	PM_{10} lb/mile	$PM_{2.5}$ lb/mile	CH_4 g/gal fuel	N_2O g/gal fuel	CO_2 g/gal fuel
Pickup Truck	1,080	27,000	25	0.001	0.007	6.55E-04	1.07E-05	9.49E-05	5.94E-05	0.703	0.561	9,172
Semi- Truck	11	280	25	2.02E-03	8.46E-03	2.42E-02	4.09E-05	2.23E-03	1.97E-03	0.240	0.332	10,206
Carpool Van	NA	4320	NA	0.001	0.007	6.55E-04	1.07E-05	9.49E-05	5.94E-05	0.703	0.561	9,172

Off-road Equipment	ROG lb	CO lb	NO_x lb	SO_2 lb	PM lb	$PM_{2.5}$ lb	CH_4 kg	N_2O kg	CO_2 kg
Pickup Truck	18.96	178.30	17.68	0.29	2.56	1.60	1.12	0.89	14,567
Semi- Truck	0.56	2.37	6.77	0.01	0.62	0.55	0.01	43.08	440
Carpool Van	3.03	28.53	2.83	0.05	0.41	0.26	0.18	0.14	2,331
Tons/year:	**0.01**	**0.10**	**0.01**	**0.00**	**0.00**	**0.00**			
CO_2e Metric tons/year:									**31**

Table 4. Pier 3 Repair Emissions Summary

YEAR	VOC T/yr	CO T/yr	NO_x T/yr	SO_2 T/yr	PM_{10} T/yr	$PM_{2.5}$ T/yr	CO_2e MT/yr
2014	0.07	0.18	0.20	0.01	0.02	0.02	34
2015	0.03	0.09	0.10	0.01	0.01	0.01	17

Pier 2 Construction/Demolition Assumptions

From Moffat & Nichol email dated June 28, 2013 and Table 6 of MOTCO Pier 2 Final Constructability Memo (June 25, 2013):

Material	Source Location	One way distance (mi)	Total Round Trip Time (hrs)	Alt 1 Total # of trips	Alt 1 Computed Total time (hrs)	Alt 1 Total mi traveled	Alt 2 Total # of trips	Alt 2 Computed Total time (hrs)	Alt 2 Total mi traveled	Alt 3 Total # of trips	Alt 3 Computed Total time (hrs)	Alt 3 Total mi traveled
Concrete	Martinez	7	1.8	1627	2,929	22778	1613	2903.4	22582	2472	4449.6	34608
Rebar	Oakland	30	2.7	120	324	7200	119	321.3	7140	183	494.1	10980
Rail	Oakland	30	2.7	3	8	180	3	8.1	180	13	35.1	780
Rip Rap	Richmond	30	2.7	16	43	960	16	43.2	960	16	43.2	960
Fill - aggregate, base	Martinez	7	1.8	238	428	3332	238	428.4	3332	238	428.4	3332
Hauling	Concord	12	2	15	30	360	15	30	360	15	30	360
Asphalt	Richmond	30	2.7	69	186	4140	69	186.3	4140	69	186.3	4140
Tug & barge - pile delivery	Richmond/Antioch	50	16.7	21	351	2100	21	351	2100	25	418	2500

Alt 3 hours of usage calculated based on total number of truck trips ; Hrs (alt 3) = Alt 1 Hrs * Alt 3 Total Trips/Alt 1 Total Trips

Alternative 3 Equipment Usage	Alt 1/2 Hours	Alt 3 Hours
Pile Driver	2210	3176
Hammer	2210	3176
Concrete Pump	490	704
Barge Crane	3400	4886
RT Crane	840	1207
Excavator	180	259
Loader	150	216
Dozer	460	661
AC Paver	450	647
Grader	430	618
Rollers	880	1265
Welder	840	1207
Gen Set	840	1207
Forklift	700	1006
Pickup Truck	2536	3645
Water Truck	600	862
Work Tug	1105	1588
Work Boat	1700	2443

Data Used in Calculations

Construction Equipment

Equipment	Cumul. Hrs	Ave Age	Model Yr	HP	HC-ZH	HC-DR	CO-ZH	CO-DR	NO_x-ZH	NO_x-DR	PM_{10}-ZH	PM_{10}-DR
Pile Driver	6767	14	2002	1320	0.32	1.12E-05	2.7	5.35E-05	6.25	0.000104	0.15	7.96E-06
Pile Hammer	6767	14	2002	180	0.32	1.48E-05	0.92	2.43E-05	6.25	0.000145	0.15	7.96E-06
Concrete Pump	6767	14	2002	50	1.45	0.000185	4.1	0.00042	5.55	0.000103	0.6	4.65E-05
Barge Crane	8517	18	1998	130	0.68	3.15E-05	2.7	7.14E-05	6.9	0.00016	0.38	2.76E-05
RT Crane	8517	18	1998	240	0.32	1.48E-05	2.7	7.14E-05	6.25	0.000145	0.15	7.96E-06
Excavator	6513	9	2007	290	0.1	0.000025	0.92	1.82E-05	2.45	3.18E-05	0.11	5.55E-06
Dozer	12000	22	1994	307	0.68	2.37E-05	2.7	5.35E-05	8.17	0.000136	0.38	2.02E-05
Paver	4700	11	2005	187	0.12	0.000024	0.92	2.43E-05	4.38	6.33E-05	0.11	5.79E-06
Grader	1200	18	1998	145	0.68	3.15E-05	2.7	7.14E-05	6.9	0.00016	0.38	2.76E-05
Roller	4000	11	2005	154	0.16	2.57E-05	2.7	7.14E-05	4.44	6.46E-05	0.16	1.18E-05
Welder	6767	14	2002	58	0.99	4.58E-05	3.49	9.23E-05	6.9	0.00016	0.69	5.02E-05
Generator	6767	14	2002	13	1.45	0.000185	4.1	0.00042	5.55	0.000103	0.6	4.65E-05
Forklift	3024	12	2005	103	0.28	2.92E-05	3.14	8.33E-05	5.22	0.000084	0.29	2.12E-05
Loader	12000	14	2002	262	0.14	2.22E-05	4.2	0.000832	4.51	6.32E-05	0.11	6.03E-06
dredge	1200	8	2008	2500	0.12	2.36E-05	0.92	0.000018	4.29	0.000058	0.11	0.0000058
[1]Excavator	7456	11	2005	232	1.32	6.11E-05	4.4	0.000116	14.00	0.000324	0.77	0.0000560
skid steer loader	2246	5	2011	197	0.1	2.50E-05	2.7	0.000071	2.45	0.000032	0.14	0.0000100
Barge Crane	7992	18	1998	800	0.68	2.37E-05	2.7	0.000054	8.17	0.000136	0.38	0.0000202

[1]Excavator data applied for both Pier 2 and Pier 3 equipment.

Notes:

Cumulative Hours -based on average by equipment type, Table 2 of Attachment A of App D

CO Efs from App D of App D, rest from CARB Construction Equipment Database Input Tables

For construction equipment:

soxdsl	0.0015	weight percent of sulfur in diesel	(CARB ULS Diesel)
soxcnv	0.02247	fraction of fuel sulfur converted to PM	

From Exhaust and Crankcase Emission Factors for Non-road Engine Modeling - Compression Ignition, USEPA July 2010.

Watercraft

ave tug life=	21	yrs
assume tugs used are at half of lifespan	10	yrs
	2006	model year
ave workboat life=	17	yrs
assume workboats used are at half of lifespan	9	yrs
	2007	model year

	Ave. engine life	Load	Model Year (half-l
dredger	16	0.51	2008
dredge boat propulsion	17	0.45	2007

from California Barge and Dredge Emissions database

Use data from workboat engine for scow engine

Fuel Correction Factors for Watercraft from App B

HP	Model Yr	NOx	PM
25-50	1999-2010	0.948	0.8
176+	1999-2010	0.948	0.8

Equipment	Ave Life	1/2 Life	Model Yr	HP	HC-ZH	HC-DR	CO-ZH	CO-DR	NO_x-ZH	NO_x-DR	PM_{10}-ZH	PM_{10}-DR
Tug	21	10	2006	500	0.68	0.44	3.73	0.25	5.10	0.21	0.15	0.67
Tug	21	10	2006	375 X 2	0.68	0.44	3.73	0.25	5.10	0.21	0.15	0.67
Tug	21	10	2007	1000 X 2	0.17	0.44	0.92	0.25	4.51	0.21	0.11	0.67
Workboat	17	9	2007	50	1.80	0.51	3.73	0.41	5.32	0.06	0.3	0.31
[1]Workboat	17	9	2007	250	0.68	0.28	3.73	0.16	5.10	0.14	0.15	0.44

[1]Workboat data used for scow with same HP.

Emission factors from Appendix B, Emissions Estimation Methodology for Commercial Harbor Craft Operating in California

On-Road Vehicles

onsite transport to storage area	1.4	miles one way (worst case scenario used)
Semi-truck fuel efficiency assumed	6.5	mpg
combined pickup trucks/van fuel efficiency assumed	17	mpg

BSFC (g/hp-hr) for >100 HP	166.468	From Exhaust and Crankcase Emission Factors for Non-road Engine Modeling - Compression Ignition, USEPA July 2010.
BSFC (g/hp-hr) for <100 HP	185.065	From Exhaust and Crankcase Emission Factors for Non-road Engine Modeling - Compression Ignition, USEPA July 2010.

Greenhouse Gases

density of diesel	0.85	g/cc
gal:cc conversion	3785	cc/gal

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References

Construction Equipment Data

California Air Resources Board (CARB). 2011. California In-Use Off-Road Equipment (Construction, Industrial, Ground Support and Oil Drilling 2011 Inventory Model). http://www.arb.ca.gov/msei/categories.htm.

_____. 2010. Appendix D: OSM and Summary of Off-Road Emissions Inventory Update, from Staff Report: Initial Statement of Reasons for Proposed Rulemaking, Proposed Amendments to the Regulation for In-Use Off-Road Diesel-fueled Fleets and the Off-Road Large Spark-Ignition Fleet Requirements. October.

_____. 2007. Appendix E: Emissions Inventory Methodology and Results, from Technical Support Document: Proposed Regulation for In-Use Off-Road Diesel Vehicles. April.

U.S. Environmental Protection Agency (USEPA). 2010. SO_2 emissions calculated from Equation 7 of Exhaust and Crankcase Emission factors for Non-road Engine Modeling - Compression-Ignition. July.

Fugitive Dust

Countess Environmental. 2006. Western Regional Air Partnership (WRAP) Fugitive Dust Handbook. Prepared for the Western Governors' Association. September.

Midwest Research Institute. 2005. Analysis of the Fine Fraction of Particulate Matter in Fugitive Dust, Final Report. Prepared for the Western Regional Air Partnership. October.

General

California Air Resources Board (CARB). 2013. Documentation of California's Greenhouse Gas Emission Inventory (Category: Energy, Fuel Combustion Activities, Transport, March 2013 including Not Specified Transportation – Distillate; Cars, On Road: Light-duty Vehicles – Gasoline; Heavy-duty Trucks and Buses, On Road: Heavy-duty Vehicles: Heavy-duty Trucks, Buses & Motorhomes – Gasoline; and Water-borne Navigation, Domestic Water-borne Navigation, Intrastate: Harborcraft – Distillate). http://www.arb.ca.gov/cc/inventory/data/data.htm.

Chevron Corporation. 2007. Diesel Fuels Technical Review. www.chevronwithtechron.com/products/.../diesel_fuel_tech_review.pdf.

Fidell, T. 2013. Personal communication between T. Fidell, Moffatt & Nichol and L. Hamilton, Cardno TEC regarding clarification of Tables 6, 7, and 8 in Pier 2 Modernization Constructability Memo.

Moffatt & Nichol. 2013a. MOTCO Pier 2 Modernization Constructability Memo. 26 June.

_____. 2013b. MOTCO Pier 3 Renovation Constructability Memo. 28 June.

U.S. Environmental Protection Agency (USEPA). 2010. Conversion Factors for Hydrocarbon Emission Components. VOC conversion of diesel hydrocarbons based on "Table for Conversion Factors for Hydrocarbon Exhaust Emission Results." http://www.epa.gov/otaq/models/nonrdmdl/nonrdmdl2010/420r10015.pdf. July.

Greenhouse Gases

California Air Resources Board (CARB). 2013. Documentation of California's Greenhouse Gas Emission Inventory - Index, Category: Energy, Fuel Combustion Activities, Transport. March.

U.S. Environmental Protection Agency (USEPA). 2010. SO_2 emissions calculated from Equation 7 of Exhaust and Crankcase Emission factors for Non-road Engine Modeling - Compression-Ignition. July.

On-Road Vehicles

South Coast Air Quality Management District (SCAQMD). Highest (Most Conservative) EMFAC2007 (version 2.3) Emission Factors for On-Road Passenger Vehicles & Delivery Trucks. www.aqmd.gov/ceqa/handbook/onroad/onroadEF07_26.xls. June.

_____. 2007b. Highest (Most Conservative) EMFAC2007 (version 2.3) Emission Factors for On-Road Heavy-Heavy-Duty Diesel Trucks, www.aqmd.gov/ceqa/handbook/onroad/onroadEFHHDT07_26.xls. June.

Watercraft Data

California Air Resources Board (CARB). 2013a. California Commercial Harbor Craft Emissions Inventory Database. http://www.arb.ca.gov/msei/categories.htm.

_____. 2013b. California Barge and Dredge Emissions Inventory Database. http://www.arb.ca.gov/msei/categories.htm.

_____. 2007. Appendix B: Emissions Estimation Methodology for Commercial Harbor Craft Operating in California, from Technical Support Document for Rulemaking to Consider the Adoption of Proposed Regulations to Reduce emissions from Diesel Engines on Commercial Harbor Craft Operated Within California Waters and 24 Nautical Miles of the California Baseline. http://www.arb.ca.gov/msei/chc-appendix-b-emission-estimates-ver02-27-2012.pdf. September.

APPENDIX D
DRAFT COASTAL CONSISTENCY DETERMINATION

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Coastal Consistency Determination
Modernization and Repair of Piers 2 and 3
Military Ocean Terminal Concord (MOTCO)

1. AUTHORITY

This Coastal Consistency Determination is submitted in compliance with 15 CFR Section 930.34 *et seq* of the National Oceanic and Atmospheric Administration Federal Consistency Regulations (15 CFR Part 930).

2. DETERMINATION

MOTCO is an Army Military Surface Deployment and Distribution Command (SDDC) munitions and general cargo transshipment facility located at a strategic site in north central Contra Costa County, California (see Figure 1-1 of the Environmental Impact Statement [EIS]). This DOD installation is the primary West Coast common-user ammunition terminal and is home to the SDDC's 834th Transportation Battalion (TRANS BN). MOTCO is in the East San Francisco Bay region, approximately 10 nautical miles inland past the Carquinez Strait that connects Suisun Bay to San Pablo Bay. San Francisco is 30 miles to the southwest, Oakland is 20 miles to the southwest, Sacramento is 65 miles to the northeast, and the City of Concord is located approximately 5 miles south.

The installation is composed of an approximately 115-acre administrative complex and an approximately 6,526-acre Tidal Area. For the purposes of this EIS, the administrative complex is referred to as the Inland Area. The Inland Area and the Tidal Area are connected by a road running parallel and west of Port Chicago Highway. The Tidal Area includes all three piers, as well as, 2,045 acres in offshore islands (see Figure 1-2 of the EIS).

Two public rail lines, Union Pacific Railroad (UPRR) and Burlington Northern Santa Fe (BNSF), traverse the Tidal Area and interconnect with MOTCO rail lines.

MOTCO installation property was formerly owned by the Department of the Navy as part of Naval Weapons Station Seal Beach Detachment (NWSSBD) Concord (see Figure 1-3 of the EIS). On 1 October 2008, MOTCO properties were transferred from the Navy to the Army per 2005 Defense Base Closure and Realignment Commission recommendations. The Army's presence at MOTCO dates back to 1 October 1997, when the Army's 1302nd Major Port Command was relocated from the Oakland Army Base to MOTCO and became the 834th TRANS BN. The City of Concord has been recognized as the Local Reuse Authority for the approximately 5,028-acres of former NWSSBD Concord lands that were determined surplus and which are not subject to the proposed action. MOTCO is one of five designated primary strategic ports in California and is the larger of two ammunition ports on the West Coast.

MOTCO supports and enables the DOD Operations Plan for the Pacific theater and must have the capability to act as a strategic launch platform for the West Coast.

The Army has evaluated the potential impacts associated with the modernization and repair of Piers 2 and 3, and has found the proposed action to be consistent to the maximum extent practicable with the San Francisco Bay Conservation and Development Commission (BCDC) coastal management program for the San Francisco Bay segment of the California coastal zone. The BCDC coastal management program is based on the provisions and policies of the McAteer-Petris Act, Suisun Marsh Preservation Act of 1977, San Francisco Bay Plan, Suisun Marsh Protection Plan, and BCDC administrative regulations. MOTCO is located in the Suisun Bay and Marsh area of the San Francisco Bay Plan (Plan Map 3).

3. PROJECT DESCRIPTION

The proposed action is to modernize and repair Piers 2 and 3 to meet current and future mission requirements at MOTCO. The intent of this action is to provide the installation with safe, functional, efficient facilities. The proposed action has five distinct components:

- Partial demolition of existing Pier 2 and reconstruction of structural elements;
- Replacement of pier-side infrastructure and supporting facilities at Pier 2;
- Upgrade to shore-side roads and electrical infrastructure in the immediate vicinity of Piers 2 and 3;
- Removal and replacement/repair of piles and selected structural elements at Pier 3; and
- Maintenance dredging to -32 feet mean lower low water (MLLW) plus 2 feet overdepth dredging to compensate for inaccuracies in the dredging operation.

Refer to Section 2.2 of the EIS for detailed information on the proposed action.

4. CONSISTENCY WITH PROVISIONS OF THE COASTAL ZONE MANAGEMENT PROGRAM FOR THE SAN FRANCISCO BAY SEGMENT OF THE CALIFORNIA COASTAL ZONE

The policies of the San Francisco Bay Plan (at http://www.bcdc.ca.gov/laws_plans/plans/sfbay_plan) and Suisun Marsh Protection Plan (at http://www.bcdc.ca.gov/laws_plans/laws/suisun_marsh.shtml) were reviewed for applicability and consistency with the proposed action. The conclusions and supporting analysis are provided below.

4.1 SAN FRANCISCO BAY PLAN

4.1.1 Fish, Other Aquatic Organisms, and Wildlife - Consistent

In accordance with Section 7 of the Endangered Species Act (ESA), the Army consulted with the U.S. Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS) regarding the potential for implementation of the proposed action to affect threatened and

endangered (T&E) species or critical habitat. During these consultations, the Army determined that the proposed action may affect, but is not likely to adversely affect, endangered species protected under the ESA, and that the proposed action would not result in the destruction or adverse modification of designated critical habitat of any of the following two species:

- Soft bird's-beak, *Cordylanthus mollis spp. Mollis*, Endangered;
- California least tern, *Sternula antillarum browni*, Endangered;

Furthermore, the Army determined that the proposed action may affect, and is likely to adversely affect, threatened and endangered species protected under the ESA, and that the proposed action would not result in the destruction or adverse modification of designated critical habitat of any of the following eight species:

- Delta Smelt, *Hypomesus transpacificus*, Threatened;
- California clapper rail, *Rallus longirostris obsoletus*, Endangered;
- Salt marsh harvest mouse, *Reithrodontomys raviventris*, Endangered;
- Southern Green Sturgeon, *Acipenser medirostris*, Threatened;
- Central California Coastal Steelhead, *Oncorhynchus mykiss*, Threatened;
- Central Valley Steelhead, *Oncorhynchus mykiss*, Threatened,
- Central Valley Spring-run Chinook Salmon, *Oncorhyncus tshawytscha*, Threatened; and
- Sacramento River Winter-run Chinook Salmon, *Oncorhynchus tshawytscha*, Endangered.

The soft bird's-beak, delta smelt, California clapper rail, and salt marsh harvest mouse are under the jurisdiction of USFWS, and the remaining ESA-listed salmonids and green sturgeon are under the jurisdiction of NMFS. The Army has made a preliminary determination of "may affect, and is likely to adversely affect" for the southern green sturgeon, Central California coast steelhead, Central Valley steelhead, Central Valley spring-run Chinook salmon, and Sacramento River winter-run Chinook salmon. In addition, the Army made a preliminary determination of "may affect, and is likely to adversely affect" for the delta smelt, California clapper rail, and salt marsh harvest mouse, as well as preliminary determination of "may affect, but is not likely to adversely affect" for the soft bird's-beak and California least tern. The Army is currently consulting with NMFS and USFWS, respectively, on these conclusions.

With respect to Essential Fish Habitat (EFH), the Army concluded that there would be no adverse effect on EFH. The Army submitted an EFH Assessment to NMFS. Potential impacts to the California black rail, which is not an ESA listed species, but which is state listed as threatened by California Department of Fish and Wildlife (CDFW), are minimized with management measures included in the proposed action.

Impacts to other wildlife would be localized and short-term, with protective measures for migratory birds identified.

4.1.2 Water Quality - Consistent

The proposed demolition and construction activities associated would follow *USEPA Technical Guidance on Implementing the Stormwater Runoff Requirements for Federal Projects* under Section 438 of the Energy Independence and Security Act. Obtaining the required National Pollutant Discharge Elimination System (NPDES) permit, including development of a project specific Stormwater Pollution Prevention Plan (SWPPP) and use of best management practices (BMPs) for all construction disturbances in excess of an acre, would minimize potential impacts to surface water resources.

The demolition of the old pier structures and construction of the new pier structures would require permitting under both Section 10 of the Rivers and Harbors Act of 1899 and Section 404 of the CWA for "incidental fallback" which may occur during demolition and construction. A Section 401 Water Quality Certification from the Regional Water Quality Control Board (RWQCB) would include assurances that BMPs would be used to minimize potential impacts to water quality. This permitting process would ensure that state water quality standards would not be affected by implementation of these demolition projects. To minimize the impacts from temporary elevated turbidity, control of floating debris, and to ensure that floating creosote-related contamination is controlled to the construction site, floating booms would be in place during the duration of the demolition and construction for both piers.

Permit applications for the dredge and fill activities and water quality certification would be submitted once project planning is more definitive and more detailed engineering is performed.

4.1.3 Water Surface Area and Volume - Consistent

The implementation of the proposed action would be consistent with BCDC policies regarding water circulation in the Bay. Under all three action alternatives, 4,514 creosote-treated timber piles approximately 12–16 inches in diameter; 136 18-inch concrete apron piles, and 118 16-inch concrete piles at Pier 2 would be removed and replaced. Under Alternatives 1 through 3, construction of the new Pier 2 would consist of the following:

- Under Alternative 1, there would be a total of 1,001 piles comprised of 876 24-inch octagonal pre-stressed concrete piles and 125 16-inch and/or 18-inch square concrete piles (reused from existing Pier 2) driven;
- Under Alternative 2, there would be a total of 993 piles comprised of 868 24-inch octagonal pre-stressed concrete piles and 125 16-inch and/or 18-inch square concrete piles (reused from existing Pier 2) driven; and
- Under Alternative 3, there would be a total of 1,214 piles comprised of 1,064 24-inch octagonal pre-stressed concrete piles and 150 16-inch and/or 18-inch square concrete piles (reused from existing Pier 2) driven. Overall, fewer piles would be in the Suisun Bay, and water circulation would increase slightly.

Compared to the former Pier 2 comprised of 4,768 piles, the new Pier 2 would be comprised of 1,001; 993; and 1,214 piles under Alternatives 1, 2, and 3, respectively (Table 2.5-1). Under Alternatives 1 and 2, there would be a net decrease in the overall pier facility footprint by approximately 27,222 SF and 27,081 SF, respectively. Under Alternative 3, there would be a net increase in the overall pier facility footprint of approximately 35,354 SF with a 7,006 SF increase in the size of the west trestle.

4.1.4 Tidal Marshes and Tidal Flats - Consistent

The proposed action would continue to conserve the Wetlands Preserve Area that encompasses the tidal marsh areas at MOTCO to the fullest extent possible. The proposed action has been designed to avoid the wetland areas and retain a transition zone between the tidal and upland habitats.

4.1.5 Smog and Weather - Not Applicable

This policy is not applicable to the proposed action.

4.1.6 Shell Deposits - Not Applicable

This policy is not applicable to the proposed action. No known shell deposits are located at or near MOTCO.

4.1.7 Fresh Water Inflow - Not Applicable

These policies are not applicable to the proposed action. There are no proposals that would reduce or impact diversions of fresh water inflow into the Bay at or near MOTCO.

4.1.8 Subtidal Areas - Consistent

Permanent impacts associated with Alternatives 1 and 2 would include a potential net gain of 0.781 and 0.551 acres of unshaded subtidal habitat, respectively, due to the removal of existing Pier 2 and its replacement by a smaller structure. Although Alternative 3 would result in a net increase (i.e., 1.113 acres) of covered bay surface, mitigation would be implemented to offset this shading.

4.1.9 Climate Change - Not Applicable

The BCDC updated the San Francisco Bay Plan in October 2011 to deal with the expected impacts of climate change in San Francisco Bay. Per the revised sea level rise policies, a sea level rise risk assessment is not required for repairs of existing facilities.

4.1.10 Safety of Fills - Consistent

For the purposes of the EIS, only a concept design was funded to adequately assess impacts of the proposed action; however, the Army will coordinate with the Engineering Criteria Review Board once the design of Pier 2 has begun.

4.1.11 Protection of the Shoreline - Consistent

As part of the proposed action at Pier 2, the shoreline rock revetment along White Road would be repaired.

4.1.12 Dredging - Consistent

Maintenance dredging is dredging performed on a regular basis; since 1943, Piers 2, 3, and 4 were dredged nearly 20 times. Dredging was typically performed using a clamshell method to -32 feet MLLW at Piers 2, 3, and 4; -14 feet MLLW at the Barge Pier and east lighter mooring; and -22 feet MLLW at the west lighter mooring. Since 1943, a total of 1.8 million cubic yards of sediment has been removed from Naval Weapons Station Seal Beach Concord Detachment. Under all alternatives, maintenance dredging to -32 feet MLLW plus 2 feet overdepth is proposed. Under Alternatives 1 and 3, approximately 750 and 1,450 CY of dredged material adjacent to Pier 2 would be redistributed using a bed-leveler device. Under Alternative 2, approximately 3,800 CY of dredged material would be removed by mechanical dredge and placed in a barge for disposal at the Montezuma Wetlands Complex as beneficial reuse of dredged material. If an upland disposal site is required, the Montezuma Hills site is located nearby. It is anticipated dredging would be conducted at the end of the project effort, be conducted within the approved delta smelt work window (i.e., 1 August through 30 November), and take approximately 1 week. Refer to Section 4.3 of the EIS for additional information on the proposed maintenance dredging.

4.1.13 Water-Related Industry - Consistent

MOTCO is currently designated as a water-related industry within the San Francisco Bay Plan (per Plan Map 3), and this designation would not change under the proposed action.

4.1.14 Ports - Consistent

The proposed action is aligned with the San Francisco Bay Area Seaport Plan, which determined the MOTCO Tidal Area is necessary for future port development and designated it as a port priority use area, which indicates that the port and associated marine terminal is to be reserved for port-related and other uses that would not impede development of the sites for port purposes.

4.1.15 Airports - Not Applicable

The proposed action would not directly or indirectly affect airport facilities on the bay.

4.1.16 Transportation - Not Applicable

The proposed action would not result in any changes in Bay Area transportation. Although there would be a temporary increase in vehicles during the repair of Pier 3 and demolition and construction of Pier 2, the temporary increase would not result in alterations of traffic patterns or trends. Refer to Section 4.7 in the EIS for additional information.

4.1.17 Commercial Fishing - Not Applicable

The proposed action would not affect any commercial fishing facilities, mooring areas, or berths; future commercial shellfish harvesting; or mariculture operations.

4.1.18 Recreation - Consistent

Outdoor recreation opportunities at MOTCO are extremely limited because of security needs and the human safety factor associated with weapons and ammunition storage. Because of the ESQD arcs at MOTCO, hunting and fishing are not permitted. Generally, recreation access is limited to visitors to the National Park Service's Port Chicago Naval Magazine National Memorial. Any potential access restrictions for the Port Chicago Naval Magazine National Memorial would be temporary, not lasting more than the duration of the Pier 3 repairs and Pier 2 demolition and construction. As a result, there might be a temporary disruption in access to recreational resources, but there would be a long-term beneficial impact associated with more efficient pier operations. Refer to Section 4.9 in the EIS for additional information.

4.1.19 Public Access - Not Applicable

Public access to MOTCO is generally restricted for security, public health, and public safety reasons. Access to the installation is granted on an individual basis for biological surveys, including an annual bird count by the local chapter of the National Audubon Society; for public access to the National Park Service's Port Chicago Naval Magazine National Memorial; and for individuals and groups who request access for historical or cultural resources reviews. The proposed action would not change public access conditions for MOTCO.

4.1.20 Appearance, Design, and Scenic Views - Consistent

The proposed action would have little impact on views of the MOTCO shoreline and coastal area. The views of residents and visitors to the adjacent East Bay Shoreline Regional Park and Point Edith Wildlife Management Area would potentially be minimally impacted, but the demolition and construction would be consistent and visually compatible with the character of surrounding areas.

As noted above, public access to the waterfront at MOTCO is limited to organized activities associated with public access to the National Park Service's Port Chicago Naval Magazine National Memorial, and for individuals and groups who request access for natural or cultural resources reviews.

4.1.21 Salt Ponds - Not Applicable

The proposed action would not have any impacts on the use and maintenance of salt ponds in the Bay Area.

4.1.22 Managed Wetlands - Consistent

The proposed action would result in a net gain of wetlands.

The demolition for the old pier structures and re-construction of the new pier structures would not impact the 100-year floodplain. The expansion of the Lot T-10 would also not impact the 100-year floodplain.

4.1.23 Other Uses of the Bay and Shoreline - Not Applicable

The proposed action would not result in a change in reservation of MOTCO shore areas for priority military use.

4.1.24 Fills in Accord with the Bay Plan - Not Applicable

The proposed action would not result in filling for Bay-oriented commercial recreation and Bay-oriented public assembly on privately owned property.

4.1.25 Fill for Bay-Oriented Commercial Recreation and Bay-Oriented Public Assembly on Privately-Owned or Publicly-Owned Property - Not Applicable

The proposed action would not result in filling for Bay-oriented commercial recreation and Bay-oriented public assembly on privately or publicly owned property.

4.1.26 Filling for Public Trust Uses on Publicly-Owned Property Granted in Trust to a Public Agency by the Legislature - Not Applicable

The proposed action would not result in filling for any land granted in public trust to a public agency.

4.1.27 Mitigation - Consistent

Proposed mitigation measures have been developed in cooperation with federal regulatory agencies to include USFWS, NMFS, and the State Historic Preservation Office. Please refer to Section 6.3 of the EIS for a discussion of the proposed mitigation measures identified during the NEPA environmental review of the proposed action.

4.1.28 Public Trust - Not Applicable

The proposed action would not affect lands subject to the public trust.

4.1.29 Navigational Safety and Oil Spill Prevention - Consistent

There would be no change to navigational safety at MOTCO. The Army's ongoing programs for Spill Prevention Control and Countermeasures would protect against the spillage of oil and hazardous substance spills as a result of activities at MOTCO.

4.1.30 Bay Plan Map 3 Policies - Consistent

The San Francisco Bay Plan maps are an integral part of the Bay Plan. They are based on-and show how to apply-the Bay Plan policies. The maps also identify the shoreline priority use areas and illustrate the BCDC's tidal water jurisdiction. The corresponding Bay Plan Policies are enforceable policies and have the same authority as the policies in the text of the Bay Plan.

MOTCO is located in the Suisun Bay and Marsh area of the San Francisco Bay Plan (Plan Map 3). Figure 1 depicts a portion of Bay Plan Map 3 for the MOTCO vicinity. There are two areas near MOTCO addressed in these policies, denoted as Areas 7 (Bay Point Wetlands) and 8 (Concord Naval Weapons Station).

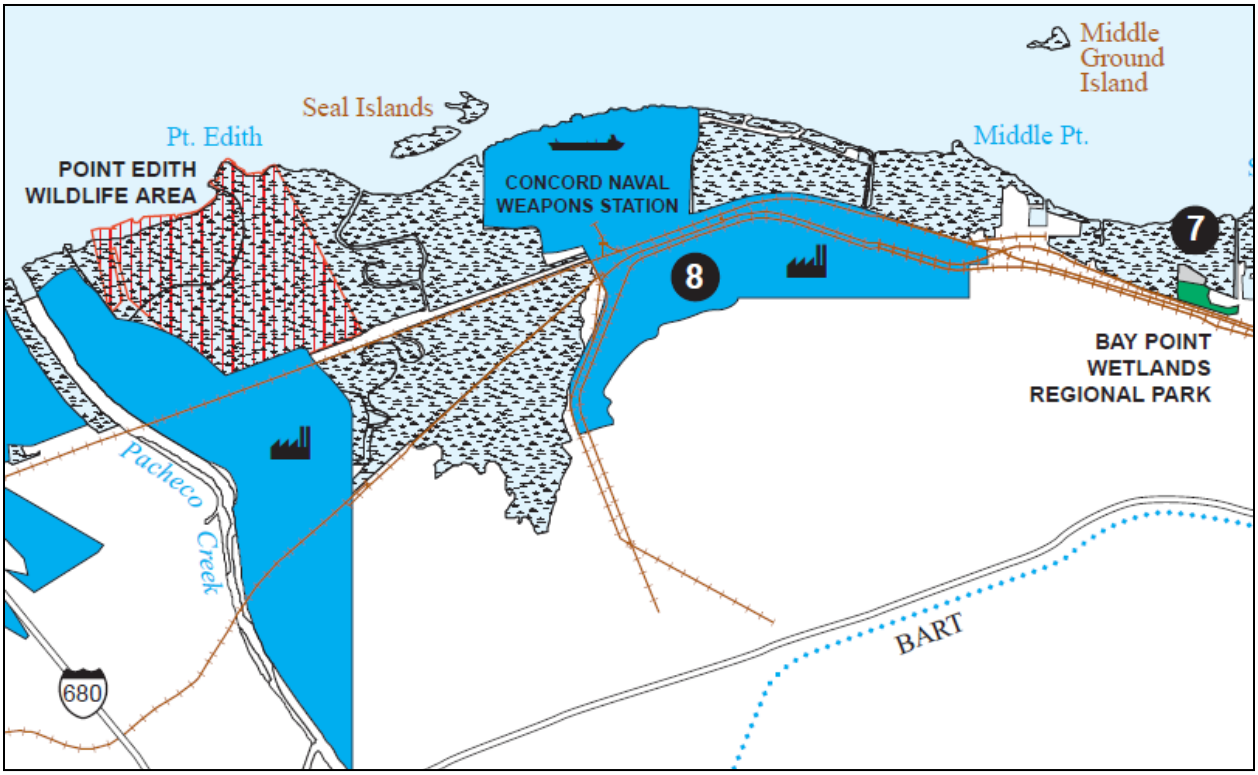

Figure 1 MOTCO Vicinity Portion of Bay Plan Map 3

The policy for Area 7, Bay Point Wetlands located to the east of the MOTCO Tidal Area, is to restore tidal wetlands and provide opportunities for shoreline trail access, wildlife observation, and non-motorized small boat access. The implementation of the proposed action would be consistent with policies for the Bay Point Regional Shoreline Park (located to the east) managed by East Bay Regional Park District.

The policy for Area 8, which encompasses the MOTCO Tidal Area (denoted as the Concord Naval Weapons Station in the map), addresses potential future use of the area at such time as the area may no longer be owned or controlled by the federal government. The policy calls for first consideration to port or water-related industrial use, noting that port and industrial use should be restricted so that they do not adversely affect marshes. The Seaport Plan is incorporated by reference. The policy states that if the area is not needed for port or water-related industry use under this future scenario, waterfront park use should be considered. The proposed action addresses long-term future DOD ownership of MOTCO lands and management by the Army.

MOTCO's Seaport and Water-Related Industry designations would not change under the proposed action. Implementation of the proposed action would optimize the Army's ability to accomplish MOTCO's mission. Accomplishing the goals of the proposed action would not be feasible without the improvement of efficiencies of MOTCO operations within the existing boundaries of the installation.

4.2 SUISUN MARSH PROTECTION PLAN, PART II, POLICIES

The Suisun Marsh Protection Plan (adopted December 1976) applies to the Suisun Marsh in Solano County. Most of MOTCO is within Contra Costa County; however, the offshore islands of Roe Island, Ryer Island, Freeman Island, Snag Island, and Middle Ground Island are within Solano County. These areas are part of the Wetlands Preserve Area and they are within the ESQD arc for MOTCO ammunition operations. The islands are undeveloped, with the exception of natural gas wells operated on the southern shore of Ryer Island. None of the proposed action would occur in or affect the Suisun Marsh in Solano County. The following sections address the applicability and consistency of the Suisun Marsh policies to the proposed action.

4.2.1 Environment - Not Applicable

The proposed action would not affect the diversity of habitats in the Suisun Marsh and surrounding upland areas; impact the Marsh waterways, managed wetlands, tidal marshes, seasonal marshes, and lowland grasses; affect existing uses in the upland grasslands; or disturb the eucalyptus groves in and around the Marsh.

4.2.2 Water Supply and Quality - Not Applicable

The proposed action would not result in the dredging of the John F. Baldwin Shipping Channel nor increased diversions that would cause violations of existing Delta Decision or Basin Plan standards. In addition, no proposals would change inflow rates from the Delta or disruption or impediments to runoff and stream flow in the Suisun Marsh watershed.

4.2.3 Natural Gas Resources - Not Applicable

The proposed action would not affect natural gas transportation, exploration, production, or injection within the Suisun Marsh.

4.2.4 Utilities, Facilities, and Transportation - Not Applicable

The proposed action does not include improvements to public utilities, facilities, and/or transportation systems potentially affecting Suisun Marsh.

4.2.5 Recreation and Access - Not Applicable

The proposed action would not affect recreation-related land acquisition efforts or recreational activities within the Suisun Marsh.

4.2.6 Water-Related Industry - Consistent

The proposed action would not affect policies for management of the Wetland Preserve Areas in Suisun Marsh. The proposed action would be carried out in a manner that would not restrict possible future development and operation of marine terminals and marine terminal berths on the deep water shoreline, or the movement of waterborne cargo, materials and products from the shoreline terminal to the upland portions of the site.

4.2.7 Land Use and Marsh Management - Not Applicable

The proposed action would not affect the tidal marshes, managed wetlands, seasonal marshes, and the lowland grasslands of the Suisun Marsh.

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