Assessment of Project Design Changes Relative to the Green Sea Turtle Assessment for the Floating Dry Dock Project at Naval Base San Diego

1.0 Introduction

The Navy is notifying the National Marine Fisheries Service (NMFS) of design changes for the Naval Base San Diego (NBSD) Mole Pier Floating Dry Dock (FDD) project (Project). The potential changes are to the number and type of piles to be removed/installed and the dredge footprint. These design changes were initiated after the Endangered Species Act (ESA) Request for Concurrence (RFC; dated February 11, 2020) was submitted and the corresponding Letter of Concurrence (LOC; dated March 25, 2020) was issued. Potential impacts to ESA-listed sea turtles and marine mammals would be related to the FDD facilities preparation (dredging and pile extraction/installation), FDD transit from Mobile, Alabama (elevated noise and vessel strike), and FDD Operations (wildlife interactions). The information below provides a summary of the current LOC, the updated Project description, and the impacts of the Project design changes on ESA-listed species.

While the RFC provided an analysis of the Project Areas for both the Mole Pier FDD and the Austal (formerly Marine Group Boat Works) FDD locations, the information below only addresses design changes to the Mole Pier FDD. The Navy is submitting this document and requests a revised LOC for the Project.

The FDD would be constructed entirely of steel and have an 18,000-ton vessel-lifting capacity designed to meet the Navy's requirements and American Bureau of Shipping Standards. The dimensions for the FDD are 213 by 50 meters (700 by 163 ft [ft]) with a wing wall height of 13 m (44 ft) above the deck. The FDD is open at both ends (Figure 1 provides an example of the type of FDD that is proposed for the Project). The FDD would be berthed after all in-water and shore-based activities have been completed.

Figure 1. Figure Showing an Example of the Open-ended Design of Proposed FDD.

2.0 Existing LOC

2.1 FDD Facilities Preparation

2.1.1 Dredging

Per the ESA RFC, the Project site would include the proposed dredge footprint (approximately 4.79 acres) as well as upland areas along the south berth of the mooring wharf (referred to as a "mooring wharf") that would require improvements to support the proposed emplacement and operation of the FDD. The proposed dredging area at the south berth of the mooring wharf was divided into three subareas: Turning Basin (1.73 acres), Approach (1.65 acres), and FDD Sump (1.40 acres) (refer to Figure 1-2 in the RFC). Dredging was planned to depths up to -36 ft Mean Lower Low Water (MLLW) in the Turning Basin, -37 ft MLLW in the Approach, and -53 ft MLLW in the FDD Sump. The south berth of the mooring wharf was originally dredged to -55 ft MLLW to facilitate the emplacement of AFDM 14 "Steadfast" (Navy 2018), a FDD that was previously used to repair Navy ships before it was relocated in 1998. Currently, the depths in the proposed dredging area range from -19 ft MLLW to -56 ft MLLW. As such, dredging was anticipated to involve the removal of approximately 86,121 cubic yards (cy) of sediment over the 4.79-acre area using a barge-mounted clamshell dredge. Dredging was anticipated to take approximately 70 days.

2.1.2 Pile Extraction and Installation

When the Project ESA RFC was submitted on February, 11, 2020, the analysis addressed the installation of steel and concrete piles using an impact pile driver, and the removal of piles using a vibratory extractor, high-pressure water jets, or a pile clipper. To assess the potential impacts on green sea turtles (*Chelonia mydas*), the maximum source values for the 24-inch steel piles were used to determine distances to regulatory thresholds. These piles used an assumed source level of 194 decibels referenced to 1 micropascal (dB re 1 μPa; root mean square [RMS]) and 178 decibels referenced to 1 micropascal squared-second (dB re 1 μPa^2-sec; sound exposure level [SEL]), with 600 strikes required to install each pile. The threshold value for injury to turtles from impact pile driving was assessed as a cumulative SEL of 204 dB SEL or a peak sound pressure level (SPL) of 232 dB RMS (Navy 2017). For potential behavioral reactions to potentially harmful noise, turtles were expected to avoid exposure to an underwater SPL of 175 RMS or greater (Navy 2017). Based on the source levels provided above, and the thresholds for injury and behavioral reactions, the injury thresholds were expected to be reached at 14 meters (m; 46 ft) and behavioral reactions were expected at 185 m (607 ft [ft]). As a result, a shutdown zone of 25 m (82 ft), which incorporated the 14 m (46 ft) acoustic injury distance plus an added buffer to 25 m (82 ft), was implemented. Shutdowns were to occur via the monitor notifying the construction crew that a sea turtle (or marine mammal) was approaching the shutdown and then asking them to stop in-water activities if the animal crossed into the 25 m (82 ft) shutdown zone.

2.2 FDD Transit

At the time of the RFC submittal, potential impacts to ESA-listed marine mammals and sea turtles during the FDD transit were not addressed. As such, we are providing new information that assesses the potential impacts to ESA-listed species during the FDD transit.

2.3 FDD Operations

Per the LOC, FDD Operations were addressed in a limited capacity based on the available information when that the LOC was issued. As the Project design has progressed, we are providing updated

information with regards to the operation of the FDD, and potential impacts from wildlife interactions with the FDD during operations.

2.3.1 Wildlife Interactions with the FDD

We are providing more details on operations to further support NMFS' previous conclusion in the 2020 LOC that future operation of the floating dry dock are not likely to adversely affect green sea turtles.

3.0 Updated Project Description

The current Project design has been updated based on revised engineering specifications and a more thorough design plan. The updated designs call for changes to the dredge footprint, as well as modification to the original pier upgrades and structure locations. For the pier upgrades, the revised design calls for the potential installation or removal of piles in two separate generalized areas within the Project footprint: 1) at the south berth of the mooring wharf; and 2) at the Ramp Pier along the quaywall to the east of the mooring wharf. More specifically, the Project design now incorporates: 1) use of "bump outs" that will extend portions of the face of the mooring wharf away from the main wharf; 2) removal of the ramp pier and replacement with a smaller pier with an intermediate support structure; and 3) use of a 24-inch octagonal concrete piles in strategic places around the FDD for a Test Pile Program (TPP). The sections below provide updated details on the pile extraction and installation activities associated with the Project.

3.1 FDD Facilities Preparation

3.1.1 Dredging

The Project dredge footprint has been enlarged to cover approximately 9.98 acres. The dredging area at the south berth of the mooring wharf remains divided into three subareas: Turning Basin (1.43 acres), Approach (2.76 acres), and FDD Sump (5.79 acres). Figure 2 provides a comparison of the previous dredge footprint and the currently designed dredge footprint relative to the three dredge areas. Dredging depths would change slightly at the Turning Basin with a reduction in dredge depth form -36 to -35 ft MLLW, the Approach dredge depths would remain the same at -37 ft MLLW, and dredge depths would increase at the FDD Sump from -53 to -56 ft MLLW. Given that the depths in the proposed dredging area range from -19 to -55.5 ft MLLW, dredging is now anticipated to involve the removal of approximately 110,960 cy of sediment over a 9.98-acre area using a barge-mounted clamshell dredge. Of the 110,960 cy of dredged sediment, 20,449 cy (18%) will be disposed of at an upland site, and 90,511 cy (82%) will be disposed at the LA-5 Ocean Dredged Material Disposal Site. As a result of the increase in the dredge area, we expect that dredging would occur over approximately 90 days, with an average daily dredge volume of approximately 1,000 cy. Because of the potential presence of munitions, and associated Explosives Safety Quantity-Distance (ESQD) arcs, dredging activities would be limited to nighttime (6:00pm to 6:00am), Monday through Friday.

During the initial RFC, the use of a silt curtain for dredging was not addressed relative to the FDD. The Navy assumes that the CWA permits will require a silt curtain around dredging activities. As such, we are providing new information that assesses the potential for impacts to green sea turtles due to silt curtain use during dredging of the Project dredge footprint. Based on the anticipated Best Management Practices (BMPs) identified in previous Clean Water Act (CWA) consultations for similar activities, a silt curtain may be required during sediment-disturbing activities. While the specific BMPs from the CWA consultation are unknown at this point, we would expect that a silt curtain would be deployed around dredging activities. The silt-curtain would likely not extend to the bottom to reduce the potential for

disturbing the sediment at lower tides. Previous CWA consultations have required silt curtains that would reduce the likelihood for entanglement of marine species. Once the CWA permits are issued, the Navy will re-evaluate appropriate BMPs for silt curtain use; however, we are providing BMPs that have been required as part of previous CWA permits that include dredging activities.

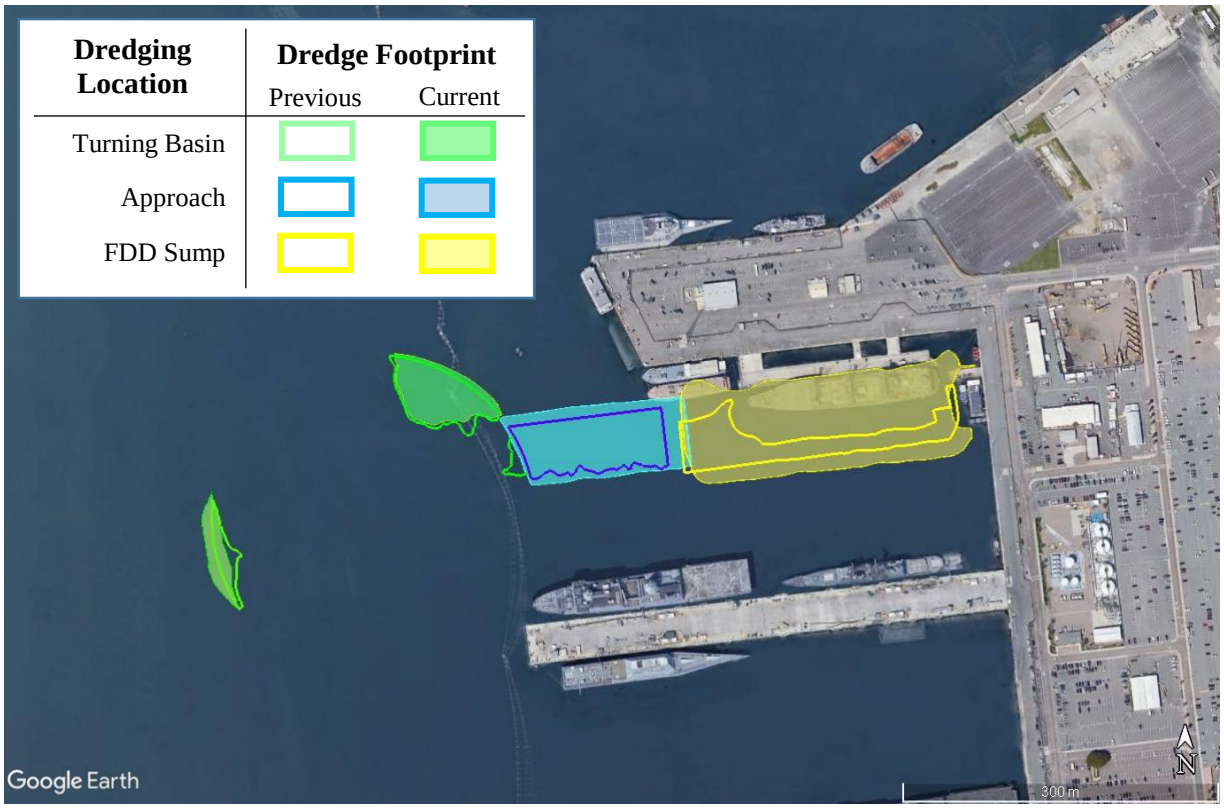

Figure 2. Comparison of Previous and Current Dredge Footprints at the NBSD Mole Pier Project Location.

3.1.2 Pile Extraction and Installation

Pile Extraction Activities

Demolition activities for the Project have been broken up into two separate generalized actions: 1) potential extraction of 24-inch octagonal and/or 24-inch square concrete piles at the mooring wharf; and 2) extraction of 24-inch square concrete piles associated with the Ramp Pier for vehicle access to the FDD. The piles at the mooring wharf would be extracted only if they interfere with piles that would be installed as part of the structural support needed to strengthen the mooring wharf; however, engineers have not made the final determination of whether these piles would need to be removed. The Ramp Pier will be completely demolished and replaced with a new structure. For both pile extraction actions, the piles could be removed via multiple methods, including vibratory extraction, high-pressure water jetting, hydraulic pile clipper, wire saw, underwater chain saw, dead pull or a via a combination of methods. A total of 65 24-inch square and octagonal concrete piles may be removed, depending on conflicts with piles to be installed, within the existing mooring wharf footprint, and as part of the ramp pier demolition. Also, once the six TPP piles are installed they will be removed. All pile are expected to be removed over

the course of 19 days. Table 1 provides the source levels used to identify distances to relevant acoustic thresholds.

Table 1. Underwater Noise Source Levels for Pile Extraction.

Activity	***Pile Type[1]***	***Source Levels[2]***		
		Peak SPL ***(dB re 1 µPa)***	***RMS SPL[3]*** ***(dB re 1 µPa)***	***SEL*** ***(dB re 1 µPa²-sec)***
Pile Extraction	24-inch Square Concrete	-	162	-
	24-inch Octagonal Concrete			

Note: [1] In the absence of information on vibratory extraction of 24-inch square and octagonal concrete piles, source data from 20-inch concrete square piles was used as a proxy source level (NAVFAC SW 2022).
[2] The SPL is unattenuated
[3] Data were not collected at source (10 m [33 ft]) for these piles due to safety concerns. The source value of 162 dB RMS value is based on a back-calculated source level, assuming practical spreading loss, using the average of the maximum RMS values (161.97 dB RMS) collected at from 49 to 79 m (161 to 259 ft). The Peak SPL and SEL values are not available for the source data.

Throughout the demolition phase, the following equipment would likely be used to remove, collect, and transport the demolition debris: a spud-anchored barge, a materials barge, barge and/or wharf cranes, tugboat(s), work skiffs, mobile construction equipment, transport trucks, and scows (Navy 2016).

All appropriate water quality BMPs would be implemented during demolition activities. For example, a system of rafts would be used under the demolition locations to capture any debris (Navy 2016). Additionally, concrete slurry from the cut operation would be vacuumed as saw cutting occurs (Navy 2016).

Mole Pier Mooring Wharf

Following the relocation of the United States (U.S.) Ship (USS) Curtiss and associated hoteling facilities from the south berth of the mooring wharf, typical pier demolition activities would progress bay-ward to landward and from the top down (Navy 2016). First, exterior appurtenances (e.g., utilities) would be removed above and below the pier deck. The concrete pier deck would be saw cut longitudinally and transversely at mid-span of every bent, allowing for removal in large but manageable sections, with weights of less than 50 tons. While the section is rigged to the derrick crane, a hydraulic shearing tool attached to a barge-mounted excavator would be used to cut the piles just below the pile cap. Once freed from the piles, the sections would be set onto a barge. Following the removal of the pier deck, the piles could be removed via multiple methods, including vibratory extraction, high-pressure water jetting, hydraulic pile clipper, wire saw, underwater chain saw, dead pull or via a combination of methods. A diver may be used to assist in the extraction of piles with this method. A diver may also be used if a hand-held hydraulic saw were needed to cut the piles at the mudline. No fender piles are required to be removed as part of this action.

A total of thirty-one piles would be potentially removed, with twenty-four 24-inch square concrete piles associated with the mooring wharf and seven 24-inch octagonal concrete piles associated with mooring bollards at the east and west ends of the mooring wharf. These piles would be removed over the course of seven days (see Figure 3, and Refer to Table 1).

Ramp Pier

The pile-supported vehicle access Ramp Pier at the west end of the wharf—originally installed to support berthing and mooring of the USS *Curtiss*—would be demolished to allow for installation of a new

structure to allow personnel and vehicle access to the FDD. The methods used to remove the Ramp Pier deck and piles would be similar to the methods described for the mooring wharf. This would include the extraction of twenty-eight 24-inch square concrete piles over the course of six days during the IHA time period (see Figure 3, and Refer to Table 1).

Pile Installation Activities

Similar to pile extraction activities, pile installation activities for the Project are primarily broken up into separate generalized actions: 1) installation and extraction of 24-inch octagonal concrete piles for a Test Pile Program (TPP); 2) installation of 24-inch octagonal concrete piles at the mooring wharf; and 3) installation of 24-inch octagonal concrete piles associated with the Ramp Pier and Intermediate Support Structure for personnel and vehicle access to the FDD (Figure 4). Pile installation will occur via an impact pile driver, high-pressure water jetting, or a combination of both methods. A total of 107 24-inch octagonal piles will be installed within the existing mooring wharf footprint, and as part of the ramp pier construction. All pile are expected to be installed over the course of 40 days. Table 2 provides the source levels used to identify distances to relevant acoustic thresholds.

Table 2. Underwater Noise Source Levels for Pile Installation.

Activity	***Pile Type***	***Source Levels[1]***		
		Peak SPL *(dB re 1 µPa)*	***RMS SPL*** *(dB re 1 µPa)*	***SEL*** *(dB re 1 µPa^2-sec)*
Pile Installation	24-inch Octagonal Concrete	188	176	166

Note: [1] All SPLs are unattenuated; single strike SEL is the proxy source level presented for impact pile driving and was used to calculate distances to PTS; Source levels for 24-inch concrete square and octagonal piles are assumed to have the same source level.

Test Pile Program

A total of six 24-inch octagonal concrete test piles would be driven for a TPP at the western end of the mooring wharf (four piles) as well adjacent to the Ramp Pier (two piles; see Figure 4). The purpose of the TPP is to verify the driving conditions and establish the pile lengths prior to fabrication of the final production piles. These piles would be installed using an impact hammer, re-struck using the same hammer approximately one week later to provide data for production piles, and then removed prior to production pile driving. The TPP piles would be installed and then removed over the course six days per activity (refer to Table 2).

Mole Pier Mooring Wharf

Once the deck of the mooring wharf has been removed, 14 clusters of four angled (batter) 24-inch octagonal concrete piles will be installed within the existing mooring wharf footprint (see Figure 4). Two sets of four 24-inch octagonal concrete piles will also be installed off the southern face of the mooring wharf and will be used to support "bump outs" that will extend out from the existing face of the pier. Four more clusters of four angled (batter) and vertical (plumb) piles may be installed on the bridges connecting the mooring wharf with the land (indicated by red text in Figure 4), but the need for these clusters of piles is not determined at this point. However, for the purposes of this analysis, these piles will be included in the total number of piles installed. A total of eighty 24-inch octagonal concrete piles would be installed for the mooring wharf over the course of 27 days (see Figure 4, and refer to Table 2).

Ramp Pier and Intermediate Support Structure

A new vehicle access bridge will be constructed that will span the distance from the quay wall to the FDD and will consist of a Ramp Pier and in Intermediate Support Structure between the Ramp Pier and the FDD. The space between the pier and the support structure will be spanned by a bridge and then a gangway from the support structure to the FDD. Twenty-one 24-in octagonal concrete pile will be installed to support the Ramp Pier and the Intermediate Support Structure. The 21 piles would be installed over the course of seven days during the IHA time period (see Figure 4, and refer to Table 2).

3.2 FDD Transit

The FDD would be transported using a heavy-lift ship with an approximate length of 800 to 1,000 ft (244 to 305 m). Heavy-lift ships allow large objects to be transported without the use of a barge. These types of ships are lowered into the water, the object is floated into a holding area, and then the ship is re-floated prior to leaving port. The FDD transit will follow established shipping lanes, leaving from Mobile, Alabama traveling through the Gulf of Mexico, along the western Atlantic coastline of South America, around Cape Horn at the southern tip of South America, and then up the eastern Pacific coast of South and Central America to San Diego Bay. The full trip is expected to last a maximum of from 75 to 90 days, and will include multiple stops for supplies and fuel. Arrival in San Diego is anticipated for approximately May or June 2025. During the transit, average speeds would be maintained at approximately 8 to 10 knots (9.2 to 11.5 miles/hour), with a maximum speed of 14 knots (16.1 miles/hour).

3.3 FDD Operations

3.3.1 Wildlife Interactions with the FDD

Dry docking evolutions (i.e., lowering and raising the floating dry dock) would be accomplished with integrated ballast tanks. Gravity would flood seawater into the ballast tanks to submerge the FDD, and electric pumps would remove water from the ballast tanks to float the FDD. When the FDD is either raised or lowered during docking operations the water in the FDD freely flows out either end. Ballast water pumps would be powered from existing land-side electrical power sources and operated in compliance with Uniform National Discharge Standards (UNDS). The Navy will obtain any necessary permits to ensure water quality standards are met. Dry docking evolutions would typically occur between four and six times per year, but up to a maximum of eight times, with each event lasting approximately six hours. The duration of each evolution would depend on the objective(s) of the specific dry docking event. When the FDD is not being used or while maintenance and repair work is undertaken on a dry-docked vessel, the dry dock ballast tanks are filled with air, and the FDD would remain stationary in the floating position. During the lifetime of the FDD, there would be an expected maximum use of the FDD eight times per year, but typical use would be from four to six times per year.

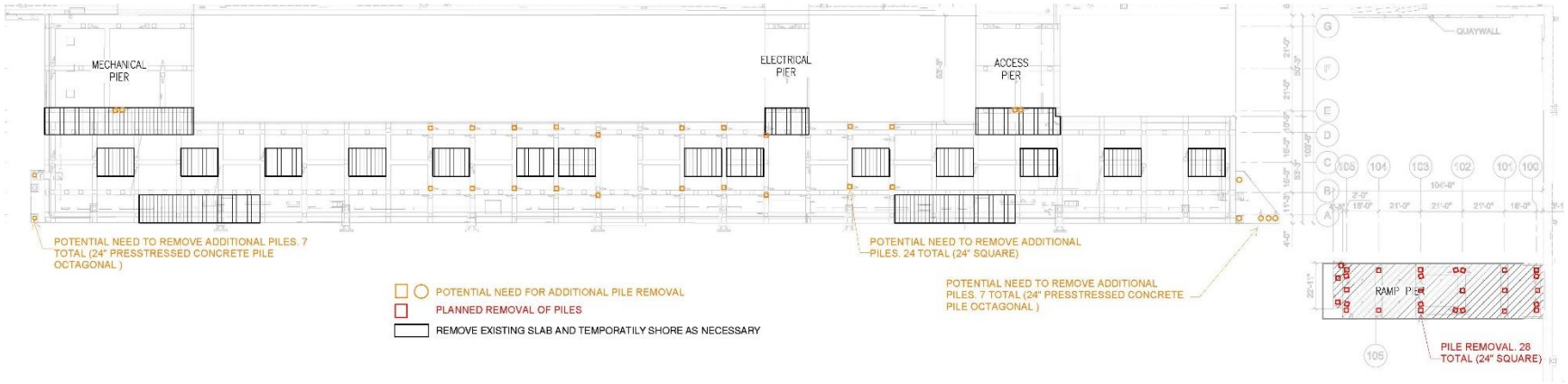

Figure 3. Piles to be Potentially Extracted as Part of the Project-related Activities.

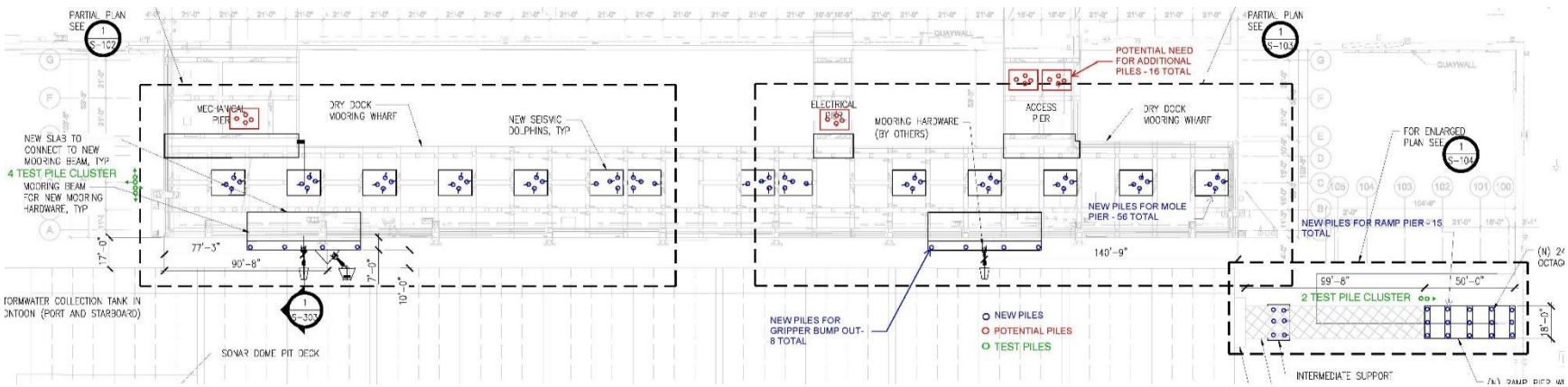

Figure 4. Piles to be Installed as Part of the Project-related Activities.

4.0 Project-related Impacts Assessments

4.1 FDD Facilities Preparation

During preparation of the FDD facilities, the only ESA-listed species known to occur in the waters of San Diego Bay is the green sea turtle. Therefore, the analysis below focuses on potential impacts to green sea turtles.

4.1.1 Dredging

Acoustically, there is no change from the analysis presented in the RFC because the same dredging equipment is expected to be used. While the duration of the dredging is anticipated to take longer than was previously analyzed, the same BMPs will be implemented during dredging activities. In the event that a silt curtain is required, equipment will be used that will reduce the potential for a green sea turtle to become trapped inside of the silt curtain, or entanglement in the curtain or anchor lines. At this time, the CWA permitting/certification is in-process, so the requirement for a specific type of silt curtain is unknown, but it is assumed that the requirement will be to use material that will reduce the potential for entanglement in the silt curtain (i.e., Type III).

While there is no habitat that would attract green sea turtles to the Project Area, and observation data indicates that presence is unlikely, there is still potential for green sea turtles to be in the Project Area during dredging activities. Therefore, the Navy finds that dredging of the Project footprint may affect, but is not likely to adversely affect green sea turtles.

4.1.2 Pile Extraction and Installation

When evaluating the potential for acoustic impacts to sea turtles, there are several factors that must be considered: 1) Noise level at the source (as measured at 10 m [33 ft] for pile driving); 2) The distance to the relevant acoustic threshold (175 dB RMS); 3) Transmission loss (reduction in noise levels over distance); and Likelihood of species presence in the Project Area. To assess the potential acoustic impacts to green sea turtles, the noise levels presented in Table 1 and Table 2 were used as the source levels for pile extraction and installation. We then calculated the distance to the 175 dB RMS threshold using a generic practical spreading loss (PSL) model, which does not take into account environmental variables (i.e., bathymetry, salinity, temperature, etc). The PSL model follows a geometric propagation loss based on the distance from the driven pile, resulting in a 4.5 dB reduction in sound levels for each doubling of distance from the source. In this model, the SPL at some distance away from the source (e.g., a driven pile) is governed by a measured source level, minus the TL of the energy as it dissipates with distance. The PSL method is generally used to estimate TL where bathymetry varies and empirical measurements are not available. The equation for PSL is:

$$TL = 15log10\left(\frac{\mathrm{R1}}{\mathrm{R2}}\right)$$

Where:

TL is the transmission loss in dB,
R1 is the distance of the modeled SPL from the driven pile, and
R2 is the distance from the driven pile of the initial measurement.

Pile Extraction Activities

Table 1 provides updated source levels for the different pile types that are planned for pile extraction. While any of the pile extraction activities identified in Section 3.1 may occur as part of the Project-related activities, none of the pile extraction activities are expected to cross the regulatory threshold of 175 dB RMS (see Table 1). Therefore, with these the pile extraction activities, there is no potential for behavioral impacts to green sea turtles due to exposure to noise. To minimize the potential for physical interaction with Project-related equipment, a 20 m (66 ft) shutdown zone would be implemented. As such, all in-water activities would be stopped before a green sea turtle would be exposed to noise that would be considered as behavioral harassment. This distances is consistent with the existing San Diego Bay Programmatic Consultation between the Navy and NMFS for reducing the potential for physical interaction with Project-related equipment.

Pile Installation Activities

Table 2 provides updated source levels for the different pile types that are planned for pile installation. With a source level of 176 dB RMS for the 24-inch octagonal concrete piles, and utilizing the same regulatory thresholds for injury and behavioral impacts as in the initial ESA consultation, the thresholds for injury would not be reached, and the threshold for behavioral reactions (175 dB RMS) would be reached at 12 m (39 ft), assuming PSL. To minimize the potential for physical interaction with Project-related equipment, a 20 m (66 ft) shutdown zone would be implemented. This distance is consistent with the existing San Diego Bay Programmatic Consultation between the Navy and NMFS for reducing the potential for physical interaction with Project-related equipment.

While there is no habitat that would attract green sea turtles to the Project Area, and observation data indicates that presence is unlikely, there is still potential for green sea turtles to be impacted by noise and activities associated with pile extraction/installation activities. Therefore, the Navy finds that pile extraction/installation associated with the FDD facilities may affect, but is not likely to adversely affect green sea turtles.

4.2 FDD Transit

During the FDD transit, different species would be encountered in the different water bodies; however, the potential for, and types of, impact would remain the same regardless of the water body. Potential stressors during transit include elevated noise and vessel strike. During the transit, ESA-listed marine mammals and sea turtles that may be encountered include those identified in Table 3.

Table 3. ESA-Listed Species with Possible Occurrence During the FDD Transit.

Common Name	Scientific Name	DPS Potentially Impacted By Project	ESA Status	Project-related Activity Area
Cetaceans				
Blue Whale	*Balaenoptera musculus*	Throughout Range	E	GOM/Atlantic/Pacific
Fin Whale	*Balaenoptera physalus*	Throughout Range	E	GOM/Atlantic/Pacific
Sei Whale	*Balaenoptera borealis*	Throughout Range	E	GOM/Atlantic/Pacific
Rice's Whale	*Balaenoptera ricei*	Throughout Range	E	GOM
Sperm Whale	*Physeter macrocephalus*	Throughout Range	E	GOM/Atlantic/Pacific
Humpback Whale	*Megaptera novaeangliae*	Mexico	T	Pacific
		Central America	E	Pacific
Gray Whale	*Eschrichtius robustus*	Western North Pacific	E	Pacific
North Pacific Right Whale	*Eubalaena japonicus*	Throughout Range	E	Pacific
Southern Right Whale	*Eubalaena australis*	Throughout Range	E[1]	Atlantic/Pacific

Common Name	Scientific Name	DPS Potentially Impacted By Project	ESA Status	Project-related Activity Area
Sea Turtles				
Green Turtle	*Chelonia mydas*	North Atlantic	T	GOM
		South Atlantic	T	Atlantic
		East Pacific	T	Pacific
Loggerhead Turtle	*Caretta caretta*	Northwest Atlantic Ocean	T	GOM
		South Atlantic Ocean	T[1]	Atlantic
		South Pacific Ocean	E[1]	Pacific
		North Pacific Ocean	E	Pacific
Hawksbill Turtle	*Eretmochelys imbricata*	Throughout Range	E	GOM/Atlantic/Pacific
Leatherback Turtle	*Dermochelys coriacea*	Throughout Range	E	GOM/Atlantic/Pacific
Kemp's Ridley Turtle	*Lepidochelys kempii*	Throughout Range	E	GOM
Pinnipeds				
Guadalupe Fur Seal	*Arctocephalus townsendi*	Throughout Range	T	Pacific

Abbreviations: GOM = Gulf of Mexico; DPS = Distinct Population Segment; E = Endangered; T = Threatened
Notes: [1]Listed as "Foreign" DPS under the ESA.

4.2.1 Elevated Noise

Shipping is known to be a primary contributor to anthropogenic noise in the ocean, with a majority of the noise generated in the low frequency spectra (10-300 Hertz [Hz]), with a majority of the noise in the 10 to 40 Hz frequency band (Mazzuca 2001). A majority of the sound is generated by the harmonics generated from cavitation associated with spinning propellers. In general the larger the ship, the louder the noise, with noise levels of from 160 to 190 decibels at 17 to 18 knots (Mazzuca 2001). As a result, ambient noise levels in the vicinity of shipping channels is elevated and may mask natural sounds, including sounds produced by large whales.

The heavy-lift vessel will remain in established shipping lanes during the transit from Mobile, Alabama to San Diego, California. The noise generated by the vessel would be consistent with other large vessels that would also use the same shipping lanes. Considering that the FDD transit will occur only once, the vessel will not remain in one place for any length of time, and noise generated by the heavy-lift vessel will be consistent with other ships in the shipping lanes, the Navy finds that any effects from elevated noise may affect, but is not likely to adversely affect ESA-listed turtles or marine mammals.

4.2.2 Vessel Strike

Vessel strikes can result in lethal and sub-lethal injuries to marine species (Laist et al 2001; Redfern et al 2017). If a marine species were to be struck during the FDD transit, impacts could include injury due to broken bones, or death as a result of the strike. Per Laist et al (2001), a majority (89%) of the lethal of severe injuries were a result of ships traveling 14 knots (16.1 miles/hour) or faster.

While there is a potential for encountering ESA-listed marine mammals and sea turtles during transit, the anticipated speeds of the heavy-lift vessel would generally be less that what would be expected to cause severe or lethal injury (Laist et al 2001). The vessel will generally be moving at 8 to 10 knots, which is slower than the speed of most lethal or severe strikes. It is also a single trip, rather than a program of repeated trips, which makes any strike very unlikely to occur. Therefore the Navy finds that vessel strikes associated with the FDD transit may affect, but are not likely to adversely affect ESA-listed turtles or marine mammals.

4.3 FDD Operations

During FDD operations, the only ESA-listed species known to occur in the waters of San Diego Bay is the green sea turtle. Therefore, the analysis below focuses on potential impacts to green sea turtles relative to the FDD operations.

4.3.1 Wildlife Interactions with the FDD

The FDD is built to accommodate multiple classes of ships with multiple hull designs. For ships with sonar domes that may strike the deck of the FDD after it is raised, there is one location in the FDD that is lower than the rest of the FDD. While unlikely, there is a potential for green sea turtles to become trapped in this area after it has been lowered to accommodate a ship entering the FDD and then raised. However, the FDD is open on both ends, and water would leave the FDD via the open ends and any animals that may be in the FDD during this process would be expected to be "flushed" out with the water as it leaves the FDD. Furthermore, FDD-related personnel would be on site during all raising or lowering of the FDD, and BMPs identified in Section 5.0 would be in place during all FDD operations.

The number of turtles using the bay is estimated to range between 40 and 60 animals during most months of the year, increasing to 100 animals during peak migratory periods (Eguchi 2017). During recent monitoring efforts for the NBSD Pier 6 replacement project, marine species monitors were routinely stationed at Pier 1, Pier, 5 and Pier 7 on NBSD and in a small vessel adjacent to the Naval Base Coronado Naval Amphibious Base. During the eight months of monitoring efforts, green sea turtles were observed a total of six times in a large eelgrass patch off the eastern end of the Naval Base Coronado Naval Amphibious Base. No green sea turtles were observed among the piers along NBSD.

Foraging habitat for green sea turtles does not exist in the Project Area, and green sea turtles are not known to occur with any regularity in the Project Area. The closest forage habitat (eelgrass) is approximately 1,100 m (0.7 miles) to the south of the Project Area; however, this small patch of eelgrass (0.83 acres) will be removed during the dredging operations for the Austal Commercial Outlease FDD. The closest persistent eelgrass patch is approximately 2,736 m (1.7 miles) to the west along the Silver Strand. Recent tagging data indicates that a majority of the green sea turtles (Eguchi et al. 2020; U.S. Navy 2023, unpublished data) primarily remain in south San Diego Bay, where there are abundant eelgrass beds.

While there is a potential for a green sea turtle to be present in the vicinity of the FDD after it has been lowered to accommodate a vessel, there is no known habitat (e.g., eelgrass) that would be considered as an attractant to adult green sea turtles in the Project Area, and their presence in the Project area is not expected. Furthermore, the Project Area is inside of a floating security fence and is adjacent to active piers to both the north and south. As a result, any green sea turtles in the vicinity of the FDD would like be transitory and are not anticipated to spend any amount of time in the Project Area. Regardless, BMPs identified in 5.0 will be utilized to reduce the likelihood of a green sea turtle entering the FDD while it is lowered or before it is raised. These BMPs would also apply to other protected marine species (e.g., marine mammals) that have the potential to occur in the Project Area.

There is no habitat that would attract green sea turtles to the Project Area, and observation data indicates that presence is unlikely. However, given that green sea turtles are known to occur in the general vicinity of the proposed FDD, green sea turtles may interact with the FDD while it is in its lowered position. While an interaction may occur, in the unlikely event that a green sea turtle entered the FDD before it was raised, it would be expected to be "flushed" out with the water as it leaves the FDD. Furthermore, the

BMPs identified in Section 5.0 would be implemented during all FDD operations. Therefore, the Navy finds that FDD operations may affect, but are not likely to adversely affect green sea turtles.

5.0 Best Management Practices

5.1 Revised BMPs

The BMPs below were identified in the original LOC for Project-related activities; however, based on the changes in the Project description and the assessments provided above, the Navy requests that some BMPs be modified to better fit the changes to the current Project design. Red and/or crossed-out text indicates additions/changes to the existing BMPS identified in the original RFC/LOC. An explanation of the reason for the change has also been provided.

5.1.1 FDD Facilities Preparation

General

- Use of biological monitors during all Project activities to detect the presence of protected species and implement monitoring zones; and
- To avoid direct contact between equipment and turtles and potential injuries, if a turtle is seen within ~~25 m (82 ft)~~ 20 m (66 ft) of the Project Area while any work is in progress, then all Project activities will immediately cease. Under this assessment, ~~25 m (82 ft)~~ 20 m (66 ft) represents the maximum range of direct contact with equipment and serves as the shutdown zone. Work will only commence once the turtle has left the Project Area out to ~~185 meters~~ appropriate zones for various activities or 15 minutes has elapsed from the last sighting in the area.
    - The 25 m (82 ft) distance in the RFC was based on the potential for injury due to exposure to injurious noise and to maintain consistency of monitoring zones between activities. Considering that the new Project design negates any potential for acoustic injury, the Navy considers that a 20 m (66 ft) shutdown zone will be effective in reducing the potential for physical interaction with Project-related equipment.

Dredging

- Sufficient lighting will be used to illuminate the entire project area;
    - This BMP was separated out from the following BMP for clarities sake.
- A standard monitoring distance of ~~120 m (394 ft)~~ 130 m (427 ft) will be implemented 15 minutes before and during all dredging activities, and after a break of more than 30 minutes;
    - The Navy requests a change in the monitoring distance for dredging activities from 120 m (394 ft) to 130 m (427 ft). This distance is consistent with the existing San Diego Bay Programmatic Consultation between the Navy and NMFS.
- If a turtle is seen within ~~120 m (394 ft)~~ 130 m (427 ft) of the project area prior to dredging, the activity will not commence until the animal has moved out of the area or at least 15 minutes has passed since the last sighting;
- If a turtle is seen within ~~25 m (82 ft)~~ 20 m (66 ft) of the Project Area while dredging is in progress, then all Project activities will immediately cease. Work will only commence once the turtle has left the Project Area out to ~~120 m (394 ft)~~ 130 m (427 ft) or 15 minutes has elapsed from the last sighting in the area; and
    - The 25 m (82 ft) distance in the RFC was based on the potential for injury due to exposure to injurious noise and to maintain consistency of monitoring zones between activities. Considering that the new Project design negates any potential for acoustic

injury, the Navy considers that a 20 m (66 ft) shutdown zone will be effective in reducing the potential for physical interaction with Project-related equipment. This distances is consistent with the existing San Diego Bay Programmatic Consultation between the Navy and NMFS.

- A debris boom would be installed around active dredging to facilitate collection and proper disposal of any debris accidentally discharged during construction.

Pile Extraction and Installation

- A standard monitoring distance of ~~185 m (607 ft)~~ 130 m (427 ft) will be implemented before and during all pile driving activities and after a break in pile driving of more than 30 minutes;
    - The acoustical analysis provided in the RFC was generated using steel piles. Based on the revised acoustical analysis, the Navy considers that the previous monitoring zones can be reduced to the above distance. This distances is consistent with the existing San Diego Bay Programmatic Consultation between the Navy and NMFS.
- If a turtle is seen in the Project Area out to a distance of ~~185 m (607 ft)~~ 130 m (427 ft) prior to pile driving, the activity will not commence until the animal has moved out of the area or at least 15 minutes has passed since the last sighting;
    - The acoustical analysis provided in the RFC was generated using steel piles. Based on the revised acoustical analysis, the Navy considers that the previous monitoring zones can be reduced to the above distance. This distances is consistent with the existing San Diego Bay Programmatic Consultation between the Navy and NMFS.
- If a turtle is seen within the ~~185 m (607 ft)~~ 130 m (427 ft) zone after pile driving has commenced, the Navy may continue driving that pile to completion, as long as that turtle is not within ~~25 m (82 ft)~~ 20 m (66 ft) of the Project work area. The Navy may not initiate the driving of another pile until at least 15 minutes has passed since the last sighting or the turtle is observed outside of the 130 m (427 ft) meter zone; and
    - The acoustical analysis provided in the RFC was generated using steel piles. Based on the revised Project design, the Navy considers that the previous monitoring zones can be reduced to the above distances. Furthermore, the new Project design negates the potential for acoustic injury, and the Navy considers that a 20 m (66 ft) shutdown zone will be effective in reducing the potential for physical interaction with Project-related equipment. These distances are consistent with the existing San Diego Bay Programmatic Consultation between the Navy and NMFS.
- Ramp-up procedures will be implemented to slowly increase the intensity of pile driving to allow undetected turtles in the area an opportunity to move away. Prior to the start of impact pile driving each day, or after each break of more than 30 minutes, a "soft-start" procedure will be used (i.e., three ~~unfueled~~ reduced energy hammer blows separated by 30 seconds). The procedure allows any animals in the area to voluntarily depart after brief exposures to Project-related noise.
    - This modification is consistent with the current MMPA Incidental Harassment Authorization for Level B (behavioral) harassment of marine mammals (Submitted to NMFS on February 16, 2023). Considering that potential acoustic impacts to green sea turtles from the Project are not expected to occur during pile extraction/installation, the Navy considers that this slight modification is appropriate to maintain consistency with other regulator documents.

5.2 Additional BMPs

The following additional BMPs would possibly be incorporated into the facilities preparation and operations to reduce the potential for impacts to green sea turtles. Final BMPs may change depending on requirements set forth in CWA permits/certifications.

5.2.1 FDD Facilities Preparation

Dredging

Dredge Site (The following BMPs are consistent with the existing San Diego Bay Programmatic Consultation between the Navy and NMFS, as well as other consultations with similar potential impacts.)

- The silt curtains must be comprised of Type III geotextile material.
- The silt curtains must restrict the surface visible turbidity plume or surface debris to the area of dredging and must control and contain the migration of re-suspended sediments or debris at the water surface and at depth.
- The silt curtain must be maintained as a full turbidity enclosure. The silt curtains must be supported by floating debris booms in open water areas such as along the bayward side of the dredging areas. Along pier edges the silt curtains may be connected to the pier structure.
- The bottom of the silt curtains must be weighted with ballast weights or rods affixed to the base of the fabric to resist the natural buoyancy of the silt curtain fabric and lessen its tendency to move in response to currents. The silt curtains must extend from San Diego Bay surface into the water column. Where feasible and applicable, the floating silt curtains must be anchored and deployed from the surface of the water to just above the substrate.
- If necessary, silt curtains with tidal flaps must be installed to facilitate curtain deployment in areas of higher flow. Air curtains may be used in conjunction with silt curtains to contain re-suspended sediment, enhance worker safety, and allow barges to transit into and out of the work area without the need to open and close silt curtain gates.
- Silt curtains must be monitored for damage, dislocation or gaps and must be immediately repaired where it is no longer continuous or where it has loosened.
- Silt curtain must not be removed until the visible turbidity plume has dissipated and/or surface debris is skimmed and removed.
- If any protected marine species (e.g., marine mammal or sea turtle) is observed within the silt curtain, dredging activities will be delayed/halted, and the NBSD biologist (Michelle Maley [619-705-5567]) will be notified. If the animal cannot be freed, the NBSD biologist will notify the West Coast Stranding Response Team (Justin Viezbicke, California Stranding Network Coordinator [562-980-3230] or Justin Greenman, Assistant Stranding Network Coordinator [562-980-3264]).

Dredge Disposal Site (LA-5 Ocean Dredged Material Disposal Site)

- During dredge disposal, a monitoring distance of 100 m (328 ft) will be implemented 15 minutes prior to, and during, sediment disposal;
- If a protected marine species is observed within the 100 m (328 ft) zone prior to release of the dredge spoils, the release will be delayed until either the animal has left the zone, or 15 minutes has elapsed from the last sighting in the area;

5.2.2 FDD Operations

Wildlife Interactions

- Prior to raising the FDD from a lowered position, and during the raising process, the inside of the FDD will be surveyed for any protected marine species (e.g., marine mammal or sea turtle);
- If any protected marine species (e.g., marine mammal or sea turtle) is observed inside of the FDD during operations, FDD personnel will immediately notify the NBSD biologist (Michelle Maley [619-705-5567]). If the animal cannot be freed, the NBSD biologist will notify the West Coast Stranding Response Team (Justin Viezbicke, California Stranding Network Coordinator [562-980-3230] or Justin Greenman, Assistant Stranding Network Coordinator [562-980-3264]); and
- The Navy will notify NMFS regional Protected Resources office of incidents within 24-48 hours, for awareness.

6.0 Conclusion

There is the potential to impact ESA-listed turtles and marine mammals during the FDD Facilities Preparation, FDD Transit, and FDD Operations. While the BMPS identified in Section 5.0 would likely reduce the potential for impact during all project-related activities, the Navy finds that all of the Project-related activities may affect, but are not likely to adversely affect ESA-listed species (Table 4). The Navy requests concurrence on the effects analysis presented in this document.

Table 4. Summary of Effects Analyses for ESA-Listed Species.

Project-related Activity	Effects Determination
FDD Facilities Preparation	
Dredging	May affect, not likely to adversely affect
Pile Extraction and Installation	May affect, not likely to adversely affect
FDD Transit	
Elevated Noise	May affect, not likely to adversely affect
Vessel Strike	May affect, not likely to adversely affect
FDD Operations	
Wildlife Interactions	May affect, not likely to adversely affect

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