Naval Station (NAVSTA) Mayport

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FINAL

Environmental Assessment for the Wharf Bravo Recapitalization at Naval Station Mayport, Jacksonville, Florida

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Abstract: The Preferred Alternative identifies and evaluates the potential effects of Wharf Bravo recapitalization (repairs and facilities maintenance) activities at NAVSTA Mayport. Activities include the construction of a new steel sheet pile bulkhead that ties into an existing steel sheet pile structure, placement of fill between existing and new steel sheet pile bulkheads, installation of a concrete pile cap and concrete encasement of sheet pile, asphalt wharf deck paving, repairs to electrical and mechanical shore utilities, and upgrades to area lighting and anti-terrorism force protection waterfront enclave facilities. No significant impacts on the resources of the physical, biological, or socioeconomic environments within the NAVSTA Mayport Study Area would occur as a result of recapitalizing Wharf Bravo.

Executive Summary

Introduction - The United States (U.S.) Department of the Navy (Navy) has prepared this Environmental Assessment (EA) to examine the potential effects on the physical, biological, and socioeconomic environmental resources associated with the recapitalization of Wharf Bravo at Naval Station (NAVSTA) Mayport. NAVSTA Mayport is located in northern Florida east of Jacksonville, along the St. Johns River and the Atlantic Ocean. NAVSTA Mayport maintains and operates facilities that provide operational deployment support to home-based and transient Navy ships, aviation units, and staff. The NAVSTA Mayport Turning Basin is approximately 2,000 feet by 3,000 feet in size and is connected to the St. Johns River by a 500-foot-wide entrance channel (Figure ES-1). A port security barrier has been installed at the mouth of the NAVSTA Mayport Turning Basin, and there is a Restricted Area that prohibits all persons, vessels, and craft from entering without the permission of the Commanding Officer, NAVSTA Mayport, or his authorized representative.

Wharf Bravo is a deep-draft, general purpose berthing wharf that was constructed in 1970 and lies at the western edge of the NAVSTA Mayport Turning Basin. Wharf Bravo is approximately 2,000 feet long, 125 feet wide, and has a design berthing depth of 50 feet mean low water. The Study Area includes the NAVSTA Mayport Turning Basin out to the limit of the most distant of the acoustic thresholds (airborne and in-water) for all protected species being addressed for the proposed Wharf Bravo recapitalization Project (Figure ES-2).

Purpose and Need - The purpose of the Proposed Action is to resolve the increasing deterioration of the bulkhead so the facility can provide adequate ship berthing, cold iron support, and ordnance handling capability. Adequate and efficiently configured facilities are required to provide general purpose ordnance loading and maintenance berthing for ships homeported at and visiting NAVSTA Mayport. The need for the Proposed Action is based on the failing functionality and structural integrity of the wharf.

Proposed Action - The Proposed Action is to recapitalize Wharf Bravo at NAVSTA Mayport. Wharf Bravo recapitalization activities include the construction of a new steel sheet pile bulkhead that ties into an existing steel sheet pile structure, placement of fill between existing and new steel sheet pile bulkheads, installation of a concrete pile cap and concrete encasement of sheet pile, asphalt wharf deck paving, repairs of electrical and mechanical shore utilities, and upgrades to area lighting and anti-terrorism/force protection waterfront enclave facilities. The Proposed Action would result in a wharf footprint increase (and basin decrease) of approximately 12,000 square feet and installation of downward-facing, shielded lighting on and around the wharf surface. No dredging requirements have been identified for this Project.

Alternatives - Although a total of four alternatives were considered to achieve the Proposed Action and to satisfy the Project's purpose and need, based on the selection criteria and the alternatives evaluation process, only two alternatives are carried forward for analysis. Alternative 1 (No Action Alternative) represents a scenario under which Wharf Bravo repair and maintenance activities would not occur, resulting in the continued deterioration of the wharf's infrastructure. This scenario would continue to place the structural integrity of Wharf Bravo and the continuation of operational requirements in jeopardy. Alternative 2 (the Preferred Alternative) evaluates the activities associated with Wharf Bravo recapitalization and includes a new sheet pile bulkhead designed for a 50-year service life. Alternative 2 includes all of the recapitalization actions included in the Proposed Action.

Figure ES-1. NAVSTA Mayport Location Map with Installation Boundary

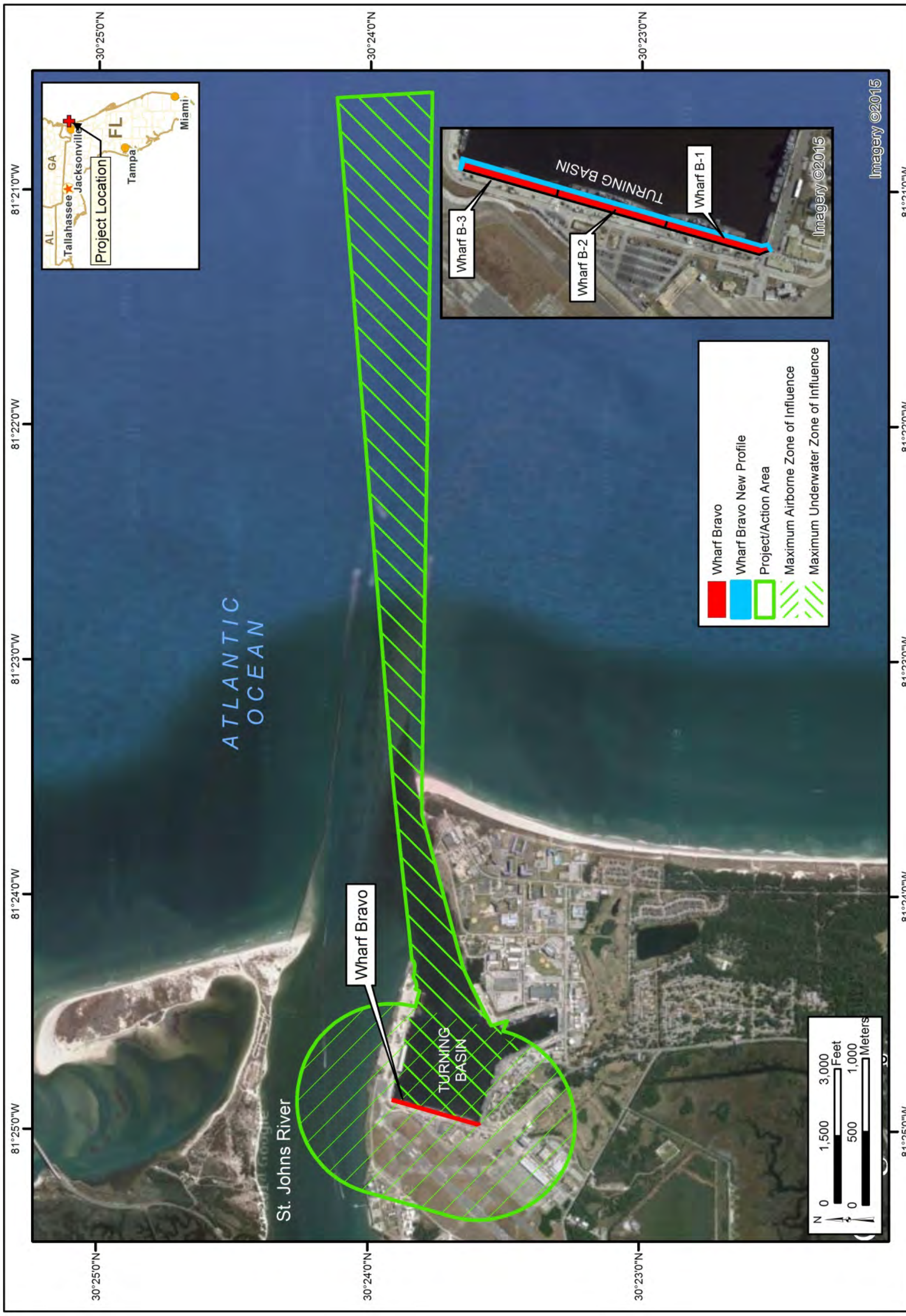

Figure ES-2. Study Area Defined by the Overall Airborne and Underwater Zones of Influence

The potentially affected physical, biological, and socioeconomic environmental resources have been identified and analyzed. The cultural resources and recreational/commercial fishing resource areas have been eliminated from further discussion, as it was concluded that these resources areas would not be impacted by the Proposed Action. A summary of the potential impacts on each of these environment resources is provided in the paragraphs to follow.

Physical Environment and Consequences -
Air Quality - The Preferred Alternative analyses assumed the use of various pieces of construction equipment in the pile driving, milling and paving, concrete fill, and utility upgrade phases of construction. Construction would result in temporary and minor increases in air emissions from the combustion of fossil fuels in equipment and vehicles and from the fugitive dust and dirt emissions associated with site ground disturbance, but those impacts would not be significant. Wharf Bravo is designed to withstand the impacts from a hurricane striking the Jacksonville area, and any increase in hurricane activity resulting from climate change would not adversely impact the life-span of the wharf structures (50 years). As such, no mitigation measures or development of adaptive measures for sea-level rise are necessary in order to mitigate for potential climate change impacts.

Sound - In the absence of official airborne noise criteria for any protected non-human species, the Navy has adopted a threshold of 65 A-weighted decibels (dBA) at any sensitive receptor as the in-air boundary of the Study Area. Underwater noise was also assessed for each sensitive receptor and the results were provided in the subsequent resource area summaries to follow. Construction equipment to be used in the pile driving, milling and paving, concrete fill, and utility upgrades were assessed qualitatively. During both impact and vibratory pile driving, sound levels may exceed 84 dBA up to 246 feet from the incident pile; operational personnel within this range would be required to wear hearing protection. Persons enjoying recreational activities, such as boating, kayaking, and fishing on the St. Johns River adjacent to NAVSTA Mayport, could be exposed to noise levels exceeding 65 dBA, as this noise footprint extends approximately 1,000 feet into the St. Johns River. Temporary and shor-term exposure to noise within this zone would not be injurious. The Preferred Alternative would not introduce any new long-term noise sources and would not significantly impact the long-term airborne or underwater ambient sound environments in the Study Area. As such, there would be no significant impacts on the airborne or underwater ambient sound environments from the implementation of the Preferred Alternative.

Water Quality - The water quality in the NAVSTA Mayport Turning Basin and entrance channel meets the Florida Department of Environmental Protection (FDEP) Class III Marine Water Quality Standards. Construction activities would not discharge any wastes with an oxygen demand into the NAVSTA Mayport Turning Basin. Pile installation would resuspend bottom sediments within the immediate construction area, resulting in short-term and localized increases in suspended sediment concentrations that, in turn, would cause increases in turbidity levels. Construction activities would not result in persistent increases in turbidity levels because they are limited in temporal and spatial scope, resulting in temporary, localized resuspended sediments that would disperse and/or settle rapidly. As such, there would be no significant impacts on water quality from the implementation of the Preferred Alternative.

Marine Sediments - Similar to water quality analyses, pile installation would resuspend bottom sediments within the immediate construction area, resulting in short-term and localized increases in suspended sediment concentrations. Construction activities would not result in the discharge

of wastes containing metals or otherwise alter the concentrations of trace metals in marine sediments, nor would construction activities result in the discharge of any high levels of contaminants or otherwise alter the concentrations of organic contaminants in marine sediments. Due to the small scale of temporary operations and the general lack of sediment contaminants in the Study Area, there would be no significant impacts on marine sediments from the implementation of the Preferred Alternative.

Hazardous Materials - No hazardous materials would be introduced to the waters of the NAVSTA Mayport Turning Basin as a result of Navy activities due to best management practices used during construction, loading, and maintenance activities. Construction activities would be conducted by contractor personnel under Navy supervision in accordance with policies and procedures established under the Office of the Chief of Naval Operations (OPNAV) M-5090.1 and the NAVSTA Mayport Pollution Prevention Plan. Adherence to the Section 4.1 General Construction Best Management Practices would minimize the possibility of hazardous materials being released into the environment. As such, there would be no significant impacts from hazardous materials with the implementation of the Preferred Alternative.

Biological Environment and Consequences -
Marine Invertebrates - The hardened structures along the shoreline provide habitat for sedentary invertebrate beds and associated mobile invertebrates. Eastern oysters grow attached to hard substrate, including pier structures, whereas quahog clams inhabit the sediments of the Study Area. The shrimp species occupy the estuary as juveniles and larvae in the water column surrounding the pier, with seasonal peaks in abundance during the warmer months. It is estimated that an area of approximately 0.15 acre of vertical oyster habitat would be permanently impacted by replacement (concrete fill) with the repairs to Wharf Bravo. However, the rapid regrowth of oysters on the new structures is anticipated to compensate for the long-term impacts on oysters residing on the existing bulkhead structures. As such, there would be no significant impacts on marine invertebrates with the implementation of the Preferred Alternative.

Marine Vegetation - Similar to marine invertebrate analyses, the attached macroalgae that inhabit the hardened shoreline and shallower depths of the Study Area would likely be impacted. There are no seagrass beds mapped in this area of Florida, despite comprehensive mapping efforts. As long as suitable substrate is maintained, any impacts on attached macroalgae should be considered temporary due to rapid regrowth of plants. The repair activities would result in no net loss of suitable habitat for attached macroalgae. Marine vegetation exposed to resuspended sediments is also not likely to be impacted by contaminants. The activities that generate suspended sediments will not be impacted. As such, there would be no significant impacts on marine vegetation with the implementation of the Preferred Alternative.

Fishes - There are three Federally listed endangered fish species whose range overlaps the Study Area: the Atlantic sturgeon (*Acipenser oxyrinchus oxyrinchus*), the shortnose sturgeon (*Acipenser brevirostrum*), and the smalltooth sawfish (*Pristis pectinata*). Additionally, the American eel (*Anguilla rostrata*) is petitioned as threatened, the common thresher shark (*Alopias vulpinus*) is petitioned as threatened or endangered, and the dwarf seahorse (*Hippocampus zosterae*) is a candidate species; all published ranges overlap the Study Area. Highly mobile juvenile or adult fish would be able to move quickly away from the disturbance area. The pile driving and backfill of the wall activities associated with the recapitalization would cause resuspension of sediments that would result in a temporary increase of suspended solids or turbidity and may cause temporary negligible impacts on fishes. Fish near the sheet pile driving

activities may also experience sound intensities that could affect their behavior or damage their hearing ability. The criteria and resulting exposure areas suggest only the most limited mortality of fish and only when they are very close to an intense sound source.

There is no population-level impact on unregulated fish anticipated from the sound intensities modeled, and there would be only minimum and temporary adverse impacts on managed species inhabiting the water column. Therefore, there would be no significant impacts on fishes with implementation of the Preferred Alternative. The Navy has concluded that activities would result in a "may affect, but not likely to adversely affect" determination for the Federally listed Atlantic sturgeon, the shortnose sturgeon, and the smalltooth sawfish. The Navy further concludes that the activities would "not jeopardize the continued existence" of the Federally petitioned (threatened) American eel and common thresher shark. The Navy also concludes that the activities would result in a "no effect" determination for the Federal candidate dwarf sea horse. The Navy submitted a biological assessment to the National Marine Fisheries Service (NMFS). On November 20, 2015, and February 4, 2016, U.S. Fish and Wildlife Service (USFWS) and the NMFS, respectively, provided letters that concurred with the Navy's effects determinations, thus fulfilling the requirements of the Endangered Species Act (ESA) and requiring no further action.

Essential Fish Habitat (EFH) - EFH and Habitat of Particular Concern (HAPC) have been identified for numerous species and fishery management units within the Study Area. Only those fisheries with EFH or HAPC potentially affected by the recapitalization activities have been carried forward for analyses; including the Snapper-Grouper Complex, Coastal Migratory Pelagics, Shrimp and Summer Flounder (*Paralichthys dentatus*). The Study Area includes components of Snapper-Grouper Complex EFH such as unconsolidated seafloor habitats, estuarine and intertidal habitats (attached macroalgae and oyster habitat), and marine water column. Components of EFH for Coastal Migratory Pelagics include estuarine and intertidal habitats (open estuarine waters in proximity to an inlet) and the marine water column (high-salinity bay).

There would be no significant impacts on EFH or HAPC with implementation of the Preferred Alternative. Further, activities would have minimum and temporary adverse impacts on the EFH and HAPC for Federally managed shrimp species. The attached macroalgae (summer flounder EFH) would experience a temporary adverse impact; although the macroalgae would be lost due to the concrete fill, but rapid recolonization is anticipated. The oyster habitat (snapper-grouper EFH) would experience short-term adverse impacts before the regrowth of oysters on the new Wharf Bravo sheet pile and bulkhead structures is established. Water column habitats (EFH for all managed species inhabiting the water column) would experience only temporary impacts of minimum intensity. The Navy submitted this EA containing the EFH assessment to NMFS, Division of Habitat Conservation. On August 20, 2015, NMFS provided a letter that concurred with the Navy's assessments and offered no EFH conservation recommendations, thus fulfilling the requirements of the Magnuson–Stevens Fishery Conservation and Management Act (MSA) and requiring no further action.

Marine Mammals - All marine mammals are protected under the Marine Mammal Protection Act (MMPA), while some are afforded additional protection under the ESA. Five species of Federally protected marine mammals have been addressed in this EA: North Atlantic right whale (*Eubalaena glacialis*; MMPA and ESA/endangered), humpback whale (*Megaptera novaeangliae*; MMPA and ESA/endangered), West Indian (Florida) manatee (*Trichechus*

manatus latirostris; MMPA and ESA/endangered), Atlantic spotted dolphin (*Stenella frontalis*; MMPA) and bottlenose dolphin (*Tursiops truncates*; MMPA). Collisions between construction vessels and marine mammals are not expected during construction activities because vessel speeds would be low and limited vessels would be required for an otherwise shore-based construction activity. Marine mammals are expected to avoid the immediate construction area due to increased construction vessel traffic, noise, human activity, increased turbidity, and possible temporary disruptions in prey availability. Marine mammals exposed to pile driving impulsive sounds greater than 180 decibels (dB) reference (re) 1 micro Pascal (μPa) root mean square (rms) are considered to have been *taken* by Level A (i.e., injurious) harassment. Behavioral harassment (Level B) is considered to have occurred when marine mammals are exposed to sounds below the injury threshold, but greater than 160 dB re 1 μPa rms for impulsive sounds (impact pile driving) and 120 dB re 1 μPa rms for non-impulsive noise (vibratory pile driving).

In compliance with the MMPA, the Navy applied for an Incidental Harassment Authorization (IHA) for the first year of in-water work associated with the Wharf Bravo recapitalization activities. Shut-down procedures will ensure no Level A harassments (injury) would occur. The number of exposures (as all Level B, Behavioral Harassment) that could result from the 1 year period of construction for the Wharf Bravo recapitalization activities from October 1, 2016, to September 30, 2017, is estimated to be 1,030 animals, 110 Atlantic spotted dolphins and 920 bottlenose dolphins. The Marine Mammal Commission (the Commission), in consultation with its Committee of Scientific Advisors on Marine Mammals, has reviewed the Navy's IHA application seeking authorization under Section 101(a)(5)(D) of the MMPA to *take* marine mammals by harassment. The *taking* would be incidental to pile driving. The IHA would be in effect for 1 year. The Commission also reviewed the NMFS August 8, 2015, notice (80 FR 46545) announcing receipt of the IHA application and proposing to issue the authorization, subject to certain conditions.

The Navy has concluded that the activities would result in a "may affect, but not likely to adversely affect" determination for the North Atlantic right whales, humpback whales, and West Indian manatees. The Navy has further concluded that a "no adverse effect" determination is appropriate for the North Atlantic right whale designated critical habitat, the North Atlantic right whale proposed critical habitat, and the West Indian manatee critical habitat. The Navy has submitted two separate biological assessments in compliance with ESA, one to NMFS and another to USFWS for species under their respective jurisdictions. On November 20, 2015, and February 4, 2016, USFWS and NMFS, respectively, provided letters that concurred with the Navy's effects determinations, thus fulfilling the requirements of the ESA and requiring no further action.

Sea Turtles - All sea turtle species are protected under the ESA. Five species of sea turtles may occur within the Study Area: the loggerhead turtle (*Caretta caretta*), the green turtle (*Chelonia mydas*), the leatherback turtle (*Dermochelys coriacea*), the hawksbill turtle (*Eretmochelys imbricata*), and the Kemp's ridley turtle (*Lepidochelys kempii*). Collisions of construction vessels and sea turtles are not expected during construction activities because vessel speeds would be low and limited vessels would be required for an otherwise shore-based construction activity. Sea turtles are expected to avoid the immediate construction area due to increased construction vessel traffic, noise and human activity, increased turbidity, and possible temporary disruptions in prey availability. Impacts on water quality and prey availability are anticipated to have short-term and minimal impacts on sea turtles.

No nesting habitat for any sea turtles would be lost due to construction activities associated with the Wharf Bravo repair and facilities maintenance activities. New lighting fixtures would be installed as part of the facilities maintenance activities; the new fixtures would utilize light-emitting diode (LED) technology and would be full cutoff type with appropriate BUG (Backlight-Uplight-Glare) ratings. Direct light from the new luminaries would not be visible on any beaches in the Study Area, including Huguenot Memorial Park, NAVSTA Mayport, and the mouth of the St. Johns River. The NMFS threshold value for onset of injury to sea turtles due to both impact pile driving and vibratory pile driving is 190 dB re 1 μPa sound pressure level rms. None of the anticipated pile driving scenarios result in sound above the 190 dB re 1 μPa; as such, no injuries associated with pile driving are anticipated for any species of sea turtle. No behavior criteria for sea turtles exist, but it is understood that behavioral impacts could still occur.

No foraging or migratory habitat for sea turtles would be lost or degraded. Additionally, few individuals may be behaviorally impacted, and no injuries are anticipated. No effects on individual Federally endangered hawksbill turtles, their habitat, or their prey are anticipated. The Navy concludes that a "no effect" determination is appropriate for hawksbill turtles. The Federally endangered green, Kemp's ridley, or leatherback turtle habitat or prey species may be present during construction activities; as such, the Navy concludes that a "may affect, but not likely to adversely affect" determination is appropriate for green turtles, Kemp's ridley turtles, and leatherback turtles. Due to the number of loggerhead turtles nesting near and foraging in the Study Area, the Navy concludes that a "may affect, but not likely to adversely affect" determination is appropriate for the loggerhead turtle. Due to the wharf lightning modifications, the Navy concludes that a "may affect, but not likely to adversely affect" determination is appropriate for nesting and hatchling sea turtles. No critical habitat for any turtle species is present in or near the Study Area. As such, the Navy concludes that a "no effect" determination is appropriate for sea turtle critical habitat. The Navy submitted two separate biological assessments that addressed sea turtles in compliance with the ESA: one to the USFWS for nesting sea turtles, hatchling sea turtles, and critical habitat; and another to the NMFS for juvenile and adult sea turtles under their respective jurisdictions. On November 20, 2015, and February 4, 2016, USFWS and NMFS, respectively, provided letters that concurred with the Navy's effects determinations, thus fulfilling the requirements of the ESA and requiring no further action.

Birds - A variety of bird species could occur in the vicinity of the Study Area; most are protected under the Migratory Bird Treaty Act. Three Federally listed birds are known to occur in the Study Area: piping plover (*Charadrius melodus*), wood stork (*Mycteria americana*), and rufa red knot *(Calidris canutus rufa)*. Designated critical habitat for wintering piping plovers is found to the north of the Study Area and includes a portion of the St. Johns River on Fort George Island within Huguenot Memorial Park. There are no established thresholds for airborne pile driving noise-related injury, or disturbance impacts on these species. Birds exposed to pile driving noise that exceeds ambient sound levels (65 dBA) may exhibit startle responses, avoidance, or other behavioral reactions. No significant impacts on bird populations are expected. The Navy concludes that a "may affect, but not likely to adversely affect" determination is appropriate for the wood stork, piping plover, and red knot. Additionally, a "no effect" determination was made for piping plover critical habitat. The Navy has submitted a biological assessment for birds in compliance with ESA to the USFWS. On November 20, 2015, USFWS provided a letter that concurred with the Navy's effects determinations, thus fulfilling the requirements of the ESA and requiring no further action.

Environmental Health and Safety - The NAVSTA Mayport Turning Basin is restricted from public access. This restriction is in place 24 hours a day, 7 days a week. NAVSTA Mayport has an approximately 1-mile-long beach that is closed to the general public and is patrolled by the NAVSTA Mayport Security Department. Recreational access, commercial fishing, and other public activities are restricted from the NAVSTA Mayport Turning Basin and entrance channel. Therefore, there would be no significant impacts on the environmental health and safety from the implementation of the Preferred Alternative.

Socioeconomics Environment and Consequences -
Socioeconomics - NAVSTA Mayport is bordered by the Village of Mayport to the northeast, the City of Jacksonville to the south and southwest, and Kathryn Abbey Hannah Park to the southeast. Socioeconomic impacts would be temporary and minor; noise impacts would not extend to residential areas, public beaches, or the historic Mayport Village. Minor beneficial temporary impacts in the form of jobs and income for area residents, revenues to local businesses, and sales taxes to Duval County and the State of Florida could be realized if construction materials are purchased locally or local construction workers are hired for repairs and maintenance. Environmental justice concerns related to construction activity include exposure to noise, safety hazards, pollutants, and other hazardous materials. However, there are no residential areas or schools in the Study Area; therefore, the activities would not result in disproportional impacts on minorities, low-income populations, or children. As such, no significant impacts on the socioeconomic environment would occur as a result of the implementation of the Preferred Alternative.

Coastal Zone Management -
Environment and Consequences - A Coastal Consistency Determination (CCD) was developed to review the activities of this EA that may have either a direct or an indirect effect on Florida's coastal zone resources and has been submitted for agency review. This CCD supports the Navy's assessment that Wharf Bravo recapitalization activities would be undertaken in a manner consistent (to the maximum extent practicable) with the 24 Florida statutes of the Florida Coastal Management Plan (FCMP) administered by eight state agencies and five water management districts. In conclusion, there would be no significant impacts on coastal zone resources from the implementation of the Preferred Alternative. The Navy submitted this EA and the CCD to the FDEP, Florida State Clearinghouse, requesting their review in compliance with the Coastal Zone Management Act (CZMA) and consistency with the FCMP. On September 23, 2015, FDEP provided a letter that concurred with the Navy's consistency determination, stating that at this stage, the proposed Federal action is consistent with the FCMP.

Cumulative Impacts - The cumulative impacts analysis summarizes expected environmental effects from the combined impacts of past, current, and reasonably foreseeable future projects. Seven Federal and four non-Federal projects/programs are planned for the region. As long as similar mitigation and monitoring measures as employed by Wharf Bravo recapitalization activities are implemented with these combined military and other agency/organization projects, additional impacts can be minimized or avoided, and the cumulative effects would be less than significant. Therefore, when added to past, present, and reasonably foreseeable future actions, the Preferred Alternative would have no significant cumulative impacts on the physical, biological, or socioeconomic environment resources.

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Acronyms and Abbreviations

μPa .... *MicroPascal*

°C .... *degrees Celsius*

°F .... *degrees Fahrenheit*

AICUZ .... *Air Installation Compatible Use Zone*

ANSI .... *American National Standards Institute*

APE .... *Area of Potential Effect*

ASMFC .... *Atlantic States Marine Fisheries Commission*

AT .... *Anti-terrorism*

BA .... *Biological Assessment*

BMPs .... *Best Management Practices*

BOEM .... *Bureau of Ocean Energy Management*

BUG .... *Backlight-Uplight-Glare*

CAA .... *Clean Air Act*

CCD .... *Coastal Consistency Determination*

CEQ .... *Council on Environmental Quality*

CERCLA .... *Comprehensive, Environmental Response, Compensation, and Liability Act*

CFCs .... *Chlorofluorocarbons*

CFR .... *Code of Federal Regulations*

CH_4 .... *Methane*

cm .... *Centimeter*

CNO .... *Chief of Naval Operations*

CNRSE .... *Commander, Navy Region Southeast*

CO .... *Carbon Monoxide*

CO_2 .... *Carbon Dioxide*

CO_{2e} .... *Carbon Dioxide Equivalent*

CWA .... *Clean Water Act*

CV .... *Coefficient of Variation*

CVN .... *Nuclear-Powered Aircraft Carrier*

CZMA .... *Coastal Zone Management Act*

dB .... *Decibels*

dBA .... *A-weighted Decibel*

DGN .... *Drift Gillnet*

DNL .... *Day-night average sound level*

DoD .... *Department of Defense*

DON .... *Department of the Navy*

DPS .... *Distinct Population Segments*

EA .... *Environmental Assessment*

EEZ .... *Economic Exclusion Zone*

EFH .... *Essential Fish Habitat*

EIS .... *Environmental Impact Statement*

ELMR .... *Estuarine Living Marine Resources*

EO .... *Executive Order*

ESA .... *Endangered Species Act*

FAA .... *Federal Aviation Administration*

FAC .... *Florida Administrative Code*

FDEP .... *Florida Department of Environmental Protection*

FMC .... *Fishery Management Council*

FMP .... *Fishery Management Plan*

FMU .... *Fishery Management Unit*

FONSI .... *Finding of No Significant Impact*

FP .... *Force Protection*

FR .... *Federal Register*

ft .... *Feet*

ft^2 .... *Square Feet*

FWC .... *Florida Fish and Wildlife Conservation Commission*

FWRI .... *Fisheries and Wildlife Research Institute*

GMFMC .... *Gulf of Mexico Fishery Management Council*

GHG .... *Greenhouse Gases*

GSRC .... *Gulf South Research Corporation*

HAPC .... *Habitat of Particular Concern*

HCFCs .... *Hydrochlorofluorocarbons*

HMS .... *Highly Migratory Species*

HP .... *Horsepower*

Hz .... *Hertz*

IHA .... *Incidental Harassment Authorization*

INST .... *Instruction*

IPCC .... *Intergovernmental Panel on Climate Change*

IWW .... *Intracoastal Waterway*

JAXPORT .... *Jacksonville Port Authority*

kg .... *Kilogram*

kHz .... *Kilohertz*

L .... *Liter*

LED .... *Light-emitting Diode*

LOA .... *Letter of Authorization*

LZ .... *Lighting Zones*

m .... *Meter*

mg .... *Milligrams*

mm .... *Millimeters*

m^2 .... *Square Meter*

M .... *Environmental Readiness Program Manual*

MAFMC .... *Mid-Atlantic Fishery Management Council*

MBTA .... *Migratory Bird Treaty Act*

MLW .... *Mean Low Water*

MLLW .... *Mean Lower Low Water*

MMPA .... *Marine Mammal Protection Act*

MOVES .... *Motor Vehicle Emission Simulator*

MRA .... *Marine Resources Assessment*

MSA .... *Magnuson-Stevens Fishery Conservation and Management Act*

MSDD .... *Marine Species Density Database*

MSC .... *Military Sealift Command*

N_2O .... *Nitrous Oxide*

NAAQS .... *National Ambient Air Quality Standards*

NAVFAC .... *Naval Facilities Engineering Command*

NAVSTA .... *Naval Station*

Navy .... *U.S.Navy*

ND .... *Negative Determination*

NEPA .... *National Environmental Policy Act*

NHPA .... *National Historic Preservation Act*

NMFS .... *National Marine Fisheries Service*

nm .... *Nautical Miles*

NO_2 .... *Nitrogen Dioxide*

NOA .... *Notice of Availability*

NOAA .... *National Oceanographic and Atmospheric Administration*

NODE .... *Navy OPAREA Density Estimates*

NOX .... *Nitrogen Oxides*

OEA .... *Overseas Environmental Assessment*

OEIS .... *Overseas Environmental Impact Statement*

OPAREA .... *Operating Area*

OPNAV .... *Office of the Chief of Naval Operations*

OSHA .... *Occupational Safety and Health Administration*

O_3 .... *Ozone*

Pa .... *Pascals*

pb .... *Lead*

PCE .... *Primary Constituent Elements*

PM .... *Particulate Matter*

PM-10 .... *Particulate Matter less than 10 Microns*

PM-2.5 .... *Particulate Matter less than 2.5 Microns*

POC .... *Point of Contact*

ppb .... *Parts per Billion*

ppm .... *Parts per Million*

ppt .... *Parts per Thousand*

PTS .... *Permanent Threshold Shift*

re .... *Referenced*

rms .... *Root mean square*

RCRA....Resource Conservation and Recovery Act

RL....Received Level

ROI....Region of Influence

RTE....Rare, Threatened, and Endangered

SAB....South Atlantic Bight

SAFMC....South Atlantic Fishery Management Council

SAIA....Sikes Act Improvement Act

SECNAV....Secretary of the Navy

SL....Source Level

SO_2....Sulfur Dioxide

SOx....Sulfur Oxides

SPL....Sound Pressure Levels

SWFSC....Southwest Fisheries Science Center

TL....Transmission Loss

TTS....Temporary Threshold Shift

UFC....Unified Facilities Criteria

U.S.....United States

USACE....U.S. Army Corps of Engineers

USACHPPM....U.S. Army Center for Health Promotion & Preventive Medicine

U.S.C.....U.S. Code

USCG....U.S. Coast Guard

USEPA....U.S. Environmental Protection Agency

USFFC....U.S. Fleet Forces Command

USFWS....U.S. Fish and Wildlife Service

WSDOT....Washington State Department of Transportation

SECTION 1.0
Introduction

1.0 Introduction

The United States (U.S.) Department of the Navy (Navy) proposes to recapitalize (repairs and facilities maintenance) Wharf Bravo at Naval Station (NAVSTA) Mayport. NAVSTA Mayport is located in northern Florida east of Jacksonville along the St. Johns River and the Atlantic Ocean (Figure 1-1). NAVSTA Mayport maintains and operates facilities that provide operational deployment support to home-based and transient Navy ships, aviation units, and staff. NAVSTA Mayport also provides logistic support for operating forces, dependent activities, and other commands as assigned. NAVSTA Mayport covers approximately 3,409 acres and supports more than 60 commands, detachments, and private organizations. NAVSTA Mayport is homeport to 17 surface combatants, one Military Sealift Command (MSC) ship, and one U.S. Coast Guard cutter. NAVSTA Mayport routinely hosts port visits by various deep-draft ships up to and including nuclear aircraft carriers and nuclear-powered ballistic missile submarines, as well as visiting ships undergoing afloat training group exercises.

1.1 Proposed Action

The Proposed Action is to recapitalize Wharf Bravo at NAVSTA Mayport. Activities include the construction of a new steel sheet pile bulkhead in front of the existing steel sheet pile structure, placement of fill between existing and new steel sheet pile bulkheads, installation of a concrete pile cap and concrete encasement of sheet pile, asphalt wharf deck paving, repairs to electrical and mechanical shore utilities, and upgrades to area lighting and anti-terrorism/force protection (AT/FP) waterfront enclave facilities.

1.2 Project Area Description

The Project Area includes the NAVSTA Mayport Turning Basin out to the limit of the most distant of the acoustic thresholds (airborne and in-water) for all protected species being addressed for the Wharf Bravo repair and facilities maintenance Project. In the absence of official airborne criteria for any protected species, the Navy has adopted a threshold of 65 A-weighted decibels (dBA) at any sensitive receptor as the in-air boundary of the Project Area. For the Proposed Action, the most distant underwater threshold is the marine mammal behavioral disturbance (120 decibles (dB) referenced [re] 1 microPascal [µPa] root mean square [rms]) threshold. The airborne and underwater zones of influence were modeled and incorporated into a single-boundary layer (Figure 1-2).

NAVSTA Mayport ship berthing facilities are provided at 16 berthing locations along wharves A through F located around the NAVSTA Mayport Turning Basin perimeter. The NAVSTA Mayport Turning Basin is approximately 2,000 feet (ft; [610 meters (m)]) by 3,000 ft (914 m) in size and is connected to the St. Johns River by a 500-ft-wide (152 m) entrance channel. A port security barrier has been installed at the mouth of the NAVSTA Mayport Turning Basin, and there is a Restricted Area that prohibits all persons, vessels, and craft, except those vessels operated by the Navy, visiting foreign navies, and the U.S. Coast Guard, from entering without the permission of the Commanding Officer, NAVSTA Mayport, or his authorized representative (Figure 1-3). NAVSTA Mayport has an approximately 1-mile-long beach area that is closed to the general public and is patrolled by the NAVSTA Mayport Security Department.

Figure 1-1. NAVSTA Mayport Location Map with Installation Boundary

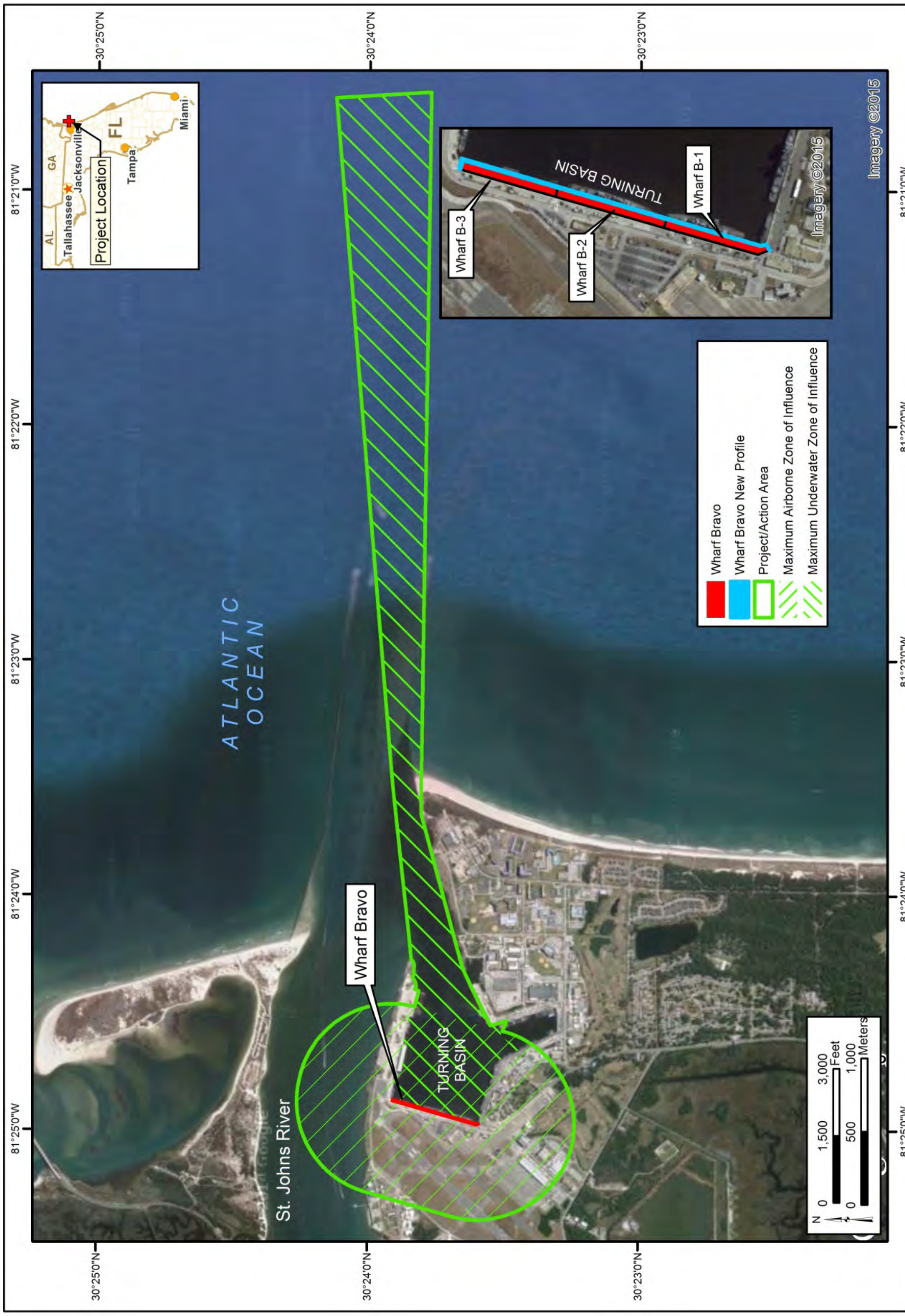

Figure 1-2. Study Area Defined by the Overall Airborne and Underwater Zones of Influence

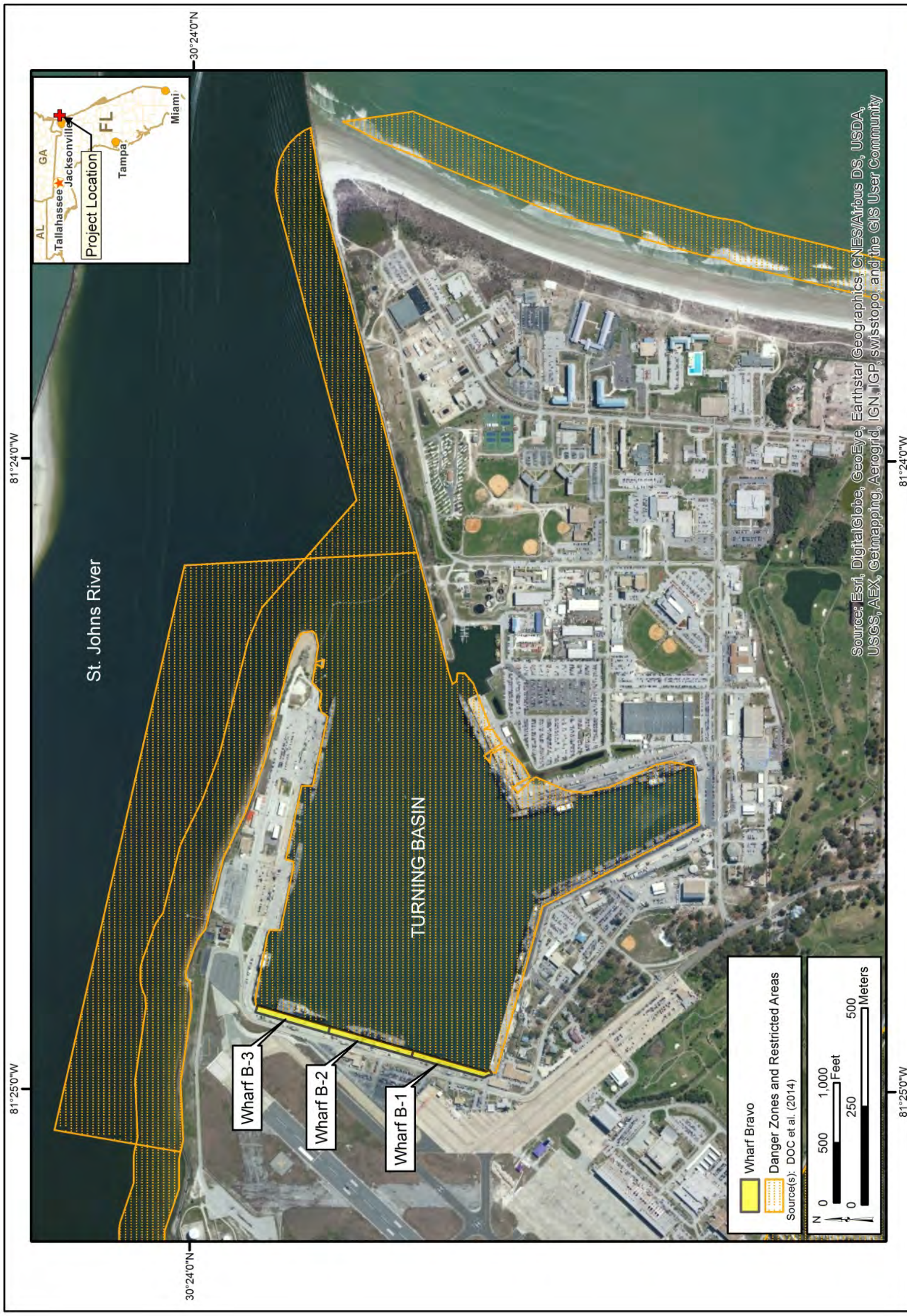

Figure 1-3. NAVSTA Mayport In-water Restricted Area

This restricted area (33 Code of Federal Regulations [CFR] 334.500) extends 380 ft (116 m) seaward from the mean high water line of the beach.

Wharf Bravo is a deep-draft, general purpose berthing wharf that was constructed in 1970 and lies at the western edge of the NAVSTA Mayport Turning Basin. Wharf Bravo is approximately 2,000 ft long (610 m), 125 ft wide (38 m), and has a design berthing depth of 50 ft (15.3 m) mean lower low water (MLLW). The wharf is one of two primary deep draft berths and is capable of berthing ships up to and including large amphibious ships; it is one of three primary ordnance handling berths. The wharf is a diaphragm steel sheet pile cell structure with a concrete apron, partial concrete encasement of the piling, and asphalt-paved deck.

Currently, the wharf is in poor condition due to the advanced deterioration of the steel sheeting and lack of corrosion protection. A major structural repair of the wharf is needed to maintain the long-term serviceability of the structure because of widespread pitting and section loss of the steel sheet piles. Also, Wharf Bravo berth two (B-2) has inadequate cold iron electrical capacity to support nesting of ships. Cold iron support provides shore-based power and support to vessels during periods of maintenance and long-term shutdown of main and auxiliary engines.

1.3 Purpose of and Need for Action

The purpose of the Proposed Action is to resolve the increasing deterioration of the bulkhead so the facility can provide adequate ship berthing, cold iron support, and ordnance handling capability. Adequate and efficiently configured facilities are required to provide general purpose ordnance loading and maintenance berthing for ships homeported at and visiting NAVSTA Mayport. The need for the Proposed Action is based on the failing functionality and structural integrity of the wharf, which has been deteriorating since it was built.

1.4 Environmental Review Process

1.4.1 National Environmental Policy Act

The National Environmental Policy Act (NEPA) of 1969 requires the consideration of potential environmental consequences of Federal actions. Regulations for Federal agency implementation of the Act were established by the President's Council on Environmental Quality (CEQ). Under NEPA, Federal agencies must prepare an environmental assessment (EA) or an environmental impact statement (EIS) for any major Federal action, except those actions that are determined to be "categorically excluded" from further analysis.

An EA is a concise public document that provides sufficient analysis for determining whether the potential environmental impacts of a proposed action are significant, resulting in the preparation of an EIS, or not significant, resulting in the preparation of a Finding of No Significant Impact (FONSI). An EIS is prepared for those Federal actions that may significantly affect the quality of the human or natural environment. Thus, if the Navy were to determine that the Proposed Action would have a significant impact on the quality of the environment, an EIS would be prepared. An EA should include brief discussions of the purpose of and need for the action, the Proposed Action, the alternatives, the affected environment, the environmental impacts of the Proposed Action and alternatives, a listing of agencies and persons consulted, and a discussion of the cumulative impacts associated with the alternatives.

This EA was reviewed by the lead agency, the Navy, representatives of which made a determination regarding the Proposed Action and whether a FONSI or an EIS is appropriate. The Navy concluded that a FONSI was appropriate; a FONSI summarizing the issues presented in this EA was prepared. The FONSI is signed by the Navy, and a Notice of Availability (NOA) was published in the *Florida Times-Union*, Duval County, Florida, to allow public and agency access to the EA.

The Navy has prepared this EA in accordance with applicable Federal and state regulations and instructions, as well as with other applicable laws, rules, and policies. These include, but are not limited to, the following:

- NEPA, as amended by Public Law 94-52, July 3, 1975 (42 U.S. Code [U.S.C.] 4321 et seq.), which requires environmental analysis for major Federal actions affecting the quality of the environment.
- CEQ regulations, as contained in 40 CFR Parts 1500 to 1508, which direct Federal agencies on how to implement the provisions of NEPA.
- Navy Regulations for Implementing NEPA 32 CFR Part 775.
- Chief of Naval Operations (OPNAV) Instruction (INST); OPNAVINST 5090.1D; Environmental Readiness Program Manual (M); OPNAV M-5090.1.

Table 1-1 provides a list of applicable mandates and additional regulations that will guide the preparation of the EA.

1.4.2 Agency Coordination and Permitting

This EA focuses its analysis of impacts based on the appropriate and relevant laws, regulations, permits, and licenses that are applicable to the Proposed Action, including the following (see Appendix A for agency correspondence):

- Permit from the U.S. Army Corps of Engineers (USACE), Jacksonville District, in accordance with Section 10 of the Rivers and Harbors Act of 1899.
- Federal Coastal Consistency Determination (CCD) concurrence by the Florida Department of Environmental Protection (FDEP), Coastal Management Program in accordance with the Coastal Zone Management Act (CZMA).
- To comply with Section 7 of the Endangered Species Act (ESA) of 1973, as amended, the Navy has consulted with the U.S. Fish and Wildlife Service (USFWS) North Florida Ecological Services Office and the National Marine Fisheries Service (NMFS) Southeast Regional Office under the ESA for Federally threatened and endangered species (including petitioned, candidate, or proposed species) that may be affected by the Project. The USFWS and NMFS have concurred with the Navy's determinations.
- To comply with the Migratory Bird Treaty Act ([MBTA]; 16 U.S.C. 703-712), as amended, the Navy will avoid or minimize the effects of actions associated with the Wharf Bravo Project on migratory birds and take active steps to protect birds and their habitat.

Table 1-1. Relevant Policy Documents, Invoking Action, Regulatory Requirements, and Status of Compliance*

Policy Document	Administrative Authority	Invoking Action	Requirements for Compliance
Archaeological Resources Protection Act of 1979 16 U.S.C. § 470aa et seq.	Department of the Interior	Excavation, removal, damage, or other alteration or defacing; or attempt to excavate, remove, damage, or otherwise alter or deface any archaeological resource located on public lands. 43 CFR Part 7.4	Because activities are exclusively for purposes other than the excavation or removal of archaeological resources, even though those activities might incidentally result in the disturbance of archaeological resources, no permit will be required. In addition, the Federal government is afforded permit exemption privileges under 32 CFR 229.5(c).
Clean Air Act (CAA) of 1963 16 U.S.C. § 470 et seq.	U.S. Environmental Protection Administration (USEPA)	Any Federal action where the total of direct and indirect emissions in a non-attainment area would equal or exceed the provided rates. 40 CFR Part 51	The counties within the Area of Potential Effect are in attainment with National Ambient Air Quality Standards (NAAQS). Project emission levels are expected to be less than *de minimis* thresholds; therefore, a determination of conformity with applicable implementation plans is not required.
Comprehensive, Environmental Response, Compensation, and Liability Act (CERCLA) of 1980 42 U.S.C. § 9601 et seq.	USEPA	Release or threatened release of a hazardous substance. 40 CFR Part 302	Development of emergency response plans, notification, and cleanup if hazardous substances are present.
Endangered Species Act (ESA) of 1973 16 U.S.C. § 1531 et seq.	USFWS	All actions in which there is discretionary Federal involvement or control that could adversely affect any species that is listed as threatened or endangered, or areas that have been designated as critical habitat for such species. 50 CFR Part 402.03	Determination of no jeopardy to listed species and no destruction or adverse modification of critical habitat through consultation with the USFWS.
Farmland Protection Policy Act of 1981 7 U.S.C. § 9601 et seq.	Natural Resources Conservation Service	Any Federal action that could remove or adversely affect soils that have been identified as prime or unique farmland soils. 7 CFR Part 658	There are no designated Farmland soils within the Study Area.

Table 1-1, continued

Policy Document	Administrative Authority	Invoking Action	Requirements for Compliance
Federal Water Pollution Control Act of 1977 (also known as Clean Water Act [CWA]) 33 U.S.C. § 1251 et seq.	USEPA	Storage, use, or consumption of oil and oil products, which could discharge oil in quantities that could affect water quality standards, into or upon the navigable waters of the U.S. 40 CFR Part 112	Preparation of a Spill Prevention, Control, and Countermeasures Plan.
		Discharge of pollutants into a public water body, either directly or indirectly. 40 CFR Part 122	Obtain a general National Pollutant Discharge Elimination System Permit.
Magnuson-Stevens Fishery Conservation and Management Act of 1976 (Magnuson-Stevens Act; also MSA) 16 U.S.C. §§ 1801 et seq.	NMFS	Action with the potential to affect Essential Fish Habitat (EFH). 50 CFR Part 600	Assess impacts on EFH and Fisheries Management Plans, consult with NMFS if the action may adversely affect EFH; and where necessary, develop measures to avoid or minimize potential impacts.
Marine Mammal Protection Act (MMPA) of 1972 16 U.S.C. §§ 1361 et seq.	NMFS	Action with the potential to *take* marine mammals. 50 CFR Part 216; Part 229	Assess potential impacts on marine mammals and determine whether *takes* are reasonably foreseeable.
Migratory Bird Treaty Act (MBTA) of 1918 16 U.S.C. § 703	USFWS	Any action resulting in the *take* of any migratory bird, or the parts, nests, or eggs of such bird. 50 CFR Part 21.11	Avoidance of *take* or application for relocation permit.
National Historic Preservation Act (NHPA) of 1966 16 U.S.C. § 470a et seq.	Advisory Council on Historic Preservation	Section 106 of the NHPA requires that the Federal Government take into account the effects of its undertakings on historic properties that may exist inside the Area of Potential Effects. 36 CFR Part 800	Any action that could affect historic property archaeological sites, buildings, structures, objects, or districts requires consultation with the State Historic Preservation Officer (SHPO), the Advisory Council on Historic Preservation, and other interested parties with standing.

Table 1-1, continued

Policy Document	Administrative Authority	Invoking Action	Requirements for Compliance
Occupational Health and Safety Act (OHSA) of 1970 29 U.S.C. § 651 et seq.	Occupational Safety and Health Administration, Department of Labor	Employments performed in a workplace. 29 CFR Part 1910.5 (a)	Adherence to occupational health and safety standards.
Resource Conservation Recovery Act (RCRA) of 1976 42 U.S.C. § 6901 et seq.	USEPA	Collection of residential, commercial, and institutional solid wastes and street wastes. 40 CFR Part 243	Adherence to guidelines for waste storage and safety and collection equipment, frequency, and management.
		Procurement of more than $10,000 annually of products containing recovered materials. 40 CFR Part 247	Procure designated items composed of the highest percentage of recovered materials practicable.
		Recovery of resources from solid waste through source separation. 40 CFR Part 246	Recovery of high-grade paper, residential materials, and corrugated containers.
		Treatment, storage, or disposal of hazardous waste on-site. 40 CFR Part 262.10(c)	Determine hazardous or non-hazardous nature of solid waste, obtain a USEPA identification number if necessary, properly accumulate hazardous waste, and maintain a record.
EO 11988: Floodplain Management 42 Federal Register (FR) 26951 (May 24, 1997)	Water Resources Council, Federal Emergency Management Agency, CEQ	Acquisition and management of Federal lands; Federally undertaken, financed, or assisted construction; conducting Federal activities affecting land use.	Determine whether the Proposed Action would occur in a floodplain, and then evaluate potential effects of any action in a floodplain.
Executive Order (EO) 11990: Protection of Wetlands 42 FR 26691 (May 24, 1977)	USACE and USFWS	Acquisition and management of Federal lands; Federally undertaken, financed, or assisted construction; conducting Federal activities affecting land use.	Take action to minimize the destruction, loss, or degradation of wetlands and to preserve and enhance the natural and beneficial values of wetlands.
EO 12898: Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations 59 FR 7629 (February 11, 1994)	USEPA	All programs or activities receiving Federal financial assistance that affect human health or the environment.	Analyze the environmental effects, including human health, economic and social effects, of Federal actions, including effects on minority communities and low-income communities.

Table 1-1, continued

Policy Document	Administrative Authority	Invoking Action	Requirements for Compliance
EO 13045: Protection of Children From Environmental Health Risks and Safety Risks 62 FR 19883 (April 23, 1997)	USEPA	Any Federal action that could have disproportionate adverse effects on or increase the risk of safety and health issues to children.	Identify and assess environmental health risks and safety risks that may disproportionately affect children.

*Not All-Inclusive

- To comply with the Magnuson-Stevens Fishery Conservation and Management Act (MSA), the Navy has consulted with NMFS on activities that may adversely affect Essential Fish Habitat (EFH).
- To comply with the MMPA of 1972, as amended, the Navy has applied for an Incidental Harassment Authorization (IHA) permit with NMFS.

1.4.3 Public Involvement

The purpose of the EA is to inform decision makers and the public of the likely environmental consequences of the Proposed Action and alternatives. The public and regulatory agencies were given an opportunity to comment on the Draft-Final EA and provide feedback. The NOA (Appendix I) for the EA was advertised from March 25 through March 27, 2016, in *The Florida Times-Union*, Duval County, Florida. The public, as well as non-governmental organizations, were given access to the *Environmental Assessment for Wharf Bravo Recapitalization at Naval Station Mayport, Jacksonville, Florida* on the Navy's website: http://www.navfac.navy.mil/ navfac_worldwide/atlantic/fecs/southeast/about_us/environmental_ planning.html from March 25, 2016 through April 25, 2016.

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SECTION 2.0
Proposed Action Alternatives

2.0 Proposed Action Alternatives

This section provides the general description of each alternative and the activities and supporting actions associated with recapitalizing Wharf Bravo, NAVSTA Mayport, Jacksonville, Florida. NEPA's implementing regulations (e.g., 40 CFR 1502.14) provide guidance on the consideration of alternatives to a Federally proposed action and require rigorous exploration and objective evaluation of reasonable alternatives. All reasonable alternatives must be considered; however, only those alternatives determined to be reasonable relative to their ability to fulfill the purpose of and need for the Proposed Action will be analyzed in the EA. Reasonable alternatives include those that are practical and feasible. The criteria the Navy used in the development of the alternatives included maintaining operational requirements and enhancing the structural integrity of the wharf.

2.1 Description of Proposed Action

The Proposed Action is to recapitalize Wharf Bravo at NAVSTA Mayport. Activities include the construction of a new steel sheet pile bulkhead that ties into an existing steel sheet pile structure, placement of fill between the existing and new steel sheet pile bulkheads, installation of a concrete pile cap and concrete encasement of sheet pile, asphalt wharf deck paving, repairs to electrical and mechanical shore utilities, and upgrades to area lighting and AT/FP waterfront enclave facilities (the Project). The Project would result in a wharf footprint increase of approximately 12,000 square feet (ft^2; 1,115 square meters [m^2]) and installation of downward-facing, shielded lighting on and around the wharf surface. Two additional alternatives were determined to not meet the purpose and need. These alternatives are presented in Section 2.3.

2.2 Description of Alternatives

2.2.1 Alternative 1 – No Action Alternative

Alternative 1 (No Action Alternative) represents a scenario under which Wharf Bravo recapitalization would not occur, resulting in the continued deterioration of the wharf's infrastructure. This scenario would continue to place the structural integrity of Wharf Bravo and the continuation of operational requirements in jeopardy.

Failure to recapitalize Wharf Bravo would result in increased deterioration of the steel bulkhead, formation of holes, and loss of backfill material. Loss of material would cause voids, failure of wharf deck paving, and potential utility outages from broken piping. Resultant live load restrictions would eventually eliminate crane and truck operations on the wharf. Wharf Bravo would no longer be effectively used as an ordnance handling berth, which would severely restrict weapons onload/offload within the NAVSTA Mayport Turning Basin, require increased ship movements within the NAVSTA Mayport Turning Basin, and possibly delay ships' operational schedules. Inability to nest ships at Wharf Bravo restricts the full use of this berth.

Although Alternative 1 does not fully satisfy the purpose and need, it will be carried forward as required by CEQ regulations 40 CFR (Parts 1500-1508). It provides a measure of baseline

conditions against which the impacts of the Proposed Action can be compared and is therefore carried forward for analysis in the EA.

2.2.2 Alternative 2 – Preferred Alternative

Alternative 2 describes the activities associated with Wharf Bravo recapitalization that include a new sheet pile bulkhead designed for a 50-year service life. The Project provides a new steel sheet pile bulkhead to be constructed in front of the existing steel sheet pile structure, placement of concrete fill between existing and new steel sheet pile bulkheads, installation of a concrete pile cap and concrete encasement of sheet pile, asphalt wharf deck paving, repairs to electrical and mechanical shore utilities, and upgrades to area lighting and AT/FP waterfront enclave facilities.

Construction using metal sheet piles would be configured as interlocking pairs (Illustration 2-1; a and b denote sheet pile segments) where each single pile dimension is 27.56 inches (70 centimeters [cm]) by 19.69 inches (50 cm). Since piles would be driven in pairs, the disturbance footprint is estimated to be approximately 7.535 ft^2 (0.70 m^2). A sheet pile would be driven in close contact or interlocking with others to provide a tight wall to resist the lateral pressure of water, adjacent earth, or other materials. Each sheet pile pair is installed as an alternating configuration to the previous pair. The wall would be anchored at the top, and fill consisting of clean gravel or concrete would be placed behind the wall. A concrete cap would be formed along the top and outside face of the wall to tie the entire structure together and provide a berthing surface for vessels (Illustration 2-2).

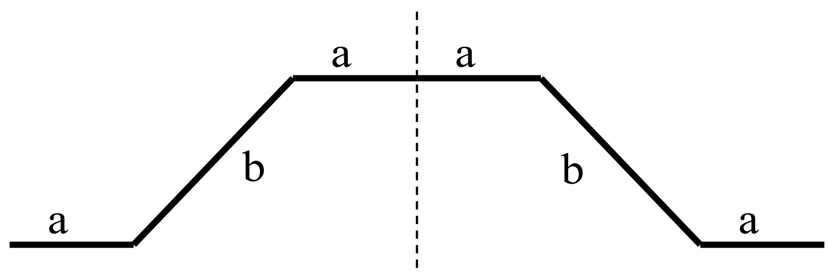


Illustration 2-1. Diagram of an AZ 19-700 Style Sheet Pile Pair

Overall, the Project would include the installation of approximately 880 single sheet piles conducted in two phases. Phase I (Wharves B-2 and B-3) would include the installation of approximately 590 single sheet piles over the course of approximately 73 days, averaging approximately 10 sheet pile pairs installed per day. Phase II (Wharf B-1) would include the installation of approximately 290 single sheet piles over the course of approximately 37 days, averaging approximately eight to nine sheet piles installed per day.

Of the 130 days of installation, 110 days are reserved for vibratory hammer driving, and the remaining 20 days are reserved for contingency impact driving. As a point of reference, only 2 days of impact pile driving occurred during the adjacent Wharf Charlie One (C-1) project (Department of the Navy [DON] 2013a). Impact pile driving, if it were to be necessary, could occur on the same day as vibratory pile driving, but driving rigs would not be operated simultaneously. No net change in the amount of vessel traffic in or around the NAVSTA

Mayport Turning Basin is anticipated as a result of the Project. No dredging is required or anticipated during the Project.

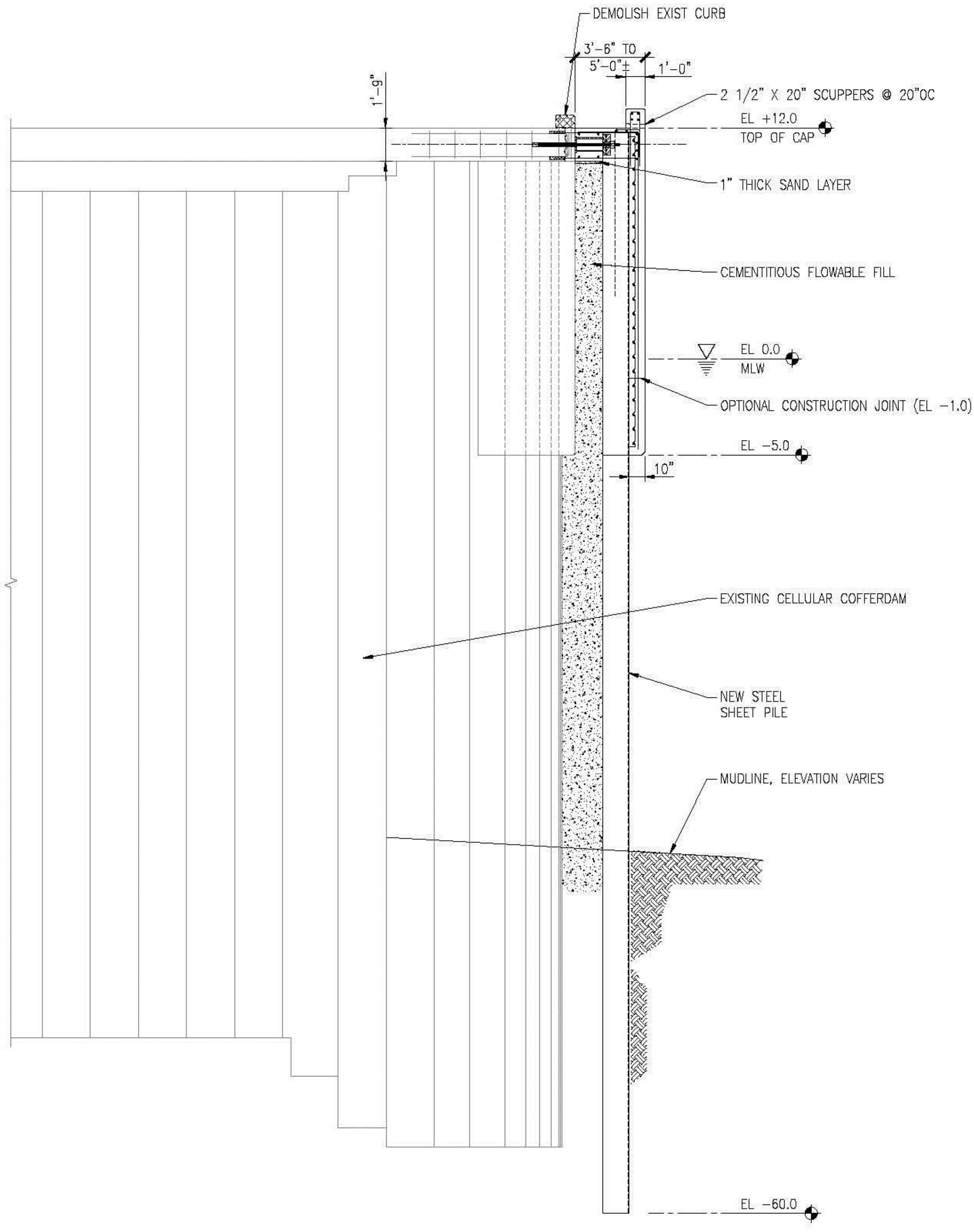


Illustration 2-2. Lateral View of Project Plan

2.2.2.1 Construction Activities:

Construction activities would include the following:

- demolish existing concrete pile cap, wharf deck, and utilities (including lateral supply lines from utilities such as water and electrical)
- remove existing miscellaneous concrete and timber pile obstructions
- install new steel combination wall with tieback anchors
- place a combination of self-hardening, flowable fill, and clean fill between existing and new walls
- install new concrete cap that partially encases the new steel wall
- install sacrificial anode cathodic protection system for the new steel wall
- install new foam-filled fenders
- install new utilities
- repair wharf deck by milling and re-paving
- upgrade area lighting fixtures with light-emitting diode (LED) fixtures
- replace security fencing

2.2.2.2 Construction Sequence:

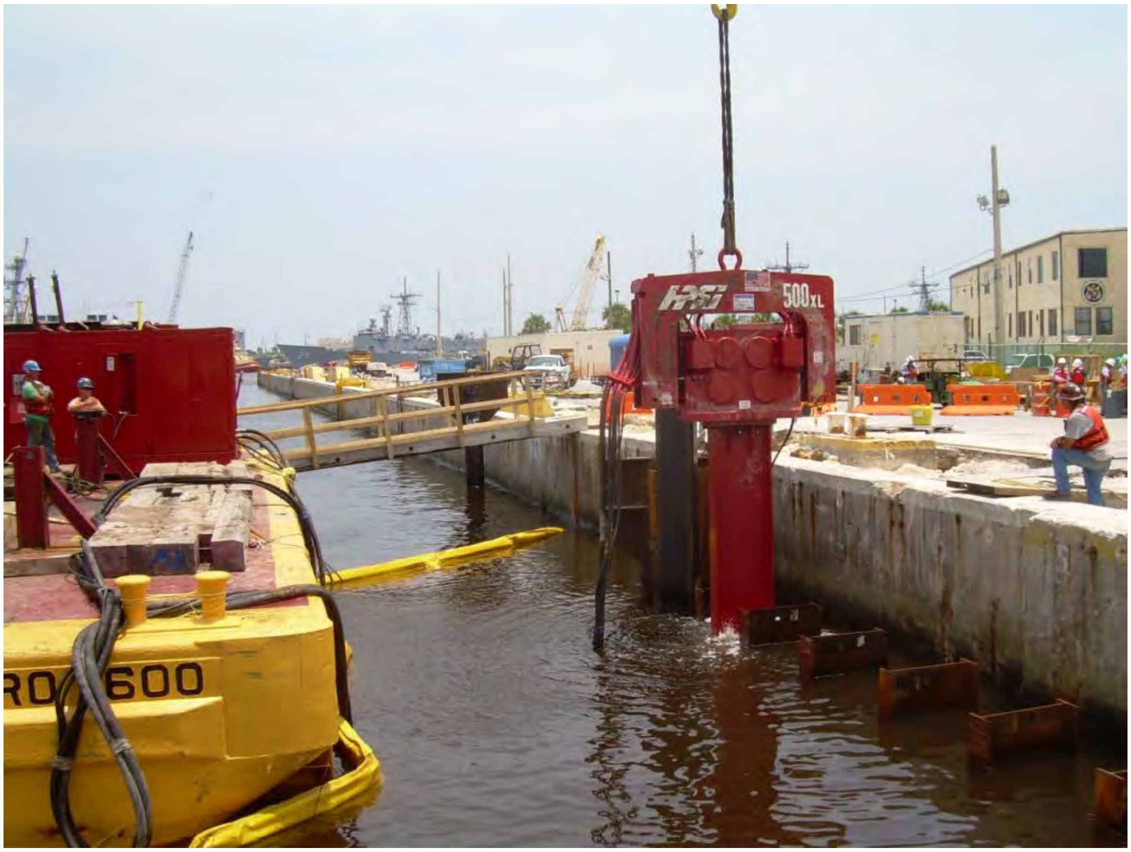
2.2.2.2.1 Preparation and Demolition

- Existing underwater obstructions and debris that may interfere with the installation of the new steel sheet pile wall would be removed utilizing divers and cranes. It is quite probable that multiple concrete and timber piles would be removed from the Study Area utilizing a crane. The points where the new steel sheet pile wall attaches to the existing sheet pile wall would be demolished above and below the waterline to expose the existing steel.
- Along the face of the existing wall, the curb and a portion of existing concrete cap would be removed to accommodate the new concrete pavement that would be placed between the new wall and the existing wall. The concrete apron along the waterside perimeter of the wharf and the utilities (including lateral supply lines from utilities such as water, fuel, steam, waste, electrical, and communications) would be removed.

2.2.2.2.2 Installation of New Bulkhead

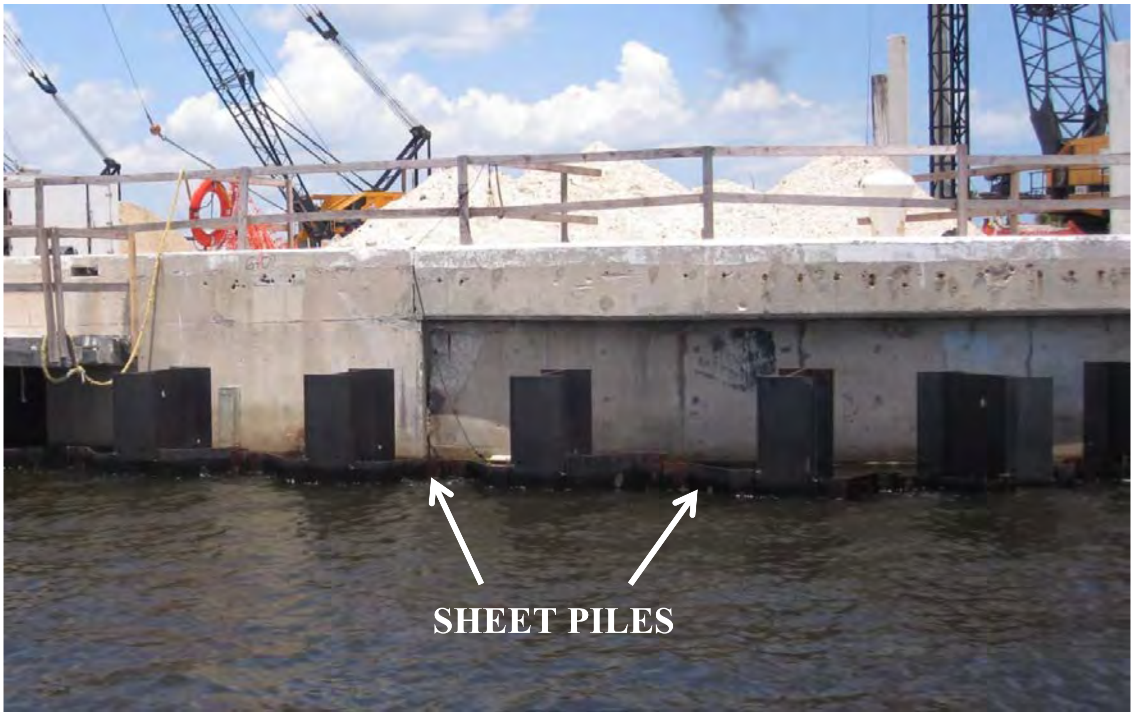
- Since there are no weight-bearing or structural integrity issues on the current Wharf Bravo, crane barges would likely not be necessary and shore-based equipment would be deployed. Shore-based equipment consisting of a pile installation suite (pile leads, vibratory hammer, and an impact hammer) would mobilize to the Project site. Once properly aligned, the metal sheet piles would be driven to the appropriate depth using the vibratory hammer (Photograph 2-1).
- Sheet piles would be driven in pairs (Photograph 2-2). A total of 880 single sheet piles would be installed. Installation of up to a maximum of 10 sheet pile pairs per pile-

driving day is anticipated. Impact driving would be a contingency employed only if vibratory methods are inadequate; a similar project that has been completed at adjacent Wharf C-1 required impact pile driving on only seven piles (DON 2013a).



Photograph 2-1. Vibratory Installation of Sheet Piles at NAVSTA Mayport

- Once all of the piles are driven, closure plates would be attached between the existing adjacent sheet pile walls and the new wall end terminations. Typically, these are welded in place using underwater welding techniques.
- In general, the pile-driving process begins by placing a choker cable around a pile and lifting it into vertical position with a crane. The pile is then lowered into position inside the template and set in place at the mudline. During vibratory driving, the pile is stabilized by the template while the vibratory driver installs the pile to the required top elevation.
- Impact hammers have guides that hold the hammer in alignment with the pile while a heavy piston moves up and down, striking the top of the pile, driving the pile into the substrate from the downward force of the hammer.
- Once piles are in position, installation typically takes 45 seconds to reach the required tip elevation, depending on site conditions (e.g., bedrock, loose soils), driving method, and equipment used.



Photograph 2-2. Sheet Piles at NAVSTA Mayport

2.2.2.2.3 Placement of Fill Behind Wall

- After the anchors are installed, fill operations would be conducted behind the new wall. This would consist of placement of either gravel fill or concrete flowable fill into the space behind the wall; trapped water behind the wall would be pumped out and discharged into the Turning Basin.

2.2.2.2.4 Form and Placement of Pile Cap

- After the fill operation has been completed, the concrete pile cap would be formed and placed along the top of the new interlocking sheet pile wall. This would consist of installation of either wood or steel forms along the top of the wall down to some point below mean low water (MLW) elevation. Water would be removed from the forms, steel reinforcement would be placed in the forms, and concrete would be poured to the required elevations.

2.2.2.2.5 Deck and Utility Replacement

- After the pile cap is in place, a new reinforced concrete apron would be installed, and the wharf deck would be repaired by milling and paving. A new high-mast lighting system, new security fencing, and new utilities would be installed to replace those that were removed.

2.2.2.2.6 Lighting Fixture Upgrades

- Lighting is required to support the maintenance and repair activities associated with Wharf Bravo. Safety and security lighting for personnel required to operate during hours of darkness on the wharf is also required. In accordance with Unified Facilities Criteria

(UFC) 3-530-01 (DoD 2012) and UFC 4-152-01 (DoD 2015), Wharf Bravo lighting should be designed for lighting levels commensurate to lighting zones (LZ) 2 to LZ3.

- Currently lighting of the wharf is accomplished utilizing “cobra head” street lights mounted on 30-ft high poles. The estimated lighting levels from these fixtures vary between 3.0 footcandles (30LUX [one lumen per square meter]) and 0.0 footcandles (0LUX). This lighting level is inconsistent with the UFC requirements for working areas of the wharf. The existing fixtures have a glass refractor on the face of the fixture to direct the light from the source. Refractors tend to allow stray illumination into the night sky causing light pollution.
- Wharf Bravo is within the clearance zone of the adjacent airfield. Therefore, height restrictions have been imposed on the lighting poles currently employed. Due to the current FAA waivers, the new lighting system would maintain the existing pole locations and 30-foot heights.
- The new fixtures would utilize LED light technology and would be full-cutoff type with a Backlight-Uplight-Glare (BUG) rating of B1-B2, U0, and G1-G2. The main lighting units would provide approximately 3 footcandles average illumination for the wharf with a sharp cutoff at the edge of the wharf. A secondary lighting system would be provided for times of low activity. This system would provide 0.5 footcandle of illumination at a “turtle friendly” 590 nanometers wavelength yellow/red color temperature, substantially reducing the amount of light pollution allowed by the current lighting system.

2.3 Alternatives Considered But Eliminated From Further Analysis

2.3.1 Alternative 3 – Leasing Berthing Space

Alternative 3 considered the activities associated with leasing berthing space as an alternative to recapitalizing Wharf Bravo. However, no berthing space is available in proximity to both operational and personnel support facilities at NAVSTA Mayport to make leasing berthing space a feasible option.

2.3.2 Alternative 4 – Constructing a New Wharf

Alternative 4 considered the activities associated with demolishing Wharf Bravo and constructing a new wharf in its place. However, this option would cost more than the recapitalization activities at Wharf Bravo, would require more time to complete, and would potentially result in more environmental impact.

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SECTION 3.0
Affected Environment and Environmental Consequences

3.0 Affected Environment and Environmental Consequences

This EA combines the typically separated Affected Environment and Environmental Consequences chapters found in many EA documents into a single chapter. A concise description of the physical environment, biological environment, and socioeconomic environment that may be potentially affected by implementation of the No Action Alternative and the Preferred Alternative is followed by the environmental impacts associated with each. After a preliminary evaluation of potential environmental issues, the following environmental resource areas are carried forward for detailed analysis in the EA due to the potential for direct, indirect, or cumulative impacts resulting from the implementation of the Proposed Action:

Physical Environment – analyses address the potential for the Wharf Bravo recapitalization activities to affect marine sediments, water quality, air quality, in-air noise, in-water noise, and hazardous materials.

Biological Environment – analyses address the potential for the Wharf Bravo recapitalization activities to affect marine vegetation, marine invertebrates, fishes, EFH (e.g., habitats of particular concern), birds, marine mammals, sea turtles, and environmental health and safety.

Socioeconomic Environment – analyses address the potential for the Wharf Bravo recapitalization activities to affect socioeconomics and tourism. The analyses also address environmental justice and protection of children, and the potential to affect minority and low-income populations and children (e.g., disproportionate impacts on sensitive populations such as children, minorities, and low-income communities).

Three resource areas have been eliminated from further discussion, as it was concluded that these resource areas would not be impacted by the Proposed Action. The resources excluded from the analysis and the justification for excluding these resources are as follows:

- ***Ground Water –*** The Navy has determined effects on ground water are not anticipated from the implementation of the Proposed Action.
- ***Cultural Resources –*** The Navy has determined and the Florida State Historic Preservation Office has concurred that Wharf Bravo does not represent a significant cultural resource, and the Proposed Action would not result in effects on historic property structures (DON 2001). In regard to submerged archaeological resources, the history of dredging within the Study Area indicates that no significant submerged archaeological resources would be identified in the course of this Project. Therefore, the activities described under the Proposed Action would not have an impact on cultural resources.
- ***Recreational and Commercial Fishing –*** Recreational and commercial fishing does not occur in the Study Area at NAVSTA Mayport. This area is restricted from access by the general public per 33 CFR 334.500. Therefore, the activities described under the Proposed Action would not have an impact on recreational and commercial fishing.

The Wharf Bravo recapitalization EA utilizes marine resources data provided by the Marine Resources Assessment (MRA) program, which was implemented by the Commander, U.S. Fleet Forces Command (USFFC), to develop a compilation of data and literature concerning the protected and managed marine resources found in the Navy's Operating Areas (OPAREAs). The

MRA program is essential to support the Navy's environmental planning and documentation efforts, including EAs, overseas environmental assessments (OEAs), and biological assessments (BAs), prepared in accordance with NEPA, EO 12114, MMPA, and ESA. The MRA referenced in support of this EA was completed in October 2008 for the Charleston/Jacksonville OPAREA (DON 2008a). The MRA includes information on marine resources, and in particular the characteristics and life history of protected marine mammals, sea turtles, and fishes.

Additionally, updated marine mammal densities supporting the Study Area were derived from the Navy OPAREA Density Estimates (NODE) for the Southeast OPAREAs (DON 2007). This report provides a compilation of the most recent data and information on the occurrence, distribution, and density of marine mammals in the southeast. The MRA also provides seasonal variations in the occurrence of protected species where available. Marine benthic communities, including coral reefs and coral, live/hardbottom, seagrass communities, and artificial habitats are also provided in the MRA. The MRA also includes an overview of fish assemblages and EFH for fish and invertebrate species managed within the MRA study area.

Intensity of Impacts – Impacts (consequence or effect) can be either beneficial or adverse, and can be either directly or indirectly caused by the action. Direct impacts are those effects that are caused by the action and occur at the same time and place (40 CFR 1508.8 [a]). Indirect impacts are those effects that are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable (40 CFR 1508.8 [b]). As discussed in this section, the durations of impacts are considered ***temporary*** (days to weeks), ***short-term*** (less than 3 years), ***long-term*** (between 3 and 20 years), and ***permanent*** (greater than 20 years) (NOAA 2004).

Whether an impact is significant depends on the context in which the impact occurs and the intensity of the impact. Impacts can vary in degree or magnitude from a slightly noticeable change to a total change in the environment. Significance exists if it is reasonable to anticipate a cumulatively significant impact on the environment (40 CFR 1508.27) and should receive the greatest attention in the decision-making process. For the purpose of this analysis, the intensity of impacts would be classified as ***negligible***, ***minor***, ***moderate***, or ***major***. The intensity thresholds are defined as follows:

- ***Negligible:*** A resource would not be affected or the effects would be at or below the level of detection, and changes would not be of any measureable or perceptible consequences.

- ***Minor:*** Effects on a resource would be detectable, although the effects would be localized, small, and of little consequence to the sustainability of the resource. Mitigation measures, if needed to offset adverse effects, would be simple and achievable.

- ***Moderate:*** Effects on a resource would be readily detectable, long-term, localized, and measureable. Mitigation measures, if needed to offset adverse effects, could be extensive and likely achievable.

- ***Major:*** Effects on a resource would be obvious, long-term, and would have substantial consequences on a regional scale. Mitigation measures to offset the adverse effects would be required and extensive, and success of the mitigation measures would not be guaranteed.

3.1 Physical Environment and Consequences

3.1.1 Air Quality

3.1.1.1 Regulatory Overview

3.1.1.1.1 National Ambient Air Quality Standards and Criteria

USEPA established National Ambient Air Quality Standards (NAAQS) for specific pollutants determined to be of concern with respect to the health and welfare of the general public. Ambient air quality standards are classified as either "primary" or "secondary." The major pollutants of concern, or criteria pollutants, are carbon monoxide (CO), sulfur dioxide (SO_2), nitrogen dioxide (NO_2), ozone (O_3), particulate matter (PM) less than 10 microns (PM-10), particulate matter less than 2.5 microns (PM-2.5), and lead (Pb). NAAQS represent the maximum levels of background pollution that are considered safe, with an adequate margin of safety, to protect the public health and welfare. NAAQS are included in Table 3-1.

Areas that do not meet NAAQS standards are called non-attainment areas. Areas that meet both primary and secondary standards are known as attainment areas. The Federal Conformity Final Rule (40 CFR Parts 51 and 93) specifies criteria or requirements for conformity determinations for Federal projects occurring in non-attainment areas. If the emissions exceed established limits, known as de minimis thresholds, the proponent is required to implement appropriate mitigation measures.

The CAA provides that Federal actions occurring in nonattainment and maintenance areas will not hinder future attainment with the NAAQS and would conform to the applicable State Implementation Plan (i.e., Florida's State Implementation Plan). Duval County is considered by the USEPA to be in attainment for all criteria pollutants. Because Duval County is in attainment with all criteria pollutants, the General Conformity rule does not apply, nor are there any requirements posed by the FDEP for a conformity analysis of the Proposed Action.

Pollutants considered in this EA are SO_2 and other compounds (i.e., oxides of sulfur or SO_x); volatile organic compounds, which are precursors to O_3; nitrogen oxides (NO_x), which are also precursors to O_3, and include NO_2 and other compounds; CO; PM-10; and PM-2.5. These criteria pollutants are generated by the types of activities (e.g., construction and mobile source operations) associated with the Proposed Action. Airborne emissions of Pb are not included because there are no known significant lead emissions sources in the region or associated with the Proposed Action.

3.1.1.1.2 Greenhouse Gases and Climate Change

CEQ released a *Revised Draft Guidance for Greenhouse Gas Emissions and Climate Change Impacts* (December 18, 2014) to provide Federal agencies direction on when and how to consider the effects of greenhouse gas (GHG) emissions and climate change in their evaluation of proposed Federal actions. To be in accordance with this guidance, Federal agencies should consider the potential effects of a proposed action on climate change as indicated by its GHG emissions and the implications of climate change for the environmental effects of a proposed action.

Table 3-1. National Ambient Air Quality Standards

Air Pollutant	Florida Standards	National Ambient Air Quality Standards			
		Primary Standards		Secondary Standards	
	Level	Level	Averaging Time	Level	Averaging Times
Carbon Monoxide	9 ppm (10 mg/ cubic meter [m^3])	9 ppm (10 mg/ cubic meter [m^3])	8-hour [1]	None	
	35 ppm (40 mg/m^3)	35 ppm (40 mg/m^3)	1-hour [1]		
Lead	None	0.15 µg/m^3 [2]	Rolling 3-Month Average	Same as Primary	
	1.5 µg/m^3	1.5 µg/m^3	Quarterly Average	Same as Primary	
Nitrogen Dioxide	100 µg/m3 (0.05 ppm)	53 ppb [3]	Annual (Arithmetic Average)	Same as Primary	
	None	100 ppb	1-hour [4]	None	
Particulate Matter (PM-10)	50 µg/m^3	None	Annual	Same as Primary	
	150 µg/m^3	150 µg/m^3	24-hour [5]	Same as Primary	
Particulate Matter (PM-2.5)	None	15.0 µg/m^3	Annual [6] (Arithmetic Average)	Same as Primary	
	None	35 µg/m^3	24-hour [7]	Same as Primary	
Ozone	None	0.075 ppm (2008 std)	8-hour [8]	Same as Primary	
	None	0.08 ppm (1997 std)	8-hour [9]	Same as Primary	
	None	0.12 ppm	1-hour [10]	Same as Primary	
Sulfur Dioxide	60 µg/m3 (0.02 ppm)	0.03 ppm	Annual (Arithmetic Average)	None	
	260 µg/m3 (0.10 ppm)	0.14 ppm	24-hour [1]	None	
	1300 µg/m3(0.5 ppm)	None	3-hour	0.5 ppm	
	None	75 ppb [11]	1-hour	None	

Source: USEPA 2015b

Units of measure for the standards are parts per million (ppm) by volume, parts per billion (ppb - 1 part in 1,000,000,000) by volume, milligrams per cubic meter of air (mg/m^3), and micrograms per cubic meter of air (µg/m^3).
(1) Not to be exceeded more than once per year.
(2) Final rule signed October 15, 2008.
(3) The official level of the annual NO_2 standard is 0.053 ppm, equal to 53 ppb, which is shown here for the purpose of clearer comparison to the 1-hour standard.
(4) 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 100 ppb (effective January 22, 2010).
(5) Not to be exceeded more than once per year on average over 3 years.
(6) To attain this standard, the 3-year average of the weighted annual mean PM2.5 concentrations from single or multiple community-oriented monitors must not exceed 15.0 µg/m3.
(7) To attain this standard, the 3-year average of the 98th percentile of 24-hour concentrations at each population-oriented monitor within an area must not exceed 35 µg/m3 (effective December 17, 2006).
(8) To attain this standard, the 3-year average of the fourth-highest daily maximum 8-hour average ozone concentrations measured at each monitor within an area over each year must not exceed 0.075 ppm. (effective May 27, 2008)
(9) (a) To attain this standard, the 3-year average of the fourth-highest daily maximum 8-hour average ozone concentrations measured at each monitor within an area over each year must not exceed 0.08 ppm.
(b) The 1997 standard—and the implementation rules for that standard—would remain in place for implementation purposes as USEPA undertakes rulemaking to address the transition from the 1997 ozone standard to the 2008 ozone standard.
(c) USEPA is in the process of reconsidering these standards (set in March 2008).
(10) (a) USEPA revoked the 1-hour ozone standard in all areas, although some areas have continuing obligations under that standard ("anti-backsliding").
(b) The standard is attained when the expected number of days per calendar year with maximum hourly average concentrations above 0.12 ppm is $\leq$ 1.
(11) (a) Final rule signed June 2, 2010. To attain this standard, the 3-year average of the 99th percentile of the daily maximum 1-hour average at each monitor within an area must not exceed 75 ppb.

Federal agencies must also incorporate adaptation measures to protect the project. Adaptation measures, themselves, may have environmental impacts that should be evaluated. Adaptation measures for development on a project site with a high coastal vulnerability to sea-level rise ensures consistency with the President's Climate Action Plan and the direction of Executive Order (EO) 13653 - *Preparing the United States for the Impacts of Climate Change*, which encourages actions by the Federal government to enhance climate preparedness and resiliency in its programs and operations.

Global climate change refers to a change in the average weather on the earth. GHG are gases that trap heat in the atmosphere. They include water vapor, carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), fluorinated gases including chlorofluorocarbons (CFCs) and hydrochlorofluorocarbons (HCFCs), and halons, as well as ground-level O_3 (California Energy Commission 2007).

The major GHG-producing sectors in society include transportation, utilities (e.g., coal and gas power plants), industry/manufacturing, agriculture, and residential. End-use sector sources of GHG emissions include transportation (40.7 percent), electricity generation (22.2 percent), industry (20.5 percent), agriculture and forestry (8.3 percent), and other (8.3 percent) (California Energy Commission 2007). The main sources of increased concentrations of GHG due to human activity include the combustion of fossil fuels and deforestation (CO_2), livestock and rice farming, land use and wetland depletions, landfill emissions (CH_4), refrigeration system and fire suppression system use and manufacturing (CFC), and agricultural activities, including the use of fertilizers (California Energy Commission 2007).

3.1.1.1.3 Final Mandatory GHG Inventory Rule

In response to the Consolidation Appropriations Act (House Resolution [H.R.] 2764; Public Law 110–161), USEPA has issued the Final Mandatory Reporting of Greenhouse Gases Rule. The rule requires large sources that emit 25,000 metric tons (27,557 U.S. tons) or more per year of GHG emissions to report GHG emissions in the U.S., collect accurate and timely emissions data to inform future policy decisions, and submit annual GHG reports to USEPA. The final rule was signed by the Administrator on September 22, 2009, published on October 30, 2009, and made effective December 29, 2009. Amendments to this rule were finalized on November 29, 2013 and included changes to global warming potentials for various chemicals (e.g., the global warming potential for CH_4 increased from 21 to 25).

3.1.1.1.4 GHG Threshold of Significance

CEQ provided draft guidelines for determining meaningful GHG decision-making analysis. CEQ GHG guidance is currently undergoing public comment; however, the draft guidance states that if the project would be reasonably anticipated to cause direct emissions of 25,000 metric tons (27,557 U.S. tons) or more of CO_2 GHG emissions on an annual basis, agencies should consider this an indicator that a quantitative and qualitative assessment may be meaningful to decision makers and the public.

For long-term actions that have annual direct emissions of less than 25,000 metric tons (27,557 U.S. tons) of CO_2, CEQ encourages Federal agencies to consider whether the action's long-term emissions should receive similar analysis. CEQ does not propose this as an indicator of a threshold of significant effects, but rather as an indicator of a minimum level of GHG emissions

that may warrant some description in the appropriate analysis for agency actions involving direct emissions of GHG (CEQ 2010).

GHG covered by EO 13514 are CO_2, CH_4, NO_2, HCFC, perfluorocarbons, and sulfur hexafluoride. These GHG have varying heat-trapping abilities and atmospheric lifetimes. CO_2 equivalency (CO_2e) is a measuring methodology used to compare the heat-trapping impact from various GHG relative to CO_2. Some gases have a greater global warming potential than others. Nitrogen oxides (NOx), for instance, have a global warming potential that is 310 times greater than an equivalent amount of CO_2, and CH_4 is 21 times greater than an equivalent amount of CO_2.

3.1.1.2 Air Quality – Environment

Jacksonville has a humid subtropical climate, with mild weather during winters and hot weather during summers. High temperatures average 64 to 91 degrees Fahrenheit (°F) (18-33 degrees Celsius [°C]) throughout the year. High heat indices are not uncommon for the summer months in the Jacksonville area. High temperatures can reach mid to high 90s with heat index ranges of 105 to 115 °F. Rainfall averages around 52 inches a year, with the wettest months being June through September. During winter, the area can experience hard freezes during the night. Such cold weather is usually short lived. Jacksonville has suffered less damage from hurricanes than other East Coast cities.

Hurricane season in Florida extends from June through November; however, the frequency of hurricanes is greatest during the months of August, September, and October. The majority of hurricanes approach northeastern Florida from the south and east. An estimated 75 percent of all damage from annual hurricanes is due to tidal flooding. The probability that a hurricane (winds exceeding 73 miles per hour) or a great hurricane (winds exceeding 125 miles per hour) would occur in a 50-mile segment of the U.S. coastline near Jacksonville, Florida, is very low. Jacksonville has had only one close call (since 1871) when hurricane Dora hit back in 1964, although Jacksonville has experienced hurricane or near-hurricane conditions more than a dozen times due to storms passing through the state from the Gulf of Mexico to the Atlantic Ocean (Climate-Zone 2015). Weather Service maps indicate that Jacksonville has a 4 percent chance of having a tropical storm, a 1 percent chance of a mild hurricane, and less than a 1 percent (effectively 0 percent) chance of a severe hurricane hitting the city (NOAA 2015c).

However, according to the Intergovernmental Panel on Climate Change (IPCC), extreme precipitation events over most of the mid-latitude land masses and over wet tropical regions would very likely become more intense and more frequent by the end of this century, as global mean surface temperature increases (IPCC 2013). According to the IPCC, the rate of sea-level rise since the mid-19th century has been larger than the mean rate during the previous two millennia. Over the period 1901 to 2010, global mean sea level rose by 0.19 meter (7.48 inches). In addition, global mean sea level is expected to continue to rise during the 21st century. The IPCC reports that the rate of sea-level rise would very likely exceed that observed during 1971 to 2010 (2.0 [1.7-2.3] millimeters, or 0.0787 inch, per year) due to increased ocean warming and increased loss of mass from glaciers and ice sheets (IPCC 2013). Global mean sea-level rise for the years 2046-2065 would likely be a mean of between 0.24 - 0.30 meter (9.45 - 11.8 inches), and for 2081-2100, between 0.40 - 0.63 meter (15.7 - 24.8 inches). The rate of sea-level rise during 2081 to 2100 is expected to be 8 to 16 millimeters (0.315 - 0.630 inch) per year (IPCC 2013).

The air quality affected environment for NAVSTA Mayport is Duval County, including the City of Jacksonville. Duval County is currently in attainment with all criteria pollutant standards.

3.1.1.3 Air Quality – Consequences

3.1.1.3.1 Alternative 1 – No Action Alternative

Under the No Action Alternative, the Wharf Bravo recapitalization would not occur. Baseline conditions for air quality, as described in Section 3.3.2, would remain unchanged. Therefore, there would be no significant impacts on air quality from the implementation of the No Action Alternative.

3.1.1.3.2 Alternative 2 – Preferred Alternative

USEPA's Office of Transportation and Air Quality has developed the Motor Vehicle Emission Simulator (MOVES) to provide accurate estimates of emissions from cars, trucks, and non-highway mobile sources under a wide range of user-defined conditions. MOVES is able to perform a series of calculations to provide estimates of bulk emissions or emission rates based on a default database that summarizes emission relevant information for the entire U.S. For the purpose of this study, MOVES2014, the latest version of MOVES, was used to estimate emissions from both on-road and non-road activities as MOVES2014 includes the NONROAD2008 model. MOVES2014 was used to estimate air emissions from common construction equipment identified in Table 3-2.

Table 3-2. Engine Horse Power Estimates of Common Construction Equipment

Equipment Types	Engine Horsepower[1]
Impact Pile Driver	700
Vibratory Pile Driver	375 & 630
Excavator	171
Grader	204
Tractors/Loaders/Backhoes	94
Crane	231
Generator	603
Hydroseeder	40
Paving Equipment	70
Rollers	92
Trenchers	76
Bore/Drill Rigs	76
Paver	124

[1] The average horsepower (hp) corresponding to each equipment type was estimated from Appendix B of *Nonroad Engine Population Estimates*, Report No. NR-006e (EPA-420-R-10-017). Actual hp for the Vibratory Pile Drivers were provided by spec sheets for APE 300 and APE 150 Vibratory Drivers.

Construction-worker vehicle emissions were also included in the analyses for driving within Installation boundaries (e.g., entry onto the Installation, lunch break, and exit from the Installation). The average number of miles used each day for each vehicle was 30 miles per day. It was assumed construction workers drive individually to the job site. MOVES2014 was also used to estimate air emissions from personally-owned vehicles, dump trucks, and delivery trucks coming on-site to support construction activities under Alternative 2.

Air emissions from hot mix asphalt paving and a diesel-fired 450-kilowatt generator were estimated using factors from USEPA's AP-42 Chapter 11.1 and Chapter 3.4, respectively. Assumptions were made regarding the total number of days and hours each piece of equipment would be used, as well as the total number of miles traveled by the personally-owned vehicles, dump trucks, and delivery trucks. The assumptions for the construction equipment and vehicles needed to support Alternative 2 activities are summarized in Appendix B.

Table 3-3 provides an estimate of the total air emissions (tons/year) resulting from the equipment employed to support Alternative 2 activities versus the *de minimis* threshold levels.

Table 3-3. Total Air Emissions (tons/year) from Alternative 2 versus the *de minimis* Threshold Levels[1]

Pollutant	Total	*de minimis* Thresholds
CO	3.05	100
VOC	0.37	100
NO_x	8.33	100
PM-10	0.26	100
PM-2.5	0.25	100
SO_2	0.01	100
CO_2 and CO_2e	823.5	27,557

[1] **Source: *de minimis* thresholds are from 40 CFR 51.853 and results are GSRC model projections**
Note that Duval County is in attainment for all NAAQS (USEPA 2015a).

Air quality impacts would be significant if emissions would 1) increase ambient air pollution concentrations above the NAAQS; 2) contribute to an existing violation of the NAAQS; 3) interfere with or delay timely attainment of the NAAQS; 4) impair visibility within Federally mandated Prevention of Significant Deterioration Class I areas; 5) result in the potential for any new stationary source to be considered a major source of emissions, as defined in 40 CFR Part 52.21 (total emissions of any pollutant subject to regulation under the CAA that is greater than 250 tons per year for attainment areas); 6) for mobile source emissions, the increase in emissions to exceed 250 tons per year for any pollutant; or 7) for GHG emissions, exceed 25,000 metric tons (27,557 U.S. tons) of direct CO_2e emissions on an annual basis.

Conclusions

Duval County, Florida, is in attainment for NAAQS pollutants and therefore the General Conformity Rule does not apply (USEPA 2011a). Construction would result in temporary and minor increases in air emissions from the combustion of fossil fuels in equipment and vehicles and from the fugitive dust and dirt emissions associated with site ground disturbance, but those impacts would not be significant with the implementation of Alternative 2.

CO_2, a GHG, would be generated by construction equipment during construction operations. Construction equipment such as bulldozers, trackhoes, cranes, pile drivers, and dump trucks release CO_2 in their exhaust as a result of their engines burning hydrocarbon fuel, which generates CO_2 as a chemical byproduct of the combustion process in the engine. In order to minimize the release of CO_2 into the atmosphere, the Navy requires the construction contractors to use the minimum amount of energy feasible to meet the project design intent, to select energy efficient equipment and strategies during construction, and to optimize operational performance in order to ensure energy efficient equipment operates as intended. Due to the *de minimis* amounts of total air emissions from construction activities, the amounts of GHG released for the

project would also be below *de minimis* threshold levels; therefore, no GHG reporting is required under the proposed CEQ *Draft Guidance for GHG Emissions and Climate Change Impacts* (CEQ 2014).

Currently there is no specific guidance on how to treat the potential for sea-level rise in Navy planning documents. The predicted rise in sea level over the life-span of the Wharf Bravo recapitalization (11.8 inches) would not be large enough to significantly impact the functionality of the NAVSTA Mayport Turning Basin structures or require elevation of the wharf infrastructure as mitigation for sea-level rise. No infrastructure would be present on the wharf that would require mitigation for sea-level rise. The wharf is designed to withstand the impacts from a hurricane striking the Jacksonville area, and any increase in hurricane activity resulting from climate change would not adversely impact the life-span of the wharf structures (50 years). As such, no mitigation measures or development of adaptive measures for sea-level rise are necessary in order to mitigate for potential climate change impacts.

3.1.2 Sound

3.1.2.1 Fundamentals of Acoustics

Sound is an oscillation in pressure, particle displacement, or particle velocity, as well as the auditory sensation evoked by these oscillations, although not all sound waves evoke an auditory sensation (i.e., they are outside of an animal's hearing range) (American National Standards Institue [ANSI] S1.1-1994). Sound may be described in terms of both physical and subjective attributes. Physical attributes may be directly measured. Subjective (or sensory) attributes cannot be directly measured and require a listener to make a judgment about the sound. Physical attributes of a sound at a particular point are obtained by measuring pressure changes as sound waves pass. The following material provides a short description of some of the basic parameters of sound.

Sound is generated by both natural (e.g., wind, waves, animals, etc.) and artificial (e.g., machinery, engines, etc.) sources and can be characterized by the physical properties of frequency (number of sound-wave cycles per second, measured in Hertz [Hz]) and amplitude (the magnitude of the variations in pressure within the medium, measured in Pascals [Pa]) (Kinsler et al. 1999). These physical characteristics are related to the perceptual qualities "pitch" and "loudness"; in general, higher frequency sounds are perceived as having higher pitch, and higher amplitude sounds within a receiver's hearing range are louder.

Within this EA, measurements of sound will be given as sound pressure levels (SPL) in units called decibels (dB). The dB scale provides a simplified relationship between sound pressure and the way it is perceived by the mammalian ear, expressing the logarithmic strength of measured sound pressure relative to a standardized reference pressure. Because the dB scale is logarithmic, each additional dB indicates an exponential increase in sound pressure. Each increase of 20 dB reflects a 10-fold increase in pressure, i.e., an increase of 20 dB means ten times the pressure, 40 dB means one hundred times the pressure, 60 dB means one thousand times the pressure, and so on.

The reference pressure used when calculating SPL in dB depends on the medium in which the sound is measured. For airborne sounds, the reference value is 20 microPascals (µPa, or 10−6 Pascals), expressed as "dB re 20 µPa". For measurements of underwater sound, the standard reference pressure is 1 µPa, and is expressed as "dB re 1µPa". Because sound levels measured in

air and water are not directly comparable, it is important to include the correct reference pressure when giving a sound level in dB.

3.1.2.1.1 A-weighting

Airborne sounds are commonly referenced to human hearing using a method which weights sound frequencies according to measures of human perception, de-emphasizing very low and very high frequencies which are not perceived well by humans. This is called A-weighting, and the decibel level measured is called the A-weighted sound level (dBA). Sounds given in dBA are assumed to be referenced to 20 μPa unless otherwise noted.

3.1.2.1.2 Noise

Noise is undesired sound (ANSI S1.1-1994), which can interfere with normal activities or diminish the quality of the environment (U.S. Army Center for Health Promotion & Preventive Medicine [USACHPPM] 2005), and can affect both human and non-human listeners. For humans, when sounds interfere with speech, disturb sleep, or interrupt routine tasks, they become noise.

Excessive noise exposure may cause hearing damage, physiological stress responses, and changes to behavior, which may affect the health and quality of life for receivers (Richardson et al. 1995). Human exposure to noise is regulated by ordinances at local, state, and Federal levels (see Section 3.3.1). Noise in natural environments is less strictly regulated and is controlled mostly by agencies managing the relevant species (addressed in Sections 3.4, 3.7, 3.8 and 3.9).

3.1.2.2 Regulatory Overview

3.1.2.2.1 Airborne Noise

Occupational Health and Safety Regulations
Navy policy is to provide a safe and healthful workplace for all personnel. The Navy achieves these conditions through an aggressive and comprehensive program fully endorsed by the Secretary of the Navy (SECNAV) and implemented through the appropriate chain of command. Navy regulations regarding noise are found in the 2011 Navy Occupational Safety and Health Program Manual (Chief of Naval Operations Instruction [OPNAVINST 5100.23G; CH-1]; 21 July 2011), which is directed at preventing occupational hearing loss and assuring auditory fitness for all Navy personnel. The Navy's Occupational Exposure Level over an 8-hour time-weighted average in any 24-hour period is 84 dBA. When noise exposures are likely to exceed 84 dBA, hearing-protective devices are required.

Acceptable noise levels have been established by the U.S. Department of Housing and Urban Development for construction activities in residential areas:

- ***Acceptable (not exceeding 65 dBA) –*** The noise exposure may be of some concern but common building construction would make the indoor environment acceptable and the outdoor environment would be reasonably pleasant for recreation and play.
- ***Normally Unacceptable (above 65 dBA but not greater than 75 dBA) –*** The noise exposure is significantly more severe; barriers may be necessary between the site and prominent noise sources to make the outdoor environment acceptable; special building

constructions may be necessary to ensure that people indoors are sufficiently protected from outdoor noise.

- ***Unacceptable (greater than 75 dBA) –*** The noise exposure at the site is so severe that the construction costs to make the indoor noise environment acceptable may be prohibitive and the outdoor environment would still be unacceptable.

The Navy has adopted similar criteria that integrate land use guidelines with predictions of percentages of the population that would be "highly annoyed" when exposed to elevated noise. Noise levels are measured over time, with metrics such as the day-night average sound level (DNL) measured in dBAs. They are used to estimate the impacts of ambient noise levels and noise emission associated with Navy activities. These sound levels have been categorized into "noise zones" and are shown in Table 3-4. Naval policy states that it is desirable that Noise Zone 1 criteria not be exceeded (Naval Surface Warfare Center 2009).

Table 3-4. Department of Navy Noise Zones

Noise Zone	Noise Criteria in dBA DNL	Percent Population "Highly Annoyed"
1	Less than 65	Less than 15 percent
2	Between 65 and 74	Between 15 and 39 percent
3	75 or greater	Greater than 39 percent

Source: Naval Surface Warfare Center 2009
DNL = day-night average sound level

3.1.2.3 Underwater Noise

Underwater noise is regulated only with respect to noise exposure by some marine mammal and fish species and is addressed in Section 3.2.3 (Fishes) and Section 3.2.5 (Marine Mammals).

3.1.2.4 Sound – Environment

For the purposes of this assessment, the Study Area includes the NAVSTA Mayport Turning Basin out to the limit of the most distant of the acoustic thresholds (airborne and in-water) for all protected species being addressed for the Wharf Bravo recapitalization Project. In the absence of official airborne criteria for any protected non-human species, the Navy has adopted a threshold of 65 dBA at any sensitive receptor as the in-air boundary of the Study Area. For the Proposed Action, the most distant underwater threshold is the marine mammal behavioral disturbance (120 dB re 1 μPa root mean squared [rms]) threshold. While some aspects of the Project (e.g., contingency-only impact pile driving) would have a much smaller zone of influence, this zone represents the furthest extent of Project influence.

Under certain conditions, areas in and outside of the NAVSTA Mayport Turning Basin may have average ambient noise levels exceeding the 120 dB re 1 μPa threshold. However, given the lack of actual underwater ambient sound recording data for this location, the Navy has assumed underwater ambient noise levels are below 120 dB re 1 μPa rms. The distance to the 120 dB threshold is therefore the maximum range at which the Navy expects to exert an environmental impact underwater, and represents a reasonable boundary for the Study Area. The airborne and underwater zones of influence were modeled (see Section 3.1.2.4) and incorporated into a single-boundary layer (see Figure 1-2). Most of the affected area is industrialized, with multiple

sources of noise contributing to the ambient acoustic environment in air and underwater. The following sections describe the current ambient in-air and in-water noise conditions.

3.1.2.4.1 Airborne Ambient Noise

Ambient noise includes sounds from natural and man-made sources. Natural sounds include wind, rain, thunder, water movement such as surf, and wildlife. Sound levels from these sources are typically low, but can be pronounced during violent weather events. Sounds from natural sources are generally not considered undesirable. Ambient background noise in urbanized areas typically varies from 60 to 70 dBA, but can be higher; suburban neighborhoods experience ambient noise levels of approximately 45 to 50 dBA (USEPA 1974). In and around NAVSTA Mayport, airborne noise levels are highest during overflights from military aircraft.

In industrialized areas such as the NAVSTA Mayport waterfront, noise sources may include common construction equipment, such as trucks, cranes, compressors, generators, pumps, and other equipment that might typically be employed along industrial waterfronts (Washington State Department of Transportation [WSDOT] 2010a). Typical source levels for common industrial noise sources are given in Table 3-5. Maximum noise levels may reach 112 dBA when two identical sources (i.e., two impact pile drivers; Table 3-3) of noise are operating simultaneously, assuming an increase of 3 dB per doubling of sound intensity (WSDOT 2010a). These maximum noise levels are intermittent in nature, and may occur sporadically on any given day with construction or other waterfront activity.

Table 3-5. Maximum Noise Levels at 50 feet for Common Construction Equipment

Equipment Types	Specification Sound Pressure Levels[1] (dBA)
Impact Pile Driver	95/101
Vibratory Pile Driver	95/101
Excavator	85/81
Grader	85/
Tractors/Loaders/Backhoes	84/
Crane	85/81
Generator	82/81
Hydroseeder	90/
Paving Equipment	85/77
Rollers	85/80
Trenchers	82/80
Bore/Drill Rigs	84/79
Paver	85/77

Source: FHA 2015; [1] Specification 721.560, Lmax @ 50 feet (dBA, slow)/ Actual Measured Lmax @ 50 feet (dBA, slow).

The Navy has previously measured airborne ambient noise levels at an industrial waterfront in a high-use area of Naval Base Kitsap, Bangor, in the Puget Sound area of Washington (DON 2011). Daytime noise levels ranged from 60 dBA to 104 dBA, with average values of approximately 64 dBA. Evening and nighttime levels ranged from 64 to 96 dBA, with an average level of approximately 64 dBA. Additional noise sources at NAVSTA Mayport include overflights from military aircraft.

The Air Installation Compatible Use Zone Report (AICUZ) document for NAVSTA Mayport indicates that over part of the basin, noise from aircraft would be expected to range from 60 to 75 DNL (DON 2007). This area does not include the airspace over Wharf Bravo, which would be expected to have a DNL below 60 dB. Given the level of activity at NAVSTA Mayport and the measured sound levels in a similar area, the Navy estimates that ambient airborne noise levels near Wharf Bravo in the NAVSTA Mayport Turning Basin currently average between 60 and 65 dBA.

3.1.2.4.2 Sensitive Noise Receptors

A sensitive noise receptor is defined as a location or facility where people involved in indoor or outdoor activities may be subject to stress or considerable interference from noise (USEPA 1971). Such locations or facilities often include residential dwellings, hospitals, nursing homes, educational facilities, libraries, and parks or other outdoor recreational areas.

Most off-Station sensitive noise receptors are located at least 1.5 miles from the Wharf Bravo, though Huguenot Memorial Park is located 0.5 mile across the St. Johns River from the wharf. On NAVSTA Mayport, sensitive receptors include Pelican's Point Recreational Vehicle Park, Bachelor Quarters (including transient quarters), Navy Lodge, Gateway Inn and Suites, Medical and Dental Clinic, Chapel, Child Development Center, and NAVSTA Mayport Family Housing.

3.1.2.4.3 Underwater Ambient Noise

Underwater ambient noise is composed of sounds produced by a number of natural and anthropogenic sources. Natural noise sources can include wind, waves, precipitation, and biological sources such as shrimp, fish, and cetaceans. These sources produce sound in a wide variety of frequency ranges (Urick 1983; Richardson et al. 1995) and can vary over both long (days to years) and short (seconds to hours) time scales. In shallow waters, precipitation may contribute up to 35 dB to the existing sound level, and increases in wind speed of 5 to 10 knots can cause a 5 dB increase in ambient ocean noise between 20 Hz and 100 kilohertz (kHz) (Urick 1983). High noise levels may also occur in nearshore areas during heavy surf, which may increase low frequency (200 Hz – 2 kHz) underwater noise levels by 20 dB or more within 200 yards of the surf zone (Wilson et al. 1985).

At NAVSTA Mayport, vessel wakes in the St. Johns River may cause breaking waves on shore, contributing to the ambient acoustic environment. Anthropogenic noise sources also contribute to ambient noise levels, particularly in ports and other high use areas in coastal regions. Normal port activities include vessel traffic (from large ships, support vessels, and security boats), loading and maintenance operations, and other activities (sonar and echo-sounders from commercial and recreational vessels, construction, etc.) which all generate underwater sound (Urick 1983). Additionally, noise from mechanized equipment on wharves or adjacent shorelines may propagate underwater and contribute to underwater ambient noise levels.

The underwater acoustic environment in the NAVSTA Mayport Turning Basin is likely to be dominated by noise from day-to-day port and vessel activities. The basin is sheltered from most wave noise, but it is a high-use area for naval ships, tugboats, and security vessels. These sources can create noise between 20 Hz and 16 kHz (Lesage et al. 1999), with broadband noise levels up to 180 dB re 1 μPa rms (Table 3-6). During the Proposed Action, normal port operations, including transits, docking, and maintenance of multiple tugboats and ships would continue, and noise contributions from these sources would remain at current levels.

Table 3-6. Representative Levels of Underwater Noise from Anthropogenic Sources

Noise Source	Peak Frequency Range (Hz)	Underwater Source Level (re 1µPa)	Reference
Small vessels	250–6,000	151 dB rms at 1 m	Lesage et al. 1999
Large vessels (underway)	20–1,500	170–180 dB rms at 1 m	Richardson et al. 1995
Tug docking barge	200–1,000	149 dB rms at 100 m	Blackwell and Greene 2002
Vibratory driving; 24-inch steel pipe pile	50–1,500	159 dB rms at 10 m	Illingworth & Rodkin 2012
Impact driving; 24-inch steel pipe pile	50–1,500	186 dB rms at 10 m	WSDOT 2010b

Source: NAVFAC Atlantic (DON 2013a)
Note: dB=decibel, rms=root mean squared, m=meter

3.1.2.5 Sound - Consequences

3.1.2.5.1 Alternative 1 – No Action Alternative

Under Alternative 1, the Wharf Bravo recapitalization would not occur. Baseline conditions for noise, as described in Section 3.4.2, would remain unchanged. Therefore, there would be no significant impacts on the sound environment from the implementation of Alternative 1.

3.1.2.5.2 Alternative 2 – Preferred Alternative

The proposed repair and facilities maintenance activities of Wharf Bravo would result in a temporary increase in airborne and underwater noise in the Study Area. Noise would be generated by a variety of sources, including pile driving, barges, trucks, cranes, and other construction equipment. As shown in Tables 3-5 and 3-6, pile driving is expected to generate the highest noise levels in both air and water. In the absence of pile driving noise, the maximum construction noise from equipment such as the crane, generator, etc. running simultaneously would be less than that of the vibratory pile driver (WSDOT 2015). Pile driving would occur during regular work hours (between 1 hour post-sunrise and 1 hour prior to sunset). Impact and vibratory hammers would never operate simultaneously.

Airborne Noise

The Proposed Action would result in a temporary increase in airborne noise levels in the Study Area. Estimated source levels for airborne noise from pile driving are given in Table 3-7; source levels were selected from published literature. Because there are no available airborne sound pressure level measurements from metal sheet piles, data from 24-inch-diameter steel pipe piles were used to estimate the airborne sound source levels.

Table 3-7. Estimated Source Levels for Airborne Pile Driving Noise

Pile Driving Method	Source Level
Vibratory[1]	96 dBA at 15 m (50 ft)
Impact[2]	100 dBA at 11 m (36 ft)

Sources: [1] Illingworth & Rodkin 2012; [2] WSDOT 2010b
Note: m=meter; dBA= A-weighted decibel scale; ft=feet

The source level selected for impact driving does not represent the maximum measured level for a 24-inch (61 cm) pipe pile (109 dBA; Illingworth & Rodkin 2012), which was obtained during short-term driving of a single pile in rocky sediment during the Navy Test Pile Program in Bangor, Washington, in 2011. The selected source level shown in Table 3-5 was obtained during driving of a 24-inch (61 cm) pipe pile for a bridge replacement in Washington (WSDOT 2010b). Because softer sediments (such as those found in the NAVSTA Mayport Turning Basin; see Section 3.1.2.1) reduce the amount of force needed to drive a pile to desired depth, in turn reducing noise from pile reverberation (Kinsler et al. 1999), the non-maximal source level estimate selected is a reasonable assumption for airborne noise levels from pile driving at NAVSTA Mayport.

Estimates of airborne noise propagation from pile driving were based on the assumption that airborne construction noise behaves as a point-source, propagating in a spherical manner, with a 6 dB decrease in sound pressure level per doubling of distance (WSDOT 2015). The hard-site conditions proposed by WSDOT (2015) apply to both the over-water and over-land (mostly paved or hard surfaces) portions of the in-air Study Area.

Noise associated with vibratory pile driving is expected to attenuate to 65 dBA within 0.34 mile (550 m) of the source; impact pile driving noise is expected to attenuate to 65 dBA at 0.40 mile (650 m). During both impact and vibratory pile driving, airborne noise levels are expected to exceed 84 dBA (the threshold for hearing protection) within 246 ft (75 m) of the incident pile. These estimates assume a free flowing medium (e.g., over water) without obstructions, which is a reasonable assumption for the majority of the Study Area. Vegetation and buildings within the land areas of the Proposed Action may obstruct sound transmission in the Study Area; however, this model did not include possible attenuation from land-based obstructions (e.g., vegetation and buildings). The ranges given are therefore a conservative estimate of the affected area.
The following sections address the potential impacts of noise on the human environment within and around Study Area. Short term effects of a slight increase in ambient noise levels on sensitive bird species are discussed in Section 3.2.7.

Human Environment
The following analysis of the effects of noise on the human environment within the Study Area considers the intensity and the duration of airborne noise that would be generated by the Proposed Action and whether this noise would be harmful to humans or disrupt human activities. Activities within the Study Area include NAVSTA Mayport operations (i.e., vessel traffic, security patrols, loading and maintenance of vessels), routine operations of non-waterfront activities at NAVSTA Mayport, and recreational activities outside of base property.

Routine operations at the NAVSTA Mayport waterfront include loading, maintenance, and transits of large vessels and security operations. Current ambient noise levels are assumed to be consistent with other industrialized waterfront areas, with maximum noise levels ranging to approximately 100 dBA for short periods (seconds – minutes). During both impact and vibratory pile driving, sound levels may exceed 84 dBA up to 246 ft (75 m) from the incident pile; personnel within this range would be required to wear hearing protection (OPNAVINST 5100-19D). Noise levels at ranges greater than 246 ft (75 m) are unlikely to adversely affect personnel accustomed to working in an industrial environment. In conclusion, there would be no significant impacts on operations or personnel from the implementation of the Preferred Alternative.

Recreational activities such as boating, kayaking, and fishing occur on the St. Johns River adjacent to NAVSTA Mayport. Recreational users could be exposed to noise levels exceeding 65 dBA in an area that includes a portion of the St. Johns River (Figure 3-1).

Exposure to noise within this zone would not be injurious. Increases in noise levels in public areas adjacent to NAVSTA Mayport would be temporary and intermittent, occurring on a maximum of 70 days over a 12-month span, and are not expected to significantly impact recreational users of the St. Johns River. In conclusion, there would be no significant impacts on recreational users from the implementation of Alternative 2.

Sensitive Noise Receptors

Generally, noise impacts are considered adverse if they expose sensitive receptors to noise levels in excess of applicable standards established in the noise ordinance. The only sensitive noise receptor that may be exposed to noise levels exceeding 65 dBA due to the Proposed Action is the Navy's Pelican's Roost RV Park, located on-base at NAVSTA Mayport (Figure 3-1). Noise levels of 65 dBA are only expected to reach this location in the unlikely event that impact pile driving is needed. If impact driving is necessary, there would be no more than 20 strikes per day, with a total estimated duration of 45 minutes per day. All pile driving activities would occur during daylight hours only.

Because of the low likelihood of impact driving during the Proposed Action and the minimal duration of increased noise should impact driving become necessary, the Navy expects no significant impacts on sensitive noise receptors. In conclusion, there would be no significant impacts on sensitive noise receptors from the implementation of Alternative 2. Figure 3-1 represents the total area exposed at the 65 dBA level throughout the duration of construction, and not necessarily on any given day.

Underwater Noise

This section addresses potential effects of noise from pile driving associated with the Proposed Action on the existing underwater noise environment. A detailed analysis of the underwater noise propagation from both types of pile driving and the effects of noise on marine species are addressed in Sections 3.2.5 (Marine Mammals) and 3.2.3 (Fish).

At present, underwater ambient noise in the Study Area is likely to be dominated by sounds from normal port operations, which can exceed 180 dB re 1 μPa close to the source and would continue during and after the Proposed Action. These sounds are non-impulsive and intermittent, occurring sporadically during normal port activities. Noise from vibratory pile driving associated with the Proposed Action is unlikely to alter the existing ambient noise within the Study Area because of its relatively low source level (approximately 157 dB re 1 μPa rms at 10 m) and non-impulsive nature. Noise from impact pile driving has higher source levels (approximately 186 dB re 1 μPa at 10m) and is impulsive in nature, with a fast rise time and multiple short-duration (50–100 millisecond; Illingworth & Rodkin 2001) events. Introduction of high-amplitude impulsive sound may temporarily alter the ambient noise environment in the basin; however, the use of impact driving during the proposed construction is limited to instances when vibratory driving fails, and would include a maximum of 20 strikes per day (estimated total net duration of 45 minutes of driving of any type per day). Because of the very limited use of impact pile driving during the Proposed Action, the Navy expects no change in the average ambient noise environment in the NAVSTA Mayport Turning Basin.

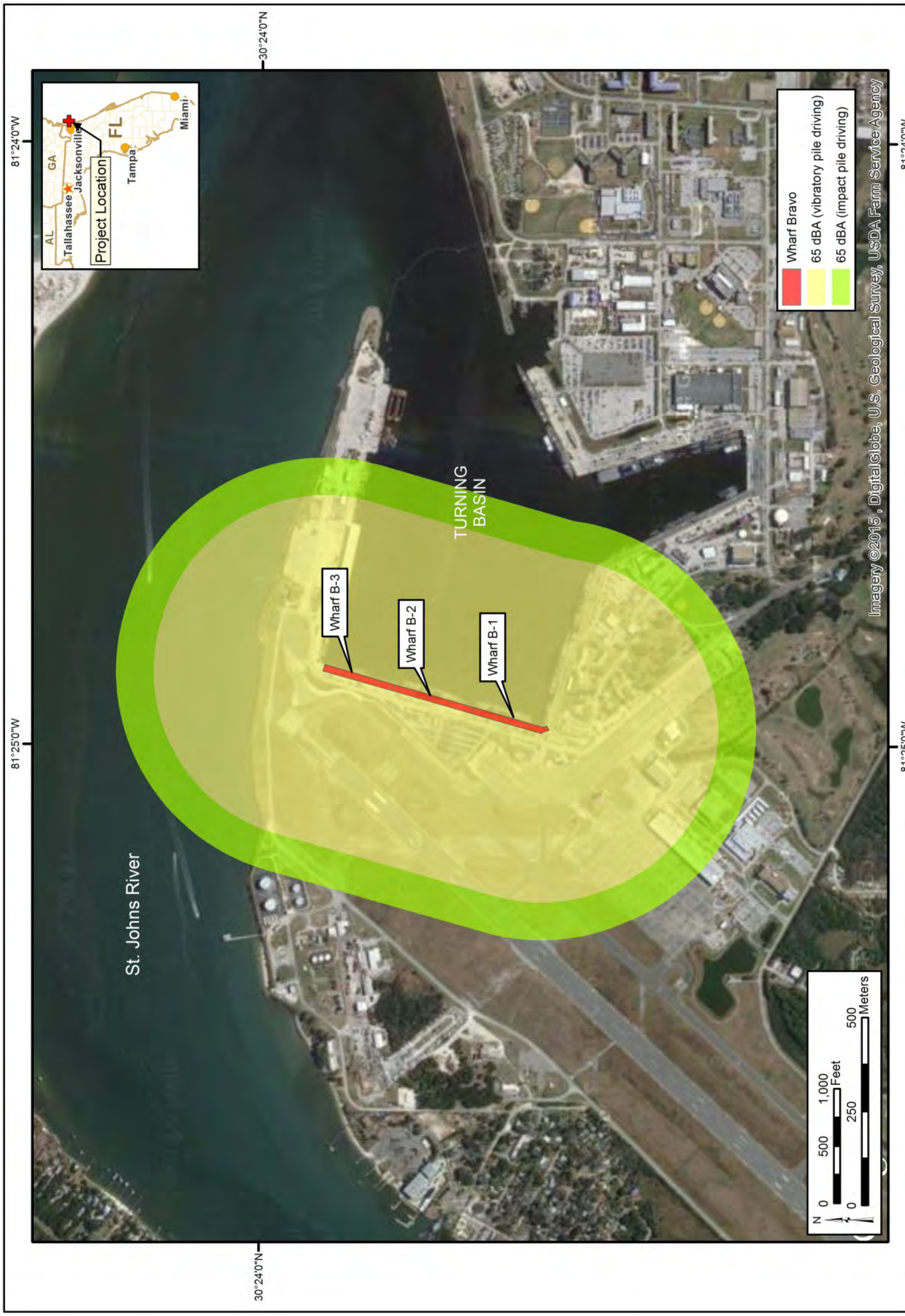


Figure 3-1. NAVSTA Mayport Airborne Zones of Influence for Sensitive Receptors During Pile Driving

Conclusions

The recapitalization activities of Wharf Bravo include a maximum of 70 days of pile driving, distributed over a period of 12 months. Given the current level of anthropogenic activity in the basin and high noise levels from normal port operations, noise from pile driving associated with Alternative 2 is not expected to significantly affect the existing ambient acoustic environment in the NAVSTA Mayport Turning Basin during the 12-month in-water work window. Alternative 2 would not introduce any new long-term noise sources impacting the airborne or underwater ambient sound environments in the Study Area. In conclusion, there would be no significant impacts on the airborne or underwater ambient sound environments from the implementation of Alternative 2.

3.1.3 Water Quality

3.1.3.1 Regulatory Overview

The waters of the U.S. are protected under Section 404 of the Clean Water Act (CWA) of 1972. Waters of the U.S. are defined by the CWA as surface waters, rivers, lakes, estuaries, coastal waters, and wetlands. Water quality describes the chemical and physical composition of water as affected by natural conditions and human activities. The CWA established the basic structure for regulating discharges of pollutants into waters of the U.S. The CWA contains the requirements to set water quality standards for all contaminants in surface waters. USEPA is the designated regulatory authority to implement pollution control programs and other requirements of the CWA.

The CWA requires that the surface waters of each state be classified according to designated uses. Florida has five surface water classifications (62-302.400 Florida Administrative Code), with specific criteria applicable to each class of water: Class I–Potable Water Supplies; Class II–Shellfish Propagation or Harvesting; Class III–Recreation, Propagation, and Maintenance of a Healthy, Well- Balanced Population of Fish and Wildlife; Class IV–Agricultural Water Supplies; and Class V–Navigation, Utility, and Industrial Use.

Section 303(d) of the CWA addresses impaired waters, which are those waters that are not meeting their designated uses (e.g., drinking, fishing, swimming, shellfish harvesting, etc.). Based on Section 303(d) of the CWA and the Florida Watershed Restoration Act, total maximum daily loads must be developed for all impaired waters. One waterbody may have several total maximum daily loads, one for each pollutant that exceeds the waterbody's capacity to absorb it safely. Florida classifies the Lower St. Johns River as a Class III water body. The Lower St. Johns River was included on the 1998 303(d) list as impaired for nutrients. The river was verified as impaired by nutrients based on elevated chlorophyll-a levels (i.e., algal organic matter) in both the fresh and estuarine portions of the river, and was included on the verified list of impaired waters for the Lower St. Johns River Basin. The total maximum daily loads for the main stem of the Lower St. Johns River Basin were adopted by the Florida FDEP in June 2008. The Class III dissolved oxygen criterion for freshwaters is a minimum dissolved oxygen of 5 milligrams per liter (mg/L), and the criterion for estuarine zones is a minimum dissolved oxygen of 4 mg/L, with a minimum daily average of 5 mg/L (FDEP 2008).

The water body identification for the mouth of the St. Johns River is 2213A, which includes the NAVSTA Mayport Turning Basin, entrance channel, beaches, and the Federal navigation channel and continues upriver to where the St. Johns River meets the Atlantic Intracoastal Waterway (USEPA 2008).

3.1.3.2 Water Quality – Environment

Based on available data, the water quality in the NAVSTA Mayport Turning Basin and entrance channel meets the FDEP Class III Marine Water Quality Standards (DON 2007a). Tides within the NAVSTA Mayport entrance channel are semi-diurnal (two highs and two lows per day). The mean and spring tidal ranges at the NAVSTA Mayport Turning Basin are 4.5 ft (1.3 m) to 5.3 ft (1.6 m) respectively. Average salinities in the basin range from 33 parts per thousand (ppt) during flood flow to 15 to 26 ppt during ebb flow, depending on tidal range and freshwater flow conditions (DON 2000). Water quality measurements taken during March 2007 in the NAVSTA Mayport Turning Basin yielded a range of surface temperatures from 64.9 to 68.2 ºF and salinity readings from 29.4 to 30.1 ppt. These are normal readings for March and this area (DON 2008b).

Due to the proximity of the Atlantic Ocean, the presence of semi-diurnal tides, and other hydrodynamic influences, flushing occurs continually within the NAVSTA Mayport Turning Basin. As part of an elutriate analysis, NAVSTA Mayport Turning Basin surface water samples were collected in March 2000 and analyzed for metals and semivolatile organic compounds. No detectable concentrations of these substances were found in the samples, illustrating the relatively high quality of water and sediment in the NAVSTA Mayport Turning Basin (DON 2000).

There is only limited information readily available for dissolved oxygen levels in the NAVSTA Mayport Turning Basin or entrance channel. Data collected in 1993 revealed no significant stratification from the surface to −40 ft depths. Despite the deep water depths and hot summertime conditions, the maximum dissolved oxygen change from top to bottom was 1.43 parts per million (ppm; ppm is equivalent to 1 milligram [mg]/liter [l]) and minimum change was 0.20 ppm. No values were less than 4.0 ppm and a number of readings were above 5.0 ppm, suggesting that good mixing is ongoing (DON 2000).

3.1.3.3 Water Quality – Consequences

3.1.3.3.1 Alternative 1 – No Action Alternative

Under Alternative 1, the Wharf Bravo recapitalization would not occur. Baseline conditions for water quality, as described in Section 3.1.2, would remain unchanged. Therefore, there would be no significant impacts on water quality from the implementation of Alternative 1.

3.1.3.3.2 Alternative 2 – Preferred Alternative

Alternative 2 activities would not result in direct discharges of waste into the marine environment. Construction-related impacts on water quality would be limited to short-term, temporary, and localized changes associated with re-suspension of bottom sediments from pile installation and barge and tug operations, such as anchoring and propeller wash, as well as accidental spills of fuel, hydraulic fluids, or oil into the NAVSTA Mayport Turning Basin. These changes would be spatially limited to the construction corridor, including areas potentially impacted by anchor drag and areas immediately adjacent to the driving sites that could be impacted by plumes of resuspended bottom sediments that are not expected to violate water quality standards. Fuel spills are unlikely, as boats, barges, and equipment would be fueled offsite.

Best management practices would be used during all activities to reduce the likelihood of deleterious materials entering the waterway. As a result, accidental spills or discharges of deleterious materials would not be expected to adversely impact marine water quality at the Study Area.

Alternative 2 activities would not discharge any wastes containing materials with an oxygen demand or wastes containing metals into the NAVSTA Mayport Turning Basin. However, pile installation would resuspend bottom sediments, which may contain chemically reduced organic materials. Subsequent oxidation of sulfides, reduced iron, and organic matter associated with the suspended sediments would consume some dissolved oxygen in the water column. The amount of oxygen consumed would depend on the magnitude of the oxygen demand associated with suspended sediments (Jabusch et al. 2008). The impacts of sediment re-suspension from pile installation on dissolved oxygen concentrations would be minimal.

Installation of piles would resuspend bottom sediments within the immediate construction area, resulting in short-term and localized increases in suspended sediment concentrations that, in turn, would cause increases in turbidity levels. Barge and tug operations (if employed) could also resuspend bottom sediments. The suspended sediment/turbidity plumes would be generated periodically, in relation to the level of in-water construction activities. The disturbed sediments would be a mix of fine-grained silt and clay. The majority of these sediments would resettle within minutes of disturbance. Construction activities would not result in persistent increases in turbidity levels because they are limited in temporal and spatial scope, resulting in temporary, localized resuspended sediments that would disperse and/or settle rapidly.

Conclusions
There would be no significant impacts on water quality from implementation of Alternative 2.

3.1.4 Marine Sediments

3.1.4.1 Marine Sediments – Environment

The NAVSTA Mayport Turning Basin was constructed during the early 1940s by dredging the eastern part of Ribault Bay. Dredge material from the basin was used to fill parts of Ribault Bay and other low-lying areas in order to elevate the land surface. The basin was originally dredged to a depth of -29 ft (-8.8 m) MLW water and, in 1952, was deepened to a depth of -40 ft (-12.2) MLW water to provide access for larger ships. Prior to 1960, the NAVSTA Mayport Turning Basin was dredged to -42 ft (-12.8 m) MLW. In 2012, the USACE completed a project to deepen the NAVSTA Mayport entrance channel and NAVSTA Mayport Turning Basin. The NAVSTA Mayport Turning Basin is currently maintained at an average depth of -50 ft (-15.2 m) MLW (plus 2 ft of overdepth), with ship berths ranging in depth from -30 (-9.1 m) to -50 ft (-15.2 m) MLW. The basin is a deepwater surface ship berthing facility whose entrance channel meets the main navigation channel at the mouth of the St. Johns River. The NAVSTA Mayport entrance channel is approximately 500 ft wide extending approximately 5,000 ft until it joins with the Federal navigation channel. Its depth ranges from -51 (-15.2 m) to -42 ft (-12.8 m) MLW (DON 2008b). Sediment sampling and testing conducted in March 2007, in support of the *Final EIS for the Proposed Homeporting of Additional Surface Ships at Naval Station, Mayport, FL*, indicated sediments within the NAVSTA Mayport Turning Basin consist primarily of fine-grained materials (e.g., silt and clay). Six sediment samples from existing depths to depths of -56 ft (-17.1 m) MLLW were collected. Water depths in the NAVSTA Mayport Turning Basin

ranged from -40 (-12.2 m) to -45 ft (-13.7 m) MLLW. The sediment that lies on the surface is silt/clay across the basin, ranging in thickness from 3 ft (0.9 m) to 10 ft (3 m) (DON 2008b).

Five of the six March 2007 sediment samples were analyzed for the presence of chemical contaminants. Testing was conducted for bulk chemical parameters including metals, polychlorinated biphenyls, semi-volatile organics or polycyclic aromatic hydrocarbons, pesticides, and inorganics. The majority of these tests did not detect the presence of any contaminants in the dredge profile. The analyses did, however, find low concentrations of metals, some polycyclic aromatic hydrocarbon analytes, and some polychlorinated biphenyls parameters in the samples. Of the substances detected in the NAVSTA Mayport Turning Basin sediments, one metal (arsenic) and two of the polycyclic aromatic hydrocarbons (acenaphthene and fluorine) had concentrations exceeding National Oceanic and Atmospheric Administration Effects Range Low thresholds in two of the five sediment samples collected. These three incidents of exceedance are only slightly above the Effects Range Low threshold and are well below the Effects Range Medium levels. All of the other detected concentrations of metals, polycyclic aromatic hydrocarbons, and polychlorinated biphenyls were well below the respective Effects Range Low levels (DON 2008b). Overall, the testing results generally reflected a low contamination level for marine sediments in the NAVSTA Mayport Turning Basin to depths of -56 ft (-17.1 m) MLLW. Additionally, the contaminant levels of the March 2007 results correlate favorably with those found during testing conducted prior to recent maintenance dredging projects at NAVSTA Mayport (DON 2008b).

3.1.4.2 Marine Sediments – Consequences

3.1.4.2.1 Alternative 1 – No Action Alternative

Under Alternative 1, the Wharf Bravo recapitalization would not occur. Baseline conditions for marine sediments, as described in Section 3.2.1, would remain unchanged. Therefore, there would be no significant impacts on water quality from the implementation of Alternative 1.

3.1.4.2.2 Alternative 2 – Preferred Alternative

Under Alternative 2, marine sediment would be disturbed and subsequently suspended in the water column. The use of the vibratory hammer and impact hammer could cause the fine silt and clay layers to be susceptible to liquefaction and subsequent contraction. As a result, the sediments would quickly settle back to the bottom of the Study Area or be carried out with tidal flow. Such suspension would be localized to the immediate area of the pile being driven.

Conclusions
Construction activities would not result in the discharge of wastes containing metals or otherwise alter the concentrations of trace metals in bottom sediments, or result in the discharge of high levels of contaminants or otherwise alter the concentrations of organic contaminants in bottom sediments. However, because the magnitude of metal and organic compound concentrations in sediment can vary as a function of grain size (higher concentrations typically are associated with fine-grained sediments due to higher interior surface areas), small changes in grain size associated with construction-related disturbances to bottom sediments could result in minor changes in metal and organic compound concentrations. However, due to the small scale of temporary operations and the general lack of sediment contaminants (apart from low levels of arsenic) in the Study Area, there would be no significant impacts on sediments from the implementation of Alternative 2.

3.1.5 Hazardous Materials

3.1.5.1 Hazardous Materials – Environment

Hazardous materials are substances or materials that are capable of posing an unreasonable risk to health, safety, property, or the environment. Materials that are physically hazardous include combustible and flammable substances, compressed gases, and oxidizers. Health hazards are associated with material that causes acute or chronic reaction, including toxic agents, carcinogens, and irritants. Hazardous materials are regulated in Florida by a combination of mandated laws promulgated by the USEPA and the FDEP.

The NAVSTA Mayport Turning Basin and the berthing wharves surrounding it are used for maintenance and loading of Navy vessels. No hazardous materials are introduced to the waters of the NAVSTA Mayport Turning Basin as a result of Navy activities due to best management practices (BMPs) used during loading and maintenance activities. Previous assessment of the water quality and marine sediments in the NAVSTA Mayport Turning Basin confirmed the lack of pollution by hazardous materials (DON 2008b).

3.1.5.2 Hazardous Materials – Consequences

3.1.5.2.1 Alternative 1 – No Action Alternative

Under Alternative 1, the Wharf Bravo recapitalization would not occur and baseline conditions for hazardous materials would be unaffected. Therefore, there would be no impacts on hazardous materials use or release from the implementation of Alternative 1.

3.1.5.2.2 Alternative 2 – Preferred Alternative

The construction activities associated with Alternative 2 would be conducted by contractor personnel under Navy supervision in accordance with policies and procedures established under OPNAV M-5090.1 and the NAVSTA Mayport Pollution Prevention Plan. Possible hazardous materials used during construction of Wharf Bravo would include fuel and lubricants used in construction equipment and vessels, concrete waste and wash from bulkhead backfilling, and cleaning and coating materials used to prepare the bulkheads and pilings.

Conclusions
Minimization and monitoring measures outlined in Section 4.0 would be followed to minimize the possibility of hazardous materials being released into the environment. Therefore, there would be no significant impacts from hazardous materials with the implementation of Alternative 2.

3.2 Biological Environment and Consequences

3.2.1 Marine Invertebrates

This section includes estuarine and marine invertebrates that are not Federally protected but are found in the Study Area. These include taxonomic groups such as bed- or reef-forming (e.g., sponges, barnacles, oysters, corals), drifting (e.g., zooplankton, jellyfish), slow-moving (e.g., worms, sea urchins, clams, snails), and highly mobile (e.g., crabs, shrimp, squid). Sedentary invertebrate beds are characterized by aggregations of unattached oysters, clams, mussels, soft corals, and other stationary invertebrates inhabiting soft or hard bottom substrate.

Such aggregations do not form ridge-like or mound-like structures on hard bottom substrate; they form “meadows” or “beds” where they dominate shore or bottom areas. Reefs are ridge-like or mound-like structures formed by the colonization and layered growth of sedentary invertebrates (Cowardin et al. 1979). Reefs are characterized by their three-dimensional structure, elevation above the surrounding substrate, and interference with normal wave flow; they are primarily subtidal, but parts of some reefs may be intertidal as well.

3.2.1.1 Regulatory Overview

There are few species of endangered marine invertebrates, and none that occur in the Study Area. The only regulated species that could occur in the Study Area are commercial shrimp (brown, pink, and white), which are all Federally managed by the South Atlantic Fishery Management Council (SAFMC). These species are addressed in either the Fish or the Essential Fish Habitat sections. Spiny lobsters and coral species on live hard bottoms are not expected to occur in shallow waters north of southern Florida (SAFMC 1998). The affected environment and environmental consequences sections will focus on taxonomic groups and population-level assessment of impacts on commercial shrimps.

3.2.1.2 Marine Invertebrates – Environment

Approximately 98 percent of the animals on earth are classified as invertebrates. The term invertebrates cover over 30 phyla and include insects (Arthropoda) and other benthic invertebrates, which populate the seafloor or other artificial structures (NAVSTA Mayport Turning Basin bulkhead and pier structures). Benthic invertebrates live either on the surface of bedforms, such as coral and rock, or within sedimentary deposits (infauna), and comprise several types of feeding groups (e.g., deposit-feeders, filter-feeders, grazers, predators). The abundance, diversity, biomass, and species composition of benthic invertebrates can be used as indicators of changing environmental conditions. Of the 30 phyla that benthic invertebrates comprise, many common invertebrates include Annelida (polychaetes or annelid worms and sea leeches), Brachiopoda (marine animals that have hard shells on the upper and lower surfaces), Bryozoa (moss animals or sea mats), Chaetognatha (commonly known as arrow worms), Cnidaria (jellyfish and sea anemones, but not corals), Crustacea (lobsters, crabs, shrimp, barnacles, hermit crabs, copepods), Ctenophora (also known as comb jellies), and Echinodermata (sea stars, brittle stars, sea urchins, sand dollars, sea cucumbers, crinoids).

Wharf Bravo within the NAVSTA Mayport Turning Basin is characterized by hardened shorelines grading vertically to depths of over 40 ft (12 m) (NOAA 2015a) in sheltered, high salinity estuarine waters (NOAA 2015b). Substrate on the bottom of the NAVSTA Mayport Turning Basin is routinely (approximately every 2 years) dredged, and consists of unconsolidated material (USGS 2000). The hardened structures along the shoreline provide habitat for sedentary invertebrate beds and associated mobile invertebrates. There may also be slow-moving invertebrates inhabiting the sediment around the base of the pier footprint, and highly-mobile species in overlying water column. NOAA's Estuarine Living Marine Resources Program has developed a consistent database on the distribution, relative abundance, and life history characteristics of ecologically and economically important fishes and invertebrates in the Nation's estuaries (NOAA 2015c). This database includes the St. Johns River estuary and higher salinity zone (greater than 25 ppt) which includes the Study Area and documents the seasonal occurrence of blue crabs, commercial shrimp (brown, pink, and white), daggerblade grass shrimp, quahog clams, and eastern oysters (Table 3-8).

Table 3-8. Estuarine Invertebrates of the High-Salinity Zone of the St. Johns River

Common Name	Life Stage	January	February	March	April	May	June	July	August	September	October	November	December
Blue Crab (*Callinectes sapidus*)	Adults	5	5	5	5	5	5	5	5	5	5	5	5
	Eggs	0	3	4	4	4	4	4	4	4	3	0	0
	Juveniles	4	4	4	4	4	4	4	4	4	4	4	4
	Larvae	0	0	0	3	4	4	4	4	4	3	0	0
	Mating	2	2	3	3	3	3	3	3	3	3	3	3
Brown Shrimp (*Farfantepenaeus aztecus*)	Adults	0	0	0	0	0	0	0	0	0	0	0	0
	Eggs	0	0	0	0	0	0	0	0	0	0	0	0
	Juveniles	0	0	3	3	4	4	4	4	4	3	3	3
	Larvae	0	3	4	4	4	4	4	3	3	0	0	0
	Mating	0	0	0	0	0	0	0	0	0	0	0	0
Daggerblade Grass Shrimp (*Palaemonetes pugio*)	Adults	5	5	5	5	5	5	5	5	5	5	5	5
	Eggs	0	0	3	3	3	3	3	3	3	3	0	0
	Juveniles	3	3	3	3	3	3	3	3	3	3	3	3
	Larvae	0	0	3	3	3	3	3	3	3	3	3	0
	Mating	0	0	3	3	3	3	3	3	3	3	0	0
Eastern Oyster (*Crassostrea virginica*)	Adults	4	4	4	4	4	4	4	4	4	4	4	4
	Eggs	0	0	0	4	4	4	4	4	4	4	4	0
	Juveniles	4	4	4	4	4	4	4	4	4	4	4	4
	Larvae	0	0	0	4	4	4	4	4	4	4	4	0
	Mating	0	0	0	4	4	4	4	4	4	4	4	0
Pink Shrimp (*Farfantepenaeus duorarum*)	Adults	0	0	0	0	0	0	0	0	0	0	0	0
	Eggs	0	0	0	0	0	0	0	0	0	0	0	0
	Juveniles	3	3	3	3	3	3	3	3	3	3	3	3
	Larvae	2	2	3	3	3	3	3	3	3	3	3	2
	Mating	0	0	0	0	0	0	0	0	0	0	0	0
Quahog Clam (*Mercenaria mercenaria*)	Adults	3	3	3	3	3	3	3	3	3	3	3	3
	Eggs	0	0	3	3	3	2	2	2	3	3	3	0
	Juveniles	3	3	3	3	3	3	3	3	3	3	3	3
	Larvae	0	0	3	3	3	2	2	2	3	3	3	0
	Mating	0	0	3	3	3	2	2	2	3	3	3	0
White Shrimp (*Litopenaeus setiferus*)	Adults	0	0	0	0	0	0	0	0	0	0	0	0
	Eggs	0	0	0	0	0	0	0	0	0	0	0	0
	Juveniles	4	4	4	3	3	3	5	5	5	4	4	4
	Larvae	0	0	0	0	4	5	5	5	4	4	4	0
	Mating	0	0	0	0	0	0	0	0	0	0	0	0

Source: NOAA 2015. Note: 0=absent, 2=rare; 3=common; 4=abundant; 5=high abundant

Eastern oysters grow attached to hard substrate, including pier structures, whereas quahog clams inhabit the sediment around the base of the pier footprint. The shrimp species occupy the estuary as juveniles and larvae in the water column surrounding the pier, with seasonal peaks in abundance during the warmer months.

3.2.1.3 Marine Invertebrates – Consequences

3.2.1.3.1 Alternative 1 – No Action Alternative

Under Alternative 1, the Wharf Bravo recapitalization would not occur and baseline conditions for invertebrates would be unaffected. Therefore, there would be no impacts on marine invertebrates from the implementation of Alternative 1.

3.2.1.3.2 Alternative 2 – Preferred Alternative

Physical Impacts

Alternative 2 activities that would result in physical impacts on marine invertebrates include the construction of a new steel sheet pile (via vibratory and impact pile driving) bulkhead in front of the existing steel sheet pile structure and placement of fill between existing and new steel sheet pile bulkheads.

The estimated area of vertical oyster distribution impacted depends on the surface area of subtidal structures buried (concrete fill) and the density-at-depth distribution of oysters. The perimeter of the concrete curtain is 609 m x approximately 1 m (visible width of oyster distribution), which equals an area of 609 m^2 (0.15 acre). This area assumes equal width of oyster reef along the entire length and no growth on the support pilings and submerged debris (Photograph 3-1). It would be difficult to determine an entire surface area impacted without a comprehensive survey of the submerged structures. However, the regrowth of oysters on the new structures is anticipated to compensate for the long-term impact on oysters residing on the existing bulkhead structures.

Photograph 3-1. Vertical Oyster Reefs of the Wharf C-2 Curtain

Water Quality Impacts

The Wharf Bravo recapitalization activities would potentially cause short term impacts on marine vegetation. The pile driving and backfill of the wall activities associated with the recapitalization would cause resuspension of sediments that would result in a temporary increase of suspended solids or turbidity, which may cause temporary negligible impacts on invertebrates (particularly filter feeders). Resuspended sediments would also reduce dissolved oxygen periodically during in-water construction activities. The overall level of sediment disturbance associated with the Wharf Bravo recapitalization Project is anticipated to be significantly lower than that of maintenance dredging in the NAVSTA Mayport Turning Basin. Frequent tidal flushing would also dilute the concentration of contaminants in the basin water column. The turbidity and the resuspended sediments are expected to dissipate, rapidly disperse, or resettle to the NAVSTA Mayport Turning Basin floor within a few hours (DON 2013a).

Conclusions

Invertebrates exposed to resuspended sediments are also not likely to be impacted by contaminants. The activities that generate suspended sediments would be short-term and localized. The rapid regrowth of oysters on the new structures is anticipated to compensate for the long-term impact on oysters residing on the existing bulkhead structures. Therefore, there would be no significant impacts on marine invertebrates with implementation of Alternative 2.

3.2.2 Marine Vegetation

3.2.2.1 Regulatory Overview

Protection for marine vegetation species may be provided through the ESA, CWA (Section 404 permits), or MSA status. Few species of endangered marine vegetation exist, and none occur in the Study Area. There are no wetlands in or near Wharf Bravo within the Study Area; however, since the NAVSTA Mayport Turning Basin is considered as Waters of the U.S., a Section 404 permit for these activities is required (Appendix A). The only regulated species that may occur in the Study Area are *Sargassum fluitans* and *Sargassum natans* (brown algae) which are Federally managed by the South Atlantic Fishery Management Council (SAFMC) under the MSA (NMFS 2012). However, designated EFH for *Sargassum* is defined as the top 33 ft of the water column in the South Atlantic Exclusive Economic Zone bounded by the Gulf Stream (50 CFR 622), which does not include estuarine waters of the Study Area.

3.2.2.2 Marine Vegetation – Environment

Features that influence the distribution and abundance of marine vegetation in the Study Area are the availability of light, water quality, water clarity, salinity level, seafloor type (important for rooted or attached vegetation), currents, tidal schedule, and temperature (Green and Short 2003). Marine ecosystems depend almost entirely on the energy produced by marine vegetation through photosynthesis (Castro and Huber 2000). In the lighted surface waters of coastal waters, marine algae and flowering plants provide oxygen and habitat for many organisms in addition to forming the base of the marine food web (Dawes 1998). The Study Area habitats include hardened shorelines grading vetically to depths of over 40 ft (NOAA 2015a) in sheltered, high salinity estuarine waters (NOAA 2015b). Substrate on the bottom is dredged, unconsolidated material (USGS 2014). As a general rule, algae can grow down to bottom areas receiving one percent or more of surface light intensity (Wetzel 2001). Microalgae, including phytoplankton, are widespread and abundant in the estuarine water column where light is sufficient for growth. The dominant genus of floating macroalgae, *Sargassum*, is widely distributed in offshore waters

of the North Atlantic Ocean (Gower and King 2008; SAFMC 2002), but may find its way to nearshore water and estuaries on the winds and tides. Attached macroalgae (i.e., kelp, seaweed) form "meadows" or "beds" where they dominate shores or subtidal bottoms; whereas kelp does not occur in the Study Area (Mathieson et al. 2009; Steneck et al. 2002), but other species of seaweeds grow attached to hard bottom substrate (Nybakken 1993) in the Study Area. Green seaweed species (e.g., *Enteramorpha*, *Ulva*, *Codium*) may also grow on mudflats in sheltered estuarine waters (Gosner 1978). Attached macroalgae inhabit the hardened shoreline and shallower depths of the Study Area. There are no seagrass beds mapped in this area of Florida, despite comprehensive mapping efforts (FWC–FWRI 2011).

3.2.2.3 Marine Vegetation – Consequences

3.2.2.3.1 Alternative 1 – No Action Alternative

Under the No Action Alternative, the Wharf Bravo recapitalization would not occur and baseline conditions for marine vegetation would be unaffected. Therefore, there would be no impacts on marine vegetation from the implementation of the No Action Alternative.

3.2.2.3.2 Alternative 2 – Preferred Alternative

Physical Impacts
Among the taxonomic groups of marine vegetation that could occur in the Study Area, only phytoplankton, benthic microalgae, and attached macroalgae are likely to occur. The Proposed Action is not expected to impact benthic microalgae populations in the local ecosystem; repair and maintenance activities would have no lasting impact on these prolific and resilient plant species. Algae species, in general, are more able to colonize disturbed environments than seagrass due to higher growth rates and lower light requirements (Levinton 2009). Attached macroalgae are also resilient to high levels of wave action (Mach et al. 2007), which aids in their ability to withstand disturbances that occur near them. As long as suitable substrate is maintained, any impacts on attached macroalgae should be considered temporary due to rapid regrowth of plants, with no net loss of suitable habitat for attached macroalgae.

Water Quality Impacts
The Wharf Bravo recapitalization activities would potentially cause short term impacts on marine vegetation. The pile driving and backfill of the wall activities associated with the recapitalization would cause resuspension of sediments that would result in a temporary increase of turbidity may cause temporary negligible impacts on marine vegetation. Resuspended sediments would also reduce dissolved oxygen periodically during in-water construction activities.

Conclusions
The overall level of sediment disturbance associated with the Wharf Bravo recapitalization Project is anticipated to be significantly lower than that of maintenance dredging in the NAVSTA Mayport Turning Basin. Frequent tidal flushing would also dilute the concentration of contaminants in the basin water column. The turbidity and the resuspended sediments are expected to dissipate, rapidly disperse, or resettle to the NAVSTA Mayport Turning Basin floor within a few hours (DON 1013b). Marine vegetation exposed to resuspended sediments is also not likely to be impacted by contaminants. The activities that generate suspended sediments would be short-term and localized. Therefore, there would be no significant impacts on marine vegetation with the implementation of Alternative 2.

3.2.3 Fishes: ESA

3.2.3.1 Regulatory Overview

Three species of endangered fish may occur in the Study Area: Atlantic sturgeon (*Acipenser oxyrinchus oxyrinchus*), shortnose sturgeon (*Acipenser brevirostrum*), and smalltooth sawfish (*Pristis pectinata*).

Additionally, candidate species including the American eel (*Anguilla rostrata*) petitioned as threatened, the common thresher shark (*Alopias vulpinus*) petitioned as threatened or endangered, and the dwarf seahorse (*Hippocampus zosterae*) petitioned as threatened or endangered (77 FR 26478), are all potentially within the Study Area and are included to support a Section 7 informal consultation. Other regulated species groups that could occur in the Study Area include Highly Migratory Species, Coastal Migratory Pelagics, and Snapper-Grouper Complex, which are managed by the SAFMC; and juvenile summer flounder (*Paralichthys dentatus*) managed by the Mid-Atlantic Fishery Management Council (see Section 3.2.4; Essential Fish Habitat).

3.2.3.2 Fishes: ESA – Environment

3.2.3.2.1 Federally Listed Fishes and Critical Habitat

Three Federally listed fishes have published ranges that overlap the Study Area: the Atlantic sturgeon, which is listed as endangered; the shortnose sturgeon, which was listed as endangered under the Endangered Species Preservation Action of 1966, which predated the ESA; and the smalltooth sawfish, which was listed as endangered under the ESA by NMFS in 2003 and by USFWS in 2005; it is co-managed by both agencies.

Atlantic Sturgeon

Status and Management – On February 6, 2012, the Carolina and South Atlantic distinct population segments (DPSs) of Atlantic sturgeon Federally listed as endangered (77 FR 5914). The Atlantic sturgeon is a long-lived, estuarine dependent, anadromous fish. The South Atlantic DPS could occur in the action area. The Atlantic sturgeon is also managed under a fishery management plan implemented by the Atlantic States Marine Fisheries Commission (ASMFC), but a coast-wide moratorium on its harvest has been in effect since the end of 1997 (Greene et al. 2009). The NMFS augmented the ASMFC moratorium with a similar moratorium for Federal waters in 1999. Amendment 1 to ASMFC's Atlantic Sturgeon Fishery Management Plan also includes measures for preservation of existing habitat, habitat restoration and improvement, monitoring of bycatch and stock recovery, and breeding and stocking protocols (75 FR 838).

Habitat and Geographic Range – Atlantic sturgeon can grow to approximately 14 feet (4.3 m) long and can weigh up to 800 pounds (370 kilogram [kg]). It is currently in danger of extinction throughout its range due to precipitous declines in population sizes and the protracted period in which sturgeon populations have been depressed, the limited amount of current spawning, and the impacts and threats that have and would continue to prevent population recovery. As an anadromous fish, mature Atlantic sturgeon undergo seasonal migrations between freshwater habitats where they spawn and marine waters where they forage and grow. During nonspawning years, adults remain in marine waters either year-round or seasonally (Bain 1997). Spawning adults migrate upriver in spring, beginning in February in the south, April in the mid-Atlantic, and May in Canadian waters (Dadswell 2006). After spawning in freshwater in the spring and

early summer, adults migrate back into estuarine and marine waters. Tagging data indicate that immature Atlantic sturgeon disperse widely once they move into coastal waters (Secor et al. 2000). Dispersal is extensive: north and south along the Atlantic coast and seaward to the edge of the continental shelf (Bain 1997; 75 FR 838).

Atlantic sturgeon can occur in the U.S. as far north as the St. Croix River in Maine and as far south as the St. Johns River in Florida. Atlantic sturgeon juveniles in the Northeast U.S. Continental Shelf and Scotian Shelf Large Marine Ecosystems may occur in salinities ranging from 5 to 25 parts per thousand in estuaries, usually over a mud-sand bottom (Dadswell 2006). Subadults and adults live in coastal waters and estuaries when not spawning, generally in shallow (35–165 ft. [10–50 m]) inshore areas of the continental shelf where they feed (75 FR 838). In a 2004 study using fisheries bycatch data, Atlantic sturgeon were found to be strongly associated with specific coastal areas, such as the mouths of Narragansett Bay and Chesapeake Bay and the inlets of the North Carolina Outer Banks; most fish were caught within a narrow range of depths (30–160 ft. [10–50 m]) over gravel and sand, and to lesser an extent, silt and clay (Stein et al. 2004).

Population and Abundance – Numbers of Atlantic sturgeon in the South Atlantic DPS are low compared to historic levels. Currently there are several hundred to a few thousand adult Atlantic sturgeon spawning annually in the Altahama River, the closest major breeding territory, approximately 70 miles from NAVSTA Mayport (Wilcox pers. comm. 2013). Documented occurrences of Atlantic sturgeon in the vicinity of the Study Area have been limited to recreational catches, all prior to the species listing under the ESA. The most recent documented occurrence was in January, 2012, reportedly caught by an angler from the St. Johns River near Fuller Warren Bridge (Nosca 2013). It is assumed that the St. Johns spawning population has been completely eliminated (NMFS n/d).

Predator/Prey Interactions and Foraging – Atlantic sturgeon feed along the bottom on invertebrates such as isopods, crustaceans, worms, and mollusks (NMFS 2010). It has also been documented to feed on fish (Bain 1997). Evidence of predation on sturgeon is scarce, but some researchers believe they are taken by the American alligator (*Alligator mississippiensis*), alligator gar (*Atractosteus spatula*), and striped bass (*Morone saxatilis*) (Dadswell 2006). Sharks likely prey on all species of sturgeon in the marine environment (NMFS 1998).

Threats – Threats to already depressed populations of Atlantic sturgeon from habitat degradation and being accidentally caught and potentially injured or killed by fishermen are working in combination to put the South Atlantic DPS in danger of extinction. Other specific activities threatening the continued existence of the Atlantic sturgeon are dredging impacts, water quality degradation, climate change, and continued incidental fisheries bycatch.

Critical Habitat – No critical habitat has been designated for this species.

Shortnose Sturgeon

The shortnose sturgeon remains on the list as endangered (Endangered Species Preservation Act of 1966, which predated the ESA) throughout its range along the Atlantic coast (NMFS 1998). NMFS manages 19 DPSs on the anadromous shortnose sturgeon; the St. Johns River population is included in the DPS. Although a DPS has been designated for shortnose sturgeon in the St. Johns River, there is no evidence suggesting their abundance in the estuary. The Estuarine Living Marine Resources database does not include shortnose sturgeon in the list of species for the St. Johns River. The shortnose sturgeon primarily occurs in freshwater rivers and coastal

estuaries of the northeastern and southeastern U.S. and into the nearshore coastal waters NMFS 1998). Adults are found in deep water (35-100 ft [10-30 m]) in winter and shallow water (7-35 ft) in summer (Welsh et al. 2002).

Habitat and Geographic Range – The historical range of shortnose sturgeon extended from New Brunswick, Canada, to as far south as the St. Johns River in Florida. More recently, the species has been observed only as far south as the Altamaha River in Georgia. Generally, shortnose sturgeon are more abundant in northern and mid-Atlantic populations as compared to southern populations, due to characteristics of watersheds or anthropogenic disturbances (NOAA Fisheries 2015i). After hatching in upstream reaches of rivers, shortnose sturgeon larvae orient into the river current and away from light sources, generally staying near the bottom and seeking cover. By 2 weeks of age, the larvae emerge from cover and swim in the water column, moving downstream from the spawning site. By 2 months, juvenile behavior becomes similar to adults, with active swimming and foraging at night along the bottom (Richmond and Kynard 1995). In estuarine systems, juveniles and adults occupy areas with little or no current over a bottom composed primarily of mud and sand (Secor et al. 2000). Adults are found in deep water (35–100 ft. [10 –30 m]) in winter and in shallow water (7–35 ft. [2–10 m]) during summer (Welsh et al. 2002). Individual shortnose sturgeons do not disperse far along the coastline beyond their home river estuaries (NMFS 1998).

Population and Abundance – No data analysis for the St. Johns River population size has been conducted. Extensive sampling was conducted in 2002 / 2003 and only one specimen was captured during that effort. Further, in the 1980s and early 1990s, other survey efforts were performed with no incidental captures (Wilcox pers. comm. 2013). Therefore, it is unlikely that any sizable population of shortnose sturgeon currently exists in the St. Johns River. This species' reproduction generally requires rocky or gravel substrate or limestone outcroppings - habitat rarely found in the St. Johns River or its tributaries. No reproduction of sturgeon in the St. Johns River has ever been documented, and no large adults have been positively identified (all known specimens have been less than 10 pounds). The last recorded shortnose sturgeon observed in the St. Johns River was in 2002 (SAFMC 2004). In other southern rivers, the species uses thermal refuges, such as springs, but no sturgeon have been observed in the numerous springs in the St. Johns River. Given the low-quality habitat, it is possible that shortnose sturgeon have not actively spawned in the St. Johns River system, and those individuals that have been documented were transients from other river systems (FWC n.d.).

Predator/Prey Interactions and Foraging – In southern rivers, feeding has been observed during winter at or just downstream of where saltwater and freshwater meet (Kynard 1997). Shortnose sturgeon in the southeastern U.S. reduce their feeding activity during summer months (NMFS 1998). Feeding patterns of the shortnose sturgeon vary seasonally between northern and southern river systems. In northern rivers, some sturgeon feed in freshwater during summer and over sand-mud bottoms in the lower estuary during fall, winter, and spring (NMFS 1998). The shortnose sturgeon feeds by suctioning polychaetes (marine worms), crustaceans, mollusks, and small fish from the bottom (NMFS 1998; Stein et al. 2004). Young-of-the-year sturgeon (individuals less than a year old) have been found in the stomachs of yellow perch (NMFS 1998); predation on adult sturgeon is not well-documented, although sharks, lampreys and pinnipeds may prey on them in the marine environment (NMSF 1998, Mierzykowski 2012).

Threats – Threats to shortnose sturgeon populations include the construction of dams, mainly during the period of industrial growth (late 1800s-early 1900s), resulting in substantial loss of

suitable habitat; pollution of many large northeastern river systems; habitat alterations from discharges, dredging, or disposal of material into rivers; and other related development activities involving alterations to estuarine/riverine mudflats and marshes (NOAA Fisheries 2015i).

Critical Habitat – There is no critical habitat designated for shortnose sturgeon.

Smalltooth Sawfish
Status and Management – As part of a group of fishes called elasmobranchs that includes all rays and sharks, the smalltooth sawfish was Federally listed as endangered in 2003 (68 FR 15674-15680); the U.S. DPS historically inhabited waters off New York south to Florida, and around the Florida peninsula to Texas. The smalltooth sawfish was once common in the Gulf of Mexico and along the east coast of the U.S. Today, the severely depleted population is restricted mostly to southern Florida (Poulakis and Seitz 2004; Simpfendorfer 2002; Simpfendorfer and Wiley 2006).

Habitat and Geographic Range – The smalltooth sawfish typically inhabits shallow subtropical or tropical estuarine and marine waters. It remains close to the bottom, in deep holes of sand or muddy sand, or over limestone hard bottom, coral reefs, and live bottoms (Poulakis and Seitz 2004). Nursery areas are in shallow nearshore regions and estuaries, especially in mangrove habitat (NMFS 2010a; Seitz and Poulakis 2006; Simpfendorfer and Wiley 2005). Mangrove prop roots provide refuge from predators, and the sawfish's compressed body allows it to navigate very shallow waters (3 ft. [1 m]) that typically exclude large sharks (NMFS 2009). Young-of-the-year sawfish (less than 39 inches [in.] or 100 centimeters [cm]) have been observed swimming in only a few inches of water (NMFS 2009). Juvenile smalltooth sawfish exhibit a high site fidelity to nearshore areas, often residing in one area between 15 and 55 days (Simpfendorfer 2006). Larger individuals may occur down to 400 ft. (120 m) (Poulakis and Seitz 2004; Simpfendorfer 2006), although tagging studies indicate that adults spend more time in shallow water than previously suspected, and are only occasionally found in deeper waters (Simpfendorfer and Wiley 2005). The smalltooth sawfish may also be associated with sea fans, artificial reefs, and offshore drilling platforms (Poulakis and Seitz 2004).

Population and Abundance – No estimates of the size of the smalltooth sawfish population are available. The best available data suggest that the current population is a small fraction of its historical size (NMFS 2010a; Simpfendorfer 2006). Limited scientific survey data are available for this species, but dockside surveys of recreational anglers in Everglades National Park beginning in 1972 suggest that the population there has at least stabilized, and may be increasing. Between 1989 and 2004, the population increased by approximately five percent per year (Carlson et al. 2007). While historical records indicate that the St. Johns River once had high numbers of smalltooth sawfish (NMFS 2000), there have been no incidental reports in the past few years.

Predator/Prey Interactions and Foraging – The smalltooth sawfish feeds primarily at night (NMFS 2009) and uses its saw while feeding to stir the substrate to expose crustaceans or to stun and slash schooling fish (74 FR 45353). Smalltooth sawfish, particularly juveniles, are preyed upon by bull sharks and other sharks occurring in shallow coastal waters.

Threats – Smalltooth sawfish are extremely vulnerable to overexploitation. This is primarily due to their susceptibility for entanglement, their restricted habitat, and low population growth rates. Abundance declines are also a result of bycatch in various fisheries, particularly in gill nets. The loss of juvenile habitat has also likely contributed to the decline of smalltooth sawfish. Many of

their habitats have been modified or lost due to waterfront development in Florida and other southeastern states (NMFS 2010a).

Critical Habitat – Two areas have been designated (2009) as critical habitat for the smalltooth sawfish and include the Charlotte Harbor Estuary Unit and the Ten Thousand Islands/Everglades Unit (74 FR 45353). The primary constituent elements of smalltooth sawfish critical habitat are designated as red mangroves and shallow habitats characterized by variable salinities with water depths between the mean high water line and 3 ft (0.9 m) measured at MLLW (74 FR 45353). Neither of these units is located near the Study Area in Duval County, Florida. Because no critical habitat for the smalltooth sawfish is present near the Study Area, no further consideration of impacts on the critical habitat for smalltooth sawfish will be included in this EA.

3.2.3.2.2 Federal Candidate Fishes and Proposed Critical Habitat

American Eel

Status and Management – On September 29, 2011, the USFWS announced a 90-day finding on a petition (76 FR 600432) to list the American eel as threatened under the ESA (FR 2011). Based on their review, USFWS found that the petition presents substantial scientific or commercial information indicating that listing this species may be warranted. The ASMFC has had a fishery management plan for the American eel since 1999 (ASMFC 2000).

Habitat and Geographic Range – The American eel ranges from Greenland south along the Atlantic Coast and into the Caribbean (USFWS 2011). The American eel is catadromous, meaning it is born in saltwater and migrates into freshwater to mature (Jessop et al. 2002). Spawning of the U.S. population of American eel is believed to occur in the Sargasso Sea of the Atlantic Ocean. From there, eggs, larvae, and juveniles are dispersed largely via the Gulf Stream and other oceanic currents as they feed at the surface of the ocean. As juveniles, or "glass eels," they enter coastal waters where they further mature into ‘‘elvers’’ and then a late juvenile stage known as ‘‘yellow eels" (USFWS 2011). Older juveniles and adults occupy estuarine and freshwater habitats, often swimming far upriver into lakes, ponds, and headwater streams, where they may spend up to 30 years as adults. Mature adults, or "silver eels," migrate to the Sargasso Sea to spawn and die (USFWS 2011). Peak migration in the St. Johns River takes place between January and February (FWC n.d. [A]).

Population and Abundance –The American eel exists as a single population that disperses widely from its spawning grounds in the Sargasso Sea, making abundance difficult to determine (Haro et al. 2000). Demographic structure is difficult to determine because nonbreeding individuals are spread over an extremely large geographic range (USFWS 2011). Annual landings of American eels have been reported since the early 1980s. However, commercial eel harvest has been declining since the early 1990s (FWC n/d).

Predator/Prey Interaction and Foraging – The American eels feed on a wide variety of prey items including benthic invertebrates, insects, crustaceans, mollusks, worms, and finfish. It is preyed upon by a wide variety of species including fish, seabirds, sharks, and rays (Dalton et al. 2009; UFWS 2011).

Threats – There is a small commercial fishery for American eels in Florida, which operates almost exclusively in the St. Johns River system (FWC 2007). The American eel has been extirpated from portions of its historical freshwater habitat during the last 100 years, mostly resulting from the construction of dams. Eels lose habitat and migration corridors when waters

are obstructed by dams and other mechanisms. Localized population declines are also attributed to mortality in hydropower plant turbines, degradation of current habitat, and overharvest.

Critical Habitat – This species is not listed under the ESA; as such, no critical habitat has been designated.

Common Thresher Shark

Status and Management – On March 3, 2015, NMFS announced (80 FR 11379) the 90-day finding for a petition to list the common thresher shark as either endangered or threatened under ESA (FR 2015). The Fishery Management Plan for U.S. West Coast Fisheries for Highly Migratory Species includes an annual harvest guideline of 340 metric tons for common thresher shark. This level of commercial catch is estimated to be 75 percent of the regional sustainable yield (NOAA Fisheries 2015j).

Habitat and Geographic Range – In the North Atlantic, common thresher sharks occur from Newfoundland, Canada, to Cuba in the west and from Norway and the British Isles to the African coast in the east (Gervelis and Natanson, 2013). Landings along the South Atlantic coast of the U.S. and in the Gulf of Mexico are rare. Juveniles tend to remain over the continental shelf in shallow water while adults are most common in deeper water but rarely range beyond 200 miles from the coast. Both juveniles and adults are often associated with highly productive or “green” water in regions of upwelling or intense mixing (Smith et al. 2008).

Population and Abundance – A population abundance estimate for common thresher sharks has not been determined. The estimated life expectancy range of common thresher sharks is from 19 to 50 years of age. Growth rates are estimated to be approximately 30 cm (1 ft) per year over the first 5 years; reaching a maximum size of approximately 550 cm (18 ft) total length, with only slight variations among geographical regions around the world. Common thresher sharks reach sexual maturity at approximately 5 years old. Their reproduction is via aplacental ovovivaparity and oophagous where eggs are deposited into one of two uterine horns and developing embryos are nourished by feeding on other eggs. The typical litter size of common thresher sharks is between 2 to 4 pups and gestation is thought to be about 9 months. The pupping season is thought to occur in the spring and mating is thought to occur in the summer.

Predator/Prey Interaction and Foraging – Common thresher sharks feed at mid-trophic levels on small pelagic fish and squid. Given their more specialized diet compared to other local pelagic sharks, they are more likely to exert top-down effects on their prey, although this remains to be demonstrated. Based on studies at the Southwest Fisheries Science Center (SWFSC), the top six prey species, in order, are anchovy (Engraulidae), sardine (Clupeidae), hake (Phycidae), mackerel (Scombridae), jack (Carangidae), and squid (Teuthida) (Preti et al*.,* 2004*).* Common thresher sharks have been observed to use their long caudal fin to bunch up, disorient and stun prey at or near the surface and are often caught on longlines tailhooked (NOAA Fisheries 2015g).

Threats – Common thresher sharks are taken incidentally as bycatch in the swordfish drift gillnet (DGN) fishery. Other natural or man-made factors such as low reproductive rates make the common thresher more susceptible to exploitation and human population growth.

Critical Habitat – This species is not listed under the ESA; as such, no critical habitat has been designated. The petitioner requests that NMFS designate critical habitat for the species in U.S. waters.

Dwarf Seahorse

Status and Management – The dwarf seahorse became a candidate for listing as threatened or endangered under the ESA on May 4, 2012 (77 FR 26478). Dwarf seahorses are harvested in Florida's commercial seahorse fishery, primarily in the southeast portion of the state through diving, seining, or dredging (Bruckner 2005; 77 FR 26478). The state imposes a commercial bag limit of 400 dwarf seahorses per person or per vessel per day, whichever is less, and a recreational bag limit of five dwarf seahorses per person, per day. There are no seasonal restrictions or closures for this fishery (77 FR 26478).

On January 4, 2016, the Florida Fish and Wildlife Conservation Commission's (FWC) proposed a final rule to amend the dwarf seahorse regulations in the Marine Life Chapter, 68B-42, Florida Administrative Code (FAC). The proposed final rule would establish an allowable harvest area for dwarf seahorses, modify recreational and commercial bag limits, and establish an annual commercial quota (FWC 2016).

Habitat and Geographic Range – The dwarf seahorse inhabits tropical and subtropical/warm-temperate waters of Florida, the Gulf of Mexico, and the Caribbean (Masonjones and Lewis 1996). The species primarily occurs in south Florida estuaries and in the Florida Keys, preferring protected bays/lagoons with low water flow, high organic content, mid- to high-salinities, and depths less than 6 ft (2 m) (Bruckner 2005; Foster and Vincent 2004). Dwarf seahorses are almost exclusively associated with seagrass beds, particularly eelgrass (*Zostera* spp.) (Bruckner 2005). Other habitats used by the dwarf seahorse include mangrove areas, unattached algae, and inshore drifting vegetation (Center for Biological Diversity 2011; Hoese and Moore 1998; Tabb and Manning 1961). While most seahorse species exhibit strong site-fidelity, in terms of home ranges and spawning habitat (Masonjones and Lewis 1996), further seahorse dispersal outside of home ranges may occur. Dispersal may be enhanced by clinging to drifting *Sargassum* or floating debris within inshore habitats (Foster and Vincent 2004; Masonjones and Lewis 1996). Dwarf seahorse spawning occurs between February and November (Foster and Vincent 2004). In winter they move to deeper water or into tide pools with heavy vegetation. The maximum recorded adult height of this species is 2.5 cm. Based on habitat requirements, particularly seagrass and subtropical water temperatures, dwarf seahorses are not expected to occur in the Study Area.

Population and Abundance – There are no published data on current global population trends or total numbers of mature dwarf seahorses; however, some population data exist in Florida based on numbers derived from the commercial seahorse fishery. The NMFS reported a five-fold increase in seahorse landings between 1991 and 1992 (from 14,000 harvested in 1991 to 83,700 harvested in 1992) (77 FR 26478), with the increased landings primarily attributed to dwarf seahorses. Over a longer period, the number of dwarf seahorses landed during 1990–2003 ranged from 2,142 to 98,779 individuals per year (Bruckner 2005). Additional density data are from ichthyoplankton tows conducted in portions of southern Florida and range from 0 to 6 seahorses per 100 cubic meters in subtidal pools, seagrass beds, in channels, and along restored marsh edges (Powell et al. 2002; Thayer et al. 1999).

Predator/Prey Interaction and Foraging – Seahorses are ambush predators, consuming primarily live, mobile nekton, such as small amphipods and other invertebrates (Bruckner 2005).

Threats – The primary threat to the dwarf seahorse is habitat decline. The loss and degradation of seagrass habitat increases the species' vulnerability. In addition, the dwarf seahorse is

harvested commercially to be sold as aquarium fish and also to be dried and sold as curios. They are also subject to accidental capture in non-selective fishing gear (bycatch).

Critical Habitat – This species is not listed under the ESA; as such, no critical habitat has been designated.

3.2.3.3 Fishes: ESA – Consequences

Where potential stressors vary in intensity, frequency, duration, and location within the Study Area, those that are applicable to fishes in the Study Area that are analyzed below include physical impacts, water quality impacts, and acoustic impacts

3.2.3.3.1 Alternative 1 – No Action Alternative

Under Alternative 1, the Wharf Bravo recapitalization would not occur. Baseline conditions for fishes, as described in Section 3.2.3.2, would remain unchanged. Therefore, there would be no impacts on fishes from the implementation of Alternative 1.

3.2.3.3.2 Alternative 2 – Preferred Alternative

Physical Impacts
Alternative 2 activities that would result in physical impacts on fishes include the construction of a new steel sheet pile (via vibratory and impact pile driving) bulkhead in front of the existing steel sheet pile structure and placement of fill between existing and new steel sheet pile bulkheads. These activities would result in disturbance of the water column and bottom substrate and permanent loss of existing oyster growth and potential foraging habitat provided by the existing bulkhead (see Section 3.2.1.3.2); however, oyster regrowth is anticipated in time. Highly mobile juvenile or adult fish would be able to move quickly away from the disturbance area. However, some fishes associated with attached macroalgae and sedentary invertebrate beds on the existing bulkhead structures would likely be displaced until the habitat community becomes re-established on the new structures.

Water Quality Impacts
The Wharf Bravo recapitalization activities would potentially cause short-term impacts on the benthic and substrate associated fishes. The pile driving and backfill of the wall activities associated with the recapitalization would cause resuspension of sediments that would result in a temporary increase of turbidity that may cause temporary negligible impacts on fishes, including impacts on egg buoyance and sight feeding of prey. Resuspended sediments would also reduce dissolved oxygen periodically during in-water construction activities. The overall level of sediment disturbance associated with the Wharf Bravo recapitalization Project is anticipated to be significantly lower than that of maintenance dredging in the NAVSTA Mayport Turning Basin. Frequent tidal flushing would also dilute the concentration of contaminants in the basin water column. The turbidity and the resuspended sediments are expected to dissipate, rapidly disperse, or resettle to the NAVSTA Mayport Turning Basin floor within a few hours (NMFS 2009). Fishes exposed to resuspended sediments are also not likely to be impacted by contaminants. The activities that generate suspended sediments would be short-term and localized.

Acoustic Impacts
Fish near the sheet pile driving activities may also experience sound intensities that could affect their behavior or damage their hearing ability. There is an in-depth discussion of underwater

noise from pile driving and the modeling methodology in Section 3.2.5; Marine Mammals. Since many fish use their swim bladders for buoyancy, they are susceptible to rapid expansion/decompression due to peak pressure waves from underwater noises (Hastings and Popper 2005). The onset of injury threshold resulting from this rapid expansion/decompression is supported by data presented on selected species (FHWG 2008). Whereas behavioral disturbance criteria for fish are not supported with data, the NMFS and USFWS generally use 150 dB rms as the threshold for Federally listed species.

Criteria for acoustic behavioral impacts and onset of injury are provided in Table 3-9. The criteria and resulting areas (Figure 3-2) suggest only the most limited mortality of fish, and only when they are very close to an intense sound source (FHWG 2008). There is no population-level impact on unregulated fish anticipated from the sound intensities modeled and only minimum and temporary adverse impacts on managed species inhabiting the water column. The ESA-listed sturgeon species and smalltooth sawfish may be affected by the sound intensities, but are not likely to be adversely impacted by them.

Table 3-9. Acoustic Criteria for Fish Behavioral Disturbance and Onset of Injury from the Sound Produced by Vibratory and Impact Pile Driving

Pile Driving Method	Threshold	Distance (m)	Area (km^2)
Vibratory	Behavioral (all):150 dB re 1 μPa rms	73.6	0.0114
Impact (contingency)	Injury (all): 206 dB re 1 μPa rms	8.6	0.0005
	Injury (≥ 2g): 187 dB re 1 μPa^2sec SEL	100.2	0.0189
	Injury (< 2g): 183 dB re 1 μPa^2sec SEL	185.1	0.0487
	Behavioral (all):150 dB re 1 μPa rms	3,981.1	1.52

Source: NAVFAC Atlantic (DON 2013a)
Note: no injury criteria for fish for vibratory driving; all sound levels expressed in dB re 1 μPa rms. dB=decibel; rms=root-mean-square; μPa=microPascal; Practical spreading loss (15 log, or 4.5 dB per doubling of distance) used for calculations.

Conclusions

The Navy has concluded that activities associated with Alternative 2 would result in a “may affect, but not likely to adversely affect” determination for the Federally listed Atlantic sturgeon, the shortnose sturgeon, and the smalltooth sawfish. The Navy further concludes that the activities would “not jeopardize the continued existence” of the Federally petitioned (threatened) American eel and common thresher shark. The Navy also concludes that the activities would result in a “no effect” determination for the Federal candidate dwarf sea horse.

The Navy submitted a BA to NMFS and USFWS for the Wharf Bravo recapitalization Project. On November 20, 2015, and February 4, 2016, USFWS and NMFS, respectively, provided letters that concurred with the Navy’s effects determinations, thus fulfilling the requirements of the ESA and requiring no further action.

3.2.4 Fishes: Essential Fish Habitat

3.2.4.1 Regulatory Overview

In 1996, the MSA was reauthorized and amended. The MSA was enacted to conserve and restore the Nation’s fisheries, mandating changes to the existing legislation designed to prevent overfishing, rebuild depleted fish stocks, minimize bycatch, enhance research, improve monitoring, and protect fish habitat.

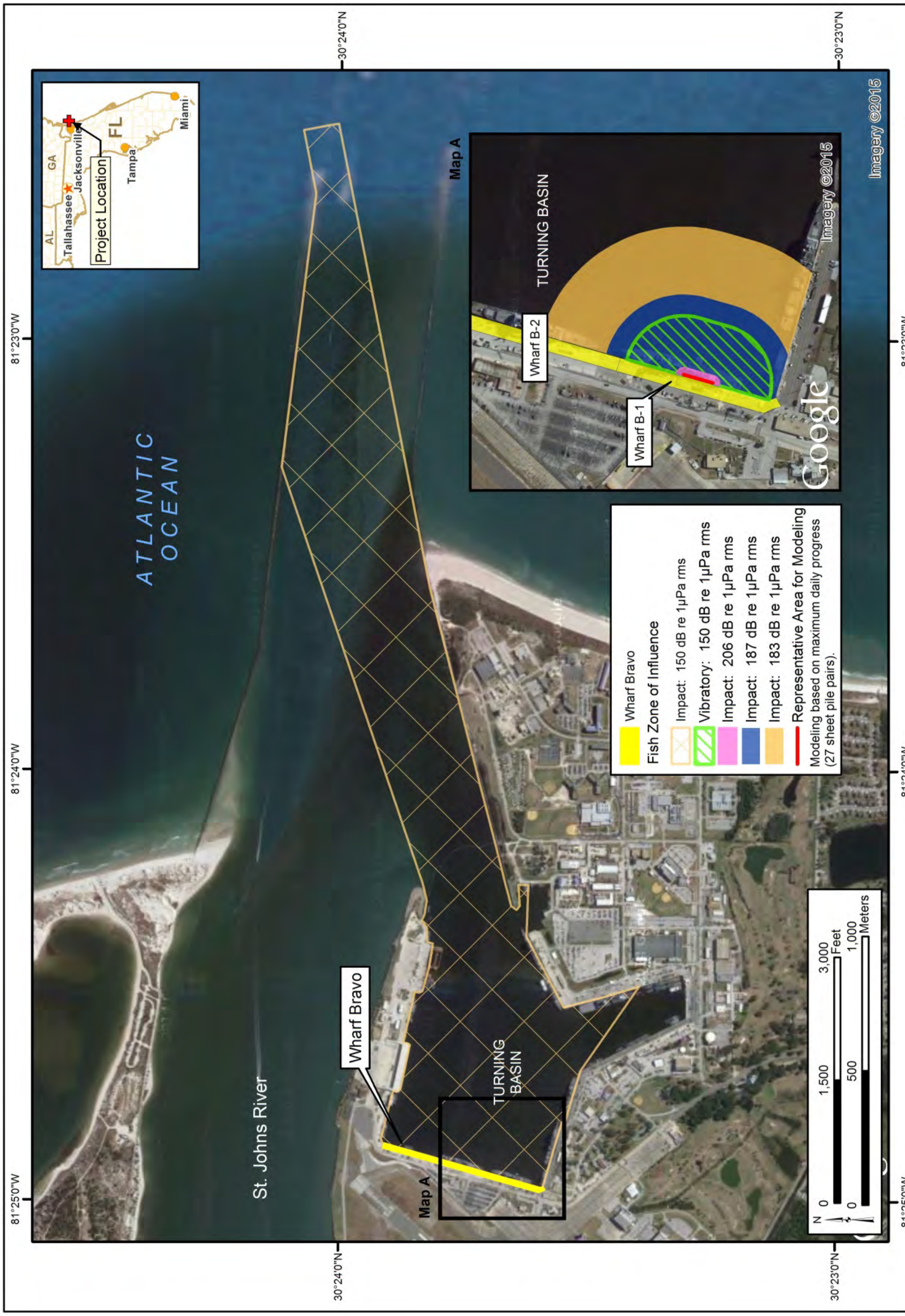


Figure 3-2. Underwater Zones of Influence based on Fish Criteria for Vibratory and Impact Pile Driving

One of the most significant mandates in the MSA is the EFH provision, which provides the means by which to conserve fish habitat. The Navy has developed this EFH Assessment for the Mayport Wharf Bravo recapitalization Project to support an informal EFH consultation with NMFS and compliance with the MSA.

The EFH mandate requires that the regional fishery management councils (FMCs), through Federal fishery management plans (FMPs), describe and identify EFH for each Federally managed species; minimize, to the extent practicable, adverse effects on such habitat caused by fishing; and identify other actions to encourage the conservation and enhancement of such habitats. Congress defines EFH as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity" (16 U.S.C. 1802[10]).

The term "fish" is defined in the MSA as "finfish, mollusks, crustaceans, and all other forms of marine animals and plant life other than marine mammals and birds." The regulations for implementing EFH clarify that "waters" include all aquatic areas and their biological, chemical, and physical properties, while "substrate" includes the associated biological communities that make these areas suitable fish habitats (50 CFR 600.10). Habitats used at any time during a species' life cycle (i.e., during at least one of its life stages) must be accounted for when describing and identifying EFH (NMFS 2002).

Authority to implement the MSA is given to NMFS through the Secretary of Commerce. The MSA requires that EFH be identified and described for each Federally managed species. The MSA also requires Federal agencies to consult with the NMFS on activities that may adversely affect EFH or when NMFS independently learns of a Federal activity that may adversely affect EFH. Adverse effects may include direct or indirect physical, chemical, or biological alterations of the waters or substrate and loss of, or injury to, benthic organisms, prey species and their habitat, and other ecosystem components, if such modifications reduce the quality and/or quantity of EFH. The MSA defines an adverse effect as "any impact which reduces quality and/or quantity of EFH [and] may include direct (e.g., contamination or physical disruption), indirect (e.g., loss of prey, reduction in species' fecundity), site-specific or habitat-wide impacts, including individual, cumulative, or synergistic consequences of actions" (50 CFR 600.810).

In addition to EFH designations, Habitat of Particular Concern (HAPC) are designated to provide additional focus for conservation efforts and represent a subset of designated EFH that are especially important ecologically to a species/life stage or that are vulnerable to degradation (50 CFR 600.805-600.815). Categorization as HAPC does not confer additional protection or restriction to the designated EFH area. The NAVSTA Mayport Turning Basin is in HAPC for the snapper-grouper complex. Regional Fishery Management Councils may designate a specific habitat area as a HAPC based on one or more of the following reasons (NMFS 2002):

- Importance of the ecological function provided by the habitat
- The extent to which the habitat is sensitive to human-induced environmental degradation
- Whether, and to what extent, activities are, or would be, stressing the habitat type
- Rarity of the habitat type

The SAFMC is responsible for the conservation and management of fish stock within the Federal 200-mile limit of the Atlantic Ocean off the coasts of North Carolina, South Carolina, Georgia, and eastern Florida to Key West. SAFMC provides for the conservation and management of

fishery resources within the Exclusive Economic Zone (EEZ). It also provides for fishery management authority over continental shelf resources and anadromous species (species of fish that spawn in fresh or estuarine waters then migrate to ocean waters) beyond the EEZ, except when they are found within a foreign nation's territorial sea or fishery conservation zone (or equivalent), to the extent that such sea or zone is recognized by the U.S. NMFS has jurisdiction over the highly migratory species in Federal waters off the U.S. Atlantic coast and the Gulf of Mexico.

The SAFMC established a panel of experts to identify physical habitats, both inshore (estuarine) and offshore (marine), present within the South Atlantic region that are essential to the various Federally managed fish (including invertebrate) species and to determine the availability of information to adequately determine the distribution and spatial extent of the habitats identified (SAFMC 1998). While maps depicting the EFH for each species or management unit were not provided along with the original EFH designations, the SAFMC has since developed a website to graphically depict the distribution and geographic extent of habitats designated as EFH by species or management unit. While not all of the EFH designations have a spatial coverage at this time, the website is continually updated as more information becomes available and all data are also available for download for use in geographic information system software applications.

Fish habitat utilized by a species can change with life history stage, abundance of the species and competition from other species, and environmental variability in time and space. The type of habitat available, its attributes, and its functions are important to species productivity and societal benefits. Some potential threats to habitat include certain fishing practices, marina construction, navigation projects, dredging, alteration of freshwater input into estuaries, and runoff.

3.2.4.1.1 General Components of EFH

The various components of EFH may be grouped into five general categories. A summary description of the categories occurring within the Study Area is provided below.

- ***Unconsolidated Seafloor Habitats***, including the continental shelf and slope, consist of substrate such as rocks, gravel, cobble, pebbles, sand, clay, mud, silt, and shell fragments, as well as the water-sediment interface used by many invertebrates. These habitats are utilized by a variety of species for spawning/nesting, development, dispersal, and feeding.
- ***Estuarine and Intertidal Habitats*** occur near the shoreline and consist of estuarine emergent vegetation (salt marsh and brackish marsh), estuarine shrub/scrub (mangroves), submerged aquatic vegetation (although this habitat type can occur in water depths up to 46 m), intertidal flats, and the estuarine water column.
- ***Marine Water Column*** includes the Gulf Stream, continental shelf currents, coastal inlets, high-salinity bays and estuaries, and the surf zone. Depending on the species, designated habitat may refer to only part of the water column such as the surface or bottom waters. Specific habitats in the water column can be defined in terms of gradients and discontinuities in temperature, salinity, density, nutrients, light, etc. The Gulf Stream is the dominant surface water mass in the South Atlantic Bight (SAB) and provides a dispersal mechanism for the larvae of many species.

- ***Structured Habitats*** include both human-made and biogenic structures that provide three-dimensional relief above the seafloor. They provide shelter and feeding opportunities for a variety of fish species, as well as surface area for settlement, attachment, and colonization by benthic organisms. Human-made structures include artificial reefs and shipwrecks. Biogenic structured habitats are created by living organisms such as sponges, mussels, hydroids, amphipods, algae, bryozoans, and corals.
- ***Pelagic Sargassum*** (*Sargassum natans* and *S. fluitans*) provide an important habitat for numerous fishes, especially the larval and juvenile life stages. These mats form a dynamic structural habitat on the sea surface that provides shelter, food, and spawning substrate. Juvenile fish are the dominant vertebrate inhabitants of *Sargassum* rafts; however, adult fish and large predators forage under and around *Sargassum* rafts.

3.2.4.1.2 Fishery Management Units

SAFMC developed eight FMPs between 1979 and 2003. Three of the eight, those for coastal migratory pelagic, spiny lobster, and corals, were developed jointly with the Gulf of Mexico Fishery Management Council (GMFMC) because the stocks of these managed species cross into both regions. The *Dolphin-Wahoo FMP* was developed in cooperation with the New England FMC and the Mid-Atlantic FMC. The other four fishery management plans, those for snapper/grouper, shrimp, *Sargassum*, and golden crab were developed by the GMFMC.

The councils have amended each FMP a number of times. Combined, 73 species are managed, excluding the coral complex. The Fishery Management Units (FMU) and the general families of fish included in each FMPs are outlined in Table 3-10. The Study Area comprises EFH for several managed fisheries. The locations of EFH have been identified for the fisheries listed in Table 3-10 that are found near Study Area and are included in the Navy's EFH Assessment for the Wharf Bravo recapitalization activities.

Table 3-10. Fishery Management Units and Managed Species with EFH and HAPC Designated Within the Study Area

Fishery Management Unit	General Species Included	EFH Specific to the Study Area	HAPC Specific to the Study Area
Coral, Coral Reefs, and Live/Hardbottoms	Predominantly corals belonging to the Class Hydrozoa and Class Anthozoa	None	None
Snapper-Grouper Complex	Sea Basses and Groupers, Wreckfish, Snappers, Porgies, Grunts, Tilefishes, Jacks, Triggerfishes, Wrasses, and Spadefishes	Unconsolidated Seafloor Habitats, Estuarine and Intertidal Habitats, and Marine Water Column	None
Coastal Migratory Pelagics	Cero, Cobia, King Mackerel, Little Tunny, Spanish Mackerel	Estuarine and Intertidal Habitats, and Marine Water Column	None
Dolphin-Wahoo	Dolphin, Wahoo	None	None
Golden Crab	Golden Crab	None	None
Shrimp	White Shrimp, Pink Shrimp, Brown Shrimp, Rock Shrimp, Royal Red Shrimp	Estuarine and Intertidal Habitats, and Marine Water Column	Estuarine and Intertidal Habitats
Spiny Lobster	Spiny Lobster	None	None

Table 3-10, continued

Fishery Management Unit	General Species Included	EFH Specific to the Study Area	HAPC Specific to the Study Area
Sargassum	*Sargassum fluitans* *Sargassum natans*	None	None
Summer Flounder	*Paralichthys dentatus*	Estuarine and Intertidal Habitats	Estuarine and Intertidal Habitats

Source: SAFMC 2012

Several FMPs contain programs for license limitation, license moratoria, and trap limitations; other management actions work toward preventing overfishing or rebuilding overfished stocks; and certain actions establish seasonal or area closures to certain gear types. These actions either directly or indirectly reduce fishing effort and potential adverse fishing impacts on segments of EFH. Once an FMP is finalized, NMFS becomes responsible for the implementation of the regulations and the U.S. Coast Guard provides enforcement authority. EFH has been identified for numerous species and management units within the Study Area. Only those fisheries with EFH identified within the Study Area, or those potentially affected by the recapitalization activities, would be discussed further. The majority of the FMPs discuss groupings or complexes of fish, and these complexes would be discussed as a whole, rather than by individual species.

The Study Area extends through the jurisdiction of the SAFMC. In addition, the Study Area also extends through areas where NMFS has designated EFH for highly migratory species (e.g., tuna, billfish, swordfish, and sharks). As a result, the Preferred Alternative may occur within areas designated as EFH by SAFMC and NMFS, and would be analyzed for potential adverse effects.

3.2.4.2 Fishes: EFH – Environment

Most juvenile estuarine fish managed by the SAFMC accumulate and thrive in shallow tidal creeks and flats (Ross 2003), which would suggest a lack of juvenile habitat in the steep-sided basin of the Study Area. The seasonal abundance patterns of selected fish species in high salinity portions of the St. Johns River estuary are detailed in Table 3-11, including but not limited to SAFMC managed species.

Adults of the selected species are more likely to occur in the Study Area; abundant species (adult life stage) in the lower St. Johns River estuary include gray snapper (*Lutjanus griseus*), lane snapper (*Lutjanus synagis*), rock sea bass (*Centropristis striata*), summer flounder (*Paralichthys lethostigma*), Spanish mackerel (*Scomberomorus maculatus*), king mackerel (*Menticirrhus americanus*), and Atlantic sharpnose shark (*Rhizoprionodon terraenovae*); all have either estuarine spawning/estuarine nursery or ocean spawning/estuarine nursery life histories. Estuarine spawning adults may be abundant year-round. The anadromous Atlantic sturgeon, an ESA species, is considered rare in the Study Area. Sharks and other highly migratory fish occurring in coastal waters were not included in the Estuarine Living Marine Resources database (Section 3.2.4 EFH).

Table 3-11. Estuarine Fishes of the High-Salinity Zone of the St. Johns River

Common Name	Life Stage	January	February	March	April	May	June	July	August	September	October	November	December
Alewife (*Alosa pseudoharengus*)	**Adults**	0	0	0	0	0	0	0	0	0	0	0	0
	Eggs	0	0	0	0	0	0	0	0	0	0	0	0
	Juveniles	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	0	0	0	0	0	0	0	0	0	0	0	0
	Mating	0	0	0	0	0	0	0	0	0	0	0	0
American Eel (*Anguilla rostrate*)	**Adults**	3	3	3	0	0	0	0	0	0	0	3	3
	Eggs	0	0	0	0	0	0	0	0	0	0	0	0
	Juveniles	4	4	4	4	4	4	4	4	4	4	4	4
	Larvae	4	5	5	5	4	0	0	0	0	0	0	0
	Mating	0	0	0	0	0	0	0	0	0	0	0	0
American Shad (*Alosa sapidissima*)	**Adults**	3	3	3	3	3	0	0	0	0	0	3	3
	Eggs	0	0	0	0	0	0	0	0	0	0	0	0
	Juveniles	3	0	0	0	0	0	0	0	0	3	3	3
	Larvae	0	0	0	0	0	0	0	0	0	0	0	0
	Mating	0	0	0	0	0	0	0	0	0	0	0	0
Atlantic Sturgeon (*Acipenser oxyrinchus oxyrinchus*)	**Adults**	0	0	2	2	2	0	0	0	2	2	2	0
	Eggs	0	0	0	0	0	0	0	0	0	0	0	0
	Juveniles	0	0	0	0	0	0	0	0	2	2	2	0
	Larvae	0	0	0	0	0	0	0	0	0	0	0	0
	Mating	0	0	0	0	0	0	0	0	0	0	0	0
Black Drum (*Pogonias cromis*)	**Adults**	3	3	3	3	3	3	3	3	3	3	3	3
	Eggs	3	3	3	3	3	0	0	0	0	0	0	0
	Juveniles	4	4	4	4	4	4	4	4	4	4	4	4
	Larvae	4	4	4	4	4	4	0	0	0	0	0	0
	Mating	3	3	3	3	3	0	0	0	0	0	0	0
Blueback Herring (*Alosa aestivalis*)	**Adults**	3	3	3	3	0	0	0	0	0	0	0	3
	Eggs	0	0	0	0	0	0	0	0	0	0	0	0
	Juveniles	3	3	3	3	3	3	3	3	3	3	3	3
	Larvae	0	0	0	0	0	0	0	0	0	0	0	0
	Mating	0	0	0	0	0	0	0	0	0	0	0	0
Bluefish (*Pomatomus saltatrix*)	**Adults**	3	3	3	3	3	0	0	0	0	3	3	3
	Eggs	0	0	0	0	0	0	0	0	0	0	0	0
	Juveniles	3	3	3	3	3	3	3	3	3	3	3	3
	Larvae	0	0	0	0	0	0	0	0	0	0	0	0
	Mating	0	0	0	0	0	0	0	0	0	0	0	0

Source: NOAA 2015. Note: 0=absent, 2=rare; 3=common; 4=abundant; 5=high abundant

Table 3-11, continued

Common Name	Life Stage	January	February	March	April	May	June	July	August	September	October	November	December
Cobia (*Rachycentron canadum*)	**Adults**	3	3	3	3	3	3	3	3	3	3	3	3
	Eggs	0	0	0	0	0	0	0	0	0	0	0	0
	Juveniles	3	3	3	3	3	3	3	3	3	3	3	3
	Larvae	0	0	0	0	0	0	0	0	0	0	0	0
	Mating	0	0	0	0	0	0	0	0	0	0	0	0
Gray Snapper (*Lutjanus griseus*)	**Adults**	3	3	3	3	3	3	3	3	3	3	3	3
	Eggs	0	0	0	0	0	0	0	0	0	0	0	0
	Juveniles	3	3	3	3	3	3	3	3	3	3	3	3
	Larvae	0	0	0	3	3	3	3	3	0	0	0	0
	Mating	0	0	0	0	0	0	0	0	0	0	0	0
Gulf Flounder (*Paralichthys albiguttata*)	**Adults**	0	0	3	3	3	3	3	3	3	3	0	0
	Eggs	0	0	0	0	0	0	0	0	0	0	0	0
	Juveniles	3	3	3	3	3	3	3	3	3	3	3	3
	Larvae	3	3	3	3	0	0	0	0	0	0	3	3
	Mating	0	0	0	0	0	0	0	0	0	0	0	0
Ladyfish (*Elops saurus*)	**Adults**	3	3	3	3	3	3	3	3	3	3	3	3
	Eggs	0	0	0	0	0	0	0	0	0	0	0	0
	Juveniles	3	3	3	3	3	3	3	3	3	3	3	3
	Larvae	3	3	3	3	0	0	0	0	0	0	0	0
	Mating	0	0	0	0	0	0	0	0	0	0	0	0
Red Drum (*Sciaenops ocellatus*)	**Adults**	3	3	3	3	3	3	3	3	3	3	3	3
	Eggs	4	0	0	0	0	0	0	0	4	4	4	4
	Juveniles	4	4	4	4	4	4	4	4	4	4	4	4
	Larvae	4	4	0	0	0	0	0	0	4	4	4	4
	Mating	4	0	0	0	0	0	0	0	4	4	4	4
Sheepshead (*Archosargus probatocephalus*)	**Adults**	4	4	4	4	4	4	4	4	4	4	4	4
	Eggs	0	3	3	3	3	0	0	0	0	0	0	0
	Juveniles	4	4	4	4	4	4	4	4	4	4	4	4
	Larvae	0	3	3	3	3	0	0	0	0	0	0	0
	Mating	0	3	3	3	3	0	0	0	0	0	0	0
Southern Flounder (*Paralichthys lethostigma*)	**Adults**	0	0	3	4	4	4	4	4	4	3	3	3
	Eggs	0	0	0	0	0	0	0	0	0	0	0	0
	Juveniles	3	3	4	4	4	4	4	4	4	4	3	3
	Larvae	4	4	3	3	3	0	0	0	0	3	4	4
	Mating	0	0	0	0	0	0	0	0	0	0	0	0

Source: NOAA 2015. Note: 0=absent, 2=rare; 3=common; 4=abundant; 5=high abundant

Table 3-11, continued

Common Name	Life Stage	January	February	March	April	May	June	July	August	September	October	November	December
Southern Kingfish (*Menticirrhus americanus*)	**Adults**	3	3	3	3	3	3	3	3	3	3	3	3
	Eggs	0	0	0	0	0	0	0	0	0	0	0	0
	Juveniles	3	3	3	3	3	3	3	3	3	3	3	3
	Larvae	0	0	0	3	3	3	3	3	0	0	0	0
	Mating	0	0	0	0	0	0	0	0	0	0	0	0
Spanish Mackerel (*Scomberomorus maculatus*)	**Adults**	3	3	3	0	0	0	0	0	0	3	3	3
	Eggs	0	0	0	0	0	0	0	0	0	0	0	0
	Juveniles	3	3	3	3	3	3	3	3	3	3	3	3
	Larvae	0	0	0	0	0	0	3	3	3	0	0	0
	Mating	0	0	0	0	0	0	0	0	0	0	0	0
Spotted Seatrout (*Cynoscion nebulosus*)	**Adults**	3	3	3	3	3	3	3	3	3	3	3	3
	Eggs	0	0	0	3	3	3	3	0	0	0	0	0
	Juveniles	3	3	3	3	3	3	3	3	3	3	3	3
	Larvae	0	0	0	3	3	3	3	3	0	0	0	0
	Mating	0	0	0	3	3	3	3	0	0	0	0	0
Striped Bass (*Morone saxatilis*)	**Adults**	0	0	0	0	0	0	0	0	0	0	0	0
	Eggs	0	0	0	0	0	0	0	0	0	0	0	0
	Juveniles	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	0	0	0	0	0	0	0	0	0	0	0	0
	Mating	0	0	0	0	0	0	0	0	0	0	0	0
Striped Mullet (*Mugil cephalus*)	**Adults**	3	3	3	5	5	5	5	5	5	3	3	3
	Eggs	0	0	0	0	0	0	0	0	0	0	0	0
	Juveniles	4	4	4	5	5	5	5	5	5	5	5	5
	Larvae	5	5	4	4	0	0	0	0	0	4	5	5
	Mating	0	0	0	0	0	0	0	0	0	0	0	0
Summer Flounder (*Paralichthys dentatus*)	**Adults**	0	0	3	3	3	3	3	3	3	0	0	0
	Eggs	0	0	0	0	0	0	0	0	0	0	0	0
	Juveniles	3	3	3	3	3	3	3	3	3	3	3	3
	Larvae	3	3	3	0	0	0	0	0	0	0	0	3
	Mating	0	0	0	0	0	0	0	0	0	0	0	0
Weakfish (*Cynoscion regalis*)	**Adults**	4	4	4	4	4	4	4	4	4	4	4	4
	Eggs	0	0	4	4	4	4	4	4	0	0	0	0
	Juveniles	4	4	4	4	4	4	4	4	4	4	4	4
	Larvae	0	0	4	4	4	4	4	4	4	0	0	0
	Mating	0	0	4	4	4	4	4	4	0	0	0	0

Source: NOAA 2015. Note: 0=absent, 2=rare; 3=common; 4=abundant; 5=high abundant

3.2.4.2.1 Snapper-Grouper Complex EFH and HAPC

Numerous fish species are included in the *Snapper-Grouper Complex* FMU; however, the gray snapper is the only common representative in the Study Area (see Table 3-11). The EFH for species within the *Snapper-Grouper Complex* FMU is defined as:

> Coral reefs, live/hard bottom, submerged aquatic vegetation, artificial reefs and medium to high profile outcroppings on and around the shelf break zone from shore to at least 600 ft (but to at least 2,000 ft for wreckfish) where the annual water temperature range is sufficiently warm to maintain adult populations of members of this largely tropical complex. EFH includes the spawning area in the water column above the adult habitat and the additional pelagic environment, including *Sargassum*, required for larval survival and growth up to and including settlement. In addition, the Gulf Stream is an essential fish habitat because it provides a mechanism to disperse snapper grouper larvae. For specific life stages of estuarine dependent and nearshore snapper-grouper species, EFH includes areas inshore of the 100-foot contour, such as attached macroalgae; submerged rooted vascular plants (seagrasses); estuarine emergent vegetated wetlands (saltmarshes, brackish marsh); tidal creeks; estuarine scrub/shrub (mangrove fringe); oyster reefs and shell banks; unconsolidated bottom (soft sediments); artificial reefs; and coral reefs and live/hard bottom. (SAFMC 1998)

The Study Area includes components of *Snapper-Grouper Complex* EFH such as unconsolidated seafloor habitats, estuarine and intertidal habitats (attached macroalgae and oyster habitat), and marine water column. The artificial structures along the shoreline may qualify as EFH because any rough, hard, and stable substrate, including the artificial substrate, would provide EFH for the *Snapper-Grouper Complex*. Estuarine emergent wetlands, mangrove fringes, tidal creeks, coral reefs, and live hard bottom (with coral species) are not expected to occur in the Study Area (see Sections 3.2.1 Invertebrates and 3.2.2 Marine Vegetation). The NAVSTA Mayport Turning Basin is in HAPC for the snapper-grouper complex.

3.2.4.2.2 Coastal Migratory Pelagics

Fish species within the *Coastal Migratory Pelagics* FMU include Spanish mackerel, king mackerel, and cobia. Of these species, Spanish mackerel and cobia are considered common in the lower St. Johns River estuary (see Table 3-11). The EFH for species within the *Coastal Migratory Pelagics* FMU is defined as:

> Sandy shoals of capes and offshore bars, high profile rocky bottom and barrier island ocean-side waters, from the surf to the shelf break zone, but from the Gulf stream shoreward, including *Sargassum*. In addition, all coastal inlets, all state-designated nursery habitats of particular importance to coastal migratory pelagics (for example, in North Carolina this would include all Primary Nursery Areas and all Secondary Nursery Areas). In addition, the Gulf Stream is an EFH because it provides a mechanism to disperse coastal migratory pelagic larvae. For king and Spanish mackerel and cobia EFH occurs in the South Atlantic and Mid-Atlantic Bights. For cobia essential fish habitat also includes high salinity bays, estuaries, and seagrass habitat. (SAFMC 1998)

The Study Area includes components of EFH for *Coastal Migratory Pelagics* such as estuarine and intertidal habitats (open estuarine waters in close proximity to an inlet) and marine water column (high salinity bay). There are no Florida state-designated nursery areas and no documented seagrass beds occurring in the Study Area (see Section 3.2.2 Marine Vegetation). No HAPC designated for *Coastal Migratory Pelagics* species coincides with the Study Area.

Highly Migratory Pelagics

NOAA Fisheries (Atlantic Highly Migratory Species (HMS) Management Division) has the responsibility for managing the *Highly Migratory Pelagics* species (e.g., tunas, billfish, swordfish, and sharks) and designating EFH and HAPC in the U.S. waters of the Atlantic Ocean and the Gulf of Mexico, as these species are not restricted to the waters under the jurisdiction of any single Fishery Management Council and often migrate long distances. Because these species cross domestic and international boundaries, NOAA Fisheries' HMS Management Division is responsible for managing them under the MSA.

In cooperation with an advisory panel, the division develops and implements fishery management plans for these species taking into account all domestic and international requirements under the Atlantic Tunas Convention Act, MMPA, the ESA, and the MBTA. Further, NOAA Fisheries has adopted amendments to the fishery management plans of each of the six primary fisheries that they manage as a means of designating EFH and HAPC for each of the species (NMFS 2009). Coastal sharks (large and small) are the only group of HMS expected to occur in the Study Area (Table 3-12). No HAPC designated for *Highly Migratory Pelagics* species coincides with the Study Area.

Table 3-12. Highly Migratory Pelagics Species Potentially in the Study Area

Species	Scientific Name
Atlantic sharpnose shark	*Rhizoprionodon terraenovae*
Blacknose shark	*Carcharhinus acronotus*
Blacktip shark	*Carcharhinus limbatus*
Bonnethead shark	*Sphyrna tiburo*
Bull shark	*Carcharhinus leucas*
Finetooth shark	*Carcharhinus isodon*
Great hammerhead	*Sphyrna mokarran*
Lemon shark	*Negaprion brevirostris*
Nurse shark	*Ginglymostoma cirratum*
Sandbar shark	*Carcharhinus plumbeus*
Scalloped hammerhead	*Sphyrna lewini*
Spinner shark	*Carcharhinus brevipinna*

Sources: GSRC 2015 and NMFS 2009b

3.2.4.2.3 Shrimp

Shrimp species within the *Shrimp* FMU include brown shrimp, pink shrimp, and white shrimp. Of these species, the juvenile and larval stages are considered common to highly abundant throughout nearly all months of the season in the lower St. Johns River estuary (see Table 3-11). The EFH for species within the *Shrimp* FMU is defined as:

> Inshore estuarine nursery areas, offshore marine habitats used for spawning and growth to maturity, and all interconnecting water bodies as described in the Habitat Plan. Inshore nursery areas include tidal freshwater (palustrine), estuarine, and marine emergent wetlands (e.g., intertidal marshes); tidal palustrine

> forested areas; mangroves; tidal freshwater, estuarine, and marine submerged aquatic vegetation (e.g., seagrass); and subtidal and intertidal non-vegetated flats. This applies from North Carolina through the Florida Keys." *Shrimp* HAPCs include: "…all coastal inlets, all state-designated nursery habitats of particular importance to shrimp (for example, in North Carolina this would include all Primary Nursery Areas and all Secondary Nursery Areas), and state identified overwintering areas. (SAFMC 1998)

The Study Area includes unconsolidated seafloor habitats and estuarine and intertidal habitats (subtidal flats) components of EFH for brown shrimp, pink shrimp, and white shrimp. HAPC designation for these commercial shrimp species coincides with the Study Area. Wetlands and seagrass are not expected to occur in the Study Area (see Section 3.2.2 Marine Vegetation).

3.2.4.2.4 Summer Flounder

The Mid-Atlantic Fishery Management Council (MAFMC) has designated all submerged aquatic vegetation and macroalgae beds from Maine to Indian River (Florida) as HAPC for summer flounder (GAFMC 2015).

> All native species of macroalgae, seagrasses, and freshwater and tidal macrophytes in any size bed, as well as loose aggregations, within adult and juvenile summer flounder EFH is HAPC. If native species of SAV are eliminated, then exotic species should be protected because of functional value; however, all efforts should be made to restore native species.

The Study Area includes unconsolidated seafloor habitats and estuarine and intertidal habitats (macroalgae) components of EFH for Summer Flounder EFH as HAPC (Section 3.2.2 Marine Vegetation). The Study Area includes an abundance of juvenile summer flounder (see Table 3.11).

3.2.4.3 Fishes: EFH – Consequences

3.2.4.3.1 Alternative 1 – No Action Alternative

Under Alternative 1, the Wharf Bravo recapitalization would not occur. Baseline conditions for fishes, as described in Section 3.2.2, would remain unchanged. Therefore, there would be no impacts on fishes from the implementation of Alternative 2.

3.2.4.3.2 Alternative 2 – Preferred Alternative

Physical Impacts

Alternative 2 activities that would result in physical impacts on fishes include the construction of a new steel sheet pile (via vibratory and impact pile driving) bulkhead in front of the existing steel sheet pile structure and placement of fill between existing and new steel sheet pile bulkheads. These activities would result in disturbance of the water column and bottom substrate, and short-term loss of existing oyster growth, attached macroalgae, and potential foraging habitat provided by the existing bulkhead (see Section 3.2.1; Marine Invertebrates). The attached macroalgae EFH would quickly recolonize the new Wharf Bravo bulkhead structures (in less than 1 year), while the oyster reef EFH would take several years to fully mature (Bahr and Lanier 1981, Coen et al. 1999). The small area of unconsolidated substrate

EFH (e.g., subtidal flats) in the affected area would be lost and others minimally disturbed by the new construction of the vertical sheet pile and bulkhead structures.

The estimated area of vertical oyster distribution (estuarine and intertidal EFH components) impacted (0.15 acres) was based on the surface area of subtidal structures buried (concrete fill) and the density-at-depth distribution of oysters (see Section 2.2.1; Marine Invertebrates). This area assumed an equal width of oyster reef growth along the entire length, and no growth on the support pilings and submerged debris. It would be difficult to determine an entire surface area impacted without a comprehensive survey of the submerged structures. However, the regrowth of oysters on the new Wharf Bravo structures is anticipated to compensate for the long-term impact on oysters residing on the existing bulkhead structures.

Water Quality Impacts

The Wharf Bravo recapitalization activities would potentially cause short-term impacts on the benthic and substrate associated fishes. The pile driving and backfill of the wall activities associated with the recapitalization would cause resuspension of sediments that would result in a temporary increase of suspended solids or turbidity may cause temporary negligible impacts on fishes. Resuspended sediments would also reduce dissolved oxygen periodically during in-water construction activities. Resuspended sediments could also improve forage opportunities for juvenile fish species that are benthic feeders (Jackson and Cowan 2013). The estuarine and intertidal EFH would experience temporary impacts associated with turbidity from the resuspension of sediments. The overall level of sediment disturbance associated with the Wharf Bravo recapitalization Project is anticipated to be significantly lower than that of maintenance dredging in the NAVSTA Mayport Turning Basin. Frequent tidal flushing would also dilute the concentration of contaminants in the basin water column. The turbidity and the resuspended sediments are expected to dissipate, rapidly disperse, or resettle to the NAVSTA Mayport Turning Basin floor within a few hours (NMFS 2009). The estuarine and intertidal EFH exposed to resuspended sediments are also not likely to be impacted by contaminants. The activities that generate suspended sediments would be short-term and localized.

Acoustic Impacts

There is an in-depth discussion of underwater noise from pile driving and the modeling methodology in Section 3.1.2; Sound and Section 3.2.3; Fishes. There is no population-level impact on unregulated fishes anticipated from the sound intensities modeled and only minor and temporary adverse impacts on water column EFH for all managed species inhabiting the water column are anticipated.

Conclusions

There would be no significant impacts on EFH or HAPC with implementation of Alternative 2. Alternative 2 activities would have minor and temporary adverse impacts on the EFH and HAPC for Federally managed shrimp species. The attached macroalgae (summer flounder EFH) would experience a temporary adverse impact, although where it would be lost due to the concrete fill, rapid recolonization is anticipated. The oyster habitat (snapper-grouper EFH) would experience long-term adverse impacts before the regrowth of oysters on the new Wharf Bravo sheet pile and bulkhead structures is established. Water column habitats (EFH for all managed species inhabiting the water column) would experience only temporary impacts of minor intensity.

The Navy submitted this EA containing the EFH assessment (Section 3.2.4 EFH) to NMFS; Division of Habitat Conservation for the Wharf Bravo recapitalization Project. On August 20,

2015, NMFS provided a letter (Appendix A) that concurred with the Navy's assessments and offered no EFH conservation recommendations, thus fulfilling the requirements of the MSA and requiring no further action.

3.2.5 Marine Mammals

3.2.5.1 Regulatory Environment

3.2.5.1.1 Marine Mammal Protection Act

All marine mammals are protected under the MMPA (PL 92-522). The MMPA provides for the conservation and management of marine mammals and their habitats. The MMPA established, with limited exceptions, a complete moratorium on the *taking* of marine mammals in waters or on lands under U.S. jurisdiction. This broad prohibition applies to all marine mammals, not just those deemed to be threatened or endangered. The term *take* is defined in the MMPA as to harass, hunt, capture, or kill, or attempt to harass, hunt, capture, or kill any marine mammal. "Harassment" was further defined in the 1994 amendments to the MMPA, which provided two levels of harassment: Level A (potential injury) and Level B (potential behavioral disturbance). Although the MMPA establishes a moratorium on the *taking* of marine mammals by any person in U.S. waters and by U.S. citizens in international waters, certain activities are exempted from the moratorium as outlined in Sections 101 and 104. The category pertinent to the Navy is that of incidental *take* during non-fishery activities (Section 101(a)(5)(A)(ii). Authorization from NMFS is required to participate in such a designated activity. Such authorization is known as a Letter of Authorization (LOA). If the *take* would be by harassment only, an IHA may be issued by NMFS.

3.2.5.1.2 Endangered Species Act

Some species of marine mammals are afforded additional protection under the ESA. The ESA provides for conservation of wildlife and plants that have been listed as either threatened or endangered. The ESA also outlines the need to protect the designated "critical habitat" of listed species (16 U.S.C. 1531). The ESA applies to Federal actions in two separate respects. First, the ESA requires that Federal agencies, in consultation with the responsible wildlife agency (i.e., USFWS or NMFS), ensure that proposed actions are not likely to jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of a critical habitat (16 U.S.C. 1536 (a)(2)). Regulations implementing the ESA expand the consultation requirement to include those actions that "may affect" a listed species or adversely modify critical habitat. Second, if an agency's proposed action would take a listed species, then the agency must obtain an Incidental Take Statement from the responsible regulatory agency. Descriptions for the threatened and endangered marine mammals of the Study Area are summarized below from the MRA for the Charleston/Jacksonville OPAREA (DON 2008a).

3.2.5.2 Marine Mammals – Environment

The information on marine species distribution relies heavily on data gathered in the Navy's MRA. The Navy MRA Program was implemented by the USFFC Commander to initiate collection of data and information concerning protected and commercial marine resources found in the Navy's OPAREAs. Marine mammal descriptions for the Study Area are supported largely from the data contained in the Navy's MRA for the Charleston/Jacksonville OPAREA (DON

2008a). The updated marine mammal densities affecting the Study Area are contained in the NODE for the Southeast OPAREAs (DON 2007) and recently updated in the *Final Environmental Impact Statement/Overseas Environmental Impact Statement for Atlantic Fleet Training and Testing* (DON 2013b). This report provides a compilation of the most recent data and information on the occurrence, distribution, and density of marine mammals in the southeastern U.S. Bottlenose dolphin (*Tursiops truncates*) densities were recently updated during a 2012 through 2013 bottlenose dolphin surveys within the NAVSTA Mayport Turning Basin and reported in the *Programmatic Biological Assessment for Harbor Maintenance and Repairs within the NAVSTA Mayport Turning Basin, Naval Station Mayport, Mayport, Florida* (DON 2014). Table 3-13 lists those Federally protected (ESA and MMPA) marine mammals that potentially occur in the vicinity of the Study Area.

Table 3-13. Protected Marine Mammals (ESA and MMPA) within the Study Area

Common Name	Scientific Name	MMPA/ESA Status
North Atlantic right whale	*Eubalaena glacialis*	MMPA and ESA/Endangered
Humpback whale	*Megaptera novaeangliae*	MMPA and ESA/Endangered
West Indian (Florida) manatee	*Trichechus manatus latirostris*	MMPA and ESA/Endangered
Atlantic spotted dolphin	*Stenella frontalis*	MMPA
Bottlenose dolphin	*Tursiops truncatus*	MMPA

Source: GSRC 2015

Mysticetes (Baleen Whales)

Two baleen whale species (North Atlantic right whale [*Eubalaena glacialis*] and humpback whale [*Megaptera novaeangliae*]) may potentially occur in the waters of the Study Area. Mysticetes may occur in many water depths, including deep oceanic water, continental shelf water, and nearshore water. In addition, North Atlantic right whales can be found in particularly shallow water during calving season (mid-December through March), sometimes just outside the surf zone. All three baleen whales are protected under the MMPA, as well as the ESA.

Odontocetes (Toothed Whales and Dolphins)

A number of Odontocetes have been documented in nearshore and offshore waters of the Study Area. The bottlenose dolphin is the most commonly sighted species with inshore species sighted within 4.0 nautical miles (nm) (7.5 km) of shore and offshore species sighted further than 18.3 nm (34 km) from shore (DON 2008a). Other relatively abundant species include the Atlantic spotted dolphin (*Stenella frontalis*). All Odontocetes are protected under the MMPA.

3.2.5.2.1 Federally Listed Marine Mammals and Critical Habitat

North Atlantic Right Whale

Status and Management – The North Atlantic right whale is Federally listed as endangered under the ESA (35 FR 18319); its listing was revised in 2008 (73 FR 12024). A 5-year review was completed in August 2012 with a recommendation to maintain the species' classification as endangered (NMFS 2012). North Atlantic right whales are designated as depleted under the MMPA.

Habitat and Geographic Range – North Atlantic right whales are large baleen whales, generally 13.7 m to 16.7 m in length, and can weigh up to 70 tons. Female right whales are larger than males. North Atlantic right whales feed from spring to fall and, in certain areas, also in winter, and are most often seen as individuals or pairs (Jefferson et al. 1993). They migrate annually

between the north and south Atlantic coasts of the U.S. They can generally be found in calving grounds off Georgia and Florida from mid-November to mid-April. North Atlantic right whale calves are born during December through March after 12 to 13 months of gestation (Kraus et al. 2001). Recent analysis of sightings data suggests a slight growth in population size to 450 (NOAA Fisheries 2015a).

Population and Abundance – The western North Atlantic minimum stock size is based on a census of individual whales identified using photo-identification techniques. A review of the photo-ID recapture database as it existed on 21 October 2011 indicated that 425 individually recognized whales in the catalog were known to be alive during 2009. Whales catalogued by this date included 20 of the 39 calves born during that year. Thus, adding the 19 calves not yet catalogued brings the minimum number alive in 2009 to 444. Based on annual surveys conducted from December through March between 1985 and 2007, North Atlantic right whales are relatively common visitors to waters offshore from NAVSTA Mayport and the Federal navigation channel (New England Aquarium 2013; Loop 2015a, 2015b). Incidental sightings of North Atlantic right whales are an infrequent occurrence in the St. Johns River and NAVSTA Mayport Turning Basin, with the most recent sighting of two individuals occurring at the mouth of the St. Johns River in December 2012 (Gibbons 2011, Loop 2015a, 2015b). Based on data in the Navy's Marine Species Density Database (MSDD), a density of 0.00005 individuals/square kilometer (km^2) has been estimated for the Study Area.

Predator/ Prey Interaction and Foraging – Right whales are skimmers; they feed by removing prey from the water using baleen while moving with their mouth open through a patch of zooplankton. The right whale occurs primarily in coastal or shelf waters, with a range strongly correlated to the distribution of its prey. Although the location of much of the population is unknown during winter, right whales do occur in lower latitudes during the winter and migrate to higher latitudes during the spring or summer. A total of 95 sightings of the North Atlantic right whale have been documented during 2014 off the coast of southern Georgia/northern Florida. These sightings ranged from a group size of one to six with the most sights (69) in a group size two of individuals (NOAA Fisheries 2015a).

Threats – Threats to the North Atlantic right whale are mostly human-related. Historically, the North Atlantic right whale population was largely depleted by commercial whaling. Currently, the primary threats to right whales include serious injury or mortality from becoming entangled in fishery gear and being struck by ships (NOAA Fisheries 2015a). From 2007 through 2011, the minimum rate of annual human-caused mortality and serious injury (incidental fishery entanglement and ship strike) to North Atlantic right whales averaged 4.05 per year; or a total of 21 that were classified as serious injury or mortality (Waring et al. 2013). Other reasons for decline may include habitat degradation, contaminants, climate and ecosystem change, and predators. Activities that may cause further disturbance to the North Atlantic right whales include whale-watching and noise from industrial activities. NMFS approved a Final Recovery Plan for the North Atlantic right whale in 1991, and the recovery plan was revised in 2005 (70 FR 32293).

The ultimate goal of the recovery effort is to allow the right whale to be delisted; the intermediate goal is to reclassify the species from endangered to threatened (NMFS 2005). Criteria for delisting the species were not included in the recovery plan because decades of population growth would likely be required before the population could attain such abundance for NMFS to consider delisting the species (NMFS 2005). NMFS has updated its serious injury

designation and reporting process, which uses guidance from previous serious injury workshops, expert opinion, and analysis of historic injury cases to develop new criteria for distinguishing serious from non-serious injury (NMFS 2012). NMFS defines serious injury as an "injury that is more likely than not to result in mortality." All injury determinations for this stock assessment were performed under the new guidelines. The new process involves proration of serious injury determinations where there is uncertainty regarding the severity or cause.

Seasonal Management Areas – NOAA Fisheries has established a Southeastern U.S. Seasonal Management Area in support of the Compliance Guide for Right Whale Ship Strike Reduction Rule (50 CFR 224.105). This Seasonal Management Area imposes and enforces a Mandatory Speed Restriction from November 15th through April 15th in the designated Calving and Nursery Grounds. Vessels may operate at a speed greater than 10 knots only if necessary to maintain a safe maneuvering speed in an area where conditions severely restrict vessel maneuverability as determined by the pilot or master. Vessel speed is restricted in the area bounded to the north by latitude 31º27'N; to the south by latitude 29º45'N; to the east by longitude 80º51'36"W (NOAA Fisheries 2015).

Critical Habitat – NMFS designated critical habitat for the North Atlantic right whale in 1994 (59 FR 28805). The whale's southeastern critical habitat unit is designated above the 28th parallel (NOAA Fisheries 2015). On February 20, 2015, NMFS further proposed a revision, recommending an expansion of the current designated critical habitat area due to improved scientific understanding of the essential calving features for the North Atlantic right whale. The specific area where the essential calving features are located ("Unit 2") is in the South Atlantic Bight and covers a total area of approximately 8,611 square nm (nm^2); within Unit 2, the essential features are:

- Sea surface conditions associated with Force 4 or less on the Beaufort Scale,
- Sea surface temperatures of 7° celcius (C) to 17 °C, and
- Water depths of 6 to 28 m.

These features occur simultaneously over contiguous areas of at least 231 nm^2 of ocean waters between the months of November and April. When these features are available, they are selected by right whale cows and calves in dynamic combinations that are suitable for calving, nursing, and rearing, and which vary, within the ranges specified, depending on factors such as weather and age of the calves. On January 27, 2016, NMFS issued a final rule (81 FR 4837) to replace the critical habitat for North Atlantic right whales with two new areas. The areas being designated as critical habitat contain approximately 29,763 nm^2 of marine habitat in the Gulf of Maine and Georges Bank region (Unit 1) and off the southeast U.S. coast (Unit 2) (Figure 3-3).

Humpback Whale
Status and Management – Humpback whales are listed as endangered under the ESA (35 FR 18319). A status review was initiated in 2009 (74 FR 40568). A distinguishing characteristic of humpback whales is their long pectoral fins, which can be up to 4.6 m in length (NOAA Fisheries 2015b). Similar to the North Atlantic right whale (and other baleens), adult females are larger than adult males. Whale watchers enjoy the humpback's aerial display and slapping of the surface. Humpback whale abundance is increasing through much of the species' range. Individuals that occur in the Study Area are from the Gulf of Maine stock. Humpback whales are designated as depleted under the MMPA.

Figure 3-3. North Atlantic Right Whale Designated Critical Habitat near the Study Area

Habitat and Geographic Range – During the winter, most of the North Atlantic population of humpback whales is believed to migrate south to calving grounds in the West Indies region (Whitehead and Moore 1982; Smith et al. 1999; Stevick et al. 2003), over shallow banks and along continental coasts, where calving occurs. Calving peaks from January through March, with some animals arriving as early as December and a few not leaving until June. The mean sighting dates in the West Indies for individuals from the U.S. and Canada are February 16 and 15, respectively (Stevick et al. 2003).

Humpbacks are found in high-latitude feeding grounds during the summer; in the winter they migrate to calving grounds. The seasonal migration of the humpback whale consists of long distances. During migration, humpbacks stay near the surface of the ocean, but while feeding and calving, humpbacks are found in shallow (warmer) waters (Waring et al. 2013). Gestation lasts about 11 months and mothers are protective of their calves; males do not provide support for the calves. Since humpback whales migrate south to calving grounds during the fall and make return migrations to the northern feeding grounds in spring, they are not expected off the coast of Florida during summer. There has been an increasing occurrence of humpbacks, which appear to be primarily juveniles, during the winter along the U.S. Atlantic coast from Florida north to Virginia (Clapham et al. 1993; Swingle et al. 1993; Wiley et al. 1995; Laerm et al. 1997).

The coastal region of Florida is not designated as an area of concentrated occurrence for humpback whales (DON 2008a). Examination of whaling catches revealed that both northward and southward migrations are characterized by a staggering of sexual and maturational classes; lactating females are among the first to leave summer feeding grounds in the fall, followed by subadult males, mature males, non-pregnant females, and pregnant females (Clapham 1996). On the northward migration, this order is broadly reversed, with newly pregnant females among the first to begin the return migration to high latitudes. Based on sightings, strandings, and life history, humpbacks will be expected to occur in waters off NAVSTA Mayport during fall, winter, and spring. The likelihood of occurrence is low, however, and even lower for the NAVSTA Mayport Turning Basin and Study Area.

Population and Abundance – The most recent line-transect survey, which did not include the Scotian Shelf portion of the stock, produced an estimate of abundance for Gulf of Maine humpback whales of 331 animals (coefficient of variation [CV] =0.48) with a resultant minimum population estimate for this stock of 228 animals. The line-transect based minimum estimate is unrealistic because at least 500 uniquely identifiable individual whales from the Gulf of Mexico stock were seen during the calendar year of that survey and the actual population would have been larger because re-sighting rates have historically been less than one. Using the minimum count from at least 2 years prior to the year of a stock assessment report has allowed NMFS time to resight whales known to be alive prior to and after the focal year. Thus the minimum population estimate is set to the 2008 mark-recapture based count of 823. Current data suggest the Gulf of Maine stock is steadily increasing in numbers (Waring et al. 2013). Based on data in the Navy's MSDD, a year-round density of 0.000113 individuals/km^2 has been estimated for the activity area.

Predator /Prey Interaction and Foraging – Humpback whales feed on a variety of plankton, invertebrates, and small schooling fishes. The most common invertebrate prey are krill; the most common fish prey are herring, mackerel, sand lance, sardines, anchovies, and capelin (Clapham and Mead 1999). Feeding occurs both at the surface and in deeper waters, wherever prey is

abundant. The humpback whale is the only species of baleen whale that shows strong evidence of cooperation when feeding in large groups (D'Vincent et al. 1985).

Threats – Threats facing the humpback whale are the same as those facing the North Atlantic right whale and specifically include entanglement in fishing equipment, ship strikes, whale watch harassment, habitat impacts, and harvest (NOAA Fisheries 2015b). From 2007 through 2011, 27 human-caused serious injuries or deaths of humpback whales were recorded. Entanglements accounted for eight mortalities and 39 serious injuries (Waring et al. 2013).

A final Recovery Plan was issued in 1991 (55 FR 29646) and a 5-year status review was initiated in August of 2009 (74 FR 40568). The recovery plan describes three types of goals for the plan: 1) a biological goal, 2) a numerical goal, and 3) a political goal (NOAA Fisheries 1991). The biological goal is to build and maintain populations large enough to withstand chance events. The numerical goal is to achieve population sizes at least 60 percent of the historic environmental carrying capacity in waters under U.S. jurisdiction. The political goal is to enable certain sub-species of the humpback whale to be down-listed or delisted completely.

Critical Habitat – There is no critical habitat designated for the humpback whale.

West Indian Manatee

Status and Management – The West Indian manatee (*Trichechus manatus latirostris*) was listed as endangered in 1967 (32 FR 4001). The USFWS announced on July 1, 2014, that it is moving forward on a status review for the West Indian manatee following an evaluation of information submitted in support of a 2012 petition to reclassify the species, including its subspecies, the Florida manatee and Antillean manatee, from endangered to threatened (FR 2014b). West Indian manatees are classified as depleted under the MMPA. Only individuals from the Florida subspecies may occur in the Study Area (Deutsch et al. 2003). The Florida subspecies is closely monitored and managed by the USFWS and the FWC. The Florida manatee population is divided into four management units, one of which (the Atlantic Coast unit) overlaps the Study Area (FWC 2007c). Data indicate that the Atlantic Coast management unit is stable.

Habitat and Geographic Range – West Indian manatees occur in warm, subtropical, and tropical waters of the western North Atlantic Ocean, from the southeastern U.S. to Central America, northern South America, and the West Indies (Lefebvre et al. 2001); they occur along both the Atlantic and gulf coasts of Florida. Florida manatees are found throughout the southeastern U.S. Because manatees are a sub-tropical species with little tolerance for cold, they are generally restricted to the inland and coastal waters of peninsular Florida during the winter, when they shelter in or near warm-water springs, industrial effluents, and other warm water sites (Hartman 1979; Lefebvre et al. 2001; Stith et al. 2006). In warmer months, manatees leave these sites and can disperse great distances. Individuals have been sighted as far north as Massachusetts, as far west as Texas, and in all states in between (Fertl et al. 2005; Rathbun 1988; Schwartz 1995; USFWS 2008).

Two groups of manatees reside in the Jacksonville area. One group remains in the area all winter, while the other group moves south during the winter (DON 2007a). Individual manatees are observed regularly in the vicinity of and inside the NAVSTA Mayport Turning Basin. There were 66 and 64 manatee sightings within the NAVSTA Mayport Turning Basin in 2014 and 2013, respectively. There were three additional sightings to date during 2015 (all in the month of April; Loop 2015a). They venture from the St. Johns River to the springs in November and reside there until March (USFWS 2001a, 2007a). As water temperatures rise in spring, West

Indian manatees disperse from winter aggregation areas. West Indian manatees are frequently reported in coastal rivers of Georgia and South Carolina during warmer months (Lefebvre et al. 2001).

West Indian manatees are not gregarious and are most often observed alone (Hartman 1979). However, in Florida they occasionally aggregate in large, unorganized groups around warm-water sources during the cooler months (Hartman 1979). The only significant social bonds are between mother and calf during the first 1 to 2 years of the calf's life (Reeves et al. 1992). There is no defined breeding season; calves are born year-round after an 11-month gestation (O'Shea et al.1995). West Indian manatees do not reproduce in consecutive years, except in rare instances (Kendall et al. 2004).

Population and Abundance – The exact population for the West Indian manatee is unknown, but the minimum population of Florida manatees was estimated at 4,834, based on a January 2014 stock assessment report (FR 2014a).

Predator/Prey Interaction and Foraging – West Indian manatees are herbivorous and are known to consume more than 60 species of plants. They typically feed on bottom vegetation, plants in the water column, and shoreline vegetation, such as hyacinths and marine sea grasses (Reynolds et al. 2009). In some areas, they are known to feed on algae and parts of mangrove trees (Jefferson et al. 2008; Mignucci-Giannoni and Beck 1998).

Threats – The most pressing threat to manatees is death or serious injury from boat strikes (USFWS 2001a). Manatee deaths have also occurred from inshore and nearshore commercial fishing activity, specifically involving the shrimping industry (FWC 2007c). Additional threats include uncertainty of the availability of warm-water refuges, increasing human population, and intensive coastal development. From 2010 through 2015, a total of 149 manatee mortalities were reported in Monroe County (FWC-FWRI 2016). Of these, 13 were watercraft-related. A recovery plan for the species was completed in 1989; the objective of the plan is to assist in the downlisting and ultimate delisting of the Florida manatee from its endangered status. The Manatee Recovery Plan was revised in 1996 and in 2001 (USFWS 2001a).

Critical Habitat – Critical habitat was designated for the Florida manatee in 1976 (41 FR 41914) and reorganized in 1977. It encompasses multiple inland rivers and coastal waterways throughout Florida; however, the designation does not define any primary constituent elements. The St. Johns River and Federal navigation channel to the northeast of the Study Area are included in this designation (Figure 3-4). A petition to revise manatee critical habitat was submitted in 2009, and a 12-month finding on that petition by USFWS stated that revisions should be made, including definition of primary constituent elements (75 FR 1574-1581); however, sufficient funding is not currently available (Center for Biological Diversity 2010).

3.2.5.2.2 Other Federally Protected Marine Mammals

Atlantic Spotted Dolphin

Status and Management – Atlantic spotted dolphins (*Stenella frontalis*) occurring in the Study Area belong to the Western North Atlantic Stock. The species is protected under the MMPA.

Habitat and Geographic Range – Atlantic spotted dolphins have a widespread distribution that ranges from the U.S. East Coast (Gulf of Mexico to Cape Cod, Massachusetts), the Azores and

Figure 3-4. West Indian Manatee Critical Habitat near the Study Area

Canary Islands, to Gabon, and Brazil (NOAA Fisheries 2015m). The large, heavily spotted coastal form of the Atlantic spotted dolphin typically occurs over the continental shelf inside or near the 185 m isobath, usually at least 8 to 20 km offshore (Perrin 2008). There are also frequent sightings of this species beyond the shelf break in the Caribbean, Gulf of Mexico, and off the U.S. Atlantic coast (NOAA Fisheries 2015m).

The Atlantic spotted dolphin tends to resemble bottlenose dolphins more than it does the pantropical spotted dolphin (Jefferson et al. 1993). In body shape, it is somewhat intermediate between the two, with a moderately long but rather thick beak. The dorsal fin is tall and falcate and there is generally a prominent spinal blaze. Adults are up to 2.3 m long and can weigh as much as 143 (kg) (Jefferson et al. 1993). Atlantic spotted dolphins are born spotless and develop spots as they age. Some Atlantic spotted dolphin individuals become so heavily spotted that the dark cape and spinal blaze are difficult to see (NOAA Fisheries 2015m).

Population and Abundance – Atlantic spotted dolphin sightings have been concentrated in the slope waters north of Cape Hatteras, but in the shelf waters south of Cape Hatteras, sightings extend into the deeper slope and offshore waters of the mid-Atlantic.

While specific seasonal occurrence information for Atlantic spotted dolphins on Florida’s Atlantic coast does not exist, studies have indicated that higher numbers of individuals have been reported over the west Florida continental shelf from November to May than during the rest of the year, suggesting that this species may migrate seasonally (NOAA Fisheries 2015m). Atlantic spotted dolphins are typically observed in deeper offshore waters. They could occur in shallower coastal waters in and around the Study Area, but the likelihood is low. The best recent abundance estimate for Atlantic spotted dolphins is the result of a 2011 survey - 26,798 (CV = 0.66) individuals (Waring et al. 2013). Based on data in the Navy’s MSDD, a year-round density of 0.680256 individual/km^2 has been estimated for the activity area.

Predator/Prey Interaction and Foraging – Atlantic spotted dolphins feed on small cephalopods, fishes, and benthic invertebrates (Perrin et al. 1994). Atlantic spotted dolphins in the Gulf of Mexico were observed feeding cooperatively on clupeid fishes and are known to feed in association with shrimp trawlers (Fertl and Leatherwood 1997; Fertl and Wursig 1995). In the Bahamas, this species was observed to chase and catch flying fish (MacLeod et al. 2004). The diet of the Atlantic spotted dolphin varies depending on its location (Jefferson et al. 2008; Perrin et al. 1994).

Threats – Atlantic spotted dolphins have been incidentally taken as bycatch in gillnets and purse seines. Harpooning of this species does occur in several parts of the world.

Critical Habitat – This species is not listed under the ESA; as such, no critical habitat has been designated.

Bottlenose Dolphins

Status and Management – Bottlenose dolphins occurring in the Study Area may be individuals belonging to any of the following stocks: the Western North Atlantic Offshore Stock, Jacksonville Estuarine System Stock; the Western North Atlantic Northern Florida Coastal Stock; and the Western North Atlantic Southern Migratory Coastal Stock. The species is protected under the MMPA.

Habitat and Geographic Range – Along the Atlantic coast of the U.S., where the majority of detailed work on bottlenose dolphins has been conducted, male and female bottlenose dolphins reach physical maturity at 13 years, with females reaching sexual maturity as early as 7 years (Mead and Potter 1990). Bottlenose dolphins are flexible in their timing of reproduction. Seasons of birth for bottlenose dolphin populations are likely responses to seasonal patterns of availability of local resources (Urian et al. 1996). Thayer et al. (2003) found bottlenose dolphins in North Carolina to exhibit a strong calving peak in spring, particularly May and June, and a diffuse peak from late spring to early fall. There is a gestation period of 1 year (Caldwell and Caldwell 1972). Calves are weaned as early as 1.5 years of age (Reynolds III et al. 2000), and typically remain with their mothers for a period of 3 to 8 years (Wells et al. 1987), although longer periods are documented (Reynolds III et al. 2000). There are no specific breeding locations for this species.

Population and Abundance – Bottlenose dolphins typically occur in groups of 2 to 15 individuals, but significantly larger groups have also been reported (Shane et al. 1986; Kerr et al. 2005). Coastal bottlenose dolphins typically exhibit smaller group sizes than larger forms, as water depth appears to be a significant influence on group size (Shane et al. 1986). Shallow, confined water areas typically support smaller group sizes, some degree of regional site fidelity, and limited movement patterns (Shane et al. 1986; Wells et al. 1987).

Recent surveys have shown that bottlenose dolphins in the vicinity of Wharf Bravo occur in groups of five or more, in pairs, and individually. Larger groups, observed infrequently, are generally seen at the entrance of the NAVSTA Mayport Turning Basin. These groups navigate into the basin, but generally not very far. A mother/calf pair was observed regularly during the winter and early spring of 2012 and 2013. Bottlenose dolphins are rarely observed lingering in a particular area in the NAVSTA Mayport Turning Basin; rather, they appear to move purposefully through the basin and then leave (DON 2014).

Based on incidental sightings in the NAVSTA Mayport Turning Basin, as well as initial results from a current survey taking place there, bottlenose dolphins are expected to be frequent visitors to the Study Area (DON 2008a, 2012). Based on surveys being conducted in the NAVSTA Mayport Turning Basin during late 2012 and early 2013 (DON 2014), a density of 2.53 individuals /km^2 has been estimated for the Study Area.

Predator/Prey Interaction and Foraging – Bottlenose dolphins are opportunistic feeders, taking a variety of fishes, cephalopods, and crustaceans (Wells and Scott 1999) and using a variety of feeding strategies (Shane et al. 1986). In addition to using echolocation, a process for locating prey by emitting sound waves that reflect back, bottlenose dolphins likely detect and orient to fish prey by listening for the sounds they produce, so-called passive listening (Barros and Myrberg 1987; Barros and Wells 1998). Nearshore bottlenose dolphins prey predominantly on coastal fishes and cephalopods, while offshore individuals prey on open ocean cephalopods and a large variety of near-surface and mid-water fishes (Mead and Potter 1995). Dive durations as long as 15 minutes have been recorded for trained bottlenose dolphins (Ridgway et al. 1969). Typical dives, however, are shallower and have a much shorter duration. Mean dive durations of Atlantic bottlenose dolphins typically range from 20 to 40 seconds at shallow depths (Mate et al. 1995).

Threats – Incidental injury and mortality of bottlenose dolphins occur from fishing gear such as gillnets, seines, trawls, and longline fishing gear. Pollutants and toxins in the water column can also pose a threat to this species.

Critical Habitat – This species is not listed under the ESA; therefore, no critical habitat has been designated.

3.2.5.3 Marine Mammals – Consequences

3.2.5.3.1 Alternative 1 – No Action Alternative

Under Alternative 1, the Wharf Bravo recapitalization would not occur. Baseline conditions for marine mammals, as described in Section 3.2.5, would remain unchanged. Therefore, there would be no impacts on marine mammals from the implementation of Alternative 1.

3.2.5.3.2 Alternative 2 – Preferred Alternative

Alternative 2 repair and facilities maintenance activities evaluates potential impacts on marine mammals by considering the importance of the resource (i.e., legal, recreational, ecological, or scientific); the proportion of the resource affected relative to its occurrence in the region; the particular sensitivity of the resource to Wharf Bravo repair and facilities maintenance activities; and the duration of environmental impacts or disruption. Impacts on resources are considered critical if:

- Habitats of high concern are adversely affected over relatively large areas;
- Disturbances to small essential habitats would lead to regional impacts on a protected species; or
- Disturbances harass or impact the ability of species to acquire resources and ultimately impact the abundance or distribution of Federally listed threatened or endangered species.

It is estimated that a maximum of 12,000 ft^2 (1,115 m^2) of benthic habitat could be disturbed or displaced in the Study Area over the 12 months; 10,000 ft^2 (929 m^2) by the potential maximum expansion of the wharf footprint, and 2,000 ft^2 (186 m^2) by the metal sheet piles themselves.

In particular, underwater pile driving noise during the construction period has the potential to temporarily disrupt marine mammal foraging, resting, and transiting in the vicinity of the Study Area during in-water work. The zone of influence due to pile driving noise is described in following sections. Other impacts on marine mammals, such as changes in prey availability, are anticipated to be highly localized to the Wharf Bravo construction area.

Any direct impacts on marine mammals resulting from the Wharf Bravo repair and facilities maintenance activities primarily would arise from underwater noise generated by vibratory and impact (contingency only) pile driving. This noise would exceed the threshold for behavioral disturbance to marine mammals and if unmitigated (e.g., if the Section 4.0; Minimization and Monitoring Measures were not adhered to), could also cause hearing-related injuries. The primary impacts on marine mammals from the Wharf Bravo repair and facilities maintenance activities would be associated with water quality changes (turbidity) in nearshore habitat, noise associated with vibratory and (contingency) impact pile driving, other construction equipment/vessel traffic; and changes in prey availability.

Seasonal occurrence of marine mammal species that may occur in the vicinity of the Wharf Bravo repair and facilities maintenance activities is summarized in Table 3-14. Marine mammals are likely to avoid (indicating behavioral disturbance) the immediate vicinity of pile driving. The likelihood of adverse impacts on these species would be minimized through application the Section 4.0; Minimization and Monitoring Measures.

Table 3-14. Expected Seasonal Occurrence of Marine Mammals Potentially in the Vicinity of the Study Area

Species	Seasons
North Atlantic right whale	More likely during winter months
Humpback whale	More likely during winter months
Bottlenose dolphin	Year round
Atlantic spotted dolphin	More likely during summer months
West Indian manatee	More likely during summer months

Sources: DON 2013

Physical Impacts

Construction vessel traffic required for the Wharf Bravo recapitalization activities is anticipated to be minimal. There have been no load restrictions placed on the current Wharf Bravo pier, and therefore, pile driving equipment (cranes, trucks, generators, etc.) would likely stage land-based operations. Vessel movements, however, do have the potential to affect marine mammals directly by accidentally striking or disturbing individual animals. For example, several studies have linked vessels with behavioral changes in killer whales in Pacific Northwest inland waters (Kruse 1991; Williams et al. 2011; Bain et al. 2006), although it is not well understood whether the presence and activity of the vessel, the vessel noise, or a combination of these factors produces the changes. It seems likely that both noise and visual presence of vessels play a role in prompting reactions from these animals. The probability and significance of vessel and marine mammal interactions is dependent on several factors including numbers, types, and speeds of vessels; the regularity, duration, and spatial extent of activities; and the presence/ absence and density of marine mammals.

Behavioral changes in response to vessel presence include avoidance reactions, alarm/startle responses, and other behavioral and stress-related changes (such as altered swimming speed, direction of travel, resting behavior, vocalizations, diving activity, and respiration rate) (Watkins 1986; Würsig et al 1998; Terhune and Verboom 1999; Foote et al. 2004). Some dolphin species approach vessels and are observed bow riding or jumping in the wake of a vessel (Norris and Prescott 1961; Shane et al 1986; Würsig et al. 1998). In other cases neutral behavior (i.e., no obvious avoidance or attraction) has been reported (Nowacek et al. 2007). Little is known about the biological importance of changes in marine mammal behavior under prolonged or repeated exposure to high levels of vessel traffic, such as increased energetic expenditure or chronic stress, which can produce adverse hormonal or nervous system effects (Reeder and Kramer 2005).

Marine mammals in the NAVSTA Mayport Turning Basin and navigation channel encounter vessel traffic associated with daily operations, maintenance, and security monitoring along the waterfront, and it is assumed that individuals that frequent the waterfront have habituated to existing levels of vessel activity. Construction vessels would operate at low speeds within the relatively limited Study Area. Construction vessel traffic would potentially pass near marine mammals on an incidental basis, but short-term behavioral reactions to vessels are not expected

to result in long-term impacts on individuals (such as chronic stress), or on marine mammal populations in waters surrounding the Study Area.

Collisions of construction vessels and marine mammals, primarily cetaceans, are not expected during construction activities because vessel speeds would be low. All of the species that may occur within the Study Area tend to surface at relatively short, regular intervals allowing for increased detectability and avoidance. Further, marine mammal observers would be deployed to observe the injury zone of influence and shutdown zones, and alert the contractor to shut down in-water work if an individual or group of marine mammals should be encountered. As such, no direct impacts on marine mammals are anticipated from construction vessel traffic.

Water Quality Impacts
Water quality would be impacted during installation of new piles and the limited construction vessel operations because bottom sediments would be temporarily resuspended. Pile installation would resuspend bottom sediments, which may contain chemically reduced organic materials. Subsequent oxidation of sulfides, reduced iron, and organic matter associated with the suspended sediments would consume some dissolved oxygen in the water column. The amount of oxygen consumed would depend on the magnitude of the oxygen demand associated with suspended sediments (Jabusch et al. 2008). The impacts of sediment resuspension from pile installation on dissolved oxygen concentrations would be minimal.

Installation of piles would resuspend bottom sediments only within the immediate vicinity of the construction area, resulting in short-term and localized increases in suspended sediment concentrations that, in turn, would cause increases in turbidity levels. Barge and tug operations (if employed) could also resuspend bottom sediments. The suspended sediment/turbidity plumes would be generated periodically, in relation to the level of in-water construction activities. The disturbed sediments would be a mix of fine-grained silt and clay. The majority of these sediments would resettle within minutes of disturbance. Construction activities would not result in persistent increases in turbidity levels because they are limited in temporal and spatial scope, resulting in temporary, localized resuspended sediments that would disperse or settle rapidly.

The overall level of sediment disturbance associated with the Wharf Bravo recapitalization activities would be significantly lower than that of the routine (every 2 years) maintenance dredging in the NAVSTA Mayport Turning Basin, and resuspended sediments are expected to dissipate within a few hours (NMFS 2009). Thus marine mammals exposed to resuspended sediments are not likely to be impacted by contaminants. The activities that generate suspended sediments would be short-term and localized and suspended sediments are expected to disperse or settle rapidly. Moreover, marine mammals are expected to avoid (i.e., indirect impact) the immediate construction area due to increased construction vessel traffic, noise and human activity, increased turbidity, and possible temporary disruptions in prey availability. Therefore, no significant impacts on marine mammals are expected due to changes in water quality during construction. As such, no water quality impacts are anticipated to affect marine mammals.

Prey Availability Impacts
The greatest potential impacts on prey species during construction would result from benthic habitat displacement, resuspension of sediments, and behavioral disturbance due to pile driving noise. Injury and behavioral disturbance of fishes, should they occur due to underwater pile driving noise, would directly affect the prey base for marine mammals. Fish behavior would potentially be affected by pile driving noise resulting from the operation of vibratory (with

contingency impact) pile driving rig within 8,300 ft (2,500 m) of the source of pile driving noise (Section 3.7). Thus, prey availability within the injury and behavioral zones may be reduced during in-water pile driving activities. The Section 4.0; Minimization Measures are designed to reduce this effect.

The limited anchoring of construction barges and propeller wash, along with pile driving activities, would locally displace or disturb benthic habitats and increase turbidity. All of these actions would indirectly affect marine mammals by degrading foraging and refuge habitat quality for prey species and reducing their invertebrate and forage fish prey base. However, due to regular disturbance resulting from routine maintenance dredging and the relative limited levels of construction vessel activity, the habitat in the NAVSTAV Mayport Turning Basin is not considered high quality. Based on the analyses in Section 3.2.1; Marine Invertebrates, the Wharf Bravo recapitalization activities would likely remove or disturb up to 12,000 ft^2 (1,115 m^2) of benthic habitat; however, recolonization is anticipated.

Acoustic Impacts

Underwater Noise – A description of in-water acoustics (and the dB unit) has been provided in Section 3.1.2; Sound; supplemental information and details of in-water acoustics are provided in Appendix F. Noise level (dB) and frequency (Hz) can affect the susceptibility of marine mammals to noise impacts. Functional hearing ranges and peak sensitivity ranges vary by species, as described below. Peak sensitivity of most marine mammal species that may occur in the vicinity of the Wharf Bravo recapitalization activities is higher than the frequency range containing the greatest energy produced by impact pile driving. However, pile driving noise is well within the functional hearing ranges of these marine mammals, and all of these species would be susceptible to auditory effects of underwater pile driving noise.

The methods for estimating the number and types of exposure are described in the sections below beginning with presentation of the threshold criteria, followed by the method for quantifying exposures of marine mammals to sources of energy exceeding those threshold values. Exposure of each was determined by:

- The potential of each species to be impacted by the acoustic sources as determined by the acoustic criterion for marine mammals.
- The potential presence of each species and their estimated density in the zone of influence for the Wharf Bravo recapitalization activities.
- The area of impact for each pile driving sound source was estimated by taking into account the source levels, propagation loss, and thresholds at which each acoustic criterion are encountered.

Potential exposures were calculated by multiplying the density of each marine mammal species potentially present by the total impacted area for each threshold value by the potential number of days of pile driving.

Assessing whether a sound may disturb or injure a marine mammal involves understanding the characteristics of the acoustic source and the potential effects that sound may have on the animal's physiology and behavior. Although it is known that sound is important for marine mammal communication, navigation, and foraging (National Research Council 2003, 2005), there are many unknowns in assessing impacts such as the potential interaction of different effects and the biological significance of responses by marine mammals to sound exposures

(Nowacek et al. 2007; Southall et al. 2007). Furthermore, many factors other than the received level of sound may affect an animal's reaction, such as the animal's physical condition, prior experience with the sound, and proximity to the source of the sound (Nowacek et al. 2007). Sound becomes noise in cases when it is produced incidental to a human activity (including during pile driving), or when it interferes with an animal's natural behaviors or diminishes the quality of the environment (USACHPPM 2006).

While some exposures are unavoidable, the Section 4.0; Minimization Measures are expected to reduce or avoid most potential adverse underwater impacts on marine mammals from pile driving. Therefore, there would be no significant impacts on marine mammals with implementation of Alternative 2.

Hearing and Vocalization for North Atlantic Right Whales – Hearing in North Atlantic right whales and other large baleen whales is poorly understood due to the difficulty of performing experimental tests on live whales. Mathematical models and anatomical studies of whale ears have been used to estimate hearing in baleen whales. Recent morphometric analyses of North Atlantic right whale inner ears estimate a hearing range of approximately 0.01 to 22 kHz based on established marine mammal models (Parks et al. 2004; Parks and Tyack 2005; Parks et al. 2007).

North Atlantic right whales produce a variety of sounds, including moans, screams, gunshots, blows, upcalls, downcalls, and warbles that are often linked to specific behaviors (Matthews et al. 2001; Laurinolli et al. 2003; Vanderlaan et al. 2003; Parks et al. 2007; Parks and Tyack 2005). Sounds can be divided into three main categories: (1) blow sounds; (2) broadband impulsive sounds; and (3) tonal call types (Parks and Clark 2007). Blow sounds are those coinciding with an exhalation; it is not known whether these are intentional communication signals or are just produced incidentally (Parks and Clark 2007). Broadband sounds include non-vocal slaps (when the whale strikes the surface of the water with parts of its body) and the "gunshot" sound; data suggests that the latter serves a communicative purpose (Parks and Clark 2007; Parks et al. 2012).

Tonal calls can be divided into simple, low-frequency, stereo-typed calls and more complex, frequency-modulated, higher frequency calls (Parks and Clark 2007). Most of these sounds range in frequency from 0.02 to 15 kHz (dominant frequency range from 0.02 to less than 2 kHz; durations typically range from 0.01 to multiple seconds) with some sounds having multiple harmonics (Parks and Tyack 2005). Source levels for some of these sounds have been measured as ranging from 137 to 192 dB rms re: 1 μPa-m (Parks et al. 2005; Parks and Tyack 2005). In certain regions (i.e., northeast Atlantic), preliminary results indicate that right whales vocalize more from dusk to dawn than during the daytime (Leaper and Gillespie 2006; Mussoline et al. 2012; Parks & Warren et al. 2012). Vocalization rates of North Atlantic right whales are also highly variable, and individuals have been known to remain silent for hours (Gillespie and Leaper 2001). Baumgartner et al. (2003) noted that downsweep calls by North Atlantic right whales in the 16 to 160 Hz frequency band exhibited a diel pattern (fewer calls at night) that corresponded strongly to the diel vertical migration of zooplankton.

Hearing and Vocalization for Humpback Whales – While no measured data on hearing ability are available for humpback whales, Ketten (1997) hypothesized that mysticetes have acute infrasonic hearing. Houser et al. (2001) produced the first humpback whale audiogram (using a mathematical model), which was u-shaped and conformed to the typical mammalian

presentation. The area of best hearing, or sensitivity, according to the model was observed between frequencies from 700 Hz to 10 kHz but the maximum range of hearing was identified between 200 Hz to 14 kHz. Au et al. (2006) noted that if the popular notion that animals generally hear the totality of the sounds they produce is applied to humpback whales, this suggests that its upper frequency limit of hearing is as high as 24 kHz.

Humpback whales are known to produce three classes of vocalizations: (1) "songs" in the late fall, winter, and spring by solitary males; (2) sounds made within groups on the wintering (calving) grounds; and (3) social sounds made on the feeding grounds (Thomson and Richardson 1995). The best-known types of sounds produced by humpback whales are songs, which are thought to be breeding displays used only by adult males (Helweg et al. 1992). Singing is most common on breeding grounds during the winter and spring months but is occasionally heard outside breeding areas and out of season (Mattila et al. 1987; Gabriele et al. 2001; Gabriele and Frankel 2002; Clark and Clapham 2004). Humpback song is an elaborate series of patterned vocalizations which are hierarchical in nature (Payne and McVay 1971). There is geographical variation in humpback whale song, with different populations singing different songs and all members of a population using the same basic song. However, the song evolves over the course of a breeding season but remains nearly unchanged from the end of one season to the start of the next (Payne et al. 1983). Components of the song range from under 20 Hz to 4 kHz and occasionally 8 kHz, with source levels measured between 151 and 189 dB re 1 μPa-m and high-frequency harmonics extending beyond 24 kHz (Au et al. 2001; Au et al. 2006). Social calls range in frequency from 50 Hz to over 10 kHz, with dominant frequencies below 3 kHz (Silber 1986). Female vocalizations appear to be simple; Simão and Moreira (2005) noted little complexity. "Feeding" calls, unlike song and social sounds, are highly stereotyped series of narrow-band trumpeting calls. They are 20 Hz to 2 kHz, less than 1 sec in duration, and have source levels of 162 to 192 dB re 1 μPa-m. The fundamental frequency of feeding calls is approximately 500 Hz (D'Vincent et al. 1985; Thompson et al. 1986).

Hearing and Vocalization for Bottlenose Dolphins – Bottlenose dolphins can typically hear within a broad frequency range of 200 Hz to 160 kHz (Turl 1993), though with exposure during testing some dolphins might receive information as low as 50 Hz (Turl 1993). Electrophysiological experiments suggest the bottlenose dolphin brain has a dual analysis system: one specialized for ultrasonic clicks and another for lower-frequency sounds, such as whistles (Ridgway 2000). Scientists have reported a range of highest sensitivity between 25 and 70 kHz, with peaks in sensitivity at 25 and 50 kHz (Nachtigall et al. 2000). Recent research on the same individuals indicates auditory thresholds obtained by electrophysiological methods correlate well with those obtained in behavior studies, except at the some lower (10 kHz) and higher (80 and 100 kHz) frequencies (Finneran and Houser 2006).

Sounds emitted by bottlenose dolphins have been classified into two broad categories: pulsed sounds (including clicks and burst-pulses) and narrow-band continuous wave sounds (whistles), which usually are frequency modulated. Clicks and whistles have dominant frequency ranges of 110 to 130 kHz and source levels of 218 to 228 dB re 1 μPa-m (Turl 1993) and 3.4 to 14.5 kHz and 125 to 173 dB re 1 μPa-m, respectively (Ketten 1998a). Whistles are primarily associated with communication and can serve to identify specific individuals (i.e., signature whistles) (Caldwell and Caldwell 1965; Janik et al. 2006). Up to 52 percent of whistles produced by bottlenose dolphins with mother-calf pairs have been classified as signature whistles (Cook et al. 2004).

Sound production is also influenced by group type (single or multiple individuals), habitat, and behavior (Nowacek 2005). Bray calls (low-frequency vocalizations; majority of energy below 4 kHz), for example, are used when capturing fishes, specifically sea trout (*Salmo trutta*) and Atlantic salmon (*Salmo salar*), in some regions (i.e., Moray Firth, Scotland) (Janik 2000). Additionally, whistle production has been observed to increase while feeding (Acevedo-Gutiérrez and Stienessen 2004; Cook et al. 2004). Both whistles and clicks have been demonstrated to vary geographically in terms of overall vocal activity, group size, and specific context (e.g., feeding, milling, traveling, and socializing) (Jones and Sayigh 2002; Zaretsky et al. 2005). For example, preliminary research indicates characteristics of whistles from populations in the northern Gulf of Mexico significantly differ (i.e., in frequency and duration) from those in the western north Atlantic (Zaretsky et al. 2005).

Hearing and Vocalization for Atlantic Spotted Dolphins – A variety of sounds including whistles, echolocation clicks, squawks, barks, growls, and chirps have been recorded for the Atlantic spotted dolphin (Thomson and Richardson 1995). Whistles have dominant frequencies below 20 kHz (range: 7.1 to 14.5 kHz) but multiple harmonics extend above 100 kHz, while burst pulses consist of frequencies above 20 kHz (dominant frequency of approximately 40 kHz) (Lammers et al. 2003). Other sounds, such as squawks, barks, growls, and chirps, typically range in frequency from 100 Hz to 8 kHz (Thomson and Richardson 1995). Recently recorded echolocation clicks have two dominant frequency ranges at 40 to 50 kHz and 110 to 130 kHz, depending on source level (i.e., lower source levels typically correspond to lower frequencies and higher frequencies to higher source levels (Au and Herzing 2003). Echolocation click source levels as high as 210 dB re 1 μPa-m peak-to-peak have been recorded (Au and Herzing 2003). Spotted dolphins in the Bahamas were frequently recorded during agonistic/aggressive interactions with bottlenose dolphins (and their own species) to produce squawks (200 Hz to 12 kHz broad band burst pulses; males and females), screams (5.8 to 9.4 kHz whistles; males only), barks (200 Hz to 20 kHz burst pulses; males only), and synchronized squawks (100 Hz - 15 kHz burst pulses; males only in a coordinated group) (Herzing 1996). There have been no data collected on Atlantic spotted dolphin hearing abilities. However, odontocetes are generally adapted to hear high-frequencies (Ketten 1997) and it can be assumed that vocalization frequencies are generally within the hearing range of a species.

Hearing and Acoustics for West Indian Manatees – West Indian manatees produce a variety of squeak-like sounds that have a typical frequency range of 0.6 to 12 kHz (dominant frequency range from 2 to 5 kHz), and last 0.25 to 0.5 s (Steel and Morris 1982; Thomson and Richardson 1995; Niezrecki et al. 2003). Recently, vocalizations below 0.1 kHz have also been recorded (Frisch and Frisch 2003; Frisch 2006). Overall, West Indian manatee vocalizations are considered relatively stereotypic, with little variation between isolated populations examined (i.e., Florida and Belize; Nowacek et al. 2003). However, vocalizations have been newly shown to possess nonlinear dynamic characteristics (e.g., subharmonics or abrupt, unpredictable transitions between frequencies), which could aid in individual recognition and mother/calf communication (Mann et al. 2006). Average source levels for vocalizations have been calculated to range from 90 to 138 dB re: 1 μPa (average: 100 to 112 dB re: 1 μPa) (Nowacek et al. 2003; Phillips et al. 2004). Behavioral data on two animals indicate an underwater hearing range of approximately 0.4 to 46 kHz, with best sensitivity between 16 and 18 kHz (Gerstein et al. 1999), while earlier electrophysiological studies indicated best sensitivity from 1 to 1.5 kHz (Bullock et al. 1982).

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

Since 1997, NMFS has used generic sound exposure thresholds to determine when an activity in the ocean that produces sound might result in impacts on a marine mammal such that a take by harassment might occur (70 FR 1871). Current NMFS practice regarding exposure of marine mammals to pile driving sounds is that cetaceans exposed to impulsive sounds ≥180 re 1 μPa rms are considered to have been taken by Level A (i.e., injurious) harassment. Level A injury thresholds have not been established for non-impulsive sounds such as vibratory pile driving, but the Navy has applied the threshold values for impulsive sounds to vibratory sound in this analysis (Table 3-15).

Table 3-15. Acoustic Injury and Disturbance Threshold Criteria for Cetaceans

Marine Mammals	Vibratory driving criteria (dB re 1 μPA rms)		Impact driving criteria (dB re 1 μPA rms)	
	Level A Injury Threshold	Level B Disturbance Threshold	Level A Injury Threshold	Level B Disturbance Threshold
Cetaceans	180	120	180	160

Source: GSRC 2015 and DON 2013a

Behavioral harassment (Level B) is considered to have occurred when marine mammals are exposed to underwater sounds below the injury threshold, but ≥ 160 dB re 1 μPa rms for impulsive sounds (e.g., impact pile driving) and 120 dB re 1 μPa rms for non-impulsive noise (e.g., vibratory pile driving).

Limitations of Existing Noise Criteria
To date, there is no research or data supporting a response by odontocetes to non-impulsive sounds from vibratory pile driving as low as the 120 dB re 1 μPa rms threshold. The application of the 120 dB rms re 1μPa threshold can be problematic because this threshold level can be either at or below the ambient noise level of certain locations. For example, noise levels at some industrialized ports in Puget Sound, Washington, have been measured at between 120 and 130 dB re 1μPa (WSDOT 2015). Assuming a 120 dB disturbance threshold in such environments implies any animals in the area would be disturbed with or without additional pile driving noise. This has led to analyses that may be overly conservative, and as a result of these issues, the threshold level is subject to ongoing discussion (74 FR 41684). NMFS is developing new science-based thresholds to improve and replace the current generic exposure level thresholds, but the criteria have not been finalized (Southall et al. 2007). The 120 dB re 1 μPa rms threshold level for non-impulsive noise originated from research conducted by Malme et al. (1984, 1988) for California gray whale response to non-impulsive industrial sounds such as drilling operations.

Ambient Noise
The baseline noise level in the NAVSTA Mayport Turning Basin is referred to as the "ambient noise level." Ambient noise is composed of sounds produced by a number of natural and

anthropogenic sources. Natural noise sources can include wind, waves, precipitation, and biological sources such as shrimp, fish, and cetaceans. These sources produce sound in a wide variety of frequency ranges (Urick 1983; Richardson et al. 1995) and can vary over both long (days to years) and short (seconds to hours) time scales. In shallow waters, precipitation may contribute up to 35 dB to the existing sound level, and increases in wind speed of 5 to 10 knots can cause a 5 dB increase in ambient ocean noise between 20 Hz and 100 kHz (Urick 1983). High noise levels may also occur in near shore areas during heavy surf, which may increase low frequency (200 Hz – 2 kHz) underwater noise levels by 20 dB or more within 200 yards of the surf zone (Wilson et al. 1985). At Mayport, Navy and other vessel wakes in the St. Johns River may cause breaking waves on shore, contributing to the ambient acoustic environment.

Anthropogenic noise sources also contribute to ambient noise levels, particularly in ports and other high use areas in coastal regions. Normal port activities include vessel traffic (from large ships, support vessels, and security boats), loading and maintenance operations, and other activities (sonar and echo-sounders from commercial and recreational vessels, construction, etc.) which all generate underwater sound (Urick 1983). Additionally, noise produced by mechanized equipment on wharves or adjacent shorelines may propagate underwater and contribute to underwater ambient noise levels.

The underwater acoustic environment in the NAVSTA Mayport Turning Basin is likely to be dominated by noise from day-to-day port and vessel activities. The basin is sheltered from most wave noise, but is a high-use area for naval ships, tugboats, and security vessels. When underway, these sources can create noise between 20 Hz and 16 kHz (Lesage et al. 1999), with broadband noise levels up to 180 dB re 1 μPa rms (see Table 3-6; Representative Levels of Underwater Noise from Anthropogenic Sources). Normal port operations, including transits, docking, and maintenance by multiple tugboats and ships would continue. While there are no current measurements of ambient noise levels in the NAVSTA Mayport Turning Basin, the high levels of anthropogenic activity in the basin are likely to have elevated ambient noise levels within the basin above “quiet” habitats in which marine mammal reactions to 120 dB sounds were observed (Malme et al. 1984, 1988).

The existing sources of anthropogenic noise in the NAVSTA Mayport Turning Basin are generally non-impulsive (Appendix F), intermittent sources such as vessel engines; this category also includes noise from vibratory pile driving. Impact pile driving noise differs from these sources in that it is impulsive, with a fast rise time and multiple short-duration (50 to 100 millisecond; Illingworth & Rodkin 2001) events. The use of impact driving during the proposed Project is limited to instances when vibratory driving fails, and would be limited to a maximum of 20 strikes per day. Because of the very limited use of impact pile driving during the Proposed Action, the Navy expects no long-term change in the average ambient noise environment with respect to impulsive sounds as a result of impact pile driving. Airborne ambient noise in industrial areas such as the NAVSTA Mayport Turning Basin is composed of sounds from trucks, cranes, compressors, generators, pumps, ship engines, and other equipment. While there are no current measurements of airborne ambient noise in the NAVSTA Mayport Turing Basin or wharf areas, expected noise levels range from a daytime minimum of 55 dBA to a maximum of 99 dBA, assuming that multiple sources would be operating simultaneously (WSDOT 2015).

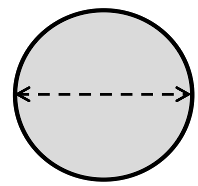
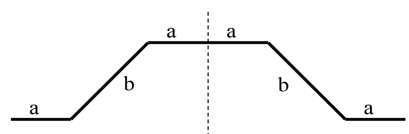
Underwater Noise from Pile Driving

Noise levels produced by pile driving are greatly influenced by factors including pile type, driving method, and the physical environment in which the activity takes place. A number of

studies have examined sound pressure levels recorded from underwater pile driving projects in California and Washington, creating a large body of data for impact driving of steel pipe piles, concrete piles, and some timber piles. Data for vibratory pile driving is similarly concentrated on steel pipe piles of a range of diameters, and on 24-inch wide sheet piles (CALTRANS 2010, DON 2013a).

Because of the differences between the Proposed Action and available measured sound pressure levels, the Navy evaluated potential source levels for modeling of steel piles based on two methods. The first method examined measured sound pressure levels for single 24-inch-wide sheet piles; the second was a comparison of the linear length of piles with the circumference of steel pipe piles for which source levels have been measured. Linear length was calculated as the sum of the lengths of all sides of each pile type (Table 3-16). Paired sheet pile linear lengths were comparable to the circumference of a 24-inch-diameter pipe pile.

Table 3-16. Comparison of Pile Sizes and Shapes for Estimating Source Sound Pressure Levels

Pile Type	Shape and Dimensions
Circular Steel Pipe Pile Diameter = 24 in. Circumference = Diameter*π = 75.4 in.	
Sheet Pile Pair Linear length = 4*a+2*b =70.4 in. a = 6.81 in. b= 21.6 in. (total width = 55.12 in.)	

Source: DON 2013a

Measured sound pressure levels for 24-inch-diameter steel sheet piles and 24-inch-diameter steel pipe piles are available for both vibratory and impact driving methods. To determine the most appropriate sound pressure levels for this Project, data from studies which met the following parameters were considered:

- Pile size/type: steel pipe piles (24-inch-diameter) and steel sheet piles (24-inch-wide)
- Installation method: vibratory and impact hammer
- Physical environment: water depth 15 ft (4.5 m) or greater, sediment similar to sandy bottom in the NAVSTA Mayport Turning Basin.

Table 3-17 and Table 3-18 detail representative pile driving sound pressure levels measured from steel pipe piles and steel sheet piles. Comparison of measured sound pressure levels from the steel pipe piles and steel sheet piles revealed that levels from sheet pile driving were higher than those from pipe pile driving; the Navy has therefore used the more conservative sound pressure levels from steel sheet piles to model the Proposed Action. The selected sound pressure levels used for modeling steel piles in this application were 163 dB re 1 μPa rms for vibratory driving and 189 dB re 1μPa rms for impact driving.

Table 3-17. Vibratory Installation Underwater Sound Pressure Levels Expected Based on Similar In-Situ Monitored Construction Activities

Project and Location	Pile Size and Type	Water Depth	Range to pile	RMS	Peak	Sediment
Portage Bay, WA[a]	24-inch steel pipe	3 – 7 m	10 m	157	170	Unknown
Berth 23 Port of Oakland, CA[b]	24-inch steel sheet pile	6.1 m	10 m	163[1]	177	Unknown
Berth 30 Port of Oakland, CA[b]	24-inch steel sheet pile	4.9 m	10 m	162	175	Unknown
Berth 35/37 Port of Oakland, CA[b]	24-inch steel sheet pile	6.1 m	10 m	163	177	Unknown
JEB Little Creek, Norfolk, VA[c]	24-inch steel sheet pile	< 4 m	11m	161	N/A	Sand/mud

Sources: a – WSDOT 2010b; b- CALTRANS 2010; and c- DON 2013a.
Sound levels expressed as dB re 1 µPa rms and dB re 1 µPa peak for RMS and Peak SPL measurements, respectively. Average and Max values for Test Pile Program data are based on 10-second rms measurements over the 60-second driving time for the pile. 1- This data point was selected for use in acoustic modeling based on similarity to physical environment at NAVSTA Mayport and measurement location in mid-water column.

Table 3-18. Vibratory Installation Underwater Sound Pressure Levels Expected Based on Similar In-Situ Monitored Construction Activities

Project and Location	Pile Size and Type	Water Depth	RMS	Peak	SEL	Sediment
Friday Harbor Ferry Terminal, WA[a]	24-inch steel sheet pile	12.8 m	170	183	180	Sandy silt/ clay
		13.4 m	186	205	179	
		14.3 m	186	204	179	
		10 m	194	210	185	Sandy silt/ rock
		10 m	195	215	187	
		10 m	193	212	184	
Typical values, CALTRANS compendium summary table[b]	24-inch steel sheet pile	15 m	194	207	178	unknown
Berth 23 Port of Oakland[b. 1]	24-inch steel sheet pile	12 to 14 m	189	205	179	unknown

Sources: a - WSDOT 2010b; b - CALTRANS 2010
Sound levels expressed as dB re 1 µPa rms and dB re 1 µPa peak for RMS and Peak SPL measurements, respectively; 1- This data point was selected for use in acoustic modeling based on similarity to physical environment at NAVSTA Mayport and measurement location in mid-water column.

Underwater Sound Propagation

Pile driving can generate underwater noise that may result in disturbance to marine mammals within the Study Area. Modeling sound propagation is useful in evaluating noise levels to determine which marine mammals may be exposed at a given distance from the pile driving activity. The decrease in acoustic intensity as a sound wave propagates outward from a source is known as transmission loss (TL).

The formula for transmission loss is:

$$TL = B * log_{10}\left(\frac{R_1}{R_2}\right) + C * R_1, \text{ where}$$

B = logarithmic (predominantly spreading) loss
C = linear (scattering and absorption) loss
$\mathbf{R_1}$ = range from source in meters
$\mathbf{R_2}$ = range from driven pile to original measurement location (generally 10 m)

The amount of linear loss (C) is proportional to the frequency of a sound. Due to the low frequencies of sound generated by impact and vibratory pile driving, this factor was assumed to be zero for all calculations in this assessment and transmission loss was calculated using only logarithmic spreading. Therefore, using practical spreading (B =15), the revised formula for transmission loss is TL = 15 $\log_{10}$ (R_1/10).

Calculated Zones of Influence

The practical spreading loss model discussed above was used to calculate the propagation of pile driving sound in and around the NAVSTA Mayport Turning Basin. A total of 130 days of pile driving were modeled; 110 days of vibratory driving (73 days for Phase I and 37 days for Phase II), plus 20 days of contingency impact driving distributed as needed across both phases. No sound mitigation methods (bubble curtains, cofferdams, etc.) are proposed and therefore no attenuation was included in the acoustic model.

- ***Vibratory driving*** – the acoustic analysis used the assumption that a maximum of 27 sheet pile pairs would be driven each day, for a maximum daily length of approximately 124 ft.
- ***Impact driving –*** the modeling assumed a maximum of 20 strikes of the impact hammer per day; this is expected to take no more than 5 to 10 minutes to complete.

The calculations presented in Table 3-19 assume a field free of obstruction, which is unrealistic because the NAVSTA Mayport Turning Basin does not represent open water conditions (free field) and sounds would attenuate as they encounter land or other solid obstacles. As a result, the distances calculated may not actually be attained at the Study Area.

Table 3-19. Acoustic Criteria for Marine Mammal Behavioral and Injury from the Sound Produced by Vibratory and Impact Pile Driving

Pile Type	Pile Driving Method	Threshold Criteria	Distance (m)[1]	Area (km^2)
Sheet Piles	Vibratory	Level A (injury): 180	< 1	0
		Level B (behavior): 120	7,356	1.96
	Impact (contingency)	Level A (injury): 180	40	0.002
		Level B (behavior): 160	858	0.51

Source: GSRC 2015 and DON 2013a
Note: no injury criteria for fish for vibratory driving; all sound levels expressed in dB re 1 µPa rms. dB=decibel; rms=root-mean-square; µPa=micro Pascal; Practical spreading loss (15 log, or 4.5 dB per doubling of distance) used for calculations; 1Sound pressure levels used for calculations are given in Tables 3-17 and 3-18.

The actual distances to the behavioral disturbance thresholds for impact and vibratory pile driving are likely to be shorter than those calculated due to the irregular contour of the waterfront and the maximum fetch (farthest distance sound waves travel without obstruction [i.e., line of

sight]) at the Study Area. Table 3-19 also depicts the actual areas encompassed by the marine mammal thresholds during the Project.

Figure 3-5 and Figure 3-6 depict the areas of each underwater sound threshold that are predicted to occur at the Study Area due to pile driving for marine mammals during each stage of the Project. Note: injury zone for vibratory pile driving is not visible due to the size of the zone (> 1 m) and map scale.

The effects of pile driving noise on marine mammals depend on several factors, including:

- type, depth, intensity, and duration of the pile driving sound,
- the species,
- size of the animal and its proximity to the source,
- condition of the animal,
- depth of the water column,
- substrate of the habitat, and
- sound propagation properties of the environment.

Impacts on marine mammals from pile driving activities are expected to result primarily from acoustic pathways. As such, the degree of effect is intrinsically related to the received level and duration of the sound exposure, which are in turn influenced by the distance between the animal and the source. The farther away from the source, the less intense the exposure would be. The substrate and depth of the habitat also affect the sound propagation properties of the environment.

Shallow environments are typically more structurally complex, which leads to rapid sound attenuation. In addition, substrates that are soft (i.e., sand), such as those in the NAVSTA Mayport Turning Basin, would absorb and attenuate the sound more readily than hard substrates (rock) which may reflect the acoustic wave. Soft porous substrates would also likely require less time to drive the pile, and possibly less forceful equipment, which would ultimately decrease the intensity of the acoustic source to other locations.

Behavioral impacts are expected to occur, but the type and severity of these effects are difficult to define due to individual differences in response and limited studies addressing the behavioral effects of sounds on marine mammals. The behavioral responses most likely to occur during the proposed Wharf Bravo recapitalization activities are habituation and temporary relocation (Ridgway et al. 1997; Finneran et al. 2003; Wartzok et al. 2003). The time required to drive each pile by vibratory methods would be less than 60 seconds, so the behavioral disturbances are anticipated to be discreet and brief. Injurious impacts on marine mammal species are not expected, but would be the result of physiological responses to both the type and strength of the acoustic signature (Viada et al. 2008).

Physiological Responses

No Level A exposures are expected because of the mitigation measures outlined in Section 4.0 and the conservative modeling assumptions discussed earlier in this Section. The only real potential for Level A exposures would be as a result of impact pile driving, and that method

Figure 3-5. Underwater Zones of Influence based on Marine Mammal Criteria for Vibratory Pile Driving

Figure 3-6. Underwater Zones of Influence based on Marine Mammal Criteria for Impact Pile Driving

would only be used as a contingency in cases when vibratory driving is insufficient (a similar Project that has been completed at adjacent Wharf C-1 required impact pile driving on only seven piles, which required less than 2 days; DON 2013a). Physiological responses to impact/impulsive sound stimulation range from non-injurious vibration or compression of tissue to injurious tissue trauma, although mitigations would prevent such occurrences during this Project.

The Navy is aware of how important such mitigations are and understands the risks of injury associated with impulsive sounds. Sound-related trauma can be lethal or sub lethal; lethal impacts are those resulting in immediate death or serious debilitation in or near an intense sound source (Ketten 1995).

Ears are the most sensitive organ to pressure and are the organs most sensitive to injury (Ketten 2000). Sub lethal damage to the ear from a pressure wave can rupture the tympanum, fracture the ossicles, damage the cochlea, cause hemorrhage, or cause leakage of cerebrospinal fluid into the middle ear (Ketten 1995). Sub-lethal damage can lead to hearing loss.

Moderate injury implies partial hearing loss. Permanent hearing loss (also called permanent threshold shift or PTS) can occur when the hair cells of the ear are damaged by a very loud event, as well as by prolonged exposure to noise. Instances of temporary threshold shifts and/or auditory fatigue are well documented in marine mammal literature as being one of the primary avenues of acoustic impact. Temporary loss of hearing sensitivity has been documented in controlled settings using captive marine mammals exposed to strong sound exposure levels at various frequencies (Ridgway et al. 1997; Kastak et al. 1999; Finneran et al. 2005). While injuries to other sensitive organs are possible, they are less likely since pile driving impacts are almost entirely acoustically mediated, versus explosive sounds which also include a shock wave resulting in damage.

Behavioral Responses

The Navy intends to accomplish all pile driving using vibratory pile driving. Impact pile driving would only be used as a contingency in cases when vibratory driving is insufficient (a similar project that has been completed at adjacent Wharf C-1 required impact pile driving on only seven piles, which required less than 2 days). The time required to drive each pile by vibratory methods would be less than 60 seconds, so behavioral disturbances are anticipated to be discreet and brief. Studies of marine mammal responses to non-impulsive noise, such as vibratory pile driving, are limited. Marine mammal monitoring at the Port of Anchorage marine terminal redevelopment project found no response by marine mammals swimming within the threshold distances to noise impacts from construction activities including pile driving (both impact hammer and vibratory driving) (Integrated Concepts & Research Corporation 2009). Background noise levels at this port are typically at 125 dB. Most marine mammals observed during the two lengthy construction seasons included beluga whales, harbor seals, harbor porpoises, and Steller sea lions (observed in smaller numbers).

Responses to impulsive impact pile driving (if it were to be needed) are expected to be more acute than response to continuous vibratory driving. Controlled experiments with captive marine mammals showed pronounced behavioral reactions, including avoidance of loud sound sources (Ridgway et al. 1997; Finneran et al. 2003). Observed responses of wild marine mammals to loud impulsive sound sources (typically seismic guns or acoustic harassment devices) have been varied, but often consist of avoidance behavior or other behavioral changes suggesting

discomfort (Morton and Symonds 2002; also see reviews in Gordon et al. 2004; Wartzok et al. 2003; and Nowacek et al. 2007). Regardless of the source of the sound, behavioral responses to sound are highly variable. The magnitude of each potential behavioral change ultimately determines the severity of the response. A number of factors may influence an animal's response to noise, including its previous experience, its auditory sensitivity, its biological and social status (including age and sex), and its behavioral state and activity at the time of exposure.

A comprehensive review of acoustic and behavioral responses to noise exposure by Nowacek et al. (2007) concluded that one of the most common responses is displacement. To assess the significance of displacements, it is necessary to know the areas to which the animals relocate, the quality of that habitat, and the duration of the displacement in the event they return to the pre-disturbance area. Short-term displacement may not be of great concern unless the disturbance happens repeatedly. Similarly, long-term displacement may not be of concern if adequate replacement habitat is available.

Marine mammals exposed to pile driving sound over the course of the Wharf Bravo recapitalization activities would likely avoid affected areas if they experience noise-related discomfort. As described in the section above, individual responses to pile driving noise are expected to be variable. Some individuals may occupy the Study Area during pile driving without apparent discomfort while others may be displaced with undetermined long-term effects. Avoidance of the affected area during pile driving operations would reduce or eliminate the likelihood of injury impacts, but would also reduce access to foraging areas. Noise-related disturbance may also inhibit some marine mammals from entering or exiting the NAVSTA Mayport Turning Basin. Given the duration of the project, there is a potential for displacement of marine mammals from the affected area due to these behavioral disturbances during the in-water work period. However, the time required to drive each pile by vibratory methods would be less than 60 seconds, so behavioral disturbances are anticipated to be discreet and brief. Further, since pile driving would only occur during daylight hours, marine mammals transiting the activity area or foraging or resting in the Study Area at night would not be affected.

Habituation is a response that occurs when an animal's reaction to a stimulus wanes with repeated exposure, usually in the absence of unpleasant associated events (Wartzok et al. 2003). Animals are most likely to habituate to sounds that are predictable and unvarying. The opposite process is sensitization, when an unpleasant experience leads to subsequent responses, often in the form of avoidance, at a lower level of exposure. Behavioral state or differences in individual tolerance levels may affect the type of response as well. For example, animals that are resting may show greater behavioral change in response to disturbing noise levels than animals that are highly motivated to remain in an area for feeding (Richardson et al. 1995; National Research Council 2003; Wartzok et al. 2003). Indicators of disturbance may include sudden changes in the animal's behavior or avoidance of the affected area. A marine mammal may show signs that it is startled by the noise or it may swim away from the sound source and avoid the area. Increased surfacing time and temporary cessation of foraging in the Study Area could indicate disturbance or discomfort in marine mammals.

As such, effects of pile driving activities would be experienced by individual marine mammals, but would not cause population-level impacts or affect the continued survival of the species. Individual marine mammals may be exposed to high sound pressure levels during pile removal and installation, which may result in Level B behavioral harassment. Any marine mammals exposed (harassed) may change their normal behavior patterns (i.e., swimming speed, foraging

habits, etc.) or be temporarily displaced from the area of construction. Any exposures would likely have only a minor effect on individuals and no effect on their populations. The sound generated from vibratory pile driving is non-impulsive, which is not known to cause injury to marine mammals. Each discreet vibratory pile driving action is also brief, requiring less than 60 seconds to completely drive a pile. The expected level of unavoidable exposure (defined as acoustic harassment) is presented earlier in this Section. This level of effect is not anticipated to have any adverse impact on North Atlantic right whales', humpback whales', Atlantic spotted dolphins', bottlenose dolphins', or West Indian manatees' population recruitment, survival, or recovery (in the case of Federally listed species).

MMPA Conclusions

In compliance with the MMPA, the Navy applied for an IHA for the first year of in-water work associated with the Wharf Bravo recapitalization activities. Shut-down procedures will ensure no Level A harassments (injury) would occur. The number of exposures (as all Level B; Behavioral Harassment) that could result from the 1 year period of construction for the Wharf Bravo recapitalization activities from October 1, 2016, and September 30, 2017, is estimated to be 1,030 animals; 110 Atlantic spotted dolphins, and 920 bottlenose dolphins. The Proposed Action activities would not proceed before receipt of the approved IHA. Should work need to continue after the initial 12-month period, a second IHA may be developed. See Appendix A for agency correspondence and Appendix D for the Draft IHA. The Marine Mammal Commission (the Commission), in consultation with its Committee of Scientific Advisors on Marine Mammals, has reviewed the Navy's IHA application seeking authorization under section 101(a)(5)(D) of the MMPA to *take* marine mammals by harassment. The *taking* would be incidental to pile driving. The IHA would be in effect for 1 year. The Commission also reviewed the NMFS August 8, 2015, notice (80 FR 46545) announcing receipt of the IHA application and proposing to issue the authorization, subject to certain conditions.

ESA Conclusions

No effects on the designated or proposed critical habitat for the North Atlantic right whale are anticipated to result from in-water noise generated by the Project. The essential calving features specific to Unit 2 (e.g., sea state, surface temperature, water depth) are unaffected by Project noise. The Navy has concluded that Alternative 2 activities would result in a "may affect, but not likely to adversely affect' determination for the North Atlantic right whales, humpback whales, and West Indian manatees, due to the effects from temporary water quality depletion, resuspended sediments, and noise that are expected to be highly localized and discountable. The Navy has further concluded that a "no adverse modification" determination is appropriate for the North Atlantic right whale designated critical habitat and the West Indian manatee critical habitat because of the highly localized, temporary nature of potential water quality depletion and sediment resuspension; any effects are expected to be discountable. The Navy has submitted two separate biological assessments in compliance with ESA; one to the USFWS and another to the NMFS for species under their respective jurisdictions for the Wharf Bravo recapitalization activities. On November 20, 2015, and February 4, 2016, USFWS and NMFS, respectively, provided letters that concurred with the Navy's effects determinations, thus fulfilling the requirements of the ESA and requiring no further action.

3.2.6 Sea Turtles

3.2.6.1 Regulatory Environment

All sea turtle species are protected under the ESA. NMFS and the USFWS share jurisdiction for sea turtles, with NMFS having jurisdiction for the conservation and recovery of sea turtles in the marine environment and USFWS for sea turtles on nesting beaches. The ESA outlines the need to protect the designated critical habitat of listed species. For background details on the ESA, see Section 3.2.5; Marine Mammals; 3.2.5.1 Regulatory Overview. Since NMFS and USFWS share jurisdiction of sea turtles, coordination with each respective agency would depend on the potentially impacted habitat. Current information about sea turtles indicates that their distribution is both specific to the species and to their stage in the life cycle.

Table 3-20 identifies the five species of sea turtles that may occur within the Study Area: the loggerhead sea turtle (*Caretta caretta*), the green sea turtle (*Chelonia mydas*), the leatherback sea turtle (*Dermochelys coriacea*), the hawksbill sea turtle (*Eretmochelys imbricata*), and the Kemp's ridley sea turtle (*Lepidochelys kempii*). Two species, the green sea turtle and loggerhead sea turtle are listed by population and DPS respectively.

Table 3-20. Federally Listed (ESA) Sea Turtles within the Study Area

Common Name	Scientific Name	Relevant Population/DPS	ESA Status
Loggerhead sea turtle	*Caretta caretta*	Northwest Atlantic Ocean	Threatened
Loggerhead sea turtle critical habitat			Designated
Green sea turtle	*Chelonia mydas*	Florida nesting population[1]	Endangered
Leatherback sea turtle	*Dermochelys coriacea*	Entire population	Endangered
Hawksbill sea turtle	*Eretmochelys imbricata*	Entire population	Endangered
Kemp's ridley sea turtle	*Lepidochelys kempii*	Entire population	Endangered

Source: GSRC 2015
Note: [1]The green sea turtle is listed as threatened as a species, but the Florida and Mexican Pacific coast nesting populations are listed as endangered. Note that green sea turtles found in the Study Area might not all be from the Florida population.

Additionally, critical habitat has been designated for the loggerhead sea turtle; where areas of the Nearshore Reproductive Habitat (nesting beaches) component of the critical habitat lie approximately 3 miles south of the Study Area (ending at the southern boundary of the Kathryn Abbey Hanna Park); therefore, this critical habitat will not be analyzed.

The olive ridley sea turtle (*Lepidochelys olivacea*) was considered for inclusion, but its occurrence in the Study Area is outside the species' normal range, and therefore the species will not be analyzed. Currently, there are no olive ridley nesting beaches in the eastern U.S., and there are no known feeding, breeding, or migration areas within the vicinity of the Study Area.

3.2.6.2 Sea Turtles – Environment

3.2.6.2.1 Federally Listed Sea Turtles and Designated Critical Habitat

Loggerhead Sea Turtle
Status and Management – Loggerhead sea turtles were Federally listed as threatened throughout its range on July 28, 1978 (43 FR 32808). In 2011, NMFS and USFWS listed five DPSs as endangered and retained four other DPSs as threatened under the ESA (NMFS 2011b). The Northwest Atlantic Ocean DPS (threatened) is the only one that occurs within the Study Area. On July 10, 2014, the NMFS issued the final rule to designate critical habitat for the Northwest Atlantic Ocean DPS of the loggerhead sea turtle within the Atlantic Ocean and the Gulf of Mexico pursuant to the ESA (79 FR 39856).

Habitat and Geographic Range – Loggerhead sea turtles occur in temperate and tropical marine waters worldwide. Depending on the life stage, loggerheads may occur in terrestrial, oceanic, or nearshore habitats. Loggerhead sea turtles in U.S. waters occur in habitats ranging from coastal estuaries to waters far beyond the continental shelf (Dodd 1988). At emergence, hatchlings swim to offshore currents and remain in the open ocean, often associating with floating mats of *Sargassum* (algae of the genus *Sargassum*) (Witherington and Hirama 2006). Migration between oceanic and nearshore habitats occurs during the juvenile stage as turtles move seasonally from open-ocean current systems to nearshore foraging areas where they would settle as adults (Mansfield 2006).

In the southeastern U.S., nesting season for loggerheads takes place from May to October (FWC 2007a). Large nesting colonies exist in Florida, with more limited nesting along the Gulf Coast and north through Virginia. Duval County hosts a moderate amount of nesting on beaches throughout the county. NAVSTA Mayport itself has several suitable nesting beaches that see regular, small amounts of nesting each season (DON 2014). Limited foraging habitat for juveniles and adults exists in the Study Area. In the NAVSTA Mayport Turning Basin and navigation channel, the muddy bottom provides habitat for invertebrates which are a major food source for loggerhead turtles.

Population and Abundance – Annual loggerhead nest counts on Florida's 26 core index beaches from 1989 through 2014 varied from a peak of 59,918 in 1998 to a low of 28,074 in 2007. In the most recent nesting season (2014), nest counts were slightly higher than in 2013 (FWC 2015). Survey effort remained nearly identical. Analysis of index nesting beach survey data has shown a decline in nesting. Results indicated that there has been a decrease of 26 percent over the 20-year period from 1989 to 2008 and a 41 percent decline since 1998. The mean annual rate of decline for the 20-year period was 1.6 percent. Surveys conducted in 2014 identified 119 loggerhead nests along Duval County beaches, representing the lowest in 5 years (FWC-FWRI 2015a). Loggerheads have historically nested on NAVSTA Mayport beaches and continue to do so each year. In 2014, six nests, 563 hatchlings, and three false crawls were documented at the installation (Loop 2015b). In-water abundances of loggerhead turtles in the action area are unknown. However, given presence of nesting and foraging habitat nearby, loggerhead turtles can be expected to occur regularly in the action area.

Predator/Prey Interaction and Foraging – Juvenile and subadult loggerhead turtles are omnivorous, foraging on crabs, molluscs, jellyfish, and vegetation captured at or near the surface (Dodd 1988). Adult loggerhead sea turtles are generalized carnivores that forage on nearshore bottom-dwelling invertebrates (molluscs, crustaceans, and anemones) and sometimes fish (Dodd

1988). Globally, common predators of eggs and hatchlings on nesting beaches are ghost crabs (Ocypodinae), raccoons (*Procyon lotor*), feral pigs (*Sus scrofa*), foxes (*Vulpes spp.*), coyotes (*Canis latrans*), armadillos (Chlamyphoridae and Dasypodidae), and fire ants (*Solenopsis spp.*) (Dodd 1988), though this is less of an issue in Florida due to intense nest protection efforts. In the water, hatchlings are susceptible to predation by birds and fish. Sharks are the primary predator of juvenile and adult loggerhead sea turtles (Fergusson et al. 2000; Simpfendorfer et al. 2001).

Threats – Specific threats to loggerhead sea turtles include incidental capture in fishing gear, primarily in longlines and gillnets, but also in trawls, traps and pots, and dredges; and directed harvest. General threats to marine turtles include entanglement in gillnets, pound nets, and the lines associated with longline and trap/pot fishing gear; ingestion of or becoming entangled in marine debris; environmental contamination; disease; and vessel strikes (NOAA Fisheries 2015h).

Critical Habitat – On July 10, 2014, NMFS designated specific areas of critical habitat that include 38 occupied marine areas within the range of the Northwest Atlantic Ocean DPSs of loggerhead sea turtles. These areas contain one or a combination of nearshore reproductive habitats, winter areas, breeding areas, migratory corridors, and *Sargassum* habitats (Federal Register [FR] 2014a). Additionally, USFWS addressed the designation of approximately 685 miles of nesting beaches (in North Carolina, South Carolina, Georgia, Florida, Alabama, and Mississippi) in a separate rulemaking (79 FR 39756) on the same date (FR 2014b). Nesting beaches constitute the Nearshore Reproductive Habitat component of the critical habitat. The closest of these areas lies approximately 3 miles south of the Study Area (ending at the southern boundary of the Kathryn Abbey Hanna Park); therefore, this critical habitat component will not be analyzed.

The *Sargassum* habitat component has been defined as the top 33 ft (10 m) of the water column in the South Atlantic EEZ bounded by the western edge of the Gulf Stream. However, *Sargassum* occurs in both the neritic and oceanic environments. Most pelagic *Sargassum* in the Atlantic Ocean circulates between 20° N and 40° N latitude, and between 30° W longitude and the western edge of the Florida Current/Gulf Stream, and the Gulf of Mexico (SAFMC 2002). The survival of loggerhead sea turtles, in particular the post-hatchling and small oceanic juvenile stages, is dependent upon suitable foraging and shelter habitat, both of which are provided by the algae of the genus *Sargassum* in the Atlantic Ocean and Gulf of Mexico (Witherington and Hirama 2006). The closest areas of the *Sargassum* habitat component of the critical habitat lies approximately 72 nm to the east of the Study Area; therefore, this critical habitat component will not be analyzed.

Green Sea Turtle

Status and Management – The green sea turtle was listed on July 28, 1978, as threatened throughout its range except for Florida and the Pacific Coast of Mexico, where it was listed as endangered (43 FR 32808). Individuals from both threatened and endangered populations may be present in the Action Area. A recent petition (80 FR 15272) on March 23, 2015 entitled "Identification and Proposed Listing of Eleven Distinct Population Segments of Green Sea Turtles (*Chelonia mydas*) as Endangered or Threatened and Revision of Current Listings" proposes to remove the current range-wide listing and, in its place, list eight DPSs as threatened and three as endangered. USFWS and NMFS also propose to apply existing protective regulations to the DPSs.

Habitat and Geographic Range – The green turtle is globally distributed and generally found in tropical and subtropical waters along continental coasts and islands between 30° North and 30° South. Nesting occurs in over 80 countries throughout the year (though not throughout the year at each specific location). Green turtles are thought to inhabit coastal areas of more than 140 countries (NOAA Fisheries 2015k). In the U.S., green sea turtles nest primarily along the coast of eastern Florida.

After emerging from the nest, green turtle hatchlings swim to offshore areas where they float passively in major current systems. At the juvenile stage (estimated at 5 to 6 years) they leave the open-ocean habitat and retreat to protected lagoons and open coastal areas that are rich in seagrass or marine algae (Bresette et al. 2006), where they will spend most of their lives (Bjorndal and Bolten 1988). Along Florida's Atlantic coast, juvenile green turtles occur in high-wave-energy, nearshore reef environments less than 2 m deep that support an abundance of macroalgae and submerged aquatic vegetation (Holloway-Adkins 2006). Adult green turtles can also utilize these habitats in between migrations for mating and nesting. Occasional green turtle nesting occurs in Duval County, on beaches adjacent to the action area. Nesting season varies with locality; in the vicinity of the Project, the season is roughly June to September (NMFS and USFWS 2007).

Population and Abundance – Although nesting activity has been recorded in almost every coastal county in Florida, most green turtle nesting is concentrated along the southeast coast of Florida. Annual green turtle nest counts on core Index beaches since 1989 to 2014, have ranged from 267 to 36,195, peaking in 2013. Numbers show a mostly biennial pattern of fluctuation, with the 2013 counts exceeding twice the next highest year (FWC 2015). An annual average of 16,064 green sea turtles nested in Florida from 2010 to 2014, with 2013 representing an all-time record with 36,195 nests (18,190 in Brevard County).

In 2014, however, only one green turtle nest was laid in Duval County. This is comparable to the past 5 years of nesting data available (FWC-FWRI 2015a). This nest was not on the NAVSTA Mayport beach; however, green turtles have nested (two nests) there as recently as 2013 (Loop 2015b). Green turtles have been recorded in the NAVSTA Mayport Turning Basin (USACE 2001). In addition to individuals from the Florida nesting population, adult and juvenile males and females from nesting colonies in the wider Caribbean could occur in the waters of the Action Area.

Predator/Prey Interaction and Foraging – The green sea turtle is the only species of sea turtle that, as a subadult and adult, primarily consumes plants and other types of vegetation (Mortimer 1995). Very young green sea turtles are omnivorous (Bjorndal 1997). Salmon et al. (2004) reported that post-hatchling green sea turtles were found to feed near the surface on seagrasses or at shallow depths on small jellyfish and fish eggs. Pelagic juveniles eat worms, young crustaceans, aquatic insects, grasses, and algae (Bjorndal 1997). After settling in coastal juvenile developmental habitat at 8 to10 inches (20.3 to 25.4 cm) in length, they eat mostly seagrass and algae (Balazs et al. 1994). Recent research indicates that green sea turtles in the open-ocean environment, and even in coastal waters, also consume jellyfish, sponges, and sea pens (Godley et al. 1998; NMFS and USFWS 2007; Parker and Balazs 2008). The loss of eggs to land-based predators such as mammals, snakes, crabs, and ants occurs on some nesting beaches globally, though this is less of an issue in Florida due to intense nest protection efforts. As with other sea turtles, hatchlings may be preyed on by birds and fish. Sharks are the primary nonhuman predators of juvenile and adult green sea turtles at sea (NOAA Fisheries 2015k).

Threats – Specific threats to green sea turtles include harvest of eggs and adults (historically, though the practice continues in some areas of the world), incidental capture in fishing gear, and fibropapillomatosis (disease). General sea turtle threats include entanglement in gillnets, pound nets, and the lines associated with longline and trap/pot fishing gear; ingestion of or becoming entangled in marine debris; environmental contamination; and vessel strikes (NOAA Fisheries 2015h).

Critical Habitat – Critical habitat for the green turtle was designated in 1998 (63 FR 46693), but does not occur in or near the Action Area.

Leatherback Sea Turtle

Status and Management – Leatherback sea turtles were Federally listed as endangered throughout their range on June 2, 1970 (35 FR 8495). On October 10, 2012, USFWS and NMFS advertised the near conclusion of a 5-Year review (2007 – 2012) for Kemp's ridley, olive ridley, leatherback, and hawksbill sea turtles (77 FR 161573). In November 2013, USFW and NMFS published the 5-Year Review: Summary and Evaluation report (NMFS and USFWS 2013b). Based on the best available information, USFWS and NMFS reported that they do not believe the leatherback turtle should be delisted or reclassified. However, USFWS and NMFS further reported that they have information that indicates an analysis and review of the species should be conducted in the future to determine the application of the DPS policy to the leatherback turtle (NMFS and USFWS 2013a).

Habitat and Geographic Range – Upwelling areas serve as nursery grounds for post-hatchling and early juvenile leatherback sea turtles because these areas provide a high level of prey (Musick and Limpus 1997). Late juvenile and adult leatherback sea turtles are known to range from mid-ocean to the continental shelf and nearshore waters (Grant and Ferrell 1993; Schroeder and Thompson 1987). Juvenile and adult foraging habitats include both coastal and offshore feeding areas (Frazier 2001). In Florida, nesting begins around March and continues through July or August. Suitable nesting habitat occurs throughout Duval County and on the beaches of NAVSTA Mayport. The waters of the Study Area exterior to the NAVSTA Mayport Turning Basin may serve as nearshore foraging habitat when their preferred prey is nearby. Leatherback turtles may also occur in the Study Area while migrating between nesting habitat south of the Study Area on their way to more productive foraging habitat in the North Atlantic.

Population and Abundance – Since 1989, there has been a substantial increase in the nesting population along the east coast of Florida (FWC 2015). This increase has coincided with an upsurge in the wider Caribbean population. Leatherbacks typically nest along the beaches from Brevard County south to Broward County, south of the Study Area. Annual leatherback turtle nest counts on core Index beaches since 1989 to 2014, have ranged from 27 to 641. These counts, however, do not include leatherback nesting at the beginning of the season before May 15, nor do they represent all the beaches in Florida where leatherbacks nest. The index provided by these counts does serve as a representative reflection of trends.

Similar to nest counts for green turtles, leatherback nest counts have been increasing exponentially. Contrarily, the FWC/FWRI Statewide Nesting Beach Survey Program Database as of 20 February 2015 reported an annual average of 1,440 leatherback sea turtles nested in Florida from 2010 to 2014, with 2014 recording 6,604 nests. In 2014, however, only one leatherback turtle nest was laid in Duval County, representing lower than average nesting activity for Duval County (FWC-FWRI 2015a). This nest was not on a NAVSTA Mayport beach;

however, leatherback sea turtles have recently nested (three nests) there from 2011 through 2013 (Loop 2015b). In-water abundances for the Study Area are unknown. Leatherbacks from the Florida stock may occur in the nearshore waters of NAVSTA Mayport during the nesting season. Migrating individuals from other stocks may pass through or forage in Study Area waters, though it is unlikely that individuals from any stock would utilize the NAVSTA Mayport Turning Basin for foraging habitat.

Predator/Prey Interaction and Foraging – Leatherbacks have pointed tooth-like cusps and sharp-edged jaws that are adapted for a diet of soft-bodied open-ocean prey such as jellyfish, which are their main food source (Bjorndal 1997; James and Herman 2001; Salmon et al. 2004). Leatherback sea turtles feed throughout the water column (Davenport 1988; Eckert et al. 1989; Eisenberg and Frazier 1983; Grant and Ferrell 1993; James et al. 2005; Salmon et al. 2004). Globally, predators of leatherback sea turtles eggs and hatchlings include feral pigs, dogs, raccoons, ghost crabs, and fire ants, though this is less of an issue in Florida due to intense nest protection efforts. As with other sea turtle species, leatherback hatchlings are preyed on by birds and large fish such as tarpon (*Megalops atlanticus*) and snapper (Lutjanidae). Sharks and killer whales are predators of adult leatherbacks (NMFS and USFWS 2007).

Threats – Specific threats to leatherback sea turtles include harvest of eggs and adults, and incidental capture in fishing gear. General sea turtle threats include entanglement in gillnets, pound nets, and the lines associated with longline and trap/pot fishing gear; ingestion or becoming entangled in marine debris; environmental contamination, and vessel strikes (NOAA Fisheries 2015h).

Critical Habitat – Critical habitat was designated for the leatherback's terrestrial environment on St. Croix in 1978. No critical habitat occurs along the continental U.S. for the leatherback sea turtle. Revision to the critical habitat designation was finalized for specific areas in the Pacific on January 26, 2012 (77 FR 4170).

Hawksbill Sea Turtle

Status and Management – The hawksbill was Federally listed as endangered on June 2, 1970 (35 FR 8495). On October 10, 2012, USFWS and NMFS advertised the near conclusion of a 5-Year review (2007 to 2012) for Kemp's ridley, olive ridley, leatherback, and hawksbill sea turtles (77 FR 161573). In June 2013, USFW and NMFS published the 5-Year Review: Summary and Evaluation report (NMFS and USFWS 2013b). Based on the best available information, USFWS and NMFS reported that they do not believe the hawksbill turtle should be delisted or reclassified.

Habitat and Geographic Range – The hawksbill is the most tropical of the world's sea turtles, rarely occurring above 35° N or below 30° S (The State of the World's Sea Turtles Team 2008; Witzell 1983). Hatchlings are believed to occupy open-ocean waters, associating themselves with surface algal mats in the Atlantic Ocean (Witherington and Hirama 2006; Witzell 1983). Juveniles leave the open-ocean habitat after 3 to 4 years and settle in coastal foraging areas, typically coral reefs (Mortimer and Donnelly 2008). Juveniles and adults share the same foraging areas, including tropical nearshore waters associated with coral reefs, hardbottoms, or estuaries with mangroves (Musick and Limpus 1997). Hawksbills are common in the waters off southern Florida, although nesting is rare. Hawksbill turtles use different habitats at different stages of their life cycle, but are most commonly associated with healthy coral reefs (NOAA Fisheries 2015e). Sightings north of Florida are rare, and Texas is the only other state where

hawksbills are sighted with any regularity (Keinath et al. 1991; Lee and Palmer 1981; Plotkin 1995).

Population and Abundance – The 2007 5-year review (NMFS and USFWS 2007) assessed nesting abundance and nesting trends in all regions inhabited by hawksbill turtles. An analysis of 25 index sites around the world indicated that hawksbill nesting has declined globally by at least 80 percent over the last three hawksbill generations (Meylan and Donnelly 1999). In the wider Caribbean, population trends vary, and trends are not known for many locations (NMFS and USFWS 2007). Nesting data for Duval County or Florida are not available, as hawksbill turtles nest rarely or not at all in Florida. Hawksbill turtles are cryptic nesters (Bjorndal et al. 1985), and the rare hawksbill nest could be missed in areas with a high number of other species nesting, or where beach coverage is incomplete. Because of its location north of the species' normal nesting range, and its lack of suitable juvenile and adult habitat, it is very unlikely that any hawksbill turtles will occur in the Study Area. There have been no documented hawksbill nesting on NAVSTA Mayport beaches from 1998 to 2014 (Loop 2015b).

Predator/Prey Interaction and Foraging – Older juvenile and adult hawksbill turtles fill a unique ecological niche in marine and coastal ecosystems, feeding on sponges helps to control populations of sponges that may otherwise compete for space with reef-building corals (Hill 1998; Leon and Bjorndal 2002). Post-hatchling hawksbills feed on floating *Sargassum* in the open ocean (Plotkin and Amos 1998). During the juvenile stage, hawksbills are considered omnivorous, feeding on sponges, sea squirts, algae, molluscs, crustaceans, jellyfish, and other aquatic invertebrates (Bjorndal 1997). As with other sea turtles, hatchlings may be preyed on by terrestrial predators upon emergence from the nest, and birds and fish at sea. Sharks are the primary nonhuman predators of juvenile and adult hawksbills at sea (Witzell 1983).

Threats – The Services believe that hawksbills remain in danger of extinction because of ongoing and threatened destruction, modification, and curtailment of their habitat. Specific threats to hawksbill sea turtles include habitat loss of coral reef communities, harvest of their eggs and meat, commercial exploitation (historically, but still permitted in some parts of the world), increased recreational and commercial use of nesting beaches in the Pacific, and incidental capture in fishing gear. One of the most detrimental human threats to hawksbill turtles is the intentional and intensive exploitation of eggs from nesting beaches. In some countries, very few eggs hatch outside protected hatcheries (Mortimer and Donnelly 2008), particularly in Indonesia, Thailand, Malaysia, and Sri Lanka. General sea turtle threats include entanglement in gillnets, pound nets, and the lines associated with longline and trap/pot fishing gear; ingestion or becoming entangled in marine debris; environmental contamination; and vessel strikes (NOAA Fisheries 2015h).

Critical Habitat – Critical habitat was designated for hawksbill terrestrial nesting areas in Puerto Rico in 1982 (47 FR 27295), but it does not occur in or near the Study Area.

Kemp's Ridley Sea Turtle

Status and Management – The Kemp's ridley sea turtle was listed as endangered throughout its range on December 2, 1970 (35 FR 18320). On October 10, 2012, USFWS and NMFS advertised the near conclusion of a 5-Year review (2007 to 2012) for Kemp's ridley, olive ridley, leatherback, and hawksbill sea turtles (77 FR 161573). The 5-Year Review: Summary and Evaluation report for Kemp's ridley sea turtle resulting from this USFW and NMFS 5-year review effort is not available.

Habitat and Geographic Range – The Kemp's ridley sea turtle is found only in the Gulf of Mexico and North Atlantic Ocean, north of the Caribbean Sea. Habitats frequently used by juvenile and adult Kemp's ridley sea turtles are warm-temperate to subtropical sounds, bays, estuaries, tidal passes, shipping channels, and beachfront waters, where their preferred food, the blue crab, is abundant (Lutcavage and Musick 1985; Seney and Musick 2005). Juveniles migrate to habitats along the U.S. Atlantic continental shelf from Florida to New England (Morreale and Standora 1998; Peña 2006) at around 2 years of age. Adult female Kemp's ridley sea turtles take part in mass synchronized nesting emergences known as "arribadas" on only a few nesting beaches; this nesting strategy is unique to *Lepidochelys* spp. Kemp's ridley turtles may also be solitary nesters, but this is less common and generally occurs outside of the main nesting areas in Mexico. Only rare nesting is known to occur on the east coast of Florida, and has not been documented in Duval County in the last 25 years (FWC-FWRI 2015).

Population and Abundance – The Final Bi-National (U.S. and Mexico) Revised Recovery Plan in English and Spanish (2nd revision) reported that from 2002 to 2010, a total of 911 Kemp's ridley nests have been documented on the Texas coast (NMFS et al. 2011). This is over 11 times the 81 nests recorded over the previous 54 years from 1948 to 2001 (Shaver et. al 2005). An updated population model predicts the population will grow 19 percent per year from 2010-2020, assuming current survival rates within each life stage remain constant. The population could attain at least 10,000 nesting females (one criterion for downlisting) in a season by 2011 (NMFS et al. 2011). Historic nesting records range from Mustang Island, Texas, in the north to Veracruz, Mexico, in the south. Most nesting occurs in Mexico. The main nesting beach is a 16-mile stretch of beach near the village of Rancho Nuevo in Tamaulipas, Mexico. In 2014, 119 nests were recorded in Texas, 103 of which were documented at Padre Island National Seashore (NPS 2015). Kemp's ridley turtles have been recorded in nearby Kings Bay, Georgia and therefore may be present in the NAVSTA Mayport Turning Basin (USACE 2006). Occurrences within the NAVSTA Mayport Turning Basin are expected to be seasonal, uncommon, rare, and correlated with presence of preferred prey species. Nesting is not expected to occur near the Study Area and none have been documented on NAVSTA Mayport beaches since 1998 (Loop 2015b).

Predator/Prey Interaction and Foraging – Kemp's ridley sea turtles feed primarily on crabs but are also known to prey on molluscs, shrimp, fish, jellyfish, and plant material (Frick et al. 1999; Marquez-M. 1994). Blue crabs (*Callinectes sapidus*) and spider crabs (*Libinia emarginata*) are important prey species for the Kemp's ridley (Keinath et al. 1987; Lutcavage and Musick 1985; Seney and Musick 2005). Major predators of Kemp's ridley sea turtle eggs and hatchlings on nesting beaches include raccoons, dogs, pigs, skunks, badgers, and fire ants. Predatory fishes such as jackfish and redfish may feed on hatchlings at sea. Sharks are the primary predator of juvenile and adult Kemp's ridley sea turtles (NMFS and USFWS 2011).

Threats – Specific threats to Kemp's ridley sea turtles include incidental capture in fishing gear (primarily in shrimp and other trawls, but also in gill nets, longlines, traps/ pots, and dredges) and egg collection (historically). General sea turtle threats include entanglement in gillnets, pound nets, and the lines associated with longline and trap/pot fishing gear; ingestion or becoming entangled in marine debris; environmental contamination; and vessel strikes (NOAA Fisheries 2015h).

Critical Habitat – In 2010, NOAA Fisheries and USFWS were jointly petitioned to designate critical habitat for Kemp's ridley sea turtles in nesting beaches along the Texas coast and marine

habitats in the Gulf of Mexico and Atlantic Ocean (WildEarth Guardians 2010). No further consideration of this petition has been documented.

3.2.6.3 Sea Turtles – Consequences

Impacts on sea turtles can be broadly classified into two categories: direct and indirect. Direct impacts affect individuals in the form of behavioral disturbances, physical injury, or even death, and occur at the time of the action. Indirect impacts affect through pathways such as habitat destruction and loss of prey and only affect individuals after the action has occurred.

Direct impacts on sea turtles are possible behavioral disturbances or physical injuries caused by pile driving noise and physical strikes during vessel navigation activities. Possible indirect impacts may include loss or degradation of benthic and migratory habitat, decreased water quality, lighting, and reduced prey availability. No loss of nesting substrate is anticipated.

3.2.6.3.1 Alternative 1 – No Action Alternative

Under Alternative 1, the Wharf Bravo recapitalization would not occur. Baseline conditions for sea turtles, as described in Section 3.2.6.2, would remain unchanged. Therefore, there would be no impacts on marine mammals from the implementation of Alternative 1.

3.2.6.3.2 Alternative 2 – Preferred Alternative

Alternative 2 repair and facilities maintenance activities evaluates potential impacts on sea turtles from five broad categories of impacts, including physical impacts (vessel strikes), water quality impacts, prey availability impacts, habitat impacts, and acoustic impacts.

Physical Impacts

Physical impacts may result primarily from vessel movements, which have the potential to affect sea turtles directly by accidentally striking or disturbing individual animals. However, since there are no weight-bearing or structural integrity issues on the current Wharf Bravo, crane barges and other support vessels would likely not be necessary, as shore-based equipment would be deployed. This would minimize the requirement for typical vessel operations, and therefore, reduce the risk of direct vessel strikes. Precise data are lacking for sea turtle mortalities directly caused by vessel strikes; however, live and dead turtles are often found with deep cuts and fractures indicative of collision with a boat hull or propeller (Hazel et al. 2007; Lutcavage et al. 1997).

Behavioral changes in response to vessel presence include avoidance reactions, alarm/startle responses, and other behavioral and stress-related changes (such as altered swimming speed, direction of travel, resting behavior, diving activity, and respiration rate). It is not well understood whether the presence and activity of the vessel, the vessel noise, or a combination of these factors produces behavioral reactions. It seems likely that both noise and visual presence of vessels play a role in prompting reactions from these animals. The probability and significance of vessel and sea turtle interactions is dependent on several factors including numbers, types, and speeds of vessels; the regularity, duration, and spatial extent of activities; and the presence/absence and density of sea turtles.

Sea turtles in the NAVSTA Mayport Turning Basin and navigation channel encounter vessel traffic associated with daily operations, maintenance, and security monitoring along the waterfront, and it is assumed that individuals that frequent the waterfront have habituated to

existing levels of vessel activity. Construction vessels (if necessary) would operate at low speeds within the relatively limited Study Area. Construction vessel traffic would potentially pass near sea turtles on an incidental basis, but short-term behavioral reactions to vessels are not expected to result in long-term impacts on individuals in the area (such as chronic stress), or to sea turtle populations in waters surrounding the Study Area.

Collisions of construction vessels and sea turtles are not expected during construction activities because vessel speeds would be low. All of the species that may occur in the Study Area tend to surface at regular intervals allowing for increased detectability and avoidance. Further, marine species observers would be deployed to observe sea turtle shutdown zones, and alert the contractor to shut down in-water work if sea turtles are sighted in the shutdown zone. Therefore, direct effects on sea turtles from physical impacts (vessel strikes) are expected as an extremely rare occurrence and practically avoided.

Water Quality Impacts
Water quality impacts may result primarily from resuspended sediments that would increase turbidity and could affect foraging success for sea turtles, which are visual predators. The overall level of sediment disturbance associated with the Wharf Bravo recapitalization activities would be significantly lower than that of maintenance dredging in the NAVSTA Mayport Turning Basin, and resuspended sediments are expected to dissipate within a few hours (NMFS 2009). Frequent tidal flushing would also dilute the concentration of contaminants in the basin water column. Thus sea turtles exposed to resuspended sediments are not likely to be impacted by contaminants. The activities that generate suspended sediments would be short-term and highly localized to the area immediately around Wharf Bravo, and suspended sediments are expected to disperse and/or settle rapidly. Therefore, direct effects on sea turtles from changes in water quality are expected to be minimal.

Prey Availability Impacts
Benthic invertebrates and blue crabs, the favored prey of loggerhead and Kemp's ridley turtles respectively, occur in the NAVSTA Mayport Turning Basin and navigation channel. Jellyfish, the favored prey of leatherback turtles, may occur in the water column when conditions favor their growth. Some benthic invertebrates that live in the substrate directly adjacent to pile driving activities may be injured or killed by the physical act of piles being placed into the substrate of the NAVSTA Mayport Turning Basin. Sound produced by pile driving may affect invertebrates both on the bottom and in the water column. However, effects of sound on invertebrates are not clearly understood (see Section 3.2.1; Marine Invertebrates). In general, effects on and removals of invertebrate prey species would not appreciably alter the amount of prey available in the area for loggerhead, Kemp's ridley, and leatherback sea turtles. No suitable prey for hawksbill turtles occurs in the Study Area and would not be affected by the Proposed Action.

Seagrasses, which are consumed by green turtles, are not present in or near the Study Area. Macroalgae, which are sometimes consumed by green turtles, could be present on the piles and armored shoreline of the Wharf Bravo. Macroalgae on old piles that are being removed would not be available for sea turtles to graze on. It is anticipated that macroalgae would quickly recolonize new piles and no overall loss of prey for green turtles would occur (see Section 3.2.2; Marine Vegetation).

Habitat Impacts
No nesting habitat for any species would be lost due to construction activities associated with the Wharf Bravo repair and facilities maintenance activities. Wharf Bravo would have an expanded profile; however, the wharf exists along an already armored shoreline and no beaches would be affected. Construction would occur during daytime hours, and no additional lighting would occur at night during the construction period.

As part of the Wharf Bravo repair and facilities maintenance activities, new lighting fixtures would be installed. Hatchling sea turtles use lighting cues to navigate from the beach to the ocean upon emergence from the nest. Following re-nourishment of the beach at NAVSTA Mayport in summer 2013, resulting in a raised beach profile, installation personnel are aware that light from proposed Wharf Bravo could be visible to nesting sea turtles and hatchlings at the northern end of the beach. Evidence was gathered on the night of September 20, 2013, that clearly demonstrates direct light visible from existing Wharf C-2. It is assumed that direct light from the proposed Wharf Bravo repair and facilities maintenance activities would also be visible unless mitigation was enacted.

The Navy developed a lighting plan for Wharf Bravo to eliminate direct light on the beach at NAVSTA Mayport and Hugenot Memorial Park. Currently, lighting of the wharf is accomplished utilizing “cobra head” street lights mounted on 30-foot poles. The estimated lighting levels from these fixtures vary between 3 footcandles (30LUX) and 0.0 footcandles (0LUX). This lighting level is inconsistent with the UFC requirements for working areas of the wharf. The existing fixtures have a glass refractor on the face of the fixture to direct the light from the source. Refractors tend to allow stray illumination into the night sky causing light pollution.

Wharf Bravo is within the clearance zone of the adjacent airfield. Therefore, unlike Wharf Charlie, height restrictions have been imposed on the lighting poles currently employed. Due to the current FAA waivers, the new lighting system would maintain the existing pole locations and 30-foot heights. The new fixtures would utilize LED light technology and would be full cutoff type with a BUG rating of B1-B2, U0, and G1-G2. The main lighting units would provide approximately 3 footcandles average illumination for the wharf with a sharp cutoff at the edge of the wharf. A secondary lighting system would be provided for times of low activity. This system would provide 0.5 footcandle of illumination at a “turtle friendly” 590 nanometers wavelength yellow/red color temperature. These fixtures would substantially reduce the amount of light pollution allowed by the current lighting system. As such, the new lights attempt to balance turtle safe recommendations without violating AT/FP and OSHA requirements and are a significant improvement over lighting currently emplaced at comparable locations (Wharf C-1).

The NAVSTA Mayport Turning Basin is already a highly industrialized area. The nearest nesting beach is in Huguenot Memorial Park across the St. Johns River 3,000 ft (1,000 m) with the NAVSTA Mayport beach the second closest. Direct light from the new luminaries would not be visible on any beaches in the Study Area, including Huguenot Memorial Park, NAVSTA Mayport, and the mouth of the St. Johns River. It is not anticipated that the change in the overall lighting profile would adversely affect any nearby emerging hatchlings, and would represent an improvement over existing conditions.

Foraging habitat in the water column for the Kemp’s ridley, loggerhead, and leatherback turtle may be temporarily degraded by the presence of increased sound in the water (3 hours per day

maximum). The effects of sound in the water would be minimal and temporary, and would not permanently degrade nearby foraging habitat for sea turtles. The increased wharf profile (approximately 6 ft [2 m]) would result in some loss of benthic foraging habitat for loggerhead turtles. However, this habitat is not of high quality, and is extremely small in proportion to the total amount of habitat available in the Study Area and the greater region. Turbidity from pile driving and vessel prop wash may temporarily decrease water quality and the foraging efficacy of sea turtles, which are visual predators. The increased turbidity is expected to dissipate over a matter of hours and would not permanently degrade water quality or sea turtles' ability to forage.

NAVSTA Mayport has an approved spill prevention and control plan. As such, runoff or pollution in the water column is not expected. Pile driving activities would cause increased sediment in the water column; however, this sediment would quickly settle back to the bottom of the NAVSTA Mayport Turning Basin and no more than minor, temporary effects are anticipated (see Section 3.1.3; Water Quality and Section 3.1.4; Marine Sediments). Because effects from the Proposed Action would be temporary and minor, no permanent effect on sea turtle habitat is anticipated. No designated or proposed critical habitat for any sea turtle species occurs in or near the Study Area and would not be affected.

Acoustic Impacts

Sea Turtle Acoustic Threshold Criteria - The Navy considers two primary categories of sound sources in its analyses of sound impacts on sea turtles: impulsive sources (e.g., impact pile driving) and non-impulsive sources (e.g., vibratory pile driving). For a general description of underwater sound, the sound produced by the Proposed Action, and the assumptions used to generate source levels, see Section 3.1.2; Sound and Section 3.2.5; Marine Mammals. Possible effects of sound from pile driving range from behavioral effects such as startle reactions and behavioral changes (e.g., ceasing foraging) to injurious effects such as temporary or permanent loss of hearing and damage to internal organs.

The NMFS threshold value for onset of injury to sea turtles due to both impact pile driving and vibratory pile driving is 190 dB re 1 μPa sound pressure level rms. This criterion was developed in cooperation with the NMFS and is not based on experimental evidence of injuries caused to sea turtles by pile driving sound, but was adopted from pinniped thresholds as a precautionary measure when addressing impacts from pile driving on sea turtles. In the absence of reliable in-water density data for sea turtles, this criterion is useful for qualitatively assessing activities that impart sound to water. Sound levels from pile driving would not reach the 190 dB re 1 μPa sound pressure level rms threshold (Section 3.2.5; Marine Mammals); therefore, no injuries to sea turtles from sound associated with pile driving are anticipated.

There are limited data available on sea turtle behavioral reactions to sound. As such, no behavioral criterion has been adopted by the NMFS for sea turtles for pile driving sound and as such, behavioral effects must be assessed qualitatively. Startle responses to anthropogenic sound have been documented in sea turtles (O'Hara and Wilcox 1990 and Moein Bartol et al.1995). Therefore, it can be conservatively assumed that pile driving has the potential to cause startle responses, and behavioral impacts on sea turtles will be assessed qualitatively. Note that all sea turtle species regularly encounter natural events that can cause startle reactions, such as the appearance of predators or changing weather conditions.

Sea Turtle Acoustic Effects – Anticipated sound source levels relevant to sea turtles are presented in Table 3-21. These source levels were developed using the assumptions presented in Section

3.2.5; Marine Mammals. Note that impact pile driving, and its associated higher source levels, would only be used when necessary. It is anticipated that impact pile driving would be used rarely, if at all, as it is only a contingency method. If used, no more than 20 strikes per day would occur. The overall use and duration of impact pile driving would be extremely limited.

Table 3-21. Representative Source Levels from Pile Driving

Noise Source	Pile Type	RMS [dB re 1µPa at 10m]	SEL [dB re 1µPa2s at 10m]
Vibratory	24" steel pipe	163	-
	12" timber	153	-
Impact	24" steel pipe	189	179
	12" timber	170	160

Source: GSRC 2015 and DON 2013a
Note: dB=decibel, rms=root mean squared, m=meter

None of the anticipated pile driving scenarios result in the production of sound above the 190 dB re 1 µPa sound pressure level rms sea turtle injury criterion. Because of this, no injuries associated with sound produced by pile driving are anticipated for any species of sea turtle. However, this does not preclude behavioral effects. As a precautionary measure against possible behavioral effects, a sea turtle and manatee shutdown zone of 50 ft (15 m) would be observed. If a sea turtle approaches or enters the shutdown zone, pile driving would cease and would not resume until the animal has moved out of the area. See Chapter 4 Minimization and Monitoring for more detail on best management practices and mitigation measures.

No behavior criteria for sea turtles exist but it is understood that behavioral impacts could still occur over the course of the Project. In general, the distances over which behavioral disturbances can occur from sound are substantially larger than the distances at which injury can occur. See Section 3.2.5; Marine Mammals for an example of how these distances vary. In the absence of established criteria and quantitative density data, impacts can only be assessed qualitatively, based on the relative abundance of a given species and the knowledge that turtles can react to underwater sound.

Hawksbill turtles are expected to be in the Study Area only rarely, if at all, due to the lack of nesting, reef, and hardbottom foraging habitat. Because of this, and the limited duration of construction, no acoustic effects on hawksbill sea turtles are anticipated. Green and leatherback sea turtles may occasionally occur in the Study Area while migrating to nest on nearby beaches. No waters directly off of nesting beaches would be impacted by the sound produced during the Wharf Bravo recapitalization activities. Green, Kemp's ridley, and leatherback sea turtles may pass through the Study Area while migrating to foraging habitats. Kemp's ridley sea turtles may forage in the NAVSTA Mayport Turning Basin and navigation channel when their preferred prey, blue crabs and invertebrates, are present. Leatherback sea turtles may forage in the offshore portions of the Study Area. Presence of these species in the Study Area is possible, though at limited times of the year and in low numbers.

Loggerhead turtles nest regularly in Duval County and have been found nesting on NAVSTA Mayport beaches. No waters directly off of nesting beaches would be impacted by the sound produced during the Wharf Bravo recapitalization activities. The NAVSTA Mayport Turning

Basin and offshore portions of the Study Area contain their preferred prey of benthic invertebrates. They are expected to be in the Study Area regularly during the nesting season, and could be found foraging during other seasons. Despite the limited duration of construction activities, the number of loggerhead turtles found in the area makes it likely that some behavioral reactions, such as startle responses, from sound produced by the Proposed Action may occur. Given the limited duration of pile driving activities and the fact the loggerhead sea turtles regularly experience stimuli that cause startle responses in their natural environment, these induced behavioral reactions should not significantly disrupt an individual turtle's normal behavioral patterns or constitute harassment.

Conclusions

No significant amount of nesting, foraging, or migratory habitat for sea turtles would be lost or degraded from the Proposed Action. Additionally, few individuals may be behaviorally impacted by the Proposed Action and no injuries are anticipated. As such, no significant impacts on sea turtles would occur as a result of the implementation of Alternative 2.

No significant effects from pile driving activities on Federally listed green, hawksbill, Kemp's ridley, or leatherback sea turtle habitat or prey are anticipated. However, a small chance that individuals of these species may be present during in-water construction and exposed to levels of sound that could cause behavioral disturbances may exist. As such, the Navy concludes that a "may affect, but not likely to adversely affect" determination is appropriate for green, hawksbill, Kemp's ridley, and leatherback sea turtles.

No significant effects on Federally listed loggerhead sea turtle habitat or prey are anticipated. Despite the regular occurrence of loggerheads in the NAVSTA Mayport Turning Basin, direct impacts from vessel operations (strikes) are not anticipated due to the limited vessel operations associated with the Wharf Bravo recapitalization activities. Due to the number of loggerhead turtles nesting near and foraging in the Study Area, it is likely that some individuals of this species may become behaviorally disturbed by sound produced by the Proposed Action. These behavioral disturbances are not expected to substantially change the turtle's normal behavior and rise to the level of harassment. As such, the Navy concludes that a "may affect, but not likely to adversely affect" determination is appropriate for the loggerhead sea turtle. Due to the wharf lighting modifications described previously in this section, the Navy concludes that a "may affect, but not likely to adversely affect" determination is appropriate for nesting and hatchling sea turtles.

No critical habitat for any Federally listed sea turtle species is present in or near the Study Area. As such, the Navy concludes that a "no effect" determination is appropriate for sea turtle critical habitat.

The Navy has submitted two separate biological assessments in compliance with ESA; one to the USFWS for nesting sea turtles, hatchling sea turtles, and critical habitat, and another to the NMFS for juvenile and adult sea turtles under their respective jurisdictions for the Wharf Bravo recapitalization activities. On November 20, 2015, and February 4, 2016, USFWS and NMFS, respectively, provided letters that concurred with the Navy's effects determinations, thus fulfilling the requirements of the ESA and requiring no further action.

3.2.7 Birds

3.2.7.1 Regulatory Overview

3.2.7.1.1 Migratory Bird Treaty Act

The MBTA provides for the protection of migratory birds through various treaties and conventions between the U.S. and Canada, Mexico, Japan, and Russia. The MBTA was enacted to ensure the protection of shared migratory bird resources (MBTA 1918). This act prohibits the intentional *take*, possession, import, export, transport, selling, purchase, barter, or offering for sale, purchase, or barter of any migratory bird or its eggs, body parts (feathers, plumes etc.), or nests, except as authorized under a valid permit. *Take* is defined as "to pursue, hunt, shoot, wound, kill, trap, capture, or collect, or any attempt to carry out these activities" (MBTA 1918). *Take* does not include habitat destruction or alteration, as long as there is no direct taking of birds, active nests, eggs, or parts thereof.

Many common birds are protected under the act, and a complete list of MBTA-protected species is found at 50 CFR 10.13. Under the amendments in 50 CFR 21, *Migratory Bird Permits*, *take* resulting from otherwise lawful military readiness activities are authorized. However, this rule does not authorize *takes* under the ESA, and USFWS retains the authority to withdraw or suspend the authorization for incidental *takes* occurring during military readiness activities under certain circumstances. The ESA requires that the Navy, in consultation with USFWS, ensure that proposed actions are not likely to jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of a critical habitat (16 U.S.C. 1536 (a)(2)). Regulations implementing the ESA expand the consultation requirement to include those actions that "may affect" a listed species or adversely modify critical habitat.

While the Proposed Action is not expected to affect migratory birds, should the Navy's environmental analysis indicate a potential for the Proposed Action to affect migratory birds, the Navy would consult with the USFWS under the MBTA.

3.2.7.1.2 Bald and Golden Eagle Protection Act

Even though the bald eagle has been delisted as a USFWS endangered species, it is still afforded protection through other legislation such as the *Bald and Golden Eagle Protection Act* (The Eagle Act) and the MBTA. The Eagle Act (16 U.S.C. §§ 668-668c), enacted in 1940, and amended several times since then, prohibits anyone without a permit issued by the Secretary of the Interior from *taking* bald eagles, including their parts, nests, or eggs. The Eagle Act provides penalties for those who "*take*, possess, sell, purchase, barter, offer to sell, purchase or barter, transport, export or import, at any time or any manner, any bald or golden eagle, alive or dead, or any part, nest, or egg thereof." In this act *take* also includes "disturb." Further, most states have their own regulations or guidelines for bald eagle management (USFWS 2007b).

3.2.7.1.3 Endangered Species Act

The ESA of 1973, as amended, requires that an action authorized by a Federal agency will not jeopardize the continued existence of an endangered or threatened species or result in the destruction or adverse modification of designated critical habitat of such species.

3.2.7.2 Birds – Environment

3.2.7.2.1 Common Birds of the Study Area

A variety of bird species could occur in the vicinity of Study Area and the NAVSTA Mayport Turning Basin (Table 3-22); most are protected under the Migratory Bird Treaty Act (USFWS 2013a). The MBTA established Federal responsibilities for protecting nearly all migratory species of birds, eggs, and nests. Bird migration is defined as the periodic seasonal movement of birds from one geographic region to another, typically coinciding with available food supplies or breeding seasons. Of the species listed in Table 3-22, three Federally listed birds are known to occur in and around Study Area: piping plover (*Charadrius melodus*), wood stork (*Mycteria americana*), and rufa red knot *(Calidris canutus rufa)*.

Table 3-22. Potential Bird Species Occurring in the Wharf Bravo Project Area

Common Name	Taxonomic Group	Description
Geese, swans, dabbling and diving ducks	Anseriformes	Diverse group of geese, swans, and ducks that inhabit shallow waters, coastal areas, and deeper waters. Feed at the surface by dabbling or by diving in deeper water. Often occur in large flocks.
Loons	Gaviiformes	Superficially duck-like, fish-eating birds that capture prey by diving and underwater pursuit.
Grebes	Podicipediformes	Small diving birds, superficially duck-like. May occur in small groups.
Albatrosses, fulmars, petrels, shearwaters, and storm-petrels	Procellariiformes	Group of largely pelagic seabirds. Fly nearly continuously when at sea. Soar low over the water surface to find prey. Some species dive below the surface.
Tropicbirds, boobies, gannets, pelicans, cormorants, and frigatebirds	Pelicaniformes	Diverse group of large, fish-eating seabirds with four toes joined by webbing. Often occur in large flocks near high concentrations of bait fish.
Herons, egrets, ibis, spoonbills	Ciconiiformes	Small to medium-sized wading birds with dagger-like, down-curved, or spoon-shaped bills used to capture prey in water or mud.
Osprey, bald eagles, peregrine falcons	Accipitriformes and Falconiformes	Large raptors that inhabit habitats with open water, including coastal areas. Feed on fish, waterfowl, or other mammals. Migrate and forage over open water.
Shorebirds, phalaropes, gulls, noddies, terns, skimmers, skuas, jaegers, and alcids	Charadriiformes	Diverse group of small- to medium-sized shorebirds, seabirds, and allies inhabiting coastal, nearshore, and open-ocean waters.
Neotropical migrant songbirds, warblers, thrushes, and allies	Passeriformes, Cuculiformes, Strigiformes, and Apodiformes	Largest and most diverse group of birds in North America, primarily occur in coastal, and inland areas, but often occur in large numbers over the open ocean (particularly over the Gulf of Mexico) during annual spring and fall migration periods.

Source: GSRC 2015

3.2.7.2.2 Threatened and Endangered Birds and Critical Habitat

Piping Plover
Status and Management – The piping plover is divided into two subspecies of plovers. Those that breed on the Atlantic coast of the U.S. and Canada belong to the Atlantic subspecies *Charadrius melodus melodus* (USFWS 2009a). The USFWS listed the Atlantic Coast piping plover population as threatened in 1985 (50 FR 50726) and has instituted a recovery plan for this

shorebird species (USFWS 1996). On July 8, 2014, the USFWS initiated a 5-year status review of nine listed animal and two listed plant species, including the Piping plover–Atlantic Coast and northern Great Plains populations of *Charadrius melodus* (79 FR 38560).

Habitat and Geographic Range – The Atlantic breeding population of piping plovers nest and breed on coastal beaches from southern Maine to North Carolina and are primarily an inhabitant of sandy shorelines in the northeastern and southeastern U.S. (Haig and Elliott-Smith 2004; O'Brien et al. 2006). Piping plovers nest above the high tide line on coastal beaches, sand flats at the ends of sandpits and barrier islands, gently sloping foredunes (dunes parallel to the shoreline), blowout areas behind primary dunes, and washover areas cut into or between dunes (USFWS 1996).

Individuals migrate through and winter in coastal areas of the U.S. from North Carolina to Texas and portions of Yucatan in Mexico and the Caribbean (USFWS 2009b). In winter, the species is only found in coastal areas using a wide variety of habitats, including mudflats and dredge spoil areas and, most commonly, sandflats (O'Brien et al. 2006). Plovers appear to prefer sandflats adjacent to inlets or passes, sandy mudflats along spits (beaches formed by currents), and overwash areas as foraging habitats. Piping plover migration routes and habitats overlap breeding and wintering habitats.

Population and Abundance – The 1991 international census documented 5,482 total piping plover (Haig and Elliott-Smith 2004). The 2001 total population estimate was 5,945 total birds (Haig and Elliott-Smith 2004). Coastal Atlantic U.S. populations have trended upward since listing, though some areas' breeding populations are remaining at depressed levels and showing little or no increase in size. Since its 1985 listing, the Atlantic Coast population estimate has increased from 790 pairs to an estimated 1,849 pairs in 2008, and the U.S. portion of the population has almost tripled, from approximately 550 pairs to an estimated 1,596 pairs (USFWS 2009b). Results of the 2006 international piping plover winter census showed a total of 3,355 piping plovers in the U.S., with the highest counts occurring in Texas. Though the increased abundance of the Atlantic Coast plovers has reduced near-term extinction threats, geographic variation in population growth and sensitivity to survival and productivity are cause for continuing conservation concern (USFWS 2009a).

As of March 21, 2012, the USFWS states that the most recent surveys place the Atlantic population at less than 2000 pairs (USFWS 2012). Although piping plovers do not breed in Florida, individuals from the three breeding populations winter there (USFWS 1999). The Atlantic Coast birds use Florida's Atlantic and Gulf of Mexico coastlines in the winter, including beaches in Duval County (Stevenson and Anderson 1994, Nicholls 1996). A previous winter census stated that approximately 20 to 30 piping plovers occur along the Atlantic coast from Duval County south to Brevard, St. Lucie, and Miami-Dade counties (Florida Natural Areas Inventory 2001). Piping plovers are infrequent visitors to NAVSTA Mayport and Duval County beaches, but were observed at NAVSTA Mayport as recently as 2007. Otherwise, they are not expected to occur routinely in the vicinity of the Study Area.

Predator/Prey Interaction and Foraging – Feeding habitats of breeding piping plovers include intertidal portions of ocean beaches, washover areas, mudflats, sandflats, wrack lines (line of deposited seaweed on the beach), shorelines of coastal ponds, lagoons, and salt marshes (USFWS 1996). They hunt visually using a start-and-stop running method, gleaning and probing prey from the substrate for a variety of small invertebrates (marine worms, crustaceans,

mollusks, insects, and the eggs and larvae of many marine invertebrates) (USFWS 1996). Foraging occurs throughout the day and at night. Piping plovers are preyed upon by various species. These predators, such as raccoons, foxes, skunks, and domestic and feral cats, are often associated with developed beaches and have been identified as a significant source of mortality for piping plover eggs and chicks (USFWS 2009a; Winter and Wallace 2006).

Critical Habitat – In 2000 and 2001, critical habitat was designated for the Great Lakes breeding population, Northern Great Plains breeding population, and wintering population of piping plovers. Designated critical habitat for wintering piping plovers is found to the north of the Study Area, and includes a portion of the St. Johns River on Fort George Island within Huguenot Memorial Park (USFWS 2001a). The Study Area overlaps a small portion of piping plover critical habitat over the St. Johns River (Figure 3-7).

The primary constituent elements (PCE) of wintering piping plover habitats are those essential to foraging, sheltering, and roosting and are found in coastal areas containing intertidal beaches and flats and dunes above the annual high tide (66 FR 36038). However, the Proposed Action is not anticipated to affect the PCEs, so the critical habitat will not be adversely modified. In May 2009, the USFWS designated revised critical habitat for the wintering population of the piping plover in 18 specific units in Texas (79 FR 23476).

Wood Stork

Status and Management – Wood storks were classified as endangered by the USFWS in 1984 (49 FR 7332). A 5-year review was conducted in 2007 resulting in a recommendation to reclassify the species from endangered to threatened and expand their range. A DPS evaluation of the species was also recommended during this review. In June 2014, the USFWS reclassified the U.S. breeding population of the wood stork from endangered to threatened. Further, the USFWS established the U.S. breeding population in Alabama, Florida, Georgia, North Carolina, Mississippi, and South Carolina as a DPS. The endangered designation no longer correctly reflects the status of the DPS due to improvement in its overall status. This action is based on a review of the best available scientific and commercial data, which indicate that the U.S. wood stork DPS is not presently in danger of extinction in its range (79 FR 37078).

Habitat and Geographic Range – Wood storks nest in tall trees in swamps and islands; sites protected from land-based predators are characterized as those surrounded by large expanses of open water or where the nest trees are inundated at the onset of nesting and remain inundated throughout most of the breeding cycle (USACE 2008). The breeding range for wood storks includes peninsular Florida, the coastal plain and large river systems of Georgia and South Carolina, extending north into southern North Carolina and west to south central Georgia and the panhandle of Florida to the Ochlockonee River system. There are approximately 50 documented wood stork nesting colonies in north Florida. They are typically seen in North Florida during the nesting season from March through August. Wood storks have been observed along the entrance channel, east of the NAVSTA Mayport Turning Basin (DON 2007a). The closest wood stork nesting colony to the project site is at Pumpkin Hill, approximately 7.3 miles (11.8 km) to the northwest (USFWS 2016).

Population and Abundance – Surveys conducted in 2006 documented 11,279 pairs of wood storks (USFWS 2007d). The current population of adult birds is difficult to estimate, since not all nest each year. Presently, the wood stork breeding population is believed to be greater than 8,000 nesting pairs (16,000 breeding adults).

Figure 3-7. Critical Habitat for the Piping Plover within the Vicinity of the Study Area

Nesting has been restricted to Florida, Georgia, and South Carolina; however, they may have formerly bred in most of the southeastern U.S. and Texas (USFWS 2013b).

Predator/Prey Interaction and Foraging – Wood storks are generalists in the selection of foraging habitat and may adjust locations based on seasonal factors such as hydroperiod (Rodgers et al. 2012). Typical forage areas include freshwater marshes, narrow tidal creeks, shallow tidal pools, agricultural or roadside drainage ditches, and managed impoundments.

3.2.7.3 Birds – Consequences

3.2.7.3.1 Alternative 1 – No Action Alternative

Under the No Action Alternative, the Wharf Bravo recapitalization would not occur. Baseline conditions for birds, as described in Section 3.2.7.2, would remain unchanged. Therefore, there would be no impacts on birds from the implementation of the No Action Alternative.

3.2.7.3.2 Alternative 2 – Preferred Alternative

Effects on birds would result primarily from airborne pile driving noise, as which would vary depending on the installation method, but is expected to attenuate to 65 dBA within 0.34 mile (550 m) or 0.4 mile (650 m) of the incident pile for vibratory and impact driving methods, respectively. Additional construction-related noise would result from use of heavy equipment and vehicle traffic, but these noise levels would be lower than pile driving noise levels (see Section 3.1.2; Sound). There are no established thresholds for airborne pile driving noise-related injury or disturbance impacts on terrestrial wildlife species with the exception of marbled murrelets in the Pacific Northwest.

The majority of the published literature on bird hearing focuses on terrestrial birds and their ability to hear in air. A review of 32 terrestrial and marine species reveals that birds generally have greatest hearing sensitivity between 1 and 4 kHz (Beason 2004; Dooling 2002). Very few can hear below 20 Hz, most have an upper frequency hearing limit of 10 kHz, and none exhibit hearing at frequencies higher than 15 kHz (Dooling et al. 2000). In comparison to humans, birds typically hear less well over a narrower frequency bandwidth (Dooling and Popper 2007).

Behavioral responses of birds to pile driving are not well known. Temporary threshold shift (hearing loss) (TTS) resulting from exposure to elevated sound pressure levels is typically not considered an injury effect (Dooling and Popper 2007), but can result in behavioral disorientation (USFWS 2008). Results of disorientation may include increased vulnerability to predators, inability to communicate with mates, or inability to identify potential prey. Other adverse behavioral effects could include flushing, aborted feeding attempts, cessation of feeding, interrupted resting attempts, and avoidance of the zone of disturbance. These behavioral changes may impair birds' ability to forage, provision chicks in the nest, create and maintain pair bonds, or rest. Energy expenditures due to avoidance of elevated sound pressure levels may increase. However, observations of seabirds suggest that if fish are killed or injured as a result of pile driving, foraging birds may be attracted to the work area to feed on the fish in spite of the noise levels (DON 2013a).

Even without the attractant of stunned or killed fish, birds could continue to forage close to the Study Area and be exposed to noise-related injuries or disturbance. For example, monitoring work at the Hood Canal Bridge in Washington demonstrated that marbled murrelets would continue to dive and forage within 984 ft of active pile driving operations (WSDOT 2015), well

within the zone of potential behavioral disturbance anticipated by USFWS (2006), indicating that foraging birds may habituate to pile driving.

Expected airborne noise levels from the Proposed Action are not expected to be injurious to birds within the Study Area. The source levels for airborne noise from pile driving (vibratory: 96 dBA at 15m; impact: 100 dBA at 11m) are well below those known to cause injury to birds in laboratory situations. Studies of TTS in captive birds indicate that long-term exposure to high levels (≥ 93 dBA) of non-impulsive noise (i.e., vibratory pile driving) or to multiple impulses over 125 dBA can cause TTS (Dooling and Popper 2007). Behavioral reactions could occur at levels below 93 dBA out to the range at which noise from the Proposed Action falls below ambient noise levels (Dooling and Popper 2007). Airborne ambient noise in the Study Area is discussed in Section 3.1.2, and daytime ambient noise at the NAVSTA Mayport waterfront is expected to average around 65 dBA. While there are no available data on noise levels in nearby natural areas (i.e., Huguenot Memorial Park), the Navy expects that these areas would have lower ambient noise levels than the industrialized waterfront at the NAVSTA Mayport Turning Basin.

Within the Study Area, birds would not be exposed to injurious noise levels, and are unlikely to experience TTS due to a lack of foraging habitat or other attractants. Based on analysis of the propagation of airborne noise from pile driving, the Navy expects that noise levels from the Proposed Action would attenuate to ≤ 65 dBA within 0.4 mile (650 m) of the Study Area. Birds exposed to pile driving noise that exceeds ambient sound levels may exhibit startle responses, avoidance, or other behavioral reactions.

Modeling for sensitive noise receptors (Section 3.1.2; Sound) indicated that during pile driving at the Study Area, sound levels above 65 dBA may overlap with over-water critical habitat for piping plovers. However, this would not affect the PCEs associated with the critical habitat, and no impacts associated with temporary reductions in water quality, increases in turbidity, or shifts in prey availability are anticipated. Potential noise exposure is likely to be limited to birds transiting the area in flight, and be at levels well below what would be disruptive to their behavior.

Conclusions

No significant impacts on bird populations are expected to result from the Wharf Bravo recapitalization activities. The Navy concludes that a "may affect, but is not likely to adversely affect" determination is appropriate for the wood stork, piping plover, and red knot. Additionally, a "no adverse modification" determination was made for piping plover critical habitat. The Navy has submitted a biological assessment in compliance with ESA to the USFWS for birds for the Wharf Bravo recapitalization activities. On November 20, 2015, the USFWS provided a letter (FWS Log. No. 04EF1000-2015-I-0367), which concurred with the Navy's effects determinations, thus fulfilling the requirements of the ESA and requiring no further action.

3.2.8 Environmental Health and Safety

3.2.8.1 Environmental Health and Safety – Environment

The NAVSTA Mayport Turning Basin is restricted from public access. Figure 1-3 indicates the restricted areas and danger zones in and around the NAVSTA Mayport Turning Basin. The restricted area and danger zone was established by the CFR, Title 33, Chapter 11, Part 334.500.

This restriction is in place 24 hours a day, 7 days a week. NAVSTA Mayport's approximately one-mile-long beach is closed to the general public and is patrolled by the NAVSTA Mayport Security Department. As a result, recreational access, commercial fishing, and other public activities are restricted from the NAVSTA Mayport Turning Basin and entrance channel.

3.2.8.2 Environmental Health and Safety – Consequences

3.2.8.2.1 Alternative 1 – No Action Alternative

Under the No Action Alternative, the Wharf Bravo recapitalization would not occur. Baseline conditions for environmental health and safety conditions, as described in Section 3.2.8.1, would remain unchanged. Therefore, there would be no impacts on the environmental health and safety conditions from the implementation of the No Action Alternative.

3.2.8.2.2 Alternative 2 – Preferred Alternative

The construction activities associated with Alternative 2 would be conducted by contractor personnel under Navy supervision in accordance with regulations established under the Navy Safety and Occupational Health Program (OPNAVINST 5100.8G) and the OSHA. Compliance with these regulations would protect the health and safety of construction workers and Navy personnel. The Proposed Action would result in construction activities occurring within the NAVSTA Mayport Turning Basin at NAVSTA Mayport for an approximate 12-month period beginning on or after September 30, 2016. Work would occur between 1 hour post-sunrise and 1 hour prior to sunset.

Conclusions
The proposed Wharf Bravo recapitalization activities would not be expected to result in any impacts related to public environmental health and safety. Activities would not be likely to release hazardous materials to the environment (see Section 3.1.5; Hazardous Materials). Adverse effects from noise would be limited to behavioral disturbance, and would not be expected to significantly impact recreational users of the St. Johns River. A floating security barrier prevents recreational and commercial boater access to the waterfront area of the base. Boaters are allowed to pass by the security fencing but must be outside the restricted area. Since no public recreational uses occur within the Study Area, the Proposed Action would have no direct impact on recreational uses or access in the surrounding community. As such, there would be no significant impacts on the environmental health and safety conditions from the implementation of Alternative 2.

3.2.9 Coastal Zone Management

3.2.9.1 Coastal Zone Management – Environment

The Coastal Zone Management Act (CZMA) of 1972 (16 U.S.C. 1451 et seq., as amended) was enacted to preserve, protect, develop, and, where possible, restore and enhance the resources of the Nation's coastal zone. Federal agency activities affecting 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 allows coastal states to develop a Coastal Zone Management Plan (CZMP) whereby it designates permissible land and water use within the state's coastal zone. The outer boundary of the coastal zone is the limit of state waters, which for the Atlantic Ocean coast of Florida is 3 nm (5.6 km) from shore.

The FCMP was approved by NOAA in 1981 and is codified in Chapter 380, Part II, Florida Statutes. FCMP consists of a network of 24 Florida statutes administered by eight state agencies and five water management districts. Coordination of the program is managed by FDEP. This framework allows the state to make integrated, balanced decisions that ensure the wise use and protection of the state's water, property, cultural, historic, and biological resources; protect public health; minimize the state's vulnerability to coastal hazards; ensure orderly, managed growth; protect the state's transportation system; and sustain a vital economy. A CZMA review of Federal agency activities is conducted and proceeds with a submittal of either a Consistency Determination or a Negative Determination. As detailed in 15 CFR 930, state agencies, such as the FCMP, have 60 days from receipt of this document in which to concur with or object to a Consistency Determination, or to request an extension in writing. The Federal agency may presume state agency concurrence if the state agency's response is not received within 60 days from receipt of the Federal agency's Consistency Determination and supporting information.

3.2.9.2 Coastal Zone Management – Consequences

A Coastal Consistency Determination (CCD) was developed to review the Preferred Alternative activities of this EA that may have either a direct or an indirect effect on Florida's coastal zone resources. This CCD supports the Navy's assessment that Wharf Bravo recapitalization activities would be undertaken in a manner consistent (to the maximum extent practicable) with the state's enforceable policies of the FCMP (Appendix C).

Conclusions

The Navy concluded that Preferred Alternative is consistent with the enforceable policies of the FCMP. In conclusion, there would be no significant impacts on coastal zone resources from the implementation of the Preferred Alternative. The Navy submitted this EA and the CCD to the FDEP, Florida State Clearinghouse, requesting their review in compliance with the CZMA and consistency with the FCMP. On September 23, 2015, FDEP provided a letter that concurred with the Navy's consistency determination that, at this stage, the proposed Federal action is consistent with the FCMP. The Federal Consistency Determination and agency correspondence can be found in Appendix C and Appendix A, respectively.

3.3 Socioeconomic Environment and Consequences

Socioeconomics is defined as the basic attributes and resources associated with the human environment, generally including factors associated with regional demographics and economic activity. This section also describes issues of environmental justice (minority and low income populations) and the protection of children. NAVSTA Mayport is bordered by the Village of Mayport to the northeast, the City of Jacksonville to the south and southwest, and Kathryn Abbey Hannah Park to the southeast. The area described includes Duval County and the City of Jacksonville, with an emphasis on NAVSTA Mayport. The Region of Influence (ROI) for this socioeconomics analysis is Duval County, Florida, including the City of Jacksonville.

3.3.1 Regulatory Overview

3.3.1.1 Environmental Justice

Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, was signed into law on February 11, 1994. This Executive Order requires each Federal agency to identify and address, as appropriate,

disproportionately high and adverse human health or environmental impacts of its programs, policies, and activities on minority and low-income populations including Native American populations. USEPA and CEQ emphasize the importance of incorporating environmental justice review in the analyses conducted by Federal agencies under NEPA and of developing protective measures that avoid disproportionate environmental impacts on minority and low-income populations.

3.3.1.2 Protection of Children

The President issued Executive Order 13045, Environmental Health Risks and Safety Risk to Children, on April 21, 1997. This order requires each Federal agency to "…make it a high priority to identify and assess environmental health risks and safety risks that may disproportionately affect children and shall…ensure that its policies, programs, activities, and standards address disproportionate risks to children…" This order was issued because a growing body of scientific knowledge demonstrates that children may suffer disproportionately from environmental health risks and safety risks.

3.3.1.3 Navy Supplemental Environmental Planning Policy

Executive Order 12898 and Executive Order 13045 require each Federal agency to identify and address impacts of their programs, policies, and activities. The Navy implemented Executive Order 12898 and Executive Order 13045 through the Chief of Naval Operations Supplemental Environmental Planning Policy (September 23, 2004) which is incorporated into the Environmental Readiness Program Manual OPNAV M-5090.1., the current policy. This policy provides instructions for naval personnel to identify and assess stressors to, as well as disproportionately high and adverse impacts upon, minorities, low-income populations, and children. A component of this policy institutes processes that result in consistent and efficient consideration of environmental impacts on Navy decision-making.

3.3.2 Socioeconomics – Environment

NAVSTA Mayport employs approximately 10,000 military and civilian personnel (Personal Communication, Bill Austin 2015). Demographic data, shown in Table 3-23, provide an overview of the socioeconomic environment in the ROI.

Table 3-23. Population, Income, Labor Force, and Unemployment

	2014 Population Estimate*	Average Annual Growth Rate 2010-2014	Per Capita Personal Income 2013	Per Capita Personal Income As A Percent of U.S.	Labor Force 2013 Annual Average	Unemployment Rate 2013 Annual Average	Unemployment Rate January 2015
Duval County	897,698	1.0%	$42,423	94.8	452,013	7.6%	6.2%
City of Jacksonville	842,583**	0.8%**	NA	NA	NA	NA	NA
Florida	19,893,297	1.5%	$41,497	92.7	9,433,000	7.1%	5.7%
U.S.	318,857,056	0.8%	$44,765	100	NA	7.4%	5.7%

Source: U.S. Census Bureau 2010, 2014a, 2014b, and 2014c; Bureau of Economic Analysis 2013; BLS 2014a, 2014b, 2015a, and 2015b
*As of July 1, 2014
**Jacksonville population estimates are as of July 1, 2013; average annual growth is for 2010 - 2013
NA – Not Applicable

The U.S. Census 2014 estimated that the population of Duval County was 897,698. The population of Duval County grew at an average annual rate of 1.0 percent for the 2010 through 2014 time period, which was below the growth rate for the State of Florida of 1.5 percent and above the U.S. average annual growth rate of 0.8 percent during the same time period. U.S. Bureau of Labor Statistics data show that the 2013 annual average labor force for Duval County was 452,013. The average annual unemployment rate for Duval County was 7.6 percent, which was above the State of Florida (7.1 percent) and the U.S (7.4 percent) (BLS 2014 and 2016).

Employment in Duval County provides an indication of economic activity in the region. As shown in Table 3-24, employment is concentrated in Health Care and Social Assistance (15 percent), Retail Trade (12 percent), Finance and Insurance (11 percent), Accommodation and Food Services (10 percent) and Administrative and Support and Waste Management and Remediation Services (9 percent). Manufacturing employment across the Nation accounts for approximately 10 percent of total employment; however, in Duval County, manufacturing employment accounts for about 5 percent of total employment (U.S. Census Bureau 2012).

Table 3-24. Employment by Industry Sector (Percent of Total)

	Duval County	Florida	U.S.
Forestry, fishing, hunting, and agricultural support	NA	<1%	0%
Mining, quarrying, and oil and gas extraction	NA	<1%	1%
Utilities	0%	<1%	1%
Construction	5%	4%	5%
Manufacturing	5%	4%	10%
Wholesale trade	5%	4%	5%
Retail trade	12%	14%	13%
Transportation and warehousing	6%	3%	4%
Information	2%	2%	3%
Finance and insurance	11%	5%	5%
Real estate, rental, and leasing	2%	2%	2%
Professional, scientific, and technical services	6%	6%	7%
Management of companies and enterprises	4%	2%	3%
Admin & support; Waste management & remediation services	9%	18%	9%
Educational services	2%	2%	3%
Health care and social assistance	15%	14%	16%
Arts, entertainment, and recreation	NA	3%	2%
Accommodation and food services	10%	11%	10%
Other services (except public administration)	4%	4%	5%
Industries not classified	NA	<1%	NA

Source: U.S. Census Bureau 2012

Tourism is an important part of the Duval County economy. A recent study assessing the economic impact of tourism reports that in fiscal year 2013, tourism supported more than 22,000 jobs, or about 5.7 percent of total employment. The study reports that tourism (direct, indirect, and induced impacts) generated approximately $180 million in state and local taxes, with $93 million of that going to local taxing authorities (Tourism Economics 2014). While the region around NAVSTA Mayport draws tourists, NAVSTA Mayport is not open to the general public.

3.3.2.1 Environmental Justice

Analysis of demographic data on race and ethnicity and poverty provides information on minority and low-income populations that could be affected by Proposed Action. The 2010 Census reports numbers of minority individuals and the U.S. Census American Community Survey provides the most recent poverty estimates available. Minority populations include those persons who identify themselves as Black, Hispanic, Asian American, American Indian/Alaskan Native, Pacific Islander, or Other. A potential disproportionate impact may occur when the percent minority in the study area exceeds 50 percent or the minority population of the affected area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographic analysis.

Poverty status is used to define low-income. Poverty is defined as the number of people with income below poverty level, which was $24,418 for a family of four in 2014, according to the U.S. Census Bureau (U.S. Census Bureau 2015). A potential disproportionate impact may occur when the percentage of people living below the poverty level in the ROI is meaningfully greater than that of the general population or other appropriate unit of geographic analysis. Table 3-25 presents U.S. Census data showing minority population and poverty rates for the ROI.

Table 3-25. Minority, Poverty, Youth

	Minority Population 2010 (Percent)	All Ages in Poverty 2013 (Percent)	Percent Youth 2010 (Under Age 18)
Duval County	43.4	16.9	23.5
City of Jacksonville	44.9	17.3	23.9
Census Tract 138	37.2	17.3	30.5
Florida	42.1	16.3	21.3
U.S.	36.3	15.4	24.0

Source: U.S. Census Bureau 2010 and U.S. Census Bureau 2014d

3.3.2.2 Protection of Children

EO 13045 requires each Federal agency "to identify and assess environmental health risks and safety risks that may disproportionately affect children" and "ensure that its policies, programs, activities, and standards address disproportionate risks to children that result from environmental health risks or safety risks."

This EO was prompted by the recognition that children, still undergoing physiological growth and development, are more sensitive to adverse environmental health and safety risks than adults. The potential for impacts on the health and safety of children is greater where projects are located near residential areas. The percentage of the population under age 18 is shown in Table 3-25. The closest off-base residential area is approximately 0.7 mile west of Wharf Bravo, and the closest school is approximately 0.75 mile away. The closest on-base residential area is approximately 0.8 mile southeast of Wharf Bravo.

3.3.3 Socioeconomics – Consequences

3.3.3.1 Alternative 1 – No Action Alternative

Under the No Action Alternative, the recapitalization activities at Wharf Bravo would not occur. There would be no impacts on socioeconomic resources, as there would be no construction or

maintenance activities. There would be no disproportionately high and adverse human health or environmental effects on minority populations, low income populations, or children.

3.3.3.2 Alternative 2 – Preferred Alternative

Socioeconomic impacts resulting from the Wharf Bravo repair and maintenance activities would be temporary and minor. Noise impacts would not extend to residential areas, public beaches, or the historic Mayport Village. Minor beneficial temporary impacts in the form of jobs and income for area residents, revenues to local businesses, and sales taxes to Duval County and the State of Florida could be realized if construction materials are purchased locally or local construction workers are hired for repairs and maintenance.

Conclusions
There would be no permanent jobs associated with Alternative 2, and construction employment associated with the Project would likely be accommodated by labor resources already in the region. With no additional personnel moving into the region as a result of the Project, there would be no additional demand on housing, schools, or other social services, so no permanent socioeconomic impacts would be anticipated as a result of this alternative.

Environmental justice concerns related to construction activity include exposure to noise, safety hazards, pollutants, and other hazardous materials. However, there are no residential areas or schools in the Study Area; therefore, Alternative 2 would not result in disproportional impacts on minorities, low-income populations, or children. As such, no significant impacts on the socioeconomic environment would occur as a result of the implementation of Alternative 2.

SECTION 4.0
Minimization and Monitoring

4.0 Minimization and Monitoring

The Navy would employ the measures listed in this section to avoid and minimize impacts on marine mammals, fish, and sea turtles, as well as their habitats and forage species. BMPs are intended to avoid and minimize potential environmental impacts. BMPs and minimization measures are included in the construction contract plans and specifications and must be agreed upon by the contractor prior to any construction activities. Upon signing the contract, it becomes a legal agreement between the contractor and the Navy. Failure to follow the prescribed BMPs and minimization measures is a contract violation.

4.1 General Construction Best Management Practices

- All work would adhere to performance requirements of the CWA, Section 404 permit and Section 401 Water Quality Certification. No in-water work would begin until after issuance of regulatory authorizations.
- The construction contractor is responsible for preparation of an Environmental Protection Plan. The plan would be submitted and implemented prior to the commencement of any construction activities and is a binding component of the overall contract. The plan will identify construction elements and recognize potential spill sources at the site. The plan will outline BMPs, responsive actions in the event of a spill or release, and notification and reporting procedures. The plan will also outline contractor management elements, such as personnel responsibilities, project site security, site inspections, and training.
- No petroleum products, lime, chemicals, or other toxic or harmful materials will be allowed to enter surface waters. Washwater resulting from washdown of equipment or work areas will be contained for proper disposal and will not be discharged unless authorized.
- Equipment that enters surface waters will be maintained to prevent any visible sheen from petroleum products.
- No oil, fuels, or chemicals will be discharged to surface waters or onto land where there is a potential for re-entry into surface waters. Fuel hoses, oil drums, oil or fuel transfer valves, fittings, etc. will be checked regularly for leaks and will be maintained and stored properly to prevent spills.
- No cleaning solvents or chemicals used for cleaning tools or equipment will be discharged to ground or surface waters.
- Construction materials will not be stored where high tides, wave action, or upland runoff could cause materials to enter surface waters.
- Barge operations will be restricted to tidal elevations adequate to prevent grounding of a barge.

4.2 Pile Removal and Installation Best Management Practices

- A containment boom surrounding the work area will be used during creosote-treated pile removal to contain and collect any floating debris and sheen. In some cases, the boom may be lined with oil-absorbing material to absorb released creosote.
- Oil-absorbent materials will be used in the event of a spill if any oil product is observed in the water.
- All creosote-treated material and associated sediments will be disposed of in a landfill that meets Florida environmental standards.
- Removed piles and associated sediments (if any) will be contained on a barge. If a barge is not utilized, piles and sediments may be stored in a containment area near the construction site.
- Piles that break or are already broken below the waterline may be removed by wrapping the piles with a cable or chain and pulling them directly from the sediment with a crane. If this is not possible, they will be removed with a clamshell bucket. To minimize disturbance to bottom sediments and splintering of piles, the contractor will use the minimum size bucket required to pull out piles based on pile depth and substrate. The clam shell bucket will be emptied of piles and debris on a contained barge before it is lowered into the water. If the bucket contains only sediment, the bucket will remain closed and be lowered to the mud line and opened to redeposit the sediment. In some cases (depending on access, location, etc.), piles may be cut below the mud line and the resulting hole backfilled with clean sediment.
- Any floating debris generated during pile installation will be retrieved. Any debris in a containment boom will be removed by the end of the work day or when the boom is removed, whichever occurs first. Retrieved debris will be disposed of at an upland disposal site.
- Whenever activities that generate sawdust, drill tailings, or wood chips from treated timbers are conducted, tarps or other containment material will be used to prevent debris from entering the water.
- If excavation around piles to be replaced is necessary, hand tools or a siphon dredge will be used to excavate around piles to be replaced.

4.2.1 Timing Restrictions

All in-water construction activities will occur during daylight hours (one hour after sunrise to one hour before sunset). Non in-water construction activities could occur between 6:00 a.m. and 10:00 p.m. during any time of the year. Sunrise and sunset are to be determined based on the NOAA data (Internet URL: http://www.srrb.noaa.gov/highlights/sunrise/sunrise.html).

4.3 Additional Minimization Measures for Marine Species

The following minimization measures will be implemented during pile driving to avoid marine mammal exposure to Level A injurious noise levels generated from impact pile driving and to reduce to the lowest extent practicable exposure to Level B disturbance noise levels.

4.3.1 Coordination

The Navy will conduct a pre-construction briefing with the contractor. During the briefing, all personnel working in the Study Area will watch the Navy's Marine Species Awareness Training video. Information will also be provided on how to identify piping plovers, wood storks, and red knots.

4.3.2 Acoustic Minimization Measures

Vibratory installation will be used to the extent possible to drive steel piles to minimize higher sound pressure levels associated with impact pile driving.

4.3.3 Soft Start

Should the brief use of impact pile driving be necessary, a soft start procedure will be used. The objective of a soft start is to provide a warning and give animals in proximity to pile driving a chance to leave the area prior to an impact driver operating at full capacity; thereby, exposing fewer animals to loud underwater and airborne sounds. A soft start cannot be implemented for vibratory driving due to safety concerns with regard to equipment operation.

For impact pile driving, the contractor will provide an initial set of strikes from the impact hammer at reduced energy, followed by a 30-second waiting period, then two subsequent sets. (The reduced energy levels of an individual hammer cannot be quantified because they vary by individual drivers. Also, the number of strikes will vary at reduced energy because raising the hammer at less than full power and then releasing it results in the hammer "bouncing" as it strikes the pile resulting in multiple "strikes".)

4.3.4 Standard Conditions

The contractor will adhere to all requirements of the following:

- USFWS 2011 Standard Manatee Conditions for In-Water Work (see Appendix D and USFWS BA; DON 2015b)
- NMFS 2006 Sea Turtle and Smalltooth Sawfish Construction Conditions (see NMFS BA; DON 2015a)
- NMFS 2012 Southeast Region Marine Mammal and Sea Turtle Viewing Guidelines (see NMFS BA; DON 2015a)

Sea Turtle Lighting Conditions:

- Lighting on construction equipment will be minimized through reduction, shielding, lowering, and appropriate placement to avoid excessive illumination of the nearby marine turtle nesting beach while still being consistent with human safety requirements.
- All permanent exterior lighting fixtures associated with the wharf redevelopment will be assessed by NAVSTA Mayport Environmental Department and designed according to the NAVSTA Mayport Light Management Plan to minimize light contribution to urban sky glow, which could be visible from the marine turtle nesting beach.

4.3.5 Visual Monitoring and Shutdown Procedures

- A separate Marine Species Monitoring Plan is being submitted to NMFS and USFWS, and it includes all details for Project monitoring efforts. Major components of the monitoring plan are summarized below.

Observers and Procedures:
The Navy will conduct a pre-construction briefing with the contractor. During the briefing, all contractor personnel working in the Study Area will watch the Navy's Marine Species Awareness Training video. An informal guide (Marine Species Monitoring Plan Attachment 1) has been included with the Monitoring Plan to aid in identifying species should they be observed in the vicinity of the Project.

Marine species observers ("observers") designated by the contractor will be placed at the best vantage point(s) practicable to monitor for protected species and implement shutdown/delay procedures when applicable by calling for the shutdown to equipment operators. The observers will have no other construction related tasks while conducting monitoring.

Methods:
The observer(s) will monitor the shutdown zone (Figure 4-1) before, during, and after pile driving and removal.

The observer(s) will be placed at the best vantage point practicable (e.g., from a small boat, construction barges, on shore, or any other suitable location) to monitor for marine species and implement shutdown/delay procedures when applicable by calling for the shutdown to the equipment operator(s).

Elevated positions are preferable; it will be the contractor's responsibility to ensure that appropriate safety measures are implemented to protect observers on elevated observation points. If a boat is used for monitoring, the boat will maintain minimum distances from all species (should they occur) as described in NMFS 2012 Southeast Region Marine Mammal and Sea Turtle Viewing Guidelines (see NMFS BA; DON 2015a).

- During all observation periods, observers will use binoculars and the naked eye to search continuously for marine mammals;
- If the shutdown zone is obscured by fog or poor lighting conditions, pile driving will not be initiated until the entire shutdown zone is visible.
- The shutdown zone will be monitored for the presence of protected species before, during, and after any pile driving or removal activity.

Pre-Activity Monitoring
The shutdown zone will be monitored for 15 minutes prior to in-water construction/demolition activities. If a protected species is observed in or approaching the shutdown zone, the activity will be delayed until the animal(s) leave the shutdown zone. Activity will resume only after the observer has determined, through re-sighting or by waiting approximately 15 minutes, that the animal(s) has moved outside the shutdown zone. The observer(s) will notify the monitoring coordinator/construction foreman/point of contact (POC) when construction activities can commence.

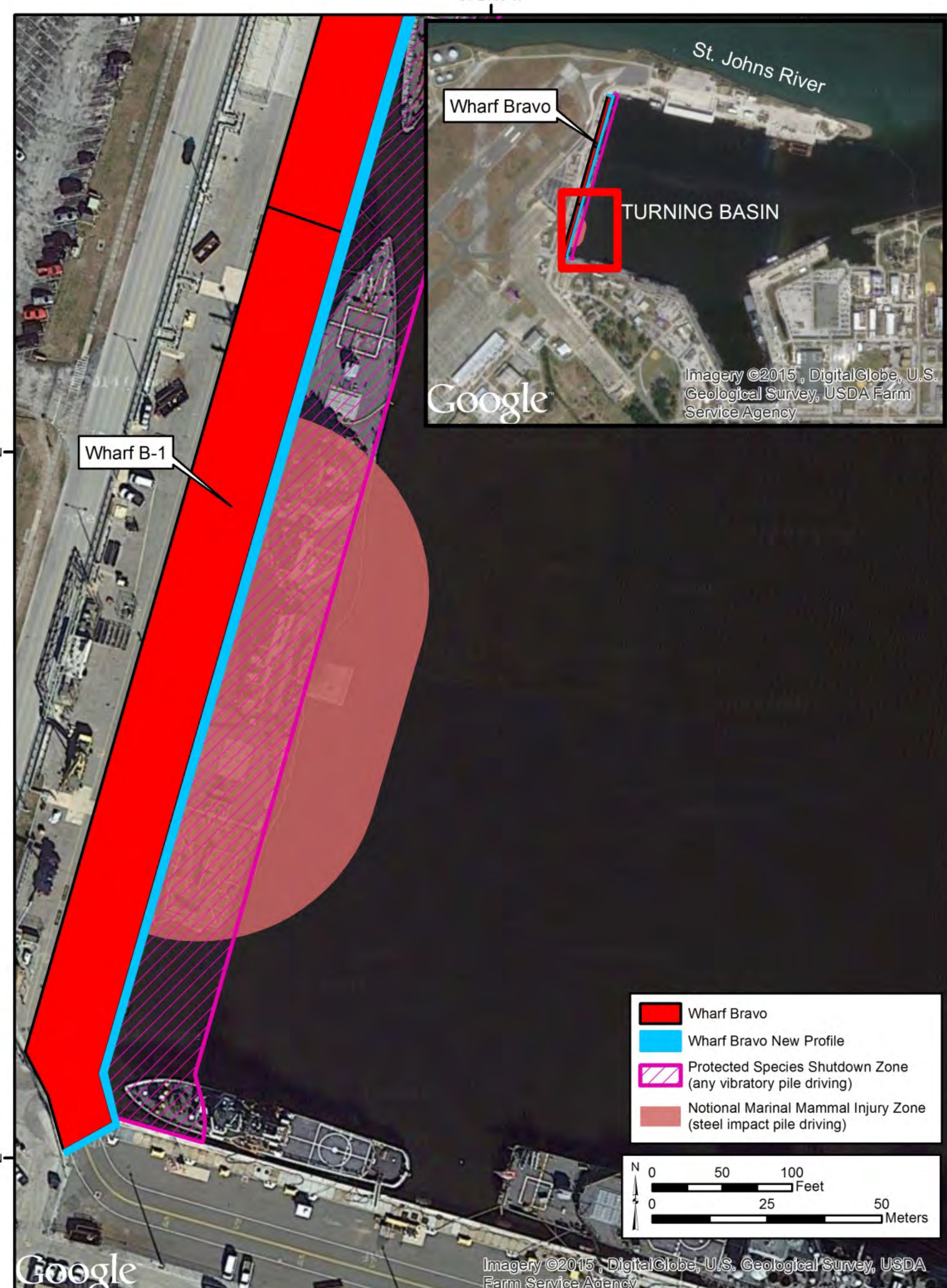


Figure 4-1. Shutdown Zones for Vibratory and (Contingency Only) Impact Pile Driving Activities

Activity Monitoring

The shutdown zone will always be a minimum of 15 m (50 ft) to prevent injury from physical interaction of protected species with construction equipment (see Figure 4-1). For contingency impact pile driving, the larger 40 m (130 ft) shutdown zone (see Figure 4-1) will be implemented for marine mammals only; the standard shutdown zone will continue to be applied for all other protected species.

If a protected species approaches or enters a shutdown zone during any in-water work, activity will be halted and delayed until either the animal has voluntarily left and been visually confirmed beyond the shutdown zone or 15 minutes have passed without re-detection of the animal.

Bulkhead sheet pile installation will be completed only after confirmation that no manatees or marine turtles will be trapped in the area to be filled between the existing and new bulkheads.

Post-Activity Monitoring

Monitoring of the shutdown zone will continue for 15 minutes following the completion of the activity.

4.3.6 Data Collection

The following information will be collected on sighting forms used by observers:

- Date and time that pile driving or removal begins or ends
- Construction activities occurring during each observation period
- Weather parameters identified in the acoustic monitoring (e.g., wind, temperature, percent cloud cover, and visibility)
- Tide and sea state (Marine Species Monitoring Plan; Appendix E)

If a protected species approaches or enters the shutdown zone, the following information will be recorded once shutdown procedures have been implemented:

- Species, numbers, and if possible sex and age class of the species
- Behavior patterns observed, including bearing and direction of travel
- Location of the observer and distance from the animal(s) to the observer

If possible, photographs of the animal(s) will be taken and forwarded to the Naval Facilities Engineering Command Southeast Environmental point of contact.

Data collection forms will be furnished to the Environmental point of contact within a mutually agreeable timeframe.

4.3.7 Interagency Notification and Reporting

If the Navy encounters an injured, sick, or dead marine mammal, NMFS will be notified immediately. Such sightings will be called into the NMFS Stranding Coordinator for the Southeast:

Erin Fougeres, Ph.D.
Marine Mammal Stranding Program Administrator
Southeast Regional Office
263 13th Avenue South
St. Petersburg, Florida 33701
e-mail: erin.fougeres@noaa.gov
office: 727-824-5323
fax: 727-824-5309

The Navy will provide NMFS with the species or description of the animal(s), the condition of the animal (including carcass condition if the animal is dead), location, the date and time of first discovery, observed behaviors (if alive), and photo or video (if available).

Care should be taken in handling dead specimens to preserve biological materials in the best possible state for later analysis of cause of death, if that occurs. In preservation of biological materials from a dead animal, the finder (i.e., marine mammal observer) has the responsibility to ensure that evidence associated with the specimen is not unnecessarily disturbed.

A draft report of any incidents of marine mammals entering the shutdown zone will be forwarded to NMFS/USFWS no later than December 31, 2017. A final report will be prepared and submitted to NMFS within 30 days following receipt of comments on the draft report from NMFS.

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SECTION 5.0
Cumulative Impacts

5.0 Cumulative Impacts

5.1 Introduction

This section of the EA addresses the potential cumulative impacts associated with the implementation of the alternatives and other projects/programs that are planned for the region. The CEQ defines cumulative impacts as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions" (40 CFR 1508.7). This CEQ section continues: "Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time," by various agencies (Federal, state, and local) or individuals. Informed decision making is served by consideration of cumulative impacts resulting from projects that are proposed, under construction, recently completed, or anticipated to be implemented in the reasonably foreseeable future.

By Memorandum dated June 24, 2005, from the Chairman of the CEQ to the Heads of Federal agencies, entitled "Guidance on the Consideration of Past Actions in Cumulative Effects Analysis", CEQ made clear its interpretation that "…generally, agencies can conduct an adequate cumulative effects analysis by focusing on the current aggregate effects of past actions without delving into the historical details of individual past actions…" and that the "…CEQ regulations do not require agencies to catalogue or exhaustively list and analyze all individual past actions."

This cumulative impacts analysis summarizes expected environmental effects from the combined impacts of past, current, and reasonably foreseeable future projects within the Study Area. The Navy reviewed available environmental documentation regarding known current and past Federal and non-Federal actions associated with the resources analyzed in Chapter 3.0. In addition, projects in the planning phase were also reviewed if they had the potential to interact with the proposed Navy action and if the projects were considered reasonably foreseeable (not speculative). The level of information available for the different projects varies but the best available science is used in the cumulative impacts analysis.

The USEPA suggests that analysis of cumulative impacts should focus on specific resources and ecological components that can be affected by the incremental effects of the proposed actions and other actions in the same geographic area. This can be determined by considering:

- Whether the resource is especially vulnerable to incremental effects;
- Whether the proposed action is one of many similar actions in the same geographic area;
- Whether other activities in the area have similar effects on the resource;
- Whether these effects have been historically significant for this resource; and
- Whether other analyses in the area have identified cumulative effects.

Additionally, the analysis should consider whether geographic and time boundaries large enough to include all potentially significant effects on the resources of concern have been identified. Geographic boundaries should be delineated and include natural ecological boundaries and the

time period of the project's effects. The adequacy of the cumulative impact analysis depends upon how well the analysis considers impacts that are due to past, present, and reasonably foreseeable actions. This can be best evaluated by considering whether the environment has been degraded (and to what extent), whether ongoing activities in the area are causing impacts, and the trend for activities and impacts in the area.

The Proposed Action analyzed in this EA would not make radical changes to the environment in and around the NAVSTA Mayport Turning Basin. Rather, the Proposed Action would result in temporary impacts on the environment. As such, there is limited potential for the affected resources of the Proposed Action to interact with the affected resources of past, present, or reasonably foreseeable actions. As discussed in Chapter 3 of this EA, environmental impacts of the Wharf Bravo recapitalization activities at NAVSTA Mayport would result in temporary changes to the noise environment and sediment and water quality. Potential interactions with other past, present, or reasonably foreseeable actions would generally be those actions that also may have effects on the noise environment and sediment and water quality of the NAVSTA Mayport Turning Basin. Specific projects that have occurred, those currently taking place, and those projected for the future are identified in subsequent subsections.

5.2 Past, Present, and Foreseeable Future Projects

Various types of past, present, and reasonably foreseeable actions not related to the Proposed Action have the potential to affect the resources identified in Chapter 3.0 of the EA. The overview of these actions in this section emphasizes components of the activities that are relevant to the impact analysis in Chapter 3. Geographic distribution, intensity, duration, and historical effects of similar activities are considered when determining whether a particular activity may contribute cumulatively and significantly to the impacts of the Proposed Action on the resource areas identified in Chapter 3.0.

Based on a review of past, present, and reasonably foreseeable actions at NAVSTA Mayport and the region (Duval County), it was determined that several actions would be considered when analyzing the potential cumulative impacts of the actions. The projects listed in this section are those that have the greatest potential to cumulatively impact the resources assessed in this EA. These projects are described below, and the impacts of these projects, in combination with the impacts of the Proposed Action, are described in Section 5.3.

5.2.1 Military Projects

5.2.1.1 Wharf C-2 Recapitalization at NAVSTA Mayport, Jacksonville, Florida

The Navy is currently renovating Wharf Charlie Two (C-2) at Naval Station (NAVSTA) Mayport. This recapitalization project includes the demolition and replacement of the existing concrete pile cap, wharf deck, and utilities and installation of a new steel king pile/sheet pile bulkhead around the existing Wharf C-2. The project will result in a wharf footprint increase of approximately 1,322 square meters and installation of downward-facing, shielded lighting on and around the wharf surface. The project includes the installation of 120 single sheet piles, 119 king piles, and 50 polymeric (plastic) fender piles. A maximum of 70 days of in-water pile driving work was planned to take place over a 12-month period. These piles are being driven using both vibratory and impact driving methods. Impact driving would be a contingency only if vibratory methods are inadequate. Therefore, if impact driving is needed, it would be temporary and of a

very short duration. Contingency dredging of up to 4,000 cubic yards of sediment may be conducted if needed; a clamshell dredge would be used if dredging is performed. This project is currently underway with a proposed December 2016 completion date.

5.2.1.2 NAVSTA Mayport Turning Basin – Biennial Maintenance Dredging

The Navy currently removes approximately 900,000 cubic yards of sediment from the NAVSTA Mayport Turning Basin and entrance channel every 2 years as part of its maintenance dredging program. Most of this material has been disposed of in the Jacksonville Ocean Dredged Material Disposal Site. The Jacksonville Ocean Dredged Material Disposal Site has been in use since 1952, and NAVSTA Mayport has used the Ocean Dredged Material Disposal Site regularly since 1954.

5.2.1.3 Nuclear-Powered Aircraft Carrier Homeporting at NAVSTA Mayport

In a Record of Decision dated January 14, 2009, the Navy announced it wants to establish a second Atlantic Fleet nuclear-powered aircraft carrier (CVN) homeport by homeporting a CVN at NAVSTA Mayport. Later that month, following the change in administrations, Obama Administration officials testified that they would review the proposal. On April 10, 2009, the DoD announced it had decided to delay a final decision on whether to propose transferring a CVN to Mayport until it reviewed the issues as part of its 2010 Quadrennial Defense Review. The DoD's final report on the 2010 Quadrennial Defense Review, released February 1, 2010, endorsed the Navy's desire to establish a second Atlantic Fleet CVN homeport by homeporting a CVN at NAVSTA Mayport. The proposal requires certain facility upgrades to make NAVSTA Mayport capable of homeporting a CVN, including construction of nuclear propulsion plant maintenance facilities. Dredging with the NAVSTA Mayport Turning Basin in support of the CVN homeporting has been completed. Original Navy plans called for having NAVSTA Mayport ready to homeport a CVN in 2019. However, the current schedule is uncertain because the Navy's proposed fiscal year 2014 budget, as well as budgets for future years, defers the Navy's plan to homeport a CVN at NAVSTA Mayport. The Navy's proposed fiscal year 2016-2020 Future Years Defense Plan contains no funding for Military Construction projects required to homeport a CVN at Mayport.

5.2.1.4 Homeporting of U.S. Coast Guard National Security Cutter and Other Ships at NAVSTA Mayport

The U.S. Coast Guard is proposing to homeport the U.S. Coast Guard Cutter VALIANT at NAVSTA Mayport, originally programmed for the summer 2013. VALIANT is a multi-mission, medium endurance cutter currently homeported in Miami Beach, Florida. VALIANT operates in the Atlantic Ocean, Caribbean Sea, and Gulf of Mexico for Commander, Coast Guard Atlantic Area. In November 2011, the U.S. Coast Guard requested assistance from the Navy in determining the feasibility of homeporting several ship classes at NAVSTA Mayport, including all or some of the following: two National Security Cutters and four additional medium-endurance cutters. Potential cumulative impact issues associated with these possible actions include a slight increase in vessel traffic.

5.2.1.5 Atlantic Fleet Training and Testing (AFTT) Environmental Impact Statement/ Overseas Environmental Impact Statement

The AFTT EIS/Overseas EIS (OEIS) study area consists of the sea and air space along the eastern coast of the U.S. and the Gulf of Mexico and was prepared by the Navy for

environmental compliance for ranges and operating areas within its areas of responsibility. The proposed location for the future mission activities is within the Jacksonville OPAREA. The Navy is proposing to conduct training and testing activities that may include the use of active sonar and explosives within existing range complexes and testing ranges located along the east coast of the U.S, including the Jacksonville Range Complex. The proposed action also includes Navy surface ship and submarine sonar maintenance and testing that would take place at Navy ports and naval shipyards located along the east coast of the U.S., including NAVSTA Mayport.

5.2.1.6 Final Undersea Warfare Training Range (USWTR) Overseas Environmental Impact Statement/Environmental Impact Statement

On August 5, 2009, the Navy published its Record of Decision regarding the construction of an undersea warfare training range in the Jacksonville Operating Area. Construction was started in fiscal year 2014, and initial operational capability is anticipated in fiscal year 2019. The USWTR EIS/OEIS Preferred Alternative identified a location for the acoustic range to be established within the Jacksonville OPAREA that would utilize portions of the range and deeper waters further north and east of the Study Area.

5.2.1.7 NAVSTA Mayport Planned Development

NAVSTA Mayport has plans for an addition to the physical fitness center, additional parking, an addition to the Southeast Regional Maintenance Center facility, and aircraft refueling facilities. The NAVSTA Mayport master plan establishes a plan for continued orderly growth and development of NAVSTA Mayport. When land use constraints are taken into account, the installation is nearly completely built-out. Therefore, the master plan focuses on recapitalization efforts. Future mission activities at NAVSTA Mayport could include the homeporting of the new littoral combat ship. The HSV2, a Navy-leased ship that may serve as a potential platform for the littoral combat ship, has recently been used by U.S. Navy Southern Command operations out of NAVSTA Mayport (Clark 2007).

5.2.2 Other Agency/Organizations Projects

5.2.2.1 The Bureau of Ocean Energy Management (BOEM)

BOEM is processing an application for Southern Company for an Interim Policy lease approximately 3 to 11 nm off the coast of Tybee Island, Georgia which would authorize the installation and operation of a meteorological tower and buoy. The EA public review was announced on April 1, 2014. BOEM is considering the public comments.

5.2.2.2 The Bureau of Ocean Energy Management (BOEM)

BOEM: 2017 – 2022 Outer Continental Shelf Oil and Gas Leasing Draft Proposed Program (January 2015), identified one lease sale, scheduled for 2021, in the Atlantic Region (includes Mid-Atlantic and South Atlantic Areas). No specific details concerning the exact location have been identified.

5.2.2.3 USACE Mile Point Project

The USACE has approved and signed for the Jacksonville Harbor (Mile Point) Navigational Study. Mile Point consists of 5,000 feet of shoreline located along the north shore of the St. Johns River and east of the Atlantic Intracoastal Waterway (AIWW). Great Marsh Island and

the Mile Point Training Wall divide Chicopit Bay. The confluence of the St. Johns River with the AIWW is known as Mile Point, an area that experiences difficult crosscurrents on the ebb tide.

Due to these crosscurrents there is navigational restriction on the ebb tide that affects all vessels that have a transit draft greater than 33 feet inbound and 36 feet outbound, inhibiting the free movement of vessel traffic.

The USACE proposes to construct approximately 4,000 feet of a new west leg training wall; remove approximately 3,300 feet of the westerly end of the existing training wall to elevation -12 feet MLLW, which is the average height of the lowest tide recorded at a tide station each day during the recording period; construct approximately 2,100 feet of a new east leg training wall; and dredge the confluence area to elevation -12 feet MLLW and the flow improvement channel to elevation -6 feet MLLW, plus 1 foot allowable over-depth.

The USACE also proposes to reuse all suitable stone material recovered from the existing training wall to build the east leg training wall. The materials will be contained in the Great Marsh Island placement area (northwest of Great Marsh Island), helping to restore and create a salt marsh. Although the project would result in the loss of 8.15 acres of salt marsh (Helen Cooper Floyd Park), this loss would be offset by restoring 18.84 acres of salt marsh (Great Marsh Island). Beyond the mitigation requirement, the USACE proposes to use the project dredged material in a beneficial manner to restore up to a total of 53 acres of salt marsh at Great Marsh Island.

Additional work includes clearing and grubbing, marine species monitoring, bird monitoring, turbidity monitoring, and coordination with the U.S. Coast Guard to allow its crews to remove and reinstall three aid-to-navigation structures.

5.2.3 Non-Federal Actions

5.2.3.1 Jacksonville Port Authority Dames Point Marine Terminal Intermodal Container Transfer Facility Draft Environmental Assessment

The original Jacksonville Port Authority, now known as JAXPORT, was created by a special act of the Florida Legislature in 1963 to develop, maintain, and market Jacksonville's port facilities. Since the creation of JAXPORT, marine port operations in Jacksonville have continued to grow. The purpose of the Intermodal Container Transfer Facility is to provide access to rail transportation for in-bound container ships, for overseas shipments and shippers who use highway semi-trailers and containers, and by attracting new distribution, manufacturing, and warehousing development to its vicinity, significantly decreasing the economic and environmental cost for draying trailers and containers between the Dames Point Marine Terminal and shippers' and receivers' facilities. The Intermodal Container Transfer Facility is needed to 1) add new rail access to support operations on Dames Point and the continued growth of JAXPORT; 2) stay economically competitive in the global marketplace; and 3) stimulate economic growth and provide jobs to a depressed local economy. The proposed action would involve a five-track rail yard extending from the existing CSX line, two to six rubber-tired gantry cranes, a paved area for containers, and several support uses including a road and gate for truck movement of cargo, a parking area, and stormwater retention facilities (Port of Jacksonville 2016).

5.2.3.2 Village of Mayport Community and Economic Development

The Village of Mayport is the oldest, continually occupied community in Duval County. The Mayport Waterfront Partnership was created by the cities of Atlantic Beach and Jacksonville in 1997 to bring economic revitalization to the eastern shore of Duval County. The Partnership's zone of interest includes the North Jacksonville barrier islands, the Village of Mayport, and Fort George and Fanning Islands. In 1998, the State of Florida designated the Village of Mayport as one of the first three waterfront communities in need of revitalization. In recent years, the Partnership oversaw the installation of a $4.2 million sanitary sewer line and the upgrading of water lines in the commercial section of the Village of Mayport. Also, the Waterfront Partnership wrote and sponsored the Mayport Village Overlay Zone Regulations, which provide protection for characteristics unique to the village (City of Jacksonville 2012).

5.2.3.3 Commercial Fishing

Commercial fishing can adversely affect fish populations, other species, and habitats. Potential impacts of commercial fishing include overfishing of targeted species and bycatch, both of which negatively affect fish stocks and other marine resources. Bycatch is the capture of fish, marine mammals, sea turtles, seabirds, and other nontargeted species that occurs incidental to normal fishing operations. Commercial and recreational fishing have, by far, the greatest impact on fish and shellfish populations across the globe (Jackson et al. 2001, Halperin et al. 2008, Crain et al. 2009). Commercial and recreational fishing do not occur within the NAVSTA Mayport Turning Basin, but do occur within the Study Area.

5.2.3.4 Marine Vessel Traffic

The nearshore areas of NAVSTA Mayport, near the Jacksonville commercial port in particular, are heavily traveled by commercial, recreational, and government marine vessels. Recreational activities in the area consist primarily of motorboating, game and sport fishing, jetskiing, waterskiing, shellfishing, shrimping, sailing, sport diving, and bird and whale watching. Recreational boats range throughout the coastal waters, depending on season and weather conditions. A commercial ferry crosses the St. Johns River between Mayport, Florida, and Fort George Island, Florida. Primary concerns for the cumulative impacts analysis include vessels striking marine mammals and sea turtles and underwater sound from ships and other vessels.

5.3 Cumulative Effects Analysis

Other military and agency actions in the region may overlap in space or time with the Proposed Action, but with the absence of specificity in knowledge of their timing and location, cumulative effects analysis is a challenge. Overlaps of other military actions, however, have historically been handled through intense, coordinated scheduling. This scheduling would not result in significant cumulative impacts. There is potential interaction with some ongoing and recent projects, described above, to have the potential to either increase or offset possible environmental consequences.

The following analysis examines the impact on the environment that would result from the incremental impact of the proposed action in addition to other past, present, and reasonably foreseeable future actions. This analysis assesses the potential for an overlap of impacts with respect to Project schedules or affected areas. Specific information on all of the projects listed in Section 5.2 is not available, so the cumulative impacts of these actions cannot yet be quantified.

Therefore, this section presents a qualitative analysis of the cumulative impacts, based on significant activities anticipated for each project (e.g., underwater noise activities).

To determine the significance of each of the cumulative impacts of the proposed action and other actions, significance was determined according to Section 1508.27 of the Environmental Quality Improvement Act of 1970, as amended [43 CFR 56003, Nov. 29, 1978]. The primary factors considered for each resource area in determining significance as used in NEPA requires considerations of both context and intensity.

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.

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 should be considered in evaluating intensity:

- Impacts that may be both beneficial and adverse. A significant effect may exist even if the Federal agency believes that on balance the effect would be beneficial.
- The degree to which the proposed action affects public health or safety.
- 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.
- The degree to which the effects on the quality of the human environment are likely to be highly controversial.
- The degree to which the possible effects on the human environment are highly uncertain or involve unique or unknown risks.
- 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.
- 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.
- The degree to which the action may adversely affect districts, sites, buildings, structures, or objects listed in or eligible for listing in the National Register of Historic Places or may cause loss or destruction of significant scientific, cultural, or historical resources.
- 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 of 1973.
- Whether the action threatens a violation of Federal, state, or local law or requirements imposed for the protection of the environment.

Based on the assessment of ongoing and reasonably foreseeable actions at NAVSTA Mayport, the proposed action would result in some less than significant cumulative impacts as a result of the various projects, as described below.

5.3.1 Physical Environment

5.3.1.1 Sediments and Water Quality

Sediment impacts include changes in the transport and distribution of sediments (sedimentation) as well as changes in sediment quality or characteristics. Past, present, and future actions involving in-water construction (i.e., pile driving and dredging) in the NAVSTA Mayport Turning Basin have caused or would cause short-term disturbances to sediment. The periodic maintenance dredging events, similar to the deepening project, have and would create short-term suspended sediment and turbidity within the NAVSTA Mayport Turning Basin. However, as with the impacts on sediments resulting from the Proposed Action, the impacts associated with maintenance dredging would be temporary and localized. The Proposed Action, in combination with Navy and non-Navy past, present, and reasonably foreseeable future events would not have a significant cumulative impact on sediments.

5.3.1.2 Air Quality

The geographic study area for evaluating cumulative impacts on air quality is Duval County. Duval County is in attainment for all NAAQS. The emissions generated during the implementation the Proposed Action would be additive to other emissions generated coincidentally within the region. Compliance with the Florida State Implementation Plan would ensure that implementation of the Proposed Action, in combination with past, present, and future actions, would not result in a new violation of existing NAAQS, nor contribute to an increase in the frequency or severity of violations of existing National Ambient Air Quality Standards, or delay the timely attainment of any NAAQS, interim milestones, or other milestones to achieve attainment.

Emissions from the Proposed Action are not expected to significantly add to the cumulative impacts on existing air quality of all past, present, and reasonably foreseeable actions. This is because existing levels of criteria pollutants and GHG emissions are low, emissions from the Proposed Action would be localized, future point sources would be required to control emissions and the level and the type of development that would occur in the reasonably foreseeable future would not produce substantial emissions. Similarly, no mitigation measures or development of adaptive measures for sea-level rise are necessary in order to mitigate for potential climate change impacts for years 2046 to 2065 due to the Proposed Action activities.

5.3.1.3 Sound

Most past, present, and future actions have generated, are generating, or would generate some type of noise, either from a facility itself, from vehicles traveling to and from a site, or from humans. Noise is typically a nuisance factor for sensitive receptors such as residences, hospitals, or parks, where quiet conditions are important, and may also affect acoustically dependent non-human species. Close proximity to high sound levels can result in physiological problems or hearing damage. Over time the trend has been for noise levels to increase as development has occurred, particularly during daytime hours when activity levels are highest.

Past actions resulting in temporary noise increases in and around NAVSTA Mayport have included recapitalization of existing wharves and buildings and new construction by the Navy, the Port of Jacksonville, and the Village of Mayport. The noise contributions from these actions were temporary and ceased upon completion of the relevant projects. Cumulative effects of permanent increases in noise from past actions and temporary and permanent increases from current and future actions are addressed below, with separate discussions of airborne and underwater ambient noise environments.

5.3.1.4 Airborne Noise

Past, present, and future actions at and around NAVSTA Mayport may cumulatively affect airborne ambient noise. Permanent increases in airborne noise from past actions have resulted from increases in aircraft, vessel and vehicle traffic and waterfront activities, and noise from these sources dominates the current daytime ambient noise environment; other noise is generated by wind, waves, and natural sources (e.g., songbirds). Current actions which may affect airborne ambient noise in the Study Area include existing aircraft, vehicle, and vessel traffic from commercial, recreational, and military activities, day-to-day port and waterfront activities, routine biennial maintenance dredging, and training operations.

The Proposed Action would generate noise from equipment, industrial activities, construction vessel movement, and pile driving. All actions would occur from one hour after sunrise to one hour before sunset. The Proposed Action would result in a temporary increase in noise in the vicinity of the Study Area.

Future Navy and non-Navy actions would also generate airborne noise. For example, proposed homeporting of a CVN would increase airborne noise from temporary construction of maintenance facilities and increased traffic at NAVSTA Mayport. Other actions include land-based construction and recapitalization of existing facilities. The type of noise and noise levels produced by these actions would be dependent on the specific project, and the impact of these noise sources would depend on their location relative to sensitive receptors. It is likely that some of these future actions would produce nuisance noise. There are requirements to limit the level of noise produced by residential, commercial, or industrial land uses. Thus, some future development would have requirements to provide soundproofing measures.

5.3.1.5 Underwater Noise

The current underwater ambient noise environment in the NAVSTA Mayport Turning Basin and St. Johns River is likely to be dominated by noise from commercial, recreational, and military vessel traffic. Past Navy and non-Navy activities have increased noise levels via commercial shipping at the Port of Jacksonville, homeporting of military vessels at NAVSTA Mayport, routine biennial dredging of the NAVSTA Mayport Turning Basin, and day-to-day port activities, among other actions. Current activities which produce underwater noise include vessel traffic, port operations, and training for surface ships and submarines at NAVSTA Mayport (including pierside sonar activities).

The Proposed Action would have a temporary effect on underwater ambient noise levels in the Study Area. Pile driving would take place between one hour after sunrise and one hour prior to sunset; the primary installation method would be vibratory driving, with impact driving reserved for contingencies.

Expected Navy and non-Navy future activities may also increase underwater noise levels in the Study Area. Construction associated with vessel transits, docking activities, maintenance, and training activities would temporarily impact noise levels in and around the NAVSTA Mayport Turning Basin. Timing of these future activities is uncertain, but increases in vessel traffic were proposed for the summer of 2013 with the arrival of additional U.S. Coast Guard ships at NAVSTA Mayport and may overlap with the temporary increase in noise due to the Proposed Action. However, because the current ambient noise environment within the Study Area is already dominated by anthropogenic noise from vessels, the Navy does not anticipate that there would be any significant cumulative impacts on underwater ambient noise environments due to the Proposed Action.

5.3.2 Biological Environment

5.3.2.1 Marine Vegetation, Marine Invertebrates, Fish, and EFH

In order to conduct an adequate assessment of cumulative impacts, there must first be a threshold for elevating one individually minor impact on a cumulatively large impact. The stressors of the Proposed Action include the repairs and maintenance of an artificial structure and associated noise impact on the water column. Given the lack of comprehensive/comparable data collection and established thresholds for these stressors, there can only be a comparison of activities with similar impacts in the local area. Other demolition and reconstruction or noise-producing activities may be associated with all the current and future action noted in Sections 5.2.1 and 5.2.2., except on land and offshore areas (e.g., Construction of the Undersea Warfare Training Range).

The area of Mayport already has a highly developed shoreline in a tidally flushed ecosystem, which is a mitigating factor with regard to cumulative impacts on the local ecosystem. In other words, the threshold for cumulative physical impacts from shoreline development have probably been surpassed already; many of the shallow, nursery habitats for estuarine species have been lost to shoreline development in the lower St. Johns River estuary. The loss of Ribault Bay as a nursery habitat overshadows any further impacts on the area. The highly altered basin now serves as a default sanctuary for adult fishery species that find it suitable habitat (e.g., southern flounder, cobia). The recapitalization of artificial structures around the shoreline would yield no lasting alteration of habitat for vegetation, invertebrates and fish inhabiting the area. However, the growing level of noise in the water column could be having a significant impact in terms of auditory masking of fish vocalizations, such as those of red drum and other sciaenids (i.e., drums) that spawn around inlets and estuarine waters. Based on the assessment of ongoing and reasonably foreseeable actions at NAVSTA Mayport, the Proposed Action will likely not result in significant cumulative noise impacts as a result of the various projects that would not be considered significant, as described in Section 5.2.

5.3.2.2 Marine Mammals

Operations and maintenance at the NAVSTA Mayport waterfront, such as the Wharf C-1 and C-2 recapitalization projects and biennial dredging in the NAVSTA Mayport Turning Basin, have likely resulted in temporary impacts such as displacement of marine mammals and their prey (forage fish and invertebrates) and temporary localized degradation of water quality. Over time, work at the NAVSTA Mayport waterfront has resulted in increased human presence, underwater and airborne noise, boat movement, and other activities, which has likely impacted some water-dependent wildlife such as marine mammals in the area. However, the abundance and

coexistence of these species with existing anthropogenic activities suggests that cumulative effects have not been detrimental. Based on NMFS stock assessment reports, with the exception of North Atlantic right whales, population trend data for the marine mammal species that may occur in the Study Area are either stable or increasing in recent years (NOAA Fisheries 2016).

Because marine mammals are highly mobile, the noise impacts of the Proposed Action could be cumulative with underwater and airborne noise impacts on marine mammals from other actions and activities in and around Mayport. However, because the expected impacts of the Proposed Action on marine mammals in general would be temporary, cumulative impacts associated with pile driving noise are considered unlikely. Continued research into acoustic effects, combined with stock assessments and documentation of mortality causes, ensure that cumulative effects would be minimized. The regulatory process also ensures that each project proposing take of marine mammals is assessed in light of the status of the species and other actions affecting it in the same region. No long-term, permanent impacts on populations of marine species, however, are expected, either as a result of each project or cumulatively when combined with other past, present, and reasonably foreseeable actions. Therefore, no cumulative adverse effects on marine mammals are expected.

Future Navy and non-Navy projects may have similar impacts on past and present actions, including increased anthropogenic sound (both airborne and underwater), increased human presence, increased vessel traffic and other associated activities. These actions could result in behavioral impacts on local populations of marine mammals, such as temporary avoidance of habitat and decreased foraging effort. Most impacts would likely be temporary and short-term in nature and are unlikely to affect the overall fitness of the animals. However, some projects such as the homeporting of the aircraft carrier and/or Coast Guard national security cutter and other ships at NAVSTA Mayport may result in more significant impacts due to longer construction timelines.

Impacts on marine mammals are still expected to primarily result from behavioral disturbance from underwater sound pressure levels; however, indirect impacts on marine mammals may occur as a result of disruption of their prey base during construction and operation of the new ships' support facilities. Potential impacts on the forage fish and invertebrate prey base could include habitat disturbance or elimination and overwater shading from new structures. Overwater shading would be long-term, but due to the existing degraded condition of the Study Area, further reduction in quality of habitat is not expected to result in as dramatic an effect compared to similar consequences in high quality habitat. Overall reductions in habitat are expected to be minimal in comparison to the total habitat available in the waters off NAVSTA Mayport. Further, marine mammals in the area can be expected to have habituated to higher anthropogenic noise and activity levels.

With minimization and monitoring measures, such as visual monitoring and use of shutdown zones (Chapter 4.0 and see Appendix D), cumulative impacts would not significantly affect marine mammal populations in the Study Area. Nevertheless, the Proposed Action and other future actions would contribute incrementally to cumulative marine mammal disturbance impacts at the NAVSTA Mayport waterfront. Continued adherence to the requirements of the ESA and MMPA by NAVSTA Mayport would limit disturbance to marine mammals. Further, existing regulatory mechanisms and mitigation measures would protect marine mammals and further decrease the likelihood of potential cumulative impacts on these species.

5.3.2.3 Sea Turtles

In addition to the Proposed Action and projects listed above, global and regional threats to sea turtles must be taken into account when considering cumulative impacts on sea turtles. Bycatch in commercial fisheries, ship strikes, and marine debris are some of the primary threats to sea turtles (Lutcavage et al. 1997). One comprehensive study estimates that worldwide, 447,000 sea turtles are killed each year from bycatch in commercial fisheries (Wallace et al. 2010). Precise data are lacking for sea turtle mortalities directly caused by ship strikes; however, live and dead turtles are often found with deep cuts and fractures indicative of collision with a boat hull or propeller (Hazel et al. 2007; Lutcavage et al. 1997). Marine debris can also be a problem for sea turtles through entanglement or ingestion (Lazar and Gracan 2011; Macedo et al. 2011). Sea turtles can mistake debris for prey; one study found 37 percent of dead leatherback turtles to have ingested various types of plastic (Mrosovsky et al. 2009). Plastic ingestion was identified as the cause of death in 9 percent of these cases. Other marine debris, including derelict fishing gear and cargo nets, can entangle and drown turtles in all life stages.

The above-listed impacts on sea turtles are multiple orders of magnitude higher than any the Proposed Action would cause, which in general are minor and temporary. No significant cumulative impacts from the Proposed Action on any Federally listed sea turtle species are anticipated.

5.3.2.4 Birds

Operations and maintenance at the NAVSTA Mayport waterfront, such as the Wharf C-1 and C-2 recapitalization projects and biennial dredging in the NAVSTA Mayport Turning Basin, have not likely resulted in significant impacts on piping plovers, wood storks, or red knots due to a lack of nesting and foraging habitat in the vicinity. Some impacts on non-listed diving birds may include displacement, temporary changes to prey availability (forage fish and invertebrates), and temporary degradation of water quality. Over time, work at the NAVSTA Mayport waterfront has resulted in increased human presence, underwater and airborne noise, boat movement, and other activities, which has likely impacted some water-dependent wildlife such as some species of diving birds in the area. However, the abundance and coexistence of these species with existing anthropogenic activities suggests that cumulative effects have not been significant. Trend data for piping plovers and wood storks indicate that the species' populations are stable or trending upward (USFWS 2007b, 2009b).

Because birds are highly mobile, the noise impacts of the Proposed Action could be cumulative with underwater and airborne noise impacts from other actions and activities in and around NAVSTA Mayport. However, because the expected impacts of the Proposed Action on birds in general would be temporary, cumulative impacts associated with pile driving noise are considered unlikely. Continued regulation of impacts on birds under the MBTA and ESA (in the case of piping plovers, wood storks, and red knots [candidate]) to anthropogenic disturbance, combined with population monitoring, documentation of mortality causes, and research into acoustic effects, ensure that cumulative effects would be minimized. However, no long-term, permanent impacts on populations of birds of any species are expected, either as a result of each project or cumulatively when combined with other past, present, and reasonably foreseeable actions.

Future Navy and non-Navy projects may have similar impacts on past and present actions, including increased anthropogenic sound (both airborne and underwater), increased human

presence, increased vessel traffic, and other associated activities. These actions could result in behavioral impacts on local populations of birds, such as temporary avoidance of habitat and decreased foraging effort. Most impacts would likely be temporary and short-term in nature, and unlikely to affect the overall fitness of the animals. However, some projects, such as the homeporting of the aircraft carrier and/or U.S. Coast Guard National security cutter and other ships at NAVSTA Mayport, may result in more significant impacts due to longer construction timelines. Impacts on birds are still expected to primarily result from behavioral disturbance from underwater (in the case of diving birds) and airborne sound pressure levels. However, indirect impacts on birds may occur as a result of disruption of their prey base during construction and operation of the new ships' support facilities. Potential impacts on the forage fish and invertebrate prey base could include habitat disturbance or elimination and overwater shading from new structures. Overwater shading would be permanent, but due to the existing degraded ecological condition of the Study Area, further reduction in habitat quality would not be expected to result in as dramatic an effect compared to similar consequences in high-quality habitat. Overall reductions in habitat are expected to be minimal in comparison to the total habitat in the areas surrounding NAVSTA Mayport. Further, birds in the area can be expected to have habituated to higher anthropogenic noise and activity levels.

With BMPs and minimization measures (Chapter 4.0), cumulative impacts would not significantly affect birds in the Study Area. Nevertheless, the Proposed Action and other future actions would contribute incrementally to cumulative bird disturbance impacts at the NAVSTA Mayport waterfront. Continued adherence to the requirements of the ESA and MBTA by NAVSTA Mayport would limit disturbance to birds. Further, existing regulatory mechanisms and mitigation measures would protect birds and further decrease the likelihood of potential cumulative impacts on these species.

5.3.2.5 Environmental Health and Safety

The geographic study area for evaluating cumulative impacts on environmental health and safety is defined as the NAVSTA Mayport Turning Basin and the immediate surrounding area, including portions of the St. Johns River. Environmental health and safety has the potential to be affected by activities along the St. Johns River, such as the construction of piers, docks, marinas, and other in-water and shoreline construction. These actions produce ambient and underwater noise, have the potential to stir up contaminants in the sediments, and have the potential to contaminate the water with toxins and chemicals from fuel spills and other accidental discharges.

Future Navy and non-Navy actions have the potential to affect the environmental health and safety of St. Johns River residents. Sediment contaminants, toxins and other pollutants, noise, and other impacts result from in-water and shoreline construction. Although Navy actions occur in areas where the public access is restricted, non-Navy actions can occur in public areas where more precautionary measures must be taken (due to increased risk to the public).

The Proposed Action would occur within the restricted area of the NAVSTA Mayport Turning Basin. As a result, there would not be any direct or indirect impacts on public safety or access. For the safety of Navy and contractor personnel, the Navy Safety and Occupational Health Program would be implemented.

Off-base residences are located approximately 0.7 miles west of the NAVSTA Mayport Turning Basin. The lack of adverse cumulative impacts of ambient noise is discussed in Section 5.3.3.1. Boat traffic along the St. Johns River could increase as a result of Jacksonville Port Authority

Dames Point Marine Terminal Intermodal Container Transfer Facility. However, the noise impact on the NAVSTA Mayport Turning Basin would be expected to remain similar to existing conditions since the area is restricted from access by the public. Therefore, implementation of the Proposed Action in conjunction with other past, present, and future actions would not result in significant cumulative impacts on environmental health and safety.

5.3.2.6 Socioeconomics

The impacts associated with the Proposed Action would be associated with a small increase in contractor activity at NAVSTA Mayport. The Proposed Action would have a temporary and localized impact on employment, income, and the demand for public services. The population of Duval County would not be significantly impacted as a result of the Proposed Action. In addition to the Proposed Action, other future projects are proposed for the St. Johns River and the NAVSTA Mayport Turning Basin. These projects are transient and temporary in nature and would not contribute to a significant cumulative impact. The Proposed Action would not contribute to cumulative impacts when considered with other past, present, and future actions. This is because the small increase in staff and dependents would only have a localized impact on employment, income, and demand for public services.

The Proposed Action would have no impact on minority or low-income populations, because there are no low-income or minority populations located within the range of impacts from the project. There would be no disproportionately high and adverse environmental, human health or socioeconomic effects upon minority or low-income populations, or children. Therefore, there would be no cumulative impact on environmental justice populations or the protection of children as a result of the Proposed Action in combination with other past, present, and future actions.

Conclusions

As long as similar mitigation and monitoring measures (Section 4.0) as employed by Wharf Bravo recapitalization activities are implemented with these combined military and other agency/organization projects, additional impacts can be minimized or avoided, and the cumulative effects would be less than significant. Therefore, when added to past, present, and reasonably foreseeable future actions, the Proposed Action would have no significant cumulative impacts on the physical, biological, or socioeconomic resources.

SECTION 6.0
List of Preparers

6.0 List of Preparers

The following people were primarily responsible for the preparation of this EA.

Name	Agency / Organization	Discipline / Expertise	Experience	Role in Preparing EA
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SECTION 7.0
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7.0 References

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APPENDIX A
Agency Correspondence

Florida Department of Environmental Protection

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Rick Scott
Governor

Carlos Lopez-Cantera
Lt. Governor

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Secretary

September 23, 2015

Mr. John D. Conway, P.G.
NEPA Compliance Section (Code EV21)
Naval Facilities Engineering Command Southeast
P.O. Box 30A, Building 903, NAS
Jacksonville, FL 32212-0030

RE: Department of the Navy – Draft Environmental Assessment for the Wharf Bravo Recapitalization Project at Naval Station Mayport – Jacksonville, Duval County, FL
SAI # FL201508077386C

Dear Mr. Conway:

The Florida State Clearinghouse has coordinated a review of the subject Draft Environmental Assessment (EA) under the following authorities: Presidential Executive Order 12372; Section 403.061(42), *Florida Statutes*; the Coastal Zone Management Act, 16 U.S.C. §§ 1451-1464, as amended; and the National Environmental Policy Act, 42 U.S.C. §§ 4321-4347, as amended.

The Florida Department of Environmental Protection's (DEP) Northeast District Office in Jacksonville advises that an environmental resource permit (ERP) will be required for the wharf recapitalization project. The project design and permit application must address stormwater treatment in accordance with Rule 62-330, *Florida Administrative Code*, and the St. Johns River Water Management District Applicant's Handbook, Volumes I and II. For further information, please contact Ms. Junhong Shi at (904) 256-1645 or Junhong.Shi@dep.state.fl.us.

The DEP's Division of Waste Management staff also offers the following comments:

1. Wharf Bravo is the location of a petroleum contaminated site identified as Site 1330. The site is currently being assessed and remediated by Naval Facilities Engineering Command Southeast (NAVFAC SE) and Naval Station (NAVSTA) Mayport under the DEP's review and concurrence. The current contaminant at this site is isopropylbenzene in groundwater. Please see the attached Conditional Site Rehabilitation Completion Order (SRCO) and No Further Action (NFA) Land Use Control (LUC) Proposal documents pertaining to Site 1330 for further information.
2. Removal of groundwater from Site 1330 is prohibited unless concurred with by the DEP and properly disposed of (please see the Conditional SRCO and the LUC Proposal for

additional information). Also, the concrete/asphalt covering on Wharf Bravo serves as an engineering control and prevents contact of the petroleum contaminated soil by human and ecological receptors. Any damage to the existing concrete/asphalt cover on Wharf Bravo needs to be repaired (see the Conditional SRCO and the LUC Proposal).

3. Please coordinate with the following individuals/groups during project planning and construction as practicable:
   a) Cheryl L. Mitchell, Environmental Director, NAVSTA Mayport Environmental Division, Public Works Office;
   b) Marshall Knight, P.E., Environmental Restoration Program Head, NAVFAC SE; and
   c) The NAVSTA Mayport Partnering Team (NAVSTA Mayport facility representative Paul Malewicki, NAVFAC SE representative Dana Hayworth, DEP representative John Winters and associated consultants). Communication and coordination will be important throughout the recapitalization project.
4. If any monitoring wells need to be abandoned during wharf construction, a permit will be required from the St. Johns River Water Management District. Please also coordinate with the NAVSTA Mayport Environmental Division and/or the NAVSTA Mayport Partnering Team prior to abandonment of any monitoring or injection well, in case it is still in use.

If you require further clarification or other assistance, please feel free to contact Mr. John Winters, P.G., in the Division's Bureau of Waste Cleanup in Tallahassee at (850) 245-8999 or John.Winters@dep.state.fl.us.

The Florida Department of State (DOS) advises that the proposed project is unlikely to affect historic properties, provided that the applicant complies with the following special condition regarding unexpected discoveries: If prehistoric or historic artifacts are encountered at any time within the project area, all activities involving subsurface disturbance should cease and the applicant should contact the DOS Division of Historical Resources, Compliance Review Section at (850) 245-6333 for further instructions. Project activities should not resume without verbal and/or written authorization from the DOS. In addition, in the event that unmarked human remains are encountered during permitted activities, all work shall stop immediately and the proper authorities notified in accordance with Section 872.05, *Florida Statutes*. Please refer to the enclosed DOS letter for additional details.

Based on the information contained in the Draft EA and enclosed state agency comments, the state has determined that, at this stage, the proposed federal action is consistent with the Florida Coastal Management Program (FCMP). To ensure the project's continued consistency with the FCMP, the concerns identified by our reviewing agencies must be addressed prior to project implementation. The state's continued concurrence will be based on the activity's compliance with FCMP authorities, including federal and state monitoring of the activity to ensure its continued conformance, and the adequate resolution of issues identified during this and subsequent regulatory reviews. The state's final concurrence of the project's consistency with

the FCMP will be determined during the environmental permitting process, in accordance with Section 373.428, *Florida Statutes*.

Thank you for the opportunity to review the draft document. Should you have any questions regarding this letter, please don't hesitate to contact me at Lauren.Milligan@dep.state.fl.us or (850) 245-2170.

Yours sincerely,

Lauren P. Milligan

Lauren P. Milligan, Coordinator
Florida State Clearinghouse
Office of Intergovernmental Programs

Enclosures

ec: Victoria Ford, DEP, Northeast District
John Winters, DEP, DWM
Tim Parsons, DOS

Project Information	
Project:	FL201508077386C
Comments Due:	09/16/2015
Letter Due:	10/06/2015
Description:	DEPARTMENT OF THE NAVY - DRAFT ENVIRONMENTAL ASSESSMENT FOR THE WHARF BRAVO RECAPITALIZATION PROJECT AT NAVAL STATION MAYPORT - JACKSONVILLE, DUVAL COUNTY, FLORIDA.
Keywords:	NAVY - DEA, WHARF BRAVO RECAPITALIZATION, NAVAL STATION MAYPORT - DUVAL CO.
CFDA #:	99.300

Agency Comments:

ENVIRONMENTAL PROTECTION - FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION

The DEP's Northeast District Office in Jacksonville advises that an environmental resource permit (ERP) will be required for the wharf recapitalization project. The project design and permit application must address stormwater treatment in accordance with Rule 62-330, F.A.C., and the SJRWMD Applicant's Handbook, Volumes I and II. For further information, please contact Ms. Junhong Shi at (904) 256-1645 or Junhong.Shi@dep.state.fl.us. The DEP's Division of Waste Management staff also offers the following comments: 1. Wharf Bravo is the location of a petroleum contaminated site identified as Site 1330. The site is currently being assessed and remediated by Naval Facilities Engineering Command Southeast (NAVFAC SE) and Naval Station (NAVSTA) Mayport under the DEP's review and concurrence. The current contaminant at this site is isopropylbenzene in groundwater. Please see the attached Conditional Site Rehabilitation Completion Order (SRCO) and No Further Action (NFA) Land Use Control (LUC) Proposal documents pertaining to Site 1330 for further information. 2. Removal of groundwater from Site 1330 is prohibited unless concurred with by the DEP and properly disposed of (please see the Conditional SRCO and the LUC Proposal for additional information). Also, the concrete/asphalt covering on Wharf Bravo serves as an engineering control and prevents contact of the petroleum contaminated soil by human and ecological receptors. Any damage to the existing concrete/asphalt cover on Wharf Bravo needs to be repaired (see the Conditional SRCO and the LUC Proposal)....

STATE - FLORIDA DEPARTMENT OF STATE

The DOS advises that the proposed project is unlikely to affect historic properties, provided that the applicant complies with the following special condition regarding unexpected discoveries: If prehistoric or historic artifacts are encountered at any time within the project area, all activities involving subsurface disturbance should cease and the applicant should contact the DOS Division of Historical Resources, Compliance Review Section at (850) 245-6333 for further instructions. Project activities should not resume without verbal and/or written authorization from the DOS. In addition, in the event that unmarked human remains are encountered during permitted activities, all work shall stop immediately and the proper authorities notified in accordance with Section 872.05, F.S.

FISH and WILDLIFE COMMISSION - FLORIDA FISH AND WILDLIFE CONSERVATION COMMISSION

FWC protection concerns will be addressed through the permitting process. No further comments per Kellie Youmans on 9/8/2015.

For more information or to submit comments, please contact the Clearinghouse Office at:

3900 COMMONWEALTH BOULEVARD, M.S. 47
TALLAHASSEE, FLORIDA 32399-3000
TELEPHONE: (850) 245-2170
FAX: (850) 245-2189

Visit the Clearinghouse Home Page to query other projects.

Florida Department of
Environmental Protection
Bob Martinez Center
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

February 15, 2011

Ms. Beverly Washington, IPT South Atlantic, OPA6
Department of the Navy
Naval Facilities Engineering Command Southeast
Building 135, Ajax Street
Naval Air Station Jacksonville
Jacksonville, Florida 32212-0030

RE: No Further Action with Land Use Controls Proposal, Site 1330, Naval Station Mayport, USEPA ID #FL9 170 024 260, Mayport, Florida (CH2M Hill Constructors, Inc., May, 2010)

Dear Ms. Washington:

I have reviewed the subject document which was dated May 2010 and was received on June 1, 2010. This report was prepared under Contract Task Order Number 0012. I am in concurrence with the conclusions and recommendations presented in this No Further Action (NFA) with Land Use Controls (LUCs) Proposal. Attached is a Conditional Site Rehabilitation Completion Order (SRCO) signed by Mr. Doug Jones, Chief, Bureau of Waste Cleanup.

Thank you for the opportunity to review this document. If you require additional clarification or other assistance, please feel free to contact me at 850/245-8999.

Sincerely,

John Winters

John Winters, P.G.
Remedial Project Manager

JJC JJC by ESN ESN ESN

cc Tim Bahr, FDEP, Tallahassee

Florida Department of
Environmental Protection
Bob Martinez Center
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

February 9, 2011

Department of the Navy
Naval Facilities Engineering Command Southeast
Attn: Ms. Beverly Washington
Naval Air Station Jacksonville
135 Ajax Street, Building 903
Jacksonville, Florida 32212-0030

Subject: Conditional Site Rehabilitation Completion Order
Site 1330
Building 46
Naval Station Mayport
Mayport, Duval County, Florida
EPA Facility ID# FL9 170 024 260

Dear Ms. Washington:

The Bureau of Waste Cleanup has reviewed the No Further Action Proposal (NFAP) with Conditions dated May 2010 (received June 1, 2010), submitted for the petroleum product discharge(s) addressed in the report. Documentation submitted with the Site Rehabilitation Completion Report (SRCR)/NFAP confirms that criteria set forth in Subsection 62-770.680(2), Florida Administrative Code (F.A.C.), effective April 17, 2005, have been met. Please refer to the enclosed figures and analytical summary tables of the site. This data includes the current Land Use Control (LUC) Implementation Plan (LUCIP) for this site. The SRCR/NFAP is hereby incorporated by reference in this Site Rehabilitation Completion Order (Order). Therefore, you are released from any further obligation to conduct site rehabilitation at the site for petroleum product contamination, except as set forth below. Failure to abide by the following requirements will result in the revocation of this Order.

(1) You must comply with the provisions outlined in the current LUCIP for this site which is on file with the Florida Department of Environmental Protection (Department) and at Naval Station Mayport. You have agreed to implement the following LUCs at Site 1330: 1) The site is to remain commercial/industrial and

prohibit residential uses, 2) A groundwater use restriction has been implemented to prohibit the use of the groundwater at the site, and 3) The old sheetpile retaining walls and the new Bravo Pier seawall must remain in place and intact because they act as an engineering control to prevent flow of contaminated groundwater into the Turning Basin. Therefore, periodic groundwater monitoring is to occur (per Rule 62-770.680(2)(d)2) to verify the continued effectiveness of the engineering control that prevents migration of the plume into the Turning Basin or the St. Johns River. The Order is conditioned upon such controls being effective, properly maintained, and remaining in place. Within one year of receipt of this Order, the Navy is to submit to the Department two copies of a Groundwater Monitoring Work Plan which satisfies the above requirement (verify the continued effectiveness of the engineering control). Following the Department's concurrence, the Navy will implement the Plan. Upon completion of the work described in the Plan, the Navy will submit to the Department two copies of a Groundwater Monitoring Report that summarizes all tasks that were necessary to achieve the objectives of the Work Plan, provides the groundwater analytical results, summarizes conclusions regarding objectives outlined in the Work Plan, and outlines recommendations concerning future groundwater monitoring events. The Department must concur with the Navy's recommendations concerning future groundwater monitoring events before the next monitoring event can proceed. If the real property owner proposes to remove the institutional controls or engineering controls, the real property owner shall obtain prior written approval from the Department. The removal of the controls shall be accompanied by the immediate resumption of site rehabilitation, or implementation of other approved controls, unless it is demonstrated to the Department that the criteria of Subsection 62-770.680(1), F.A.C., are met.

(2) Per the Rule (62-770.680(2)(d)3), for groundwater contamination that is affecting or may potentially affect only a marine surface water body with no other properties or freshwater surface water bodies located between the source property boundary and the marine surface water body, the Cleanup Target Level(s) or CTLs specified in Chapter 62-777, F.A.C., Table I marine surface water criteria column shall apply to groundwater. The Department's marine and fresh surface water CTL for isopropyl benzene is 260 micrograms per liter. In the event concentrations of isopropyl benzene (cumene) increase above 260 micrograms per liter in the farthest down gradient monitoring wells (these monitoring wells are currently labeled MPT-1330-MW18 and BP-MW2), or if a

subsequent discharge of petroleum or petroleum product(s) occurs at the site, the Department may require site rehabilitation to reduce concentrations of isopropyl benzene or other petroleum products' contaminants of concern to the levels approved in the SRCR/NFAP or otherwise allowed by Chapter 62-770, F.A.C.

(3) Additionally, you are required to properly abandon all monitoring wells at Site 1330 that are not needed during periodic monitoring of the engineering control, within 60 days of receipt of this Order. The monitoring wells must be plugged and abandoned in accordance with the requirements of Subsection 62-532.500(5), F.A.C.

Legal Issues

The Department's Order shall become final unless a timely petition for an administrative hearing is filed under Sections 120.569 and 120.57, Florida Statutes (F.S.), within 21 days of receipt of this Order. The procedures for petitioning for an administrative hearing are set forth below.

Persons affected by this Order have the following options:

(A) If you choose to accept the Department's decision regarding the SRCR/NFAP you do not have to do anything. This Order is final and effective on the date filed with the Clerk of the Department, which is indicated on the last page of this Order.

(B) If you choose to challenge the decision, you may do the following:

(1) File a request for an extension of time to file a petition for an administrative hearing with the Department's Agency Clerk in the Office of General Counsel within 21 days of receipt of this Order; such a request should be made if you wish to meet with the Department in an attempt to informally resolve any disputes without first filing a petition for an administrative hearing; or

(2) File a petition for an administrative hearing with the Department's Agency Clerk in the Office of General Counsel within 21 days of receipt of this Order.

Please be advised that mediation of this decision pursuant to Section 120.573, F.S., is not available.

How to Request an Extension of Time to File a Petition for an Administrative Hearing

For good cause shown, pursuant to Subsection 62-110.106(4), F.A.C., the Department may grant a request for an extension of time to file a petition for an administrative hearing. Such a request must be filed (received) by the Department's Agency Clerk in the Office of General Counsel at 3900 Commonwealth Boulevard, Mail Station 35, Tallahassee, Florida, 32399-3000, within 21 days of receipt of this Order. Petitioner, if different from Ms. Beverly Washington/Naval Station Mayport, shall mail a copy of the request to Ms. Beverly Washington/Naval Station Mayport at the time of filing. Timely filing a request for an extension of time tolls the time period within which a petition for an administrative hearing must be made.

How to File a Petition for an Administrative Hearing

A person whose substantial interests are affected by this Order may petition for an administrative hearing under Sections 120.569 and 120.57, F.S. The petition must contain the information set forth below and must be filed (received) by the Department's Agency Clerk in the Office of General Counsel at 3900 Commonwealth Boulevard, Mail Station 35, Tallahassee, Florida, 32399-3000, within 21 days of receipt of this Order. Petitioner, if different from Ms. Beverly Washington/Naval Station Mayport, shall mail a copy of the petition to Ms. Beverly Washington/Naval Station Mayport at the time of filing. Failure to file a petition within this time period shall waive the right of anyone who may request an administrative hearing under Sections 120.569 and 120.57, F.S.

Pursuant to Subsection 120.569(2), F.S. and Rule 28-106.201, F.A.C., a petition for an administrative hearing shall contain the following information:

(a) The name, address, and telephone number of each petitioner; the name, address, and telephone number of the petitioner's representative, if any; the facility owner's name and address, if different from the petitioner; the FDEP facility number, and the name and address of the facility;

(b) A statement of when and how each petitioner received notice of the Department's action or proposed action;

(c) An explanation of how each petitioner's substantial interests are or will be affected by the Department's action or proposed action;

(d) A statement of the disputed issues of material fact, or a statement that there are no disputed facts;

(e) A statement of the ultimate facts alleged, including a statement of the specific facts the petitioner contends warrant reversal or modification of the Department's action or proposed action;

(f) A statement of the specific rules or statutes the petitioner contends require reversal or modification of the Department's action or proposed action; and

(g) A statement of the relief sought by the petitioner, stating precisely the action petitioner wishes the Department to take with respect to the Department's action or proposed action.

This Order is final and effective on the date filed with the Clerk of the Department, which is indicated on the last page of this Order. Timely filing a petition for an administrative hearing postpones the date this Order takes effect until the Department issues either a final order pursuant to an administrative hearing or an Order Responding to Supplemental Information provided to the Department pursuant to meetings with the Department.

Judicial Review

Any party to this Order has the right to seek judicial review of it under Section 120.68, F.S., by filing a notice of appeal under Rule 9.110 of the Florida Rules of Appellate Procedure with the Department's Agency Clerk in the Office of General Counsel at 3900 Commonwealth Boulevard, Mail Station 35, Tallahassee, Florida, 32399-3000, and by filing a copy of the notice of appeal accompanied by the applicable filing fees with the appropriate district court of appeal. The notice of appeal must be filed within 30 days after this Order is filed with the Department's clerk (see below).

Questions

Any questions regarding the Department's review of your SRCR/NFAP should be directed to John Winters, P.G. at (850) 245-8999 or to his email address at John.Winters@dep.state.fl.us. Questions regarding legal issues should be referred to the Department's Office of General Counsel at (850) 245-2242. Contact with any of the

above does not constitute a petition for administrative hearing or request for an extension of time to file a petition for administrative hearing. The USEPA Facility Number for Naval Station Mayport is FL9 170 024 260. Please use this identification on all future correspondence with the Department.

Sincerely,

Douglas A. Jones, Chief
Bureau of Waste Cleanup
Division of Waste Management

DAJ/jdw

Enclosures

ec: Jim Crane, FDEP-BWC - Jim.Crane@dep.state.fl.us
Mary Stewart, c/o Dan Blackwell, FDEP-OGC - Dan.Blackwell@dep.state.fl.us
File

FILING AND ACKNOWLEDGMENT
FILED, on this date, pursuant to §120.52 Florida Statutes, with the designated Department Clerk, receipt of which is hereby acknowledged.

Clerk (or Deputy Clerk) — Date: February 9, 2011

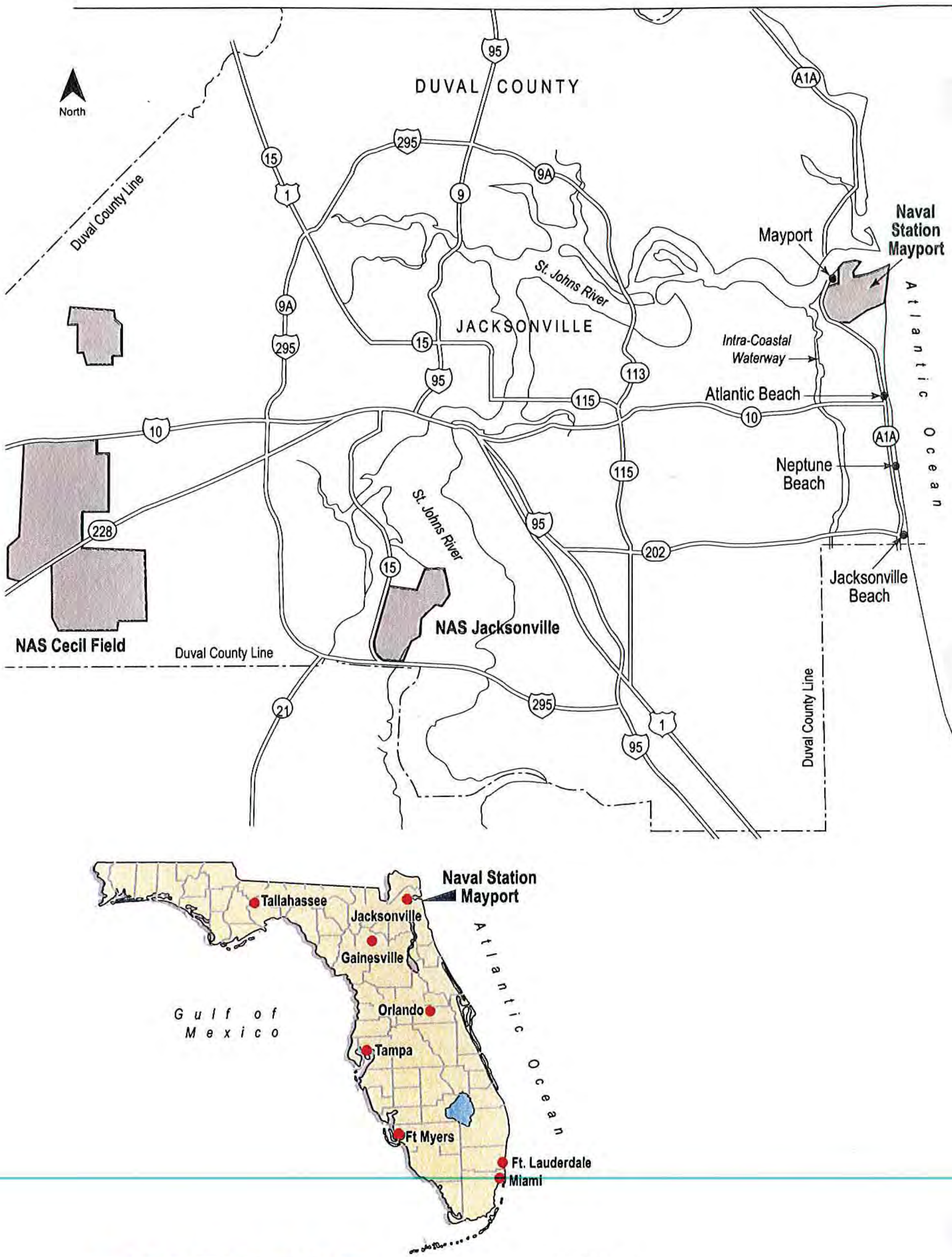
Professional Geologist Certification

Conditional Site Rehabilitation Completion Order
Site 1330, Building 46
Naval Station Mayport

I hereby certify that in my professional judgment, the components of this Conditional Site Rehabilitation Completion Order for Site 1330, U.S. Naval Station Mayport, Mayport, Florida, satisfies the requirements set forth in Chapter 62-770.680(2), Florida Administrative Code, and that the geological interpretations in this report provides reasonable assurances of achieving the Assessment objectives stated in Chapter 62-770, F.A.C. I personally completed this review.

John Winters, P.G.
Remedial Project Manager
Florida Department of Environmental Protection
Federal Programs Section

1/14/2011
Date

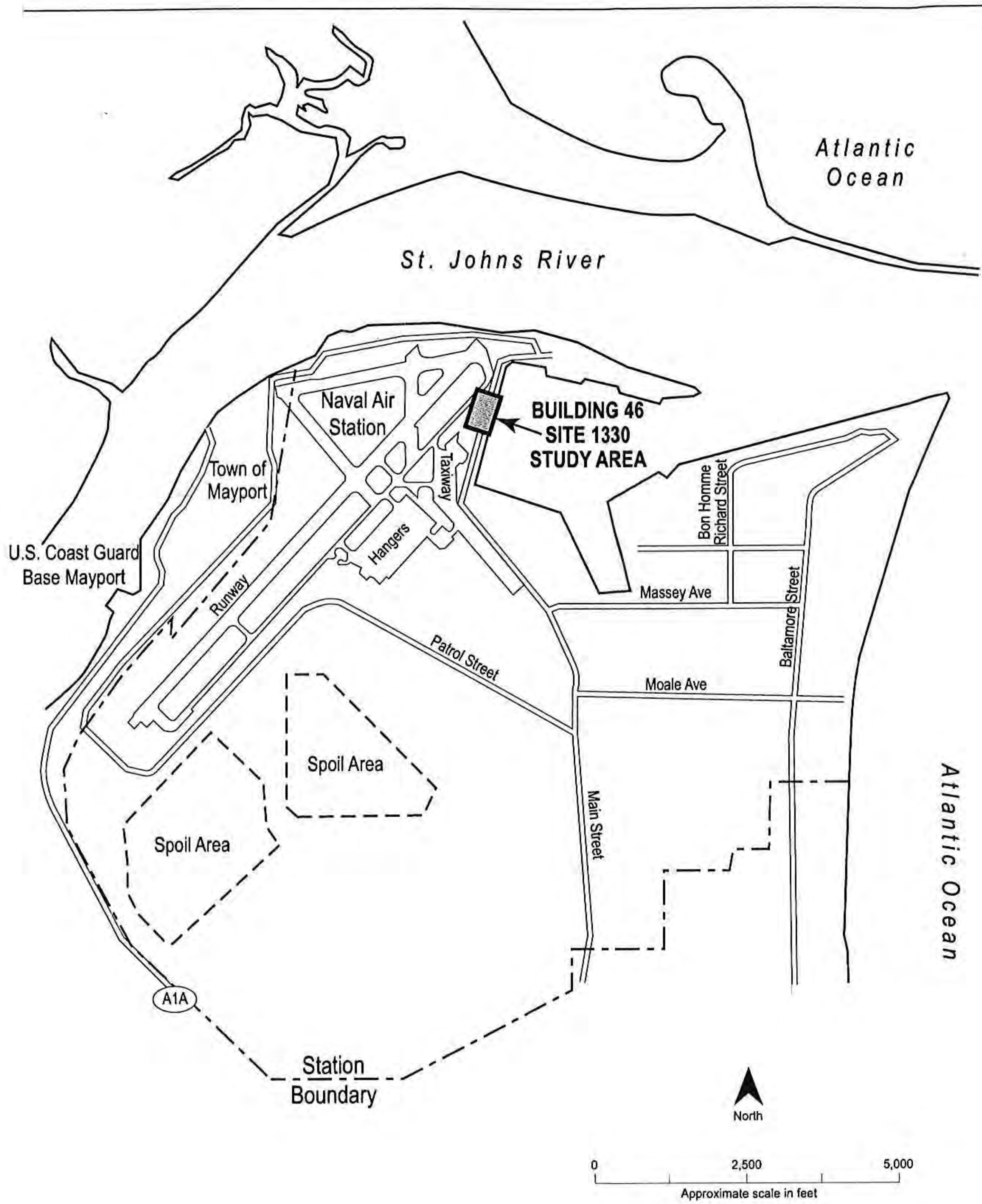


NAVFAC Naval Facilities Engineering Command

FIGURE 1-1
Station Location Map
NAVSTA Mayport, Florida

CH2MHILL

ES032007003ORO_Mayport_Fig1-1LocMap

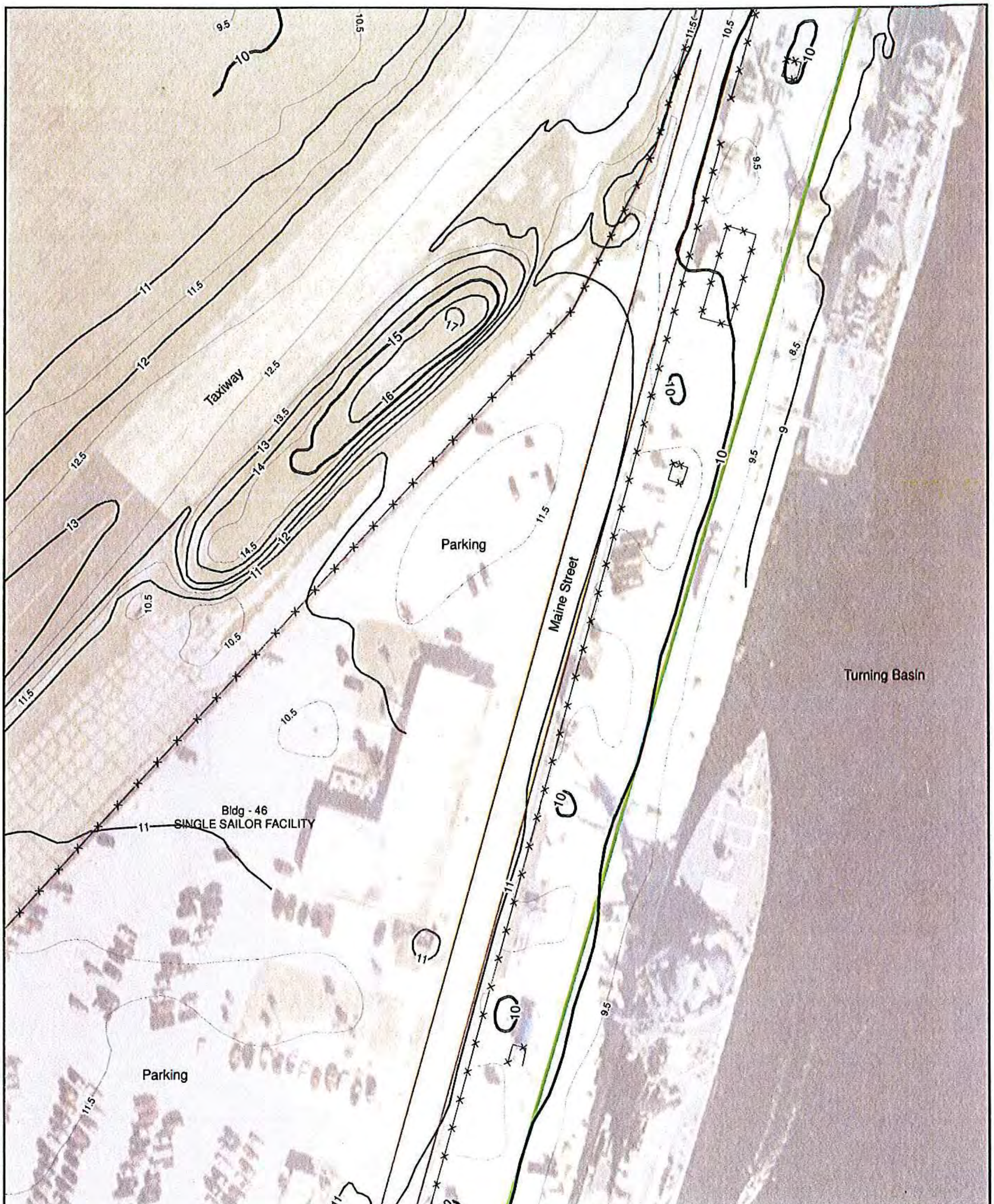


NAVFAC Naval Facilities Engineering Command

FIGURE 1-2
Site Location Map
Site 1330
NAVSTA Mayport, Florida

CH2MHILL

ES032007003ORO_Mayport_Fig1-2 RAP Site Map



Approximate location of the old sheet pile face associated with the former dock and piers (Taken from the 1944 engineering drawing by Roberts and Company, Inc. and the 1952 aerial imagery)

Major 5ft Contour

1ft Contour (amsl)

0.5ft Contour (amsl)

Fence

Imagery reference: 2002 aerial photo obtained from EGIS

Bulkhead and Fender taken from 1968 Engineering drawing of Bravo Pier

N W E S

0 50 100 Feet

Figure 1-3
Current Site 1330 Surface Infrastructure and Topography
NAVSTA Mayport
Mayport, Florida

CH2MHILL

\\Oakridge\Proj\USNavy\281913Mayport\Maps\MXD\May_2007\Fig1_3_Surface_Features_Topo.mxd
5/9/2007

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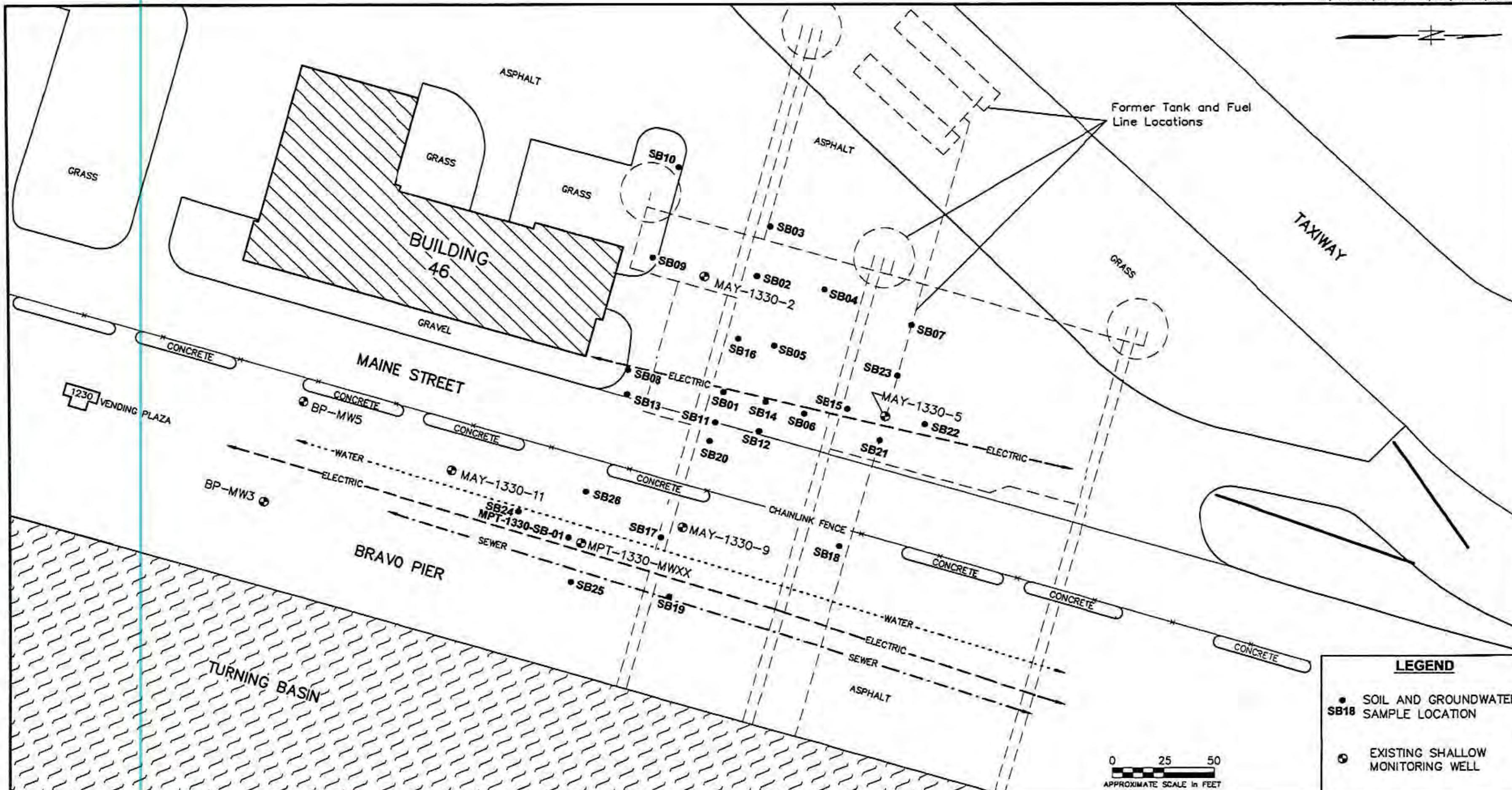

LEGEND

- SB18 — SOIL AND GROUNDWATER SAMPLE LOCATION
- EXISTING SHALLOW MONITORING WELL

NO.	DATE	REVISIONS	BY	CHKD	APPD	REFERENCES

DRAWN BY LLK DATE 11/15/02
CHECKED BY DATE
COST/SCHED-AREA
SCALE AS NOTED

SOIL BORING LOCATIONS
SITE ASSESSMENT REPORT
SITE 1330
NAVAL STATION MAYPORT
MAYPORT, FLORIDA

CONTRACT NO. 4265
APPROVED BY DATE
APPROVED BY DATE
DRAWING NO. FIGURE 2-2 REV. 0

FORM CADD NO. SDIV_BH.DWG - REV 0 - 1/20/98

Table 3-2
Soil Vapor Results

Site Assessment Report Addendum, Site 1330
Naval Station Mayport
Mayport, Florida

Soil Boring Number	Date of Measurement	Sample Depth (ft bls)	Headspace Readings (ppm)		
			Total Organic Reading	Carbon Filtered Reading	Net Reading
SB-01	8/3/2002	1	0	0	0
		3	0	0	0
		5	0	0	0
		6	0	0	0
SB-02	8/3/2002	1	0	0	0
		3	0	0	0
		5	0	0	0
		6	0	0	0
SB-03	8/3/2002	1	0	0	0
		3	0	0	0
		5	0	0	0
		6	0	0	0
SB-04	8/3/2002	1	0	0	0
		3	0	0	0
		5	0	0	0
SB-05	8/3/2002	1	0	0	0
		3	0	0	0
		5	0	0	0
SB-06	8/3/2002	1	0	0	0
		3	0	0	0
		5	0	0	0
		6	0	0	0
SB-07	8/3/2002	1	0	0	0
		3	0	0	0
		5	0	0	0
		6	0	0	0
SB-08	8/3/2002	1	0	0	0
		3	0	0	0
		5	0	0	0
		6	0	0	0
SB-09	8/3/2002	1	0	0	0
		3	0	0	0
		5	0	0	0
		6	0	0	0
SB-10	8/3/2002	1	0	0	0
		3	0	0	0
		5	0	0	0
		6	0	0	0
SB-11	8/3/2002	1	0	0	0
		3	0	0	0
		5	0	0	0
		6	0	0	0
SB-12	8/3/2002	1	0	0	0
		3	0	0	0
		5	0	0	0
		6	0	0	0

Table 3-2
Soil Vapor Results

Site Assessment Report Addendum, Site 1330
Naval Station Mayport
Mayport, Florida

Soil Boring Number	Date of Measurement	Sample Depth (ft bls)	Headspace Readings (ppm)		
			Total Organic Reading	Carbon Filtered Reading	Net Reading
SB-13	8/3/2002	1	0	0	0
		3	0	0	0
		5	0	0	0
		6	0	0	0
SB-14	8/3/2002	1	0	0	0
		3	0	0	0
		5	0	0	0
		6	0	0	0
SB-15	8/3/2002	1	0	0	0
		3	0	0	0
		5	0	0	0
		6	0	0	0
SB-16	8/3/2002	1	0	0	0
		3	0	0	0
		5	0	0	0
		6	0	0	0
		7	0	0	0
SB-17	8/3/2002	1	0	0	0
		3	0	0	0
		5	0	0	0
		6	0	0	0
SB-18	8/3/2002	1	0	0	0
		3	0	0	0
		5	0	0	0
		6	0	0	0
SB-19	8/3/2002	1	0	0	0
		3	0	0	0
		5	0	0	0
		6	0	0	0
		7	0	0	0
SB-20	8/3/2002	1	0	0	0
		3	0	0	0
		5	0	0	0
		6	0	0	0
		7	0	0	0
SB-21	8/3/2002	1	0	0	0
		3	0	0	0
		5	0	0	0
		6	0	0	0
		7	0	0	0
SB-22	8/3/2002	1	0	0	0
		3	0	0	0
		5	0	0	0
		6	0	0	0
		7	0	0	0

Table 3-2
Soil Vapor Results

Site Assessment Report Addendum, Site 1330
Naval Station Mayport
Mayport, Florida

Soil Boring Number	Date of Measurement	Sample Depth (ft bls)	Headspace Readings (ppm)		
			Total Organic Reading	Carbon Filtered Reading	Net Reading
SB-23	8/3/2002	1	0	0	0
		3	0	0	0
		5	0	0	0
		6	0	0	0
		7	0	0	0
SB-24	8/3/2002	1	0	0	0
		3	0	0	0
		5	0	0	0
		6	0	0	0
SB-25	8/3/2002	1	0	0	0
		3	0	0	0
		5	0	0	0
		6	0	0	0
SB-26	8/3/2002	1	0	0	0
		3	0	0	0
		5	0	0	0
		6	0	0	0

Notes:
ppm = parts per million

Table 3-3
Mobile Laboratory Soil Results

Site Assessment Report, Site 1330
Naval Station Mayport
Mayport, Florida

Compound	FDEP Target Level[1] (mg/kg)		SB-01	SB-02	SB-03	SB-04	SB-05	SB-06	SB-07
			10/1/2002	9/30/2002	9/30/2002	9/30/2002	9/30/2002	10/1/2002	9/30/2002
Sample Interval	**Residential**	**Leachability**	7ft	6-7 ft	5 ft	5 ft	5 ft	7 ft	5 ft
VOCs (USEPA Method 8260B) (mg/kg)									
Isoprolylbenzene	160	0.8	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
MTBE	3200	0.2	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzene	1.1	0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007
Toluene	380	0.5	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Ethylbenzene	1100	0.6	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Total Xylenes	5600	0.2	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Napthalene	40	1.7	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
1-Methylnapthalene	68	2.2	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
2-Methylnapthalene	80	6.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02

Compound	FDEP Target Level[1] (mg/kg)		SB-08	SB-09	SB-10	SB-11	SB-12	SB-13	SB-14
			9/30/2002	9/30/2002	9/30/2002	10/1/2002	10/1/2002	10/1/2002	10/1/2002
Sample Interval	**Residential**	**Leachability**	6 ft	6 ft	6 ft	6 ft	6 ft	6 ft	6 ft
VOCs (USEPA Method 8260B) (mg/kg)									
Isoprolylbenzene	160	0.8	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
MTBE	3200	0.2	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzene	1.1	0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007
Toluene	380	0.5	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Ethylbenzene	1100	0.6	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Total Xylenes	5600	0.2	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Napthalene	40	1.7	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
1-Methylnapthalene	68	2.2	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
2-Methylnapthalene	80	6.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02

Table 3-3
Mobile Laboratory Soil Results

Site Assessment Report, Site 1330
Naval Station Mayport
Mayport, Florida

Compound	FDEP Target Level[1] (mg/kg)		SB-15	SB-16	SB-17	SB-18	SB-19	SB-20	SB-21
			10/1/2002	10/1/2002	10/1/2002	10/2/2002	10/2/2002	10/1/2002	10/2/2002
Sample Interval	**Residential**	**Leachability**	6 ft	6 ft	7 ft	5 ft	6 ft	6 ft	7 ft
VOCs (USEPA Method 8260B) (mg/kg)									
Isoprolylbenzene	160	0.8	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
MTBE	3200	0.2	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzene	1.1	0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007
Toluene	380	0.5	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Ethylbenzene	1100	0.6	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Total Xylenes	5600	0.2	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Napthalene	40	1.7	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
1-Methylnapthalene	68	2.2	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
2-Methylnapthalene	80	6.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02

Compound	FDEP Target Level[1] (mg/kg)		SB-22	SB-23	SB-24	SB-25	SB-26
			10/2/2002	10/2/2002	10/2/2002	10/2/2002	10/2/2002
Sample Interval	**Residential**	**Leachability**	7 ft	7 ft	6 ft	5 ft	6 ft
VOCs (USEPA Method 8260B) (mg/kg)							
Isoprolylbenzene	160	0.8	<0.01	<0.01	<0.01	<0.01	<0.01
MTBE	3200	0.2	<0.01	<0.01	<0.01	<0.01	<0.01
Benzene	1.1	0.007	<0.007	<0.007	<0.007	<0.007	<0.007
Toluene	380	0.5	<0.01	<0.01	<0.01	<0.01	<0.01
Ethylbenzene	1100	0.6	<0.01	<0.01	<0.01	<0.01	<0.01
Total Xylenes	5600	0.2	<0.01	<0.01	<0.01	<0.01	<0.01
Napthalene	40	1.7	<0.02	<0.02	<0.02	<0.02	<0.02
1-Methylnapthalene	68	2.2	<0.02	<0.02	<0.02	<0.02	<0.02
2-Methylnapthalene	80	6.1	<0.02	<0.02	<0.02	<0.02	<0.02

Notes:
[1]Chapter 62-770, FAC (April 30, 1999) mg/kg = milligrams per kilogram
Bold indicates values in excess of SCTLs, Chapter 62-770, FAC (April 30, 1999).

Table 3-4
Fixed-Base Laboratory Soil Results

Site Assessment Report Addendum, Site 1330
Naval Station Mayport
Mayport, Florida

Compound	FDEP Target Level[1] (mg/kg)		MPT-1330-SB-01 10/2/2002
Sample Interval	Residential	Leachability	6 ft
VOCs (USEPA Method 8021B) (mg/kg)			
Isoprolylbenzene	160	0.8	<.0058
MTBE	3200	0.2	<.0058
Benzene	1.1	0.007	<.0058
Toluene	380	0.5	<.0058
Ethylbenzene	1100	0.6	<.0058
Total Xylenes	5600	0.2	<.0058
PAHs (USEPA Method 8310) (mg/kg)			
Benzo (a) anthracene	1.4	3.2	0.042 J
Benzo (a) pyrene	0.1	8	0.059 J
Benzo (b) fluoranthene	1.4	10	0.110 J
Chrysene	140	77	0.042 J
Indeno (1,2,3-cd) pyrene	1.5	28	0.033 J
Benzo (g,h,i) perylene	2300	32000	0.039 J
Pyrene	2200	880	0.042 J
FL-PRO (USEPA Method 8270 (mg/kg)			
TRPH	340	340	<11

Notes:
[1]Chapter 62-770, FAC (April 30, 1999)
Bold indicates values in excess of SCTLs, Chapter 62-770, FAC (April 30, 1999).
<.0058 = less than analyzed detection limit
J = estimated value

TABLE 2-1
Well Construction Details
Site 1330, NAVSTA Mayport, Florida

Well ID	Northing	Easting	Ground Elevation (ft amsl)	TOC Elevation (ft amsl)	Total Depth (ft bls)	Screen Interval (ft bls)	Zone Screened	Diameter (inches)
BP-DMW1	2204220.231	525157.416	9.4	9.16	29.79	24.79 -29.79*	Lower I	2
BP-MW1	2204275.199	525180.409	8.79	8.47	13.91	3.91 - 13.91*	S/Upper I	2
BP-MW2	2204257.989	525234.245	8.48	8.15	13.25	3.25 - 13.25	S/Upper I	2
BP-MW3	2204204.436	525208.694	8.79	8.67	13.94	3.94 - 13.94*	S/Upper I	2
BP-MW4	2204177.044	525143.337	9.71	9.43	13.75	3.75 - 13.75	S/Upper I	2
BP-MW5	2204224.61	525158.359	9.38	9.20	13.86	3.86 - 13.86	S/Upper I	2
MAY-1330-1	2204258.468	524955.061	9.83	9.48	12.77	2.77 - 12.77	S/Upper I	2
MAY-1330-2	2204422.349	525097.455	10.51	10.21	12.91	2.91 - 12.91	S/Upper I	2
MAY-1330-3	2204357.153	524991.323	9.56	9.22	12.73	2.73 - 12.73	S/Upper I	2
MAY-1330-4	2204650.57	525215.819	9.93	NA	12.80	2.8 - 12.8	S/Upper I	2
MAY-1330-5	2204520.662	525167.83	10.49	10.34	12.93	2.93 - 12.93	S/Upper I	2
MAY-1330-6	2204380.462	525050.566	10.74	10.58	24.90	14.9 - 24.9	Middle I	2
MAY-1330-7	2204082.144	525050.07	10.65	10.26	12.96	2.96 - 12.96	S/Upper I	2
MAY-1330-8	2204133.367	525129.608	9.16	8.92	13.75	3.75 - 13.7*	S/Upper I	2
MAY-1330-9	2204412.435	525221.979	8.93	8.72	13.59	3.59 - 13.59*	S/Upper I	2
MAY-1330-10	2204552.589	525250.926	8.90	8.56	13.59	3.59 - 13.59	S/Upper I	2
MAY-1330-11	2204294.712	525191.65	9.01	8.67	13.57	3.57 - 13.57	S/Upper I	2
MAY-1330-13	2204640.287	525081.516	12.82	12.52	17.32	7.32 - 17.32	S/Upper I	2
MAY-1330-14	2204526.67	525000.224	12.36	12.10	18.75	8.75 - 18.75	S/Upper I	2
MAY-1330-15	2204428.374	524884.759	9.70	9.47	15.80	5.8 - 15.8	S/Upper I	2
MAY-1330-16	2204616.38	525295.309	9.30	9.10	10.95	0.95 - 10.95	S/Upper I	0.5
MPT-1330-W17D	2204357.427	525227.963	9.09	8.90	39.46	34.46 - 39.46*	Lower I	2
MPT-1330-MW18	2204387.675	525295.487	7.99	7.82	13.11	3.11 - 13.11	S/Upper I	2
MPT-1330-MW19	2204456.886	525249.02	9.12	8.80	13.08	3.08 - 13.08	S/Upper I	2
MPT-1330-MW20	2204427.448	525147.383	10.40	10.16	14.27	4.27 - 14.27	S/Upper I	2
MPT-1330-WXX	2204362.01	525229.688	8.77	8.94	10.80	0.8 - 10.8*	S/Upper I	0.5
MAY-1330-21	2204365.408	525230.982	9.03	8.74	14.81	4.81 - 14.81	S/Upper I	2
MAY-1330-22	2204642.811	525301.734	9.21	8.74	14.80	4.8 - 14.8	S/Upper I	2
MAY-1330-23	2204751.253	525341.345	8.95	8.63	14.78	4.78 - 14.78	S/Upper I	2

*Screen interval provided in Table 2-1 SARA (TtNUS, 2003). All other screen intervals estimated from tagging total depth or documented during well installation.
ft amsl feet above mean sea level
ft bls feet below land surface
S shallow surficial aquifer (Halford, 1998)
I deep surficial aquifer (Halford, 1998)

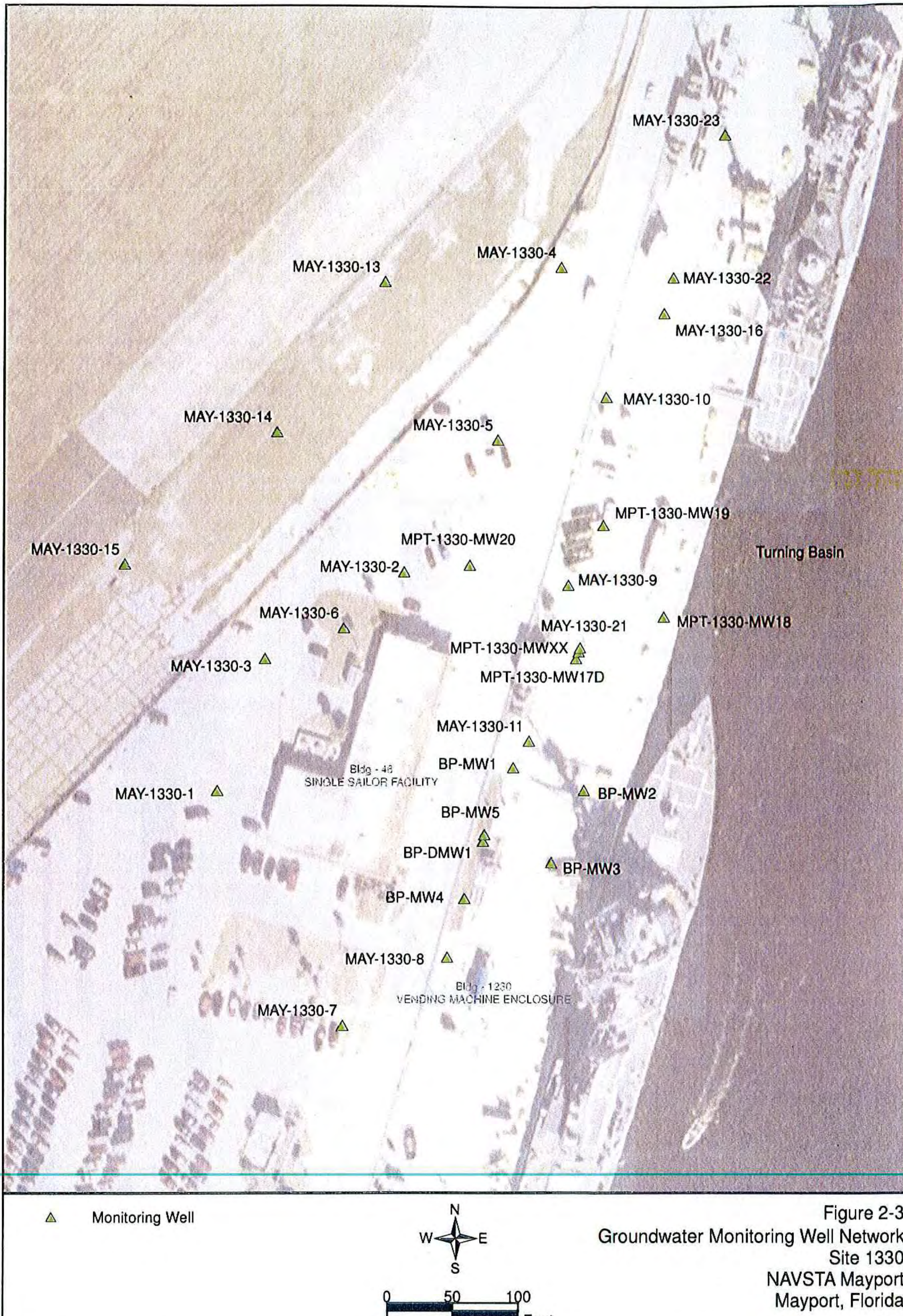

Figure 2-3
Groundwater Monitoring Well Network
Site 1330
NAVSTA Mayport
Mayport, Florida

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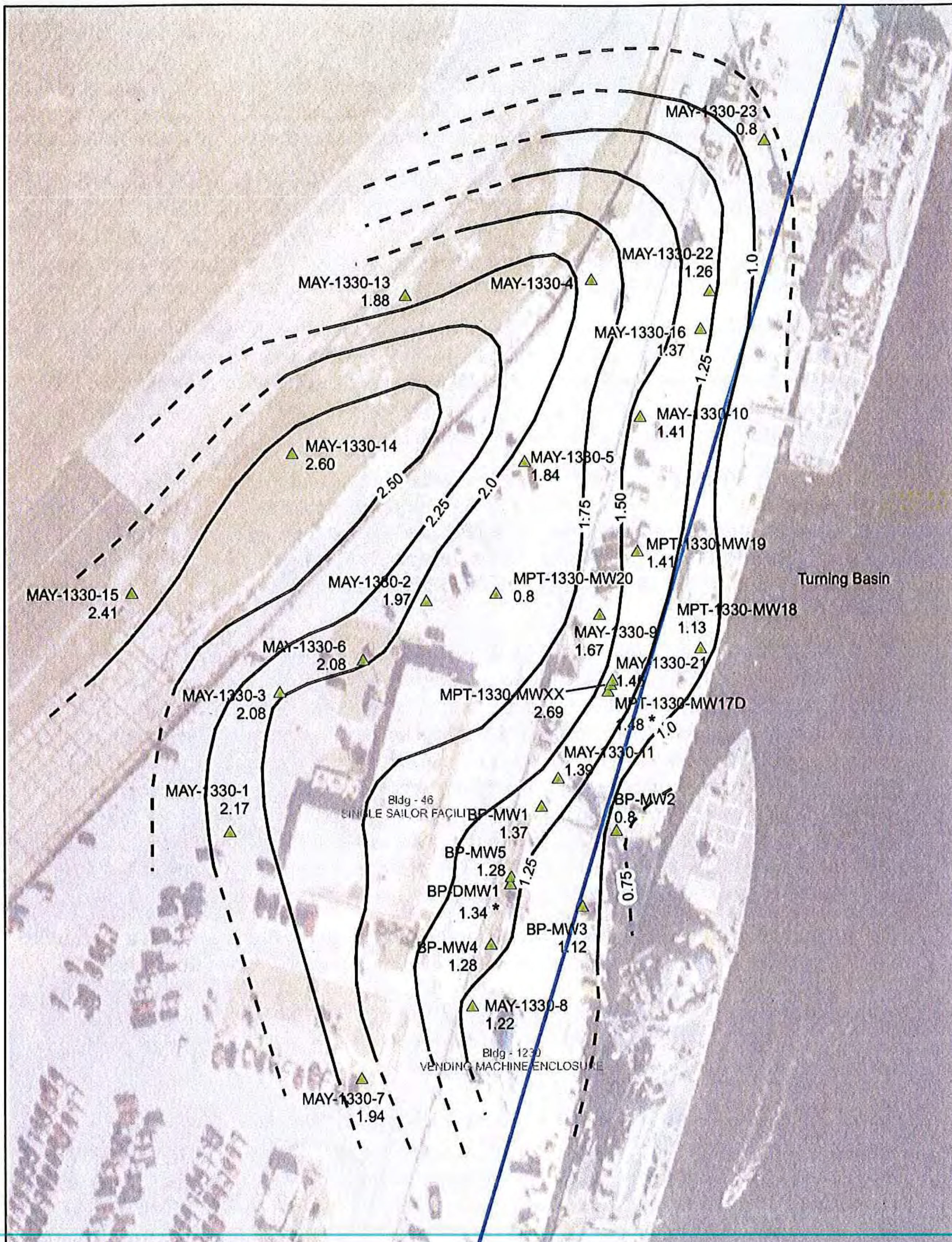
5/18/2007



Monitoring Well

Potentiometric Surface (feet above mean sea level) (dashed when inferred)

Approximate Location of the old sheet pile face associated with the former dock and piers. (Taken from the 1944 engineering drawing by Roberts and Company, Inc. and the 1952 aerial imagery)

* Water level measurement collected from screen interval placed at the base of the surficial aquifer instead of across the water table. Data was not incorporated into the potentiometric surface map.

N W E S

0 50 100 Feet

Figure 2-10
Surficial Aquifer Potentiometric Surface Map
February 11, 2008
Site 1330
NAVSTA Mayport
Mayport, Florida

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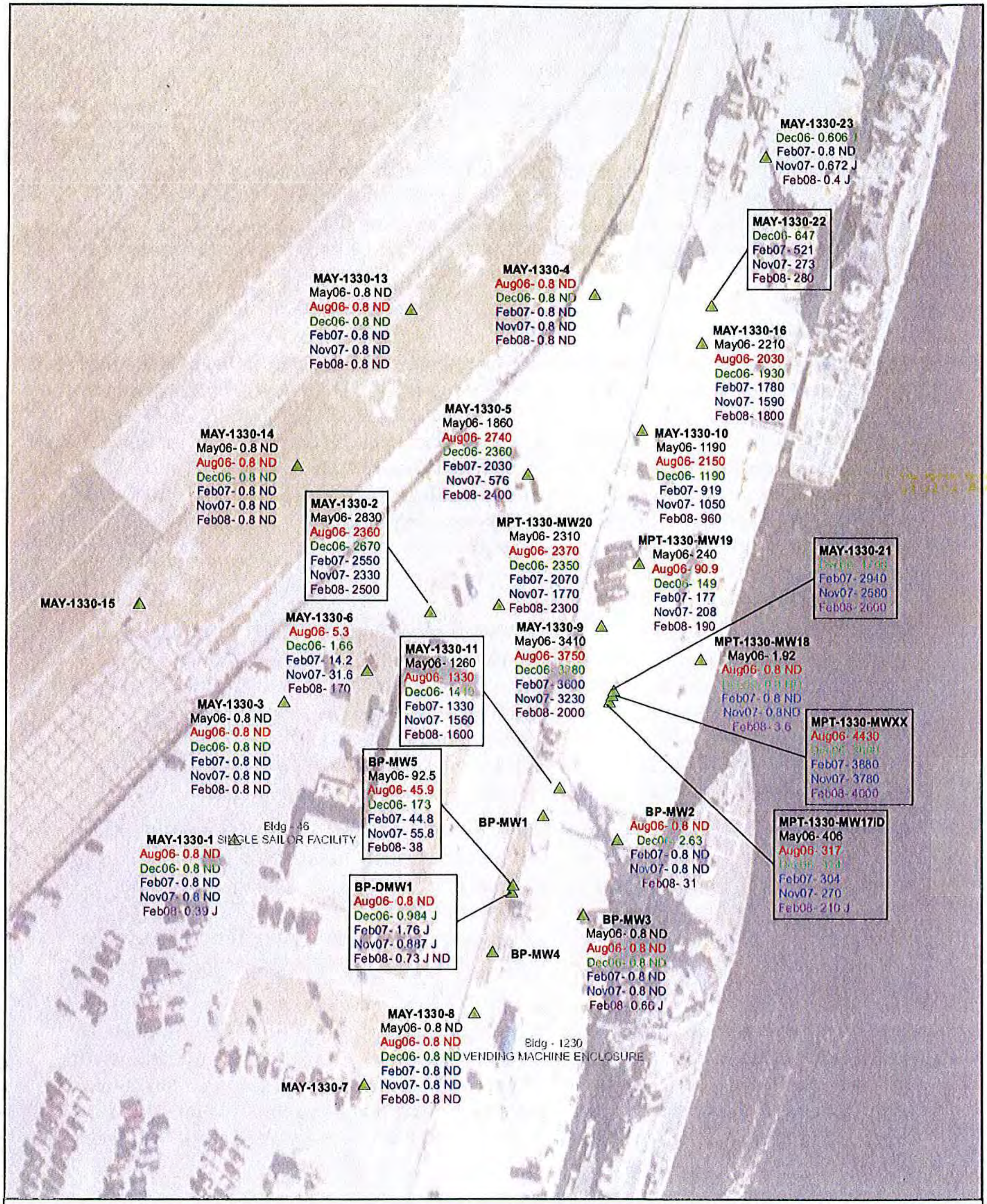

△ Monitoring Well Location
Isopropyl Benzene Concentration (ug/L) per sampling event
(ND = Non-Detect J = Estimated Value)

N W E S

0 50 100 Feet

Figure 2-11
Isopropylbenzene Concentration Trends
Site 1330
NAVSTA Mayport
Mayport, Florida

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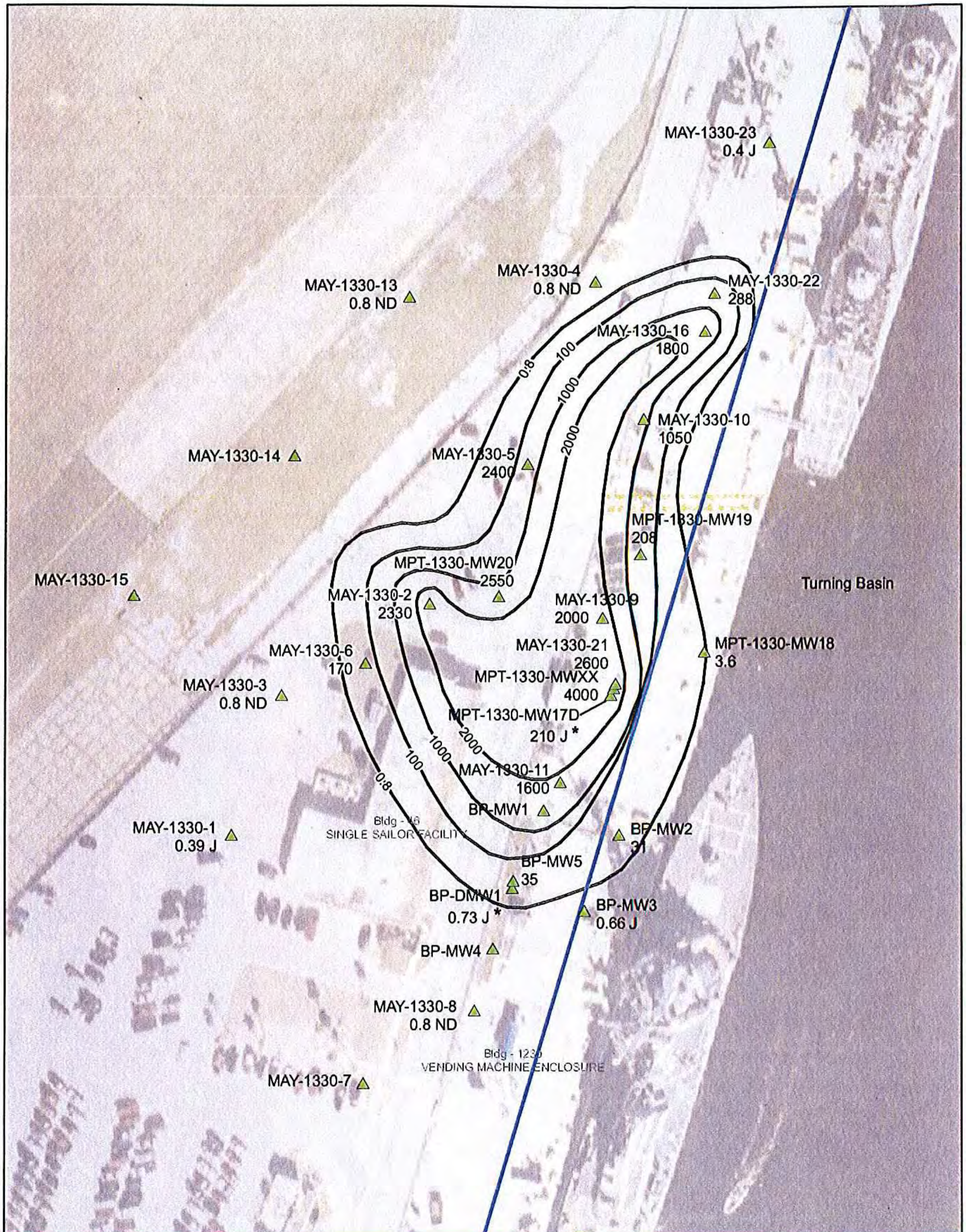

Monitoring Well
Isopropylbenzene Concentration (ug/L) (ND = non-detect J = estimated value)
Isopropylbenzene Isoconcentration Line
0.8 FDEP GCTL for Isopropylbenzene in Groundwater
Approximate Location of the old sheet pile face associated with the former dock and piers. (Taken from the 1944 engineering drawing by Roberts and Company, Inc. and the 1952 aerial imagery)
* Sample collected from screened interval located at the base of the aquifer. Results not incorporated into isoconcentration map.

N W E S

0 50 100 Feet

Figure 2-17
Isopropylbenzene Concentrations in the Surficial Aquifer
February 2008
Site 1330
NAVSTA Mayport, Mayport, Florida

CH2MHILL

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NAVFAC

PROFESSIONAL CERTIFICATION

No Further Action with Land Use Controls Proposal
Site 1330
Naval Station Mayport, Mayport, Florida

The contractor, CH2M HILL Constructors, Inc., hereby certifies that, to the best of its knowledge and belief, this No Further Action with Land Use Controls Proposal and the technical data, delivered herewith under Contract No. N62467-01-D-0331, Contract Task Order No. 0012 is complete and accurate and complies with all requirements of this contract and standard professional practices at the time the submittal was prepared. This decision document was prepared under the supervision of the signing Professional Engineer and is partly based on information obtained from others. If conditions are determined to exist differently than those described in this document, then the undersigned Professional Engineer should be notified to evaluate the effects of any additional information on the project described in this document.

DATE: 05/25/2010

NAME AND TITLE OF CERTIFYING OFFICIAL: [signature]

Michael D. Halil, P.E.
Senior Project Manager
Professional Engineer Number 0000058049
Expiration Date: February 28, 2011

Bravo Pier Fuel Spill Site
U.S. Naval Station (NAVSTA), Mayport, Florida

1. Site Description: Bravo Pier is used for docking active duty Naval vessels such as Frigates and Cruisers and also ships that are being decommissioned. Bravo Pier has a long history of fuel handling operations. Bravo Pier is completely covered by concrete/asphalt.

Four 25,000-gallon aviation gasoline (AVGAS) tanks and two 40,000-gallon lube oil tanks, situated in an area (Site 1330) adjacent to and northwest of Bravo Pier, stored and dispensed fuel used for seaplanes and boats. Two of the AVGAS tanks were abandoned in place and 2 others were demolished in placed allowing for a parking lot to be built on top of them in the 1950's. The lube oil tanks were removed in the mid 1980's. A Contamination Assessment (Army Corp of Engineers [ACOE], 1992) revealed a dissolved petroleum plume that extended beneath Bravo Pier. During further investigations, a leak from a diesel fuel marine (DFM) lateral line near the western edge of Bravo Pier was found and repaired. Remedial actions were performed (Bechtel Environmental, Inc., 1995) to remove vadose zone contaminants between August and Sept of 1995.

2. Site Location: Bravo Pier runs in a north-south direction along the northern border of the base adjacent to the mouth of the St. Johns River. See Figure 1-2 (attached) of the Site Assessment Report, Bravo Pier, Naval Station Mayport, Mayport, Florida (TtNUS 1999) and Figures 1-3 and 1-4 also attached.

3. Land Use Control (LUC) Objectives: Land use at Bravo Pier is to remain industrial. Two soil sample locations (Tetra Tech NUS [TtNUS], 1999) contain concentrations of Benzo(a)pyrene and Dibenzo(a,h)anthracene higher than their respective Florida Department of Environmental Protection (FDEP) residential soil cleanup target levels (SCTL) but are within the range of the FDEP industrial SCTL. The concrete/asphalt covering serves as an engineering control and prevents contact of the petroleum-contaminated soil by human and ecological receptors.

Bravo Pier also contains concentrations of isopropylbenzene (TtNUS, 1999) that exceed the FDEP groundwater cleanup target levels (GCTL). The origin of the Isopropylbenzene (ACOE, 1999) is the adjacent site, Site 1330 and is being addressed in Site 1330 Activities.

4. LUC Implemented to Achieve Objective(s): (1) Notation in the Station's Geographic Information System designating only "industrial" land use. (2) Present inclusion of Bravo Pier wells (containing isopropylbenzene), BP-MW1, BP-DMW1, BP-MW2, and BP-MW5 in the Site 1330 monitoring or treatment program.

5. Decision Documents: Below are the Bravo Pier decision documents.

Bechtel Environmental, Inc. *Closure Report for the Underground Storage Tank Remedial Action at Site 1330, Naval Station Mayport, Mayport, Fl, dated August 1995.* prepared for SOUTHNAVFACENGCOM, North Charleston, South Carolina.

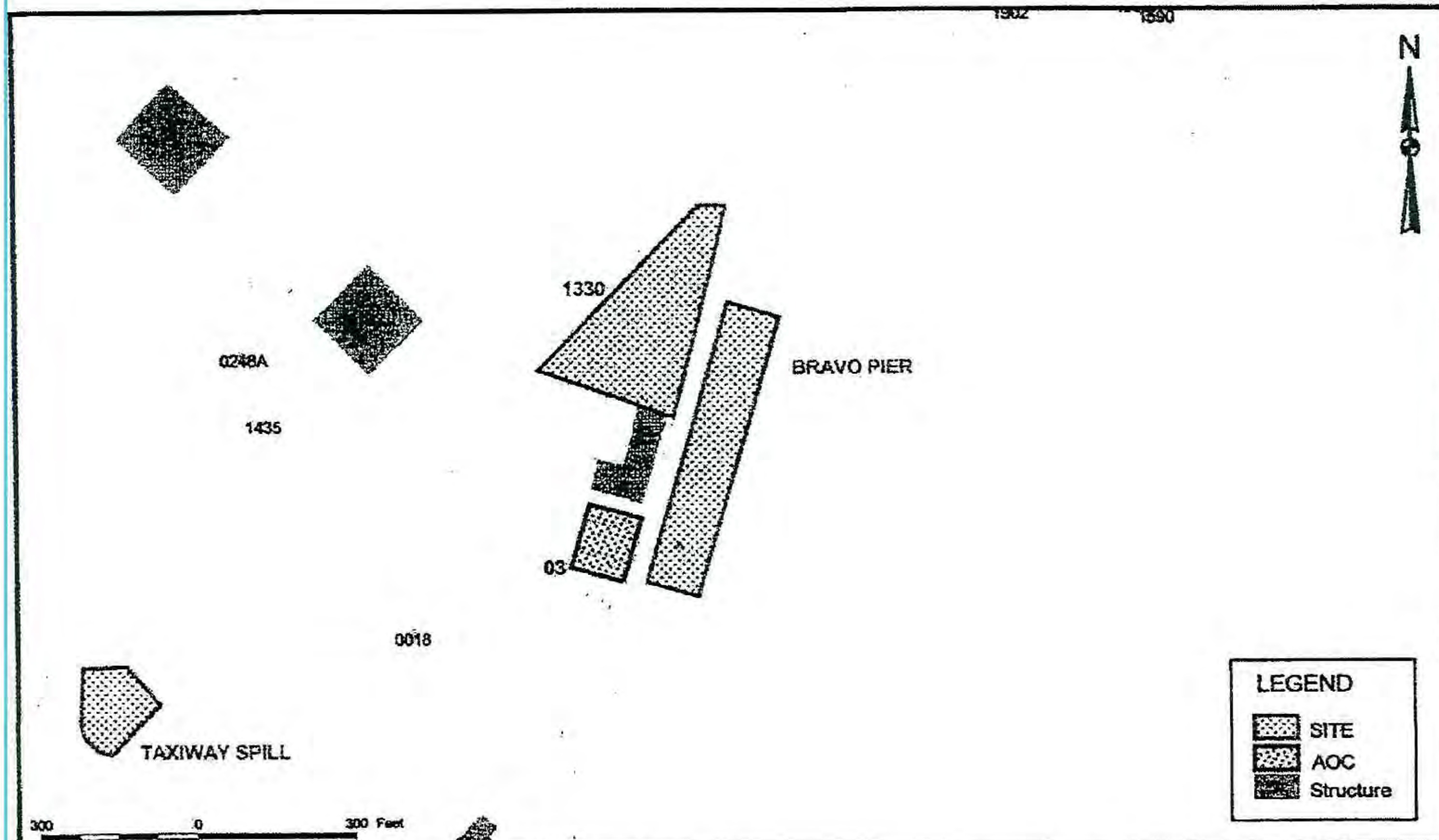
Tetra Tech NUS. *Site Assessment Report Bravo Pier, Naval Station Mayport, Mayport, FL, dated January 1999.* prepared for SOUNAVFACENGCOM, North Charleston, South Carolina.

FDEP Letter, *(Review of Site Assessment Report, Bravo Pier), Naval Station Mayport, Mayport, Florida, dated 25 March 1999.*

Tetra Tech NUS. *Letter; Request for No Further Action at Bravo Pier, Naval Station Mayport, FL. dated June 28, 1999.* prepared for SOUTHNAVFACENGCOM, North Charleston, South Carolina.

FDEP Letter, *(Conditional Site Rehabilitation Approval Order) Response to "No Further Action Request, Bravo Pier Fuel Spill Site, Naval Station Mayport, Mayport, Florida", dated 10 Jan 2000.*

(ACOE). *Technical Memorandum, Mayport Naval Station, Site 1330, Mayport, FL, dated July 2000.* prepared for SOUNAVFACENGCOM, North Charleston, South Carolina.



DRAWN BY	DATE	Tetra Tech NUS, Inc.	VIEW	OWNER NUMBER
CHECKED BY	DATE	BRAVO PIER SITE LOCATION NS MAYPORT, FLORIDA	APPROVED BY	DATE
COST/SCHEDULE-AREA			APPROVED BY	DATE
SCALE AS NOTED			DRAWING NO. FIGURE 1-4	REV 0

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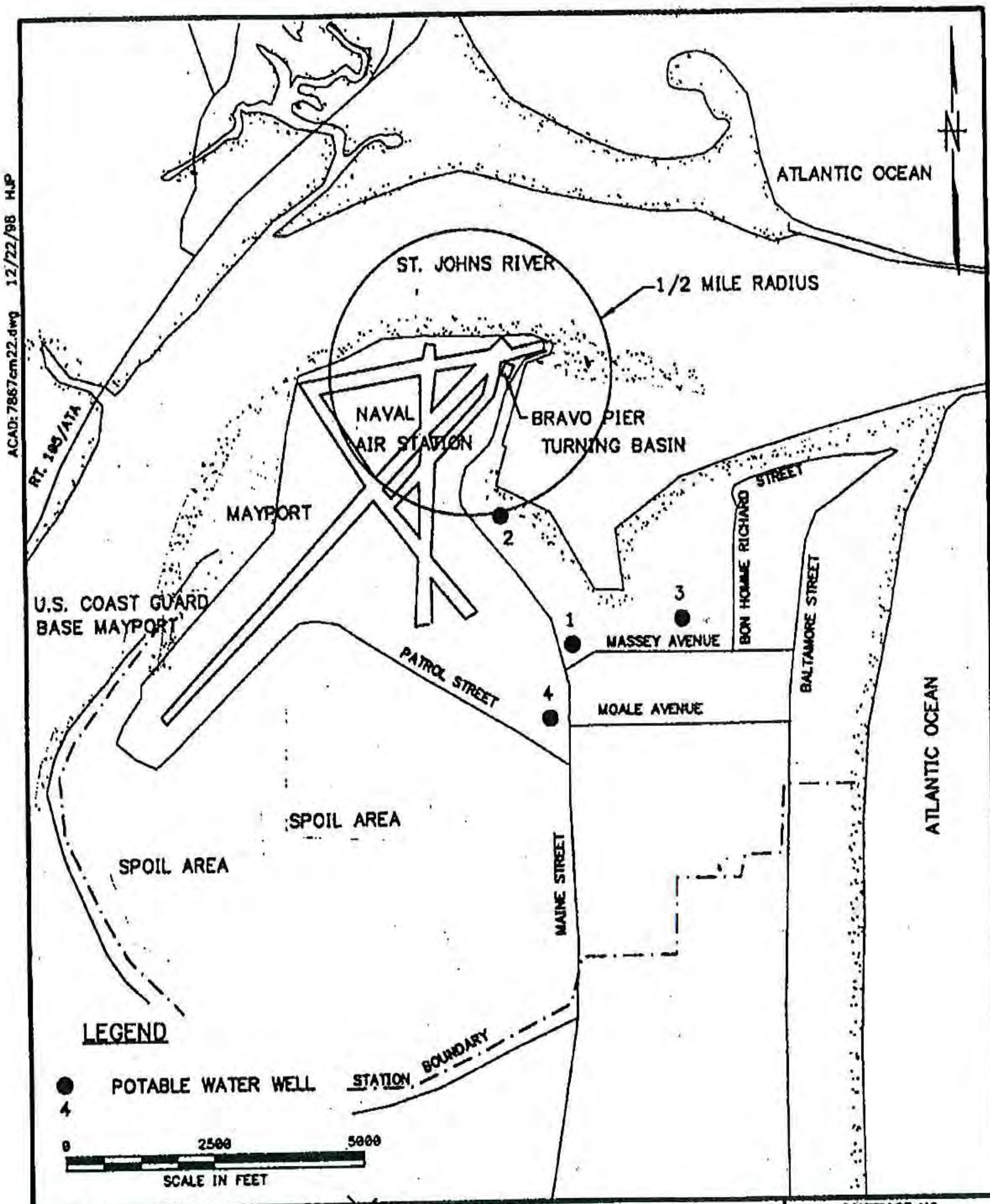
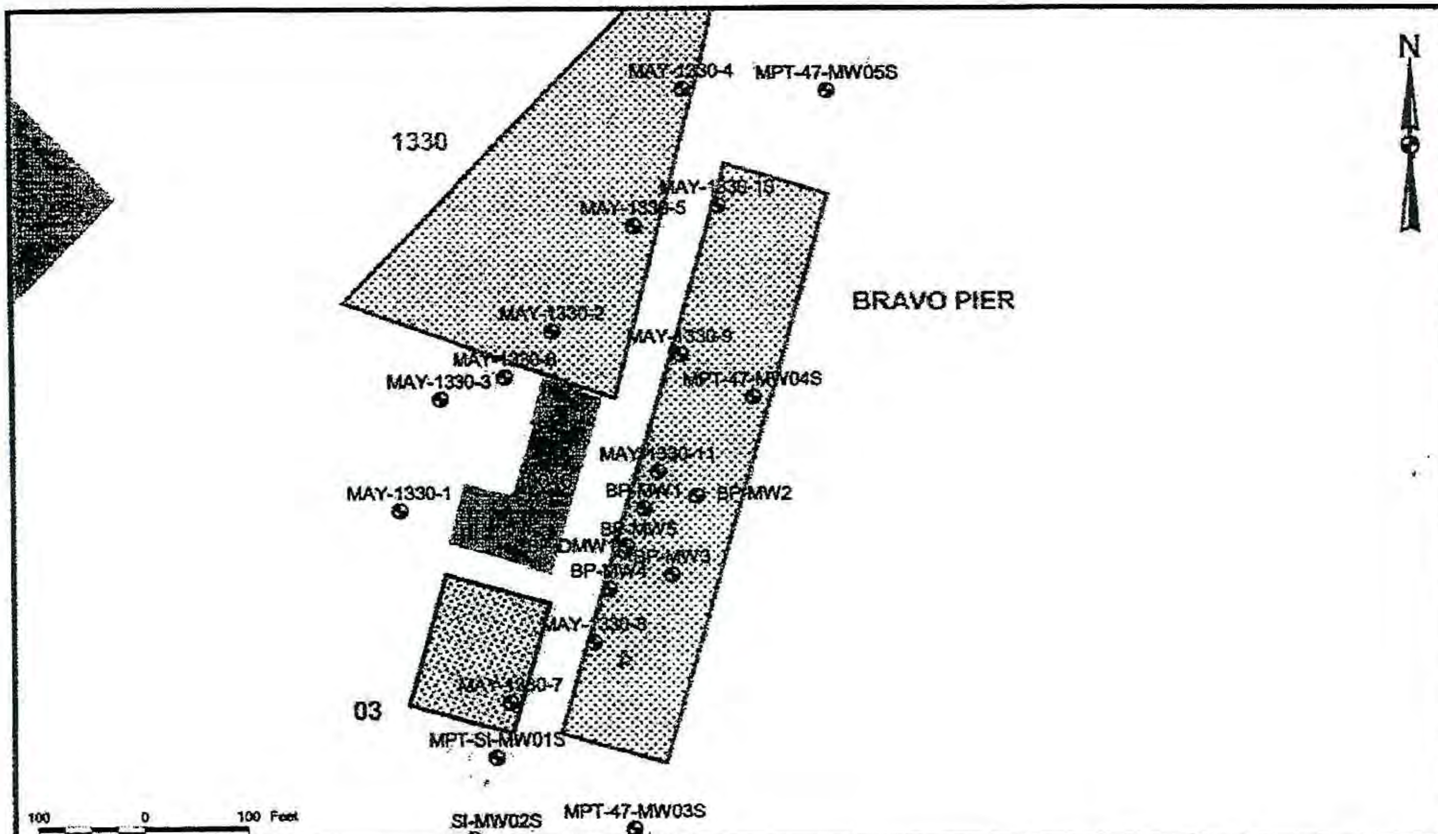


DRAWN BY HJP	DATE 6/22/98		BRAVO PIER LOCATION	CONTRACT NO. 7867	
CHECKED BY	DATE		MAYPORT NAVAL STATION MAYPORT, FLORIDA	APPROVED BY	DATE
COST/SCHED-AREA				APPROVED BY	DATE
SCALE AS NOTED				DRAWING NO. FIGURE 1-2	REV. 0

FORM CADD NO. SDIV_AV.DVG - REV 0 - 1/20/98



DRAWN BY	DATE	Tetra Tech NUS, Inc.	View1	OWNER NUMBER
CHECKED BY	DATE	BRAVO PIER WELL LOCATIONS NS MAYPORT, FLORIDA	APPROVED BY	DATE
COST/SCHEDULE-AREA			APPROVED BY	DATE
SCALE AS NOTED			DRAWING NO. FIGURE 1-3	REV 0

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RICK SCOTT
Governor

KEN DETZNER
Secretary of State

Florida State Clearinghouse
Agency Contact and Coordinator (SCH)
Attn: Lauren Milligan
3900 Commonwealth Blvd. MS-47
Tallahassee, Florida 32399-3000

August 12, 2015

RE: DHR Project File No.: 2015-3885/ Received by DHR: August 12, 2015
Application No.: SAI FL201508077386C
Project: *Draft EA for the Wharf Bravo Recapitalization Project at Naval Station Mayport – Jacksonville, Duval County*

Dear Ms. Milligan,

The Florida State Historic Preservation Officer reviewed the referenced project for possible effects on historic properties listed, or eligible for listing, on the *National Register of Historic Places.* The review was conducted in accordance with Section 106 of the *National Historic Preservation Act of 1966*, as amended, and its implementing regulations in *36 CFR Part 800: Protection of Historic Properties.*

It is the opinion of this office that the proposed project is unlikely to affect historic properties. However, the permit, if issued, should include the following special condition regarding unexpected discoveries:

- If prehistoric or historic artifacts, such as pottery or ceramics, projectile points, dugout canoes, metal implements, historic building materials, or any other physical remains that could be associated with Native American, early European, or American settlement are encountered at any time within the project site area, the permitted project shall cease all activities involving subsurface disturbance in the vicinity of the discovery. The applicant shall contact the Florida Department of State, Division of Historical Resources, Compliance Review Section at (850)-245-6333. Project activities shall not resume without verbal and/or written authorization. In the event that unmarked human remains are encountered during permitted activities, all work shall stop immediately and the proper authorities notified in accordance with Section 872.05, *Florida Statutes*.

For any questions concerning our comments, please contact Mary Berman, Historic Sites Specialist, by phone at 850.245.6333 or by electronic mail at Mary.Berman@dos.myflorida.com.

Sincerely,

Robert F. Bendus, Director
Division of Historical Resources
and State Historic Preservation Officer

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND SOUTHEAST
JACKSONVILLE, FL 32212-0030

5090
Ser EV22/289
July 30, 2015

Ms. Lauren P. Milligan
Florida State Clearinghouse
Florida Department of Environmental Protection
3900 Commonwealth Blvd., MS 47
Tallahassee, FL 32399

Dear Ms Milligan:

SUBJECT: DRAFT ENVIRONMENTAL ASSESSMENT AND FEDERAL COASTAL CONSISTENCY DETERMINATION FOR THE WHARF BRAVO RECAPITALIZATION AT NAVAL STATION MAYPORT, JACKSONVILLE, FL

The Department of the Navy (Navy) is preparing an Environmental Assessment (EA) for the Wharf Bravo recapitalization at Naval Station (NAVSTA) Mayport, Jacksonville, Florida. The purpose of this letter is to seek comments that will assist the DON in project planning and analysis in accordance with the National Environmental Policy Act (NEPA) of 1969. The EA assesses the potential effects of the proposed action and project alternatives.

Based on the information presented in the enclosed Draft EA, the Navy respectfully requests that your agency identify any specific information, issues, or concerns that should be included in the EA and would facilitate the decision making process. We would appreciate receiving your comments no later than August 31, 2015.

In addition and based upon your guidance, we have enclosed the Navy's Coastal Consistency Determination under the Coastal Zone Management Act 16 United States Code (U.S.C.) § 1456 Section 307 (c) (1) [or (2)] and 15 Code of Federal Regulations (CFR) § 930 (c), for the Wharf Bravo recapitalization at Naval Station Mayport, Jacksonville, Florida. The information in this Consistency Determination is provided pursuant to 15 CFR § 930.39 and is based on the Preferred Alternative supporting the Proposed Action identified in the Draft EA for the Recapitalization of Wharf Bravo at Naval Station Mayport, Jacksonville, Florida.

The Navy has determined that the recapitalization of Wharf Bravo at NAVSTA Mayport is consistent to the maximum extent

Program based on the enclosed information, data, and analysis of Enclosure 2 (given as a summary in Table A-1) and presented as a comprehensive analysis in Chapter 3 of the Draft EA (Enclosure 1). In accordance with 15 CFR § 930.36, the Navy requests concurrence with this determination.

If you have any questions about this project, please contact Mr. John Conway, NEPA Project Manager at (904) 542-6870 or email: john.conway@navy.mil.

Written comments may be sent to:

Commanding Officer
NAVFAC Southeast
Attn: Mr. John Conway (EV21)
PO Box 30A, Bldg 903, NAS
Jacksonville, FL 32212-0030

Your assistance in this project is greatly appreciated.

Sincerely,

C. R. DESTAFNEY, PE
Environmental Business Line
Coordinator
By direction of the
Commanding Officer

Enclosures:
1. Biological Evaluation for the Wharf Bravo Recapitalization Project at Naval Station Mayport, Jacksonville, Florida.
2. Draft Environmental Assessment, Wharf Bravo Recapitalization at Naval Station Mayport, Jacksonville, Florida
3. Coastal Consistency Determination, Wharf Bravo Recapitalization at Naval Station Mayport, Jacksonville Florida.

Copy to: Ms Cheryl Mitchell, Code PR34

FORM #: 62-343.900 (1)
FORM TITLE: JOINT ENVIRONMENTAL RESOURCE PERMIT APPLICATION
DATE: October 3, 1995
Incorporated by Reference in subsection 62-343.070(2), F.A.C.

WHARF BRAVO RECAPITALIZATION
NAVAL STATION MAYPORT

JOINT APPLICATION FOR
ENVIRONMENTAL RESOURCE PERMIT/

AUTHORIZATION TO USE
SOVEREIGN SUBMERGED LANDS/

FEDERAL DREDGE AND FILL PERMIT

FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION/
WATER MANAGEMENT DISTRICTS/
U.S. ARMY CORPS OF ENGINEERS

Prepared By:

MN FST
A JOINT VENTURE

(Updated 1/24/2012 to include technical changes 3-26-04, 4-14-08, 1-13-11, 1-10-12)

FORM #: 62-343.900 (1)
FORM TITLE: JOINT ENVIRONMENTAL RESOURCE PERMIT APPLICATION
DATE: October 3, 1995
Incorporated by Reference in subsection 62-343.070(2), F.A.C.

SECTION A

FOR AGENCY USE ONLY	
ACOE Application #	DEP/WMD Application #
Date Application Received	*Date Application Received*
Proposed Project Lat.	Fee Received $
Proposed Project Long.	Fee Receipt #

PART 1:
Are any of the activities described in this application proposed to occur in, on, or over wetlands or other surface waters?
☒ yes ☐ no
Is this application being filed by or on behalf of a government entity or drainage district? ☒yes ☐no

A. Type of Environmental Resource Permit Requested (check at least one). See Attachment 2 for thresholds and descriptions.
- ☐ Noticed General - include information requested in Section B.
- ☐ Standard General (Single Family Dwelling) - include information requested in Sections C and D.
- ☒ Standard General (all other Standard General projects) - include information requested in Sections C and E.
- ☐ Individual (Single Family Dwelling) - include information requested in Sections C and D.
- ☐ Individual (all other Individual projects) - include information requested in Sections C and E.
- ☐ Conceptual - include information requested in Sections C and E.
- ☐ Mitigation Bank Permit (construction) - include information requested in Sections C and F. (If the proposed mitigation bank involves the construction of a surface water management system requiring another permit defined above, check the appropriate box and submit the information requested by the applicable section.)
- ☐ Mitigation Bank (conceptual) - include information requested in Sections C and F.

B. Type of activity for which you are applying (check at least one)

- ☒ Construction or operation of a new system, other than a solid waste facility, including dredging or filling in, on or over wetlands and other surface waters.
- ☐ Construction, expansion or modification of a solid waste facility.
- ☐ Alteration or operation of an existing system which was not previously permitted by a WMD or DEP.
- ☐ Modification of a system previously permitted by a WMD or DEP.
  Provide previous permit numbers:__________
  - ☐ Alteration of a system ☐ Extension of permit duration
  - ☐ Abandonment of a system ☐ Construction of additional phases of a system
  - ☐ Removal of a system

C. Are you requesting authorization to use Sovereign Submerged Lands?
☐yes ☒no
(See Section G and Attachment 5 for more information before answering this question.)

D. For activities in, on, or over wetlands or other surface waters, check type of federal dredge and fill permit requested:
☐Individual ☐Programmatic General ☐General
☒Nationwide ☐Not Applicable

E. Are you claiming to qualify for an exemption? ☐yes ☒no
If yes, provide rule number if known. __________

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PART 3: A. OWNER(S) OF LAND	B. ENTITY TO RECEIVE PERMIT (IF OTHER THAN OWNER)
Name LUKE GREENE, CDR, CEC, USN	Name
Title and Company PUBLIC WORKS OFFICER, NAVAL STATION MAYPORT	Title and Company
Address BON HOMME RICHARD STREET, BUILDING 1966	Address
City, State, Zip MAYPORT, FL 32228-0067	City, State, Zip
Telephone and Fax (904) 270-3162 / ((904) 270-6884	Telephone and Fax
E-mail Address: (optional) Luke.B.Greene@navy.mil	E-mail Address: (optional)
C. AGENT AUTHORIZED TO SECURE PERMIT	**D. CONSULTANT (IF DIFFERENT FROM AGENT)**
Name	Name DAVID CORTINAS
Title and Company	Title and Company PROJECT MANAGER, MOFFATT & NICHOL
Address	Address 101 WEST MAIN STREET, SUITE 800
City, State, Zip	City, State, Zip NORFOLK, VA 23510
Telephone and Fax	Telephone and Fax (757) 628-8222 / (757) 628-8244
E-mail Address: (optional)	E-mail Address: (optional) DCORTINAS@MOFFATTNICHOL.COM

PART 4: (Please provide metric equivalent for federally funded projects):

A. Name of Project, including phase if applicable: NAVAL STATION MAYPORT, WHARF BRAVO RECAPITALIZATION

B. Is this application for part of a multi-phase project? ☐Yes ☒No

C. Total applicant-owned area contiguous to the project?
3,409 ac.; 1.380 ha.

D. Total area served by the system: N/A ac.; N/A ha.

E. Impervious area for which a permit is sought: 0.237 ac.; 0.096 ha. (NEW IMPERVIOUS SURFACE)

F. Volume of water that the system is capable of impounding:
__________ ac. ft.; __________ m^3

G. What is the total area of work in, on, or over wetlands or other surface waters?
0.237 ac.; 0.096 ha.; 10,318 sq. ft.; 959 sq. m.

H. Total volume of material to be dredged: 0 yd^3; 0 m^3

I. Number of new boat slips proposed: 0 wet slips; 0 dry slips

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PART 5:

Project location (use additional sheets if needed):
County DUVAL
Section 38 Township 1 SOUTH Range 29 EAST

Land Grant name, if applicable: DEWEES GRANT

Tax Parcel Identification Number: 168295 0000

Street Address, Road, or other location: LATITUDE 30º23'45.44"N, LONGITUDE 81º24'54.96"W
NAVAL STATION MAYPORT, NEW MAINE STREET

City, Zip Code, if applicable: MAYPORT, FL 32228

PART 6: Describe in general terms the proposed project, system, or activity.

INSTALLATION OF A NEW STEEL SHEET PILE BULKHEAD 2.67 TO 5.92 FEET SEAWARD OF THE EXISTING BULKHEAD WITHIN MAYPORT HARBOR. ASSOCIATED IMPROVEMENTS INCLUDE MILLING AND OVERLAYING THE EXISTING ASPHALT PAVEMENT, REPLACEMENT OF DAMAGED STORM DRAIN PIPES, REPLACEMENT OF SITE LIGHTING, REPLACEMENT OF SELECTED SHIP-TO-SHORE UTILITY CONNECTION POINTS, AND REPLACEMENT OF SECURITY FENCING.

INSTEAD OF COLLECTING AND TREATING STORMWATER RUNOFF FROM THE EXPANDED WHARF AREA, THE PROJECT PROPOSES THE DEMOLITION OF APPROXIMATELY 1.30 ACRES OF IMPERVIOUS ASPHALT PAVEMENT TO CREATE A NEW PERVIOUS AREA. THE PROPOSED MITIGATION SITE IS LOCATED APPROXIMATELY 1,700 FEET WEST OF THE PROJECT SITE. BOTH THE PROJECT SITE AND PROPOSED MITIGATION AREA DISCHARGE TO THE ST. JOHNS RIVER THROUGH EXISTING PIPED STORMWATER SYSTEMS.

PART 7:

A. If there have been any pre-application meetings, including on-site meetings, with regulatory staff, please list the date(s), location(s), and names of key staff and project representatives.
NO

B. Please identify by number any MSSW/Wetland Resource/ERP/ACOE Permits pending, issued or denied for projects at the location, and any related enforcement actions.

Agency	Date	No.\Type of Application	Action Taken
USACE	10/24/2009	NWP-3	Issued for Wharf Alpha
FDEP	12/01/2009	16-298112-001-EE	Issued for Wharf Alpha
USACE			Issued for Wharf Charlie 1
FDEP	06/08/2011	16-306359-001-EE	Issued for Wharf Charlie 1
USACE	01/06/2014	SAJ-2002-02464-(SP-BAL)	Issued for Wharf Charlie 2
FDEP	07/18/2013	16-307845-001-ES	Issued for Wharf Charlie 2

C. Note: The following information is required for projects proposed to occur in, on or over wetlands that need a federal dredge and fill permit or an authorization to use state owned submerged lands. Please provide the names, addresses and zip codes of property owners whose property directly adjoins the project (excluding application) and/or (for proprietary authorizations) is located within a 500 ft. radius of the applicant's land. Please attach a plan view showing the owner's names and adjoining property lines. Attach additional sheets if necessary.

1. NO ADJACENT PROPERTY OWNERS WITHIN 500 FT. OF THE PROJECT SITE

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PART 8:

A. By signing this application form, I am applying, or I am applying on behalf of the applicant, for the permit and any proprietary authorizations identified above, according to the supporting data and other incidental information filed with this application. I am familiar with the information contained in this application and represent that such information is true, complete and accurate. I understand this is an application and not a permit, and that work prior to approval is a violation. I understand that this application and any permit issued or proprietary authorization issued pursuant thereto, does not relieve me of any obligation for obtaining any other required federal, state, water management district or local permit prior to commencement of construction. I agree, or I agree on behalf of the applicant, to operate and maintain the permitted system unless the permitting agency authorizes transfer of the permit to a responsible operation entity. I understand that knowingly making any false statement or representation in this application is a violation of Section 373.430, F.S. and 18 U.S.C. Section 1001.

Luke Greene, CDR, CEC, USN
Typed/Printed Name of Applicant (If no Agent is used) or Agent (If one is so authorized below)

Typed/Printed Name of Co-Applicant

Signature of Applicant/Agent | Date | Signature of Co-Applicant | Date

Public Works Officer, Naval Station Mayport
(Corporate Title if applicable)

(Corporate Title if applicable)

AN AGENT MAY SIGN ABOVE ONLY IF THE APPLICANT COMPLETES THE FOLLOWING:

B. I hereby designate and authorize the agent listed above to act on my behalf, or on behalf of my corporation, as the agent in the processing of this application for the permit and/or proprietary authorization indicated above; and to furnish, on request, supplemental information in support of the application. In addition, I authorize the above-listed agent to bind me, or my corporation, to perform any requirements which may be necessary to procure the permit or authorization indicated above. I understand that knowingly making any false statement or representation in this application is a violation of Section 373.430, F.S. and 18 U.S.C. Section 1001.

Typed/Printed Name of Applicant	Signature of Applicant	Date

(Corporate Title if applicable)

Please note: The applicant's original signature (not a copy) is required above.

PERSON AUTHORIZING ACCESS TO THE PROPERTY MUST COMPLETE THE FOLLOWING:

C. I either own the property described in this application or I have legal authority to allow access to the property, and I consent, after receiving prior notification, to any site visit on the property by agents or personnel from the Department of Environmental Protection, the Water Management District and the U.S. Army Corps of Engineers necessary for the review and inspection of the proposed project specified in this application. I authorize these agents or personnel to enter the property as many times as may be necessary to make such review and inspection. Further, I agree to provide entry to the project site for such agents or personnel to monitor permitted work if a permit is granted.

Luke Greene, CDR, CEC,, USN		
Typed/Printed Name of Applicant	Signature of Applicant	Date

Public Works Officer, Naval Station Mayport
(Corporate Title if applicable)

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SECTION C

ENVIRONMENTAL RESOURCE PERMIT NOTICE OF RECEIPT OF APPLICATION

Note: this form does not need to be submitted for noticed general permits.
This information is required in addition to that required in other sections of the application. Please submit five copies of this notice of receipt of application and all attachments with the other required information. Please submit all information on 8 1/2" x 11" paper.

Project Name	**WHARF BRAVO RECAPITALIZATION**
County	**DUVAL**
Owner	**U.S. NAVY**
Applicant:	**LUKE GREENE, CDR, CEC, USN**
Applicant's Address:	**BON HOMME RICHARD STREET, BUILDING 1966, MAYPORT, FL 32228-0067**

1. Indicate the project boundaries on a USGS quadrangle map. Attach a location map showing the boundary of the proposed activity. The map should also contain a north arrow and a graphic scale; show Section(s), Township(s), and Range(s); and must be of sufficient detail to allow a person unfamiliar with the site to find it.

   REFERENCE FIGURE 1

2. Provide the names of all wetlands, or other surface waters that would be dredged, filled, impounded, diverted, drained, or would receive discharge (either directly or indirectly), or would otherwise be impacted by the proposed activity, and specify if they are in an Outstanding Florida Water or Aquatic Preserve:

   MAYPORT HARBOR ADJACENT TO THE ST. JOHNS RIVER IS A CLASS III WATERBODY. THE PROJECT IS NOT LOCATED IN AN OUTSTANDING FLORIDA WATER OR AQUATIC PRESERVE.

3. Attach a depiction (plan and section views), which clearly shows the works or other facilities proposed to be constructed. Use multiple sheets, if necessary. Use a scale sufficient to show the location and type of works.

   REFERENCE ATTACHED FIGURES 8 THROUGH 15.

4. Briefly describe the proposed project (such as "construct dock with boat shelter", "replace two existing culverts", "construct surface water management system to serve 150 acre residential development"):

   REPLACEMENT OF DETERIORATING BULKHEAD. REFERENCE SUPPLEMENT INFORMATION ATTACHMENT.

5. Specify the acreage of wetlands or other surface waters, if any, that are proposed to be filled, excavated, or otherwise disturbed or impacted by the proposed activity:

   filled **0.237** ac.; **N/A** excavated ac.;

   other impacts **N/A** ac.

6. Provide a brief statement describing any proposed mitigation for impacts to wetlands and other surface waters (attach additional sheets if necessary):

   THE U.S. NAVY PROPOSES TO CREATE APPROXIMATELY 57,000 SQUARE FEET OF PERVIOUS SURFACE IN AN ADJACENT AREA, BY DEMOLISHING A CURRENTLY IMPERVIOUS ASPHALT PAVED AREA AND SEEDING THE RESTORED AREA. THIS

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PROPOSAL IS TO MITIGATE FOR THE APPROXIMATELY 10,318 SQUARE FEET OF NEW IMPERVIOUS AREA THAT WILL BE CREATED BY THE BULKHEAD RECONSTRUCTION.

FOR AGENCY USE ONLY

Application Name: ______________________
Application Number: ____________________
Office where the application can be inspected: ___________________________
____

Note to Notice recipient: The information in this notice has been submitted by the applicant, and has not been verified by the agency. It may be incorrect, incomplete or may be subject to change.

SECTION E

INFORMATION REQUESTED FOR STANDARD GENERAL, INDIVIDUAL AND CONCEPTUAL ENVIRONMENTAL RESOURCE PERMIT APPLICATIONS NOT RELATED TO A SINGLE FAMILY DWELLING UNIT

Please provide the information requested below if the proposed project requires either a standard general, individual, or conceptual approval environmental resource permit and is not related to an individual, single family dwelling unit, duplex or quadruplex. The information listed below represents the level of information that is usually required to evaluate an application. The level of information required for a specific project will vary depending on the nature and location of the site and the activity proposed. Conceptual approvals generally do not require the same level of detail as a construction permit. However, providing a greater level of detail will reduce the need to submit additional information at a later date. If an item does not apply to your project, proceed to the next item. Please submit all information that is required by the Department on either 8 1/2 in. X 11 in. paper or 11 in. X 17 in. paper. Larger drawings may be submitted to supplement but not replace these smaller drawings.

I. Site Information

A. Provide a map(s) of the project area and vicinity delineating USDA/SCS soil types.

REFERENCE FIGURE 5

B. Provide recent aerials, legible for photo interpretation with a scale of 1" = 400 ft, or more detailed, with project boundaries delineated on the aerial.

REFERENCE FIGURE 4

C. Identify the seasonal high water or mean high tide elevation and normal pool or mean low tide elevation for each on site wetland or surface water, including receiving waters into which runoff will be discharged. Include dates, datum, and methods used to determine these elevations.

REFERENCE SUPPLEMENT INFORMATION ATTACHMENT.

D. Identify the wet season high water tables at the locations representative of the entire project site. Include dates, datum, and methods used to determine these elevations.

GROUNDWATER LEVELS AT THE PROJECT SITE ARE ANTICIPATED TO FLUCTUATE WITH CHANGES IN TIDE LEVELS IN MAYPORT HARBOR.

II. Environmental Considerations

A. Provide results of any wildlife surveys that have been conducted on the site, and provide any comments pertaining to the project from the Florida Game and Fresh Water Fish Commission and the U.S. Fish and Wildlife Service.

NO PROJECT SPECIFIC WILDLIFE SURVEYS HAVE BEEN CONDUCTED. THE SITE IS AN EXISTING FULLY DEVELOPED MILITARY PORT.

THE NAVY IS CONSULTING WITH U.S. FISH AND WILDLIFE SERVICE (USFWS) NORTH FLORIDA ECOLOGICAL SERVICES OFFICE AND THE NATIONAL MARINE FISHERIES SERVICE (NMFS) SOUTHEAST REGIONAL OFFICE REGARDING THE PROJECT.

THE FLORIDA MANATEE BOTTLENOSE DOLPHINS, AND SEA TURTLES ARE KNOWN TO INHABIT THE WATERS OF DUVAL COUNTY. WE ANTICIPATE STANDARD AVOIDANCE REQUIREMENTS WILL BE INCLUDED IN PERMITS ISSUED FOR THE PROJECT.

B. Provide a description of how water quantity, quality, hydroperiod, and habitat will be maintained in on-site wetlands and other surface waters that will be preserved or will remain undisturbed.

N/A

C. Provide a narrative description of any proposed mitigation plans, including purpose, maintenance, monitoring, and construction sequence and techniques, and estimated costs.

THE U.S. NAVY PROPOSES TO CREATE APPROXIMATELY 57,000 SQUARE FEET OF PERVIOUS SURFACE IN AN ADJACENT AREA, BY DEMOLISHING A CURRENTLY IMPERVIOUS ASPHALT PAVED AREA AND SEEDING THE RESTORED AREA. THIS PROPOSAL IS TO MITIGATE FOR THE APPROXIMATELY 10,318 SQUARE FEET OF NEW IMPERVIOUS AREA THAT WILL BE CREATED BY THE BULKHEAD RECONSTRUCTION. REFERENCE FIGURES 16 AND 17.

D. Describe how boundaries of wetlands or other surface waters were determined. If there has ever been a jurisdictional declaratory statement, a formal wetland determination, a formal determination, a validated informal determination, or a revalidated jurisdictional determination, provide the identifying number.

N/A

E. Impact Summary Tables:

1. For all projects, complete Tables 1, 2 and 3 as applicable.

   TABLES 1 AND 2 COMPLETED. TABLE 3 N/A.

2. For docking facilities or other structures constructed over wetlands or other surface waters, provide the information requested in Table 4.

   EXISTING WHARF RENOVATION, NO NEW DOCKS. TABLE 4 N/A.

3. For shoreline stabilization projects, provide the information requested in Table 5.

   TABLE 5 N/A. 2,038' OF BULKHEAD WILL BE REPLACED AS PART OF THIS PROJECT, BUT THE PRIMARY USE OF THE BULKHEAD IS FOR DOCKING AND NOT SHORELINE STABILIZATION.

III. Plans

Provide clear, detailed plans for the system including specifications, plan (overhead) views, cross sections (with the locations of the cross sections shown on the corresponding plan view), and profile (longitudinal) views of the proposed project. The plans must be signed and sealed by an appropriate registered professional as required by law. Plans must include a scale and a north arrow. These plans should show the following:

A. Project area boundary and total land area, including distances and orientation from roads or other land marks;

REFERENCE FIGURES 11 THROUGH 16. TOTAL PROJECT LAND AREA = 5.436 ACRES.

B. Existing land use and land cover (acreage and percentages), and on-site natural communities, including wetlands and other surface waters, aquatic communities, and uplands. Use the Florida Land Use Cover & Classification System (FLUCCS)(Level 3) for projects proposed in the South Florida Water Management District, the St. Johns River Water Management District, and the Suwannee River Water Management District and use the National Wetlands Inventory (NWI) for projects proposed in the Southwest Florida Water Management District. Also identify each community with a unique identification number which must be consistent in all exhibits.

REFERENCE FIGURE 6. LAND USE – MILITARY AND STREAMS/WATERWAYS.

C. The existing topography extending at least 100 feet off the project area, and including adjacent wetlands and other surface waters. All topography shall include the location and a description of known benchmarks, referenced to NGVD. For systems waterward of the mean high water (MHW) or seasonal high water lines, show water depths, referenced to mean low water (MLW) in tidal areas or seasonal low water in non-tidal areas, and list the range between MHW and MLW. For docking facilities, indicate the distance to, location of, and depths of the nearest navigational channel and access routes to the channel.

REFERENCE FIGURES 8 THROUGH 10.

D. If the project is in the known flood plain of a stream or other water course, identify the following: 1) the flood plain boundary and approximate flooding elevations; and 2) the 100-year flood elevation and floodplain boundary of any lake, stream or other watercourse located on or adjacent to the site;

REFERENCE FIGURE 7. THE PROJECT DOES NOT LIE WITHIN A FLOODPLAIN.

E. The boundaries of wetlands and other surface waters within the project area. Distinguish those wetlands and other surface waters that have been delineated by any binding jurisdictional determination;

NO WETLANDS ARE LOCATED WITHIN THE PROJECT AREA. 0.237 ACRES OF OPEN WATER WILL BE FILLED. REFERENCE FIGURES 11 THROUGH 17.

F. Proposed land use, land cover and natural communities (acreage and percentages), including wetlands and other surface waters, undisturbed uplands, aquatic communities, impervious surfaces, and water management areas. Use the same classification system and community identification number used in III (B) above.

REFERENCE FIGURE 6. THE EXISTING UPLAND LAND USE WILL BE NOT BE CHANGED. 0.237 ACRES OF STREAMS AND WATERWAYS (OPEN WATER) WILL BE CONVERTED TO MILITARY LAND USE. THIS LAND USE IS CONSISTENT WITH THE SURROUNDING AREA.

G. Proposed impacts to wetlands and other surface waters, and any proposed connections/outfalls to other surface waters or wetlands;

REFERENCE FIGURE 6. 0.237 ACRES OF OPEN WATER WILL BE FILLED. REFERENCE FIGURES 11 THROUGH 17.

H. Proposed buffer zones;

N/A. NO PROPOSED BUFFER ZONES ON THIS PROJECT.

I. Pre- and post-development drainage patterns and basin boundaries showing the direction of flows, including any off-site runoff being routed through or around the system; and connections between wetlands and other surface waters;

NO CHANGES TO DRAINAGE PATTERNS WILL BE MADE AS PART OF THE PROJECT. THE AREA SLOPES FROM WEST TO EAST WITH THE MAJORITY OF SURFACE STORMWATER SHEET FLOWING DIRECTLY ACROSS THE WHARF INTO MAYPORT HARBOR. A SERIES OF FOURTEEN STORMWATER INLETS ARE LOCATED NEAR THE WESTERN BOUNDARY OF THE PROJECT AREA. THE INLETS PRIMARILY COLLECT OFFSITE DRAINAGE AND DISCHARGE DIRECTLY INTO MAYPORT HARBOR VIA STORMWATER OUTFALLS THROUGH THE BULKHEAD FACE.

THE U.S. NAVY PROPOSES TO CREATE APPROXIMATELY 57,000 SQUARE FEET OF PERVIOUS SURFACE IN AN ADJACENT AREA, BY DEMOLISHING A CURRENTLY IMPERVIOUS ASPHALT PAVED AREA AND SEEDING THE RESTORED AREA. THIS PROPOSAL IS TO MITIGATE FOR THE APPROXIMATELY 10,318 SQUARE FEET OF NEW IMPERVIOUS AREA THAT WILL BE CREATED BY THE BULKHEAD RECONSTRUCTION.

J. Location of all water management areas with details of size, side slopes, and designed water depths;

N/A.

K. Location and details of all water control structures, control elevations, any seasonal water level regulation schedules; and the location and description of benchmarks (minimum of one benchmark per structure);

N/A.

L. Location, dimensions and elevations of all proposed structures, including docks, seawalls, utility lines, roads, and buildings;

REFERENCE FIGURES 11 THROUGH 18.

M. Location, size, and design capacity of the internal water management facilities;

N/A.

N. Rights-of-way and easements for the system, including all on-site and off-site areas to be reserved for water management purposes, and rights-of-way and easements for the existing drainage system, if any;

N/A. NO RIGHT-OF-WAYS OR EASEMENTS ARE INCLUDED OR REQUIRED FOR THIS PROJECT.

O. Receiving waters or surface water management systems into which runoff from the developed site will be discharged;

SURFACE STORMWATER SHEET FLOWS DIRECTLY ACROSS THE WHARF INTO MAYPORT HARBOR. A SERIES OF FOURTEEN STORMWATER INLETS ARE LOCATED NEAR THE WESTERN BOUNDARY OF THE PROJECT AREA. THE INLETS PRIMARILY COLLECT OFFSITE DRAINAGE AND DISCHARGE DIRECTLY INTO MAYPORT HARBOR VIA STORMWATER OUTFALLS THROUGH THE BULKHEAD FACE.

P. Location and details of the erosion, sediment and turbidity control measures to be implemented during each phase of construction and all permanent control measures to be implemented in post-development conditions;

SWPPP TO BE DEVELOPED BY THE SELECTED CONTRACTOR. REFERENCE FIGURE 21 FOR TYPICAL EROSION, SEDIMENT, AND TURBIDITY CONTROL MEASURES TO BE USED DURING CONSTRUCTION.

Q. Location, grading, design water levels, and planting details of all mitigation areas;

REFERENCE FIGURES 19 AND 20.

R. Site grading details, including perimeter site grading;

REFERENCE FIGURES 11 THROUGH 13. EXISTING SITE GRADING WILL BE ALTERED DURING CONSTRUCTION.

S. Disposal site for any excavated material, including temporary and permanent disposal sites;

N/A.

T. Dewatering plan details;

N/A. ONLY MINOR DEWATERING ASSOCIATED WITH THE REPLACEMENT OF STORM DRAIN PIPES AND INSTALLATION OF SITE UTILITIES MAY BE REQUIRED. SELECTED CONTRACTOR WILL BE RESPONSIBLE FOR DEVELOPING DEWATERING PLAN. WATER EXTRACTED AS PART OF ANY DEWATERING ACTIVITIES WILL BE COLLECTED, TREATED IF NECESSARY, AND DISCHARGED TO THE SANITARY SEWER SYSTEM. WATER WILL NOT BE DIRECTLY DISCHARGED INTO THE STORM DRAIN SYSTEM OR OPEN WATERS.

U. For marina facilities, locations of any sewage pumpout facilities, fueling facilities, boat repair and maintenance facilities, and fish cleaning stations;

N/A. LOCATION IS AN EXISTING ACTIVE MILITARY PORT.

V. Location and description of any nearby existing offsite features which might be affected by the proposed construction or development such as stormwater management ponds, buildings or other structures, wetlands or other surface waters.

N/A. NO NEARBY, EXISTING FACILITIES WILL BE IMPACTED BY THIS PROJECT.

W. For phased projects, provide a master development plan.

N/A. NOT A PHASED PROJECT.

IV. Construction Schedule and Techniques

Provide a construction schedule, and a description of construction techniques, sequencing and equipment. This information should specifically include the following:

REFERENCE SUPPLEMENTAL INFORMATION ATTACHMENT.

A. Method for installing any pilings or seawall slabs;

B. Schedule of implementation of temporary or permanent erosion and turbidity control measures;

C. For projects that involve dredging or excavation in wetlands or other surface waters, describe the method of excavation, and the type of material to be excavated;

D. For projects that involve fill in wetlands or other surface waters, describe the source and type of fill material to be used. For shoreline stabilization projects that involve the installation of riprap, state how

these materials are to be placed, (i.e., individually or with heavy equipment) and whether the rocks will be underlain with filter cloth;

E. If dewatering is required, detail the dewatering proposal including the methods that are proposed to contain the discharge, methods of isolating dewatering areas, and indicate the period dewatering structures will be in place (Note: a consumptive use or water use permit may by required);

F. Methods for transporting equipment and materials to and from the work site. If barges are required for access, provide the low water depths and draft of the fully loaded barge;

G. Demolition plan for any existing structures to be removed; and

H. Identify the schedule and party responsible for completing monitoring, record drawings, and as-built certifications for the project when completed.

V. Drainage Information

A. Provide pre-development and post-development drainage calculations, signed and sealed by an appropriate registered professional, as follows:

NO CHANGES TO DRAINAGE PATTERNS WILL BE MADE AS PART OF THE PROJECT. THE AREA SLOPES FROM WEST TO EAST WITH THE MAJORITY OF SURFACE STORMWATER SHEET FLOWING DIRECTLY ACROSS THE WHARF INTO MAYPORT HARBOR. A SERIES OF FOURTEEN STORMWATER INLETS ARE LOCATED NEAR THE WESTERN BOUNDARY OF THE PROJECT AREA. THE INLETS PRIMARILY COLLECT OFFSITE DRAINAGE AND DISCHARGE DIRECTLY INTO MAYPORT HARBOR VIA STORMWATER OUTFALLS THROUGH THE BULKHEAD FACE.

1. Runoff characteristics, including area, runoff curve number or runoff coefficient, and time of concentration for each drainage basin;
2. Water table elevations (normal and seasonal high) including aerial extent and magnitude of any proposed water table draw down;
3. Receiving water elevations (normal, wet season, design storm);
4. Design storms used including rainfall depth, duration, frequency, and distribution;
5. Runoff hydrograph(s) for each drainage basin, for all required design storm event(s);
6. Stage-storage computations for any area such as a reservoir, close basin, detention area, or channel, used in storage routing;
7. Stage-discharge computations for any storage areas at a selected control point, such as control structure or natural restriction;
8. Flood routings through on-site conveyance and storage areas;
9. Water surface profiles in the primary drainage system for each required design storm event(s);
10. Runoff peak rates and volumes discharged from the system for each required design storm event(s);
11. Tail water history and justification (time and elevation); and

12. Pump specifications and operating curves for range of possible operating conditions (if used in system).

B. Provide the results of any percolation tests, where appropriate, and soil borings that are representative of the actual site conditions;

C. Provide the acreage, and percentages of the total project, of the following:

1. Impervious surfaces, excluding wetlands;

   EXISTING = 5.199 ACRES (EXISTING IMPERVIOUS)

   PROPOSED = 0.237 ACRES (NEW IMPERVIOUS)

   TOTAL PROJECT SITE = 5.436 ACRES (EXISTING + PROPOSED)

2. Pervious surfaces (green areas, not including wetlands);

   NO EXISTING. 1.309 ACRES OF EXISTING IMPERVIOUS PROPOSED TO BE CONVERTED TO PERVIOUS FOR STORMWATER MITIGATION.

3. Lakes, canals, retention areas, other open water areas; and

   EXISTING 0.237 ACRES OF OPEN WATER TO BE FILLED AND CONVERTED TO PERVIOUS.

4. Wetlands.

   N/A

D. Provide an engineering analysis of floodplain storage and conveyance (if applicable), including:

1. Hydraulic calculations for all proposed traversing works;

2. Backwater water surface profiles showing upstream impact of traversing works;

3. Location and volume of encroachment within regulated floodplain(s); and

4. Plan for compensating floodplain storage, if necessary, and calculations required for determining minimum building and road flood elevations.

E. Provide an analysis of the water quality treatment system including:

1. A description of the proposed stormwater treatment methodology that addresses the type of treatment, pollution abatement volumes, and recovery analysis; and

2. Construction plans and calculations that address stage-storage and design elevations, which demonstrate compliance with the appropriate water quality treatment criteria.

F. Provide a description of the engineering methodology, assumptions and references for the parameters listed above, and a copy of all such computations, engineering plans, and specifications used to analyze the system. If a computer program is used for the analysis, provide the name of the program, a description of the program, input and output data, two diskette copies, if available, and justification for model selection.

VI. Operation and Maintenance and Legal Documentation

REFERENCE SUPPLEMENTAL INFORMATION ATTACHMENT.

A. Describe the overall maintenance and operation schedule for the proposed system.

B. Identify the entity that will be responsible for operating and maintaining the system in perpetuity if different than the permittee, a draft document enumerating the enforceable affirmative obligations on the entity to properly operate and maintain the system for its expected life, and documentation of the entity's financial responsibility for long-term maintenance. If the proposed operation and maintenance entity is not a property owner's association, provide proof of the existence of an entity, or the future acceptance of the system by an entity which will operate and maintain the system. If a property owner's association is the proposed operation and maintenance entity, provide copies of the articles of incorporation for the association and copies of the declaration, restrictive covenants, deed restrictions, or other operational documents that assign responsibility for the operation and maintenance of the system. Provide information ensuring the continued adequate access to the system for maintenance purposes. Before transfer of the system to the operating entity will be approved, the permittee must document that the transferee will be bound by all terms and conditions of the permit.

C. Provide copies of all proposed conservation easements, storm water management system easements, property owner's association documents, and plats for the property containing the proposed system.

D. Provide indication of how water and waste water service will be supplied. Letters of commitment from off-site suppliers must be included.

E. Provide a copy of the boundary survey and/or legal description and acreage of the total land area of contiguous property owned/controlled by the applicant.

VII. Water Use

A. Will the surface water system be used for water supply, including landscape irrigation, or recreation.

N/A.

B. If a Consumptive Use or Water Use permit has been issued for the project, state the permit number.

N/A.

C. If no Consumptive Use or Water Use permit has been issued for the project, indicate if such a permit will be required and when the application for a permit will be submitted.

N/A.

D. Indicate how any existing wells located within the project site will be utilized or abandoned.

N/A. NO GROUNDWATER EXTRACTION WELLS ARE LOCATED WITH THE PROJECT AREA.

FORM #: 62-343.900 (1)
FORM TITLE: JOINT ENVIRONMENTAL RESOURCE PERMIT APPLICATION
DATE: October 3, 1995
Incorporated by Reference in subsection 62-343.070(2), F.A.C.

TABLE 1
Project Impact Summary

WL & SW ID	WL & SW TYPE	WL & SW SIZE (ac.) ON SITE	WL & SW ACRES NOT IMPACTED	PERMANENT IMPACTS TO WL & SW		TEMPORARY IMPACTS TO WL & SW		MITIGATION ID
				IMPACT SIZE (acres)	IMPACT CODE	IMPACT SIZE (acres)	IMPACT CODE	
SW Impact 1	510	0.237 ac	0	0.237 ac	F			Upland 1

WL = Wetland; **SW** = Surface water; **ID** = Identification number, letter, etc.
Wetland Type: Use an established wetland classification system and, in the comments section below, indicate which classification system is being used.
Impact Code (Type): D = dredge; F = fill; H = change hydrology; S = shading; C = clearing; O = other. Indicate the final impact if more than one impact type is proposed in a given area. For example, show F only for an area that will first be demucked and then backfilled.

Note: Multiple entries per cell are not allowed, except in the "Mitigation ID" column. Any given acreage of wetland should be listed in one row only, such that the total of all rows equals the project total for a given category (column). For example, if Wetland No. 1 includes multiple wetland types and multiple impact codes are proposed in each type, then each proposed impact in each wetland type should be shown on a separate row, while the size of each wetland type found in Wetland No. 1 should be listed in only one row.

Comments: **UPLAND MITIGATION PROPOSED FOR FILLED SURFACE WATER IMPACTS.**

FORM #: 62-343.900 (1)
FORM TITLE: JOINT ENVIRONMENTAL RESOURCE PERMIT APPLICATION
DATE: October 3, 1995
Incorporated by Reference in subsection 62-343.070(2), F.A.C.

TABLE 2
ON-SITE MITIGATION SUMMARY

MITIGATION ID	CREATION		RESTORATION		ENHANCEMENT		WETLAND PRESERVE		UPLAND PRESERVE		OTHER	
	AREA	TARGET TYPE	AREA	TARGET TYPE	AREA	TARGET TYPE	AREA	TARGET TYPE	AREA	TARGET TYPE	AREA	TARGET TYPE
Upland 1	0	0	0	0	0	0	0	0	0	0	1.309 ac	1733
PROJECT TOTALS:											1.309 ac	

CODES (multiple entries per cell not allowed): Target Type or Type = target or existing habitat type from an established wetland classification system or land use classification for non-wetland mitigation

COMMENTS: **UPLAND MITIGATION PROPOSED FOR FILLED SURFACE WATER IMPACTS.**

FORM #: 62-343.900 (1)
FORM TITLE: JOINT ENVIRONMENTAL RESOURCE PERMIT APPLICATION
DATE: October 3, 1995
Incorporated by Reference in subsection 62-343.070(2), F.A.C.

TABLE 3
OFF-SITE MITIGATION SUMMARY

MITIGATION ID	CREATION		RESTORATION		ENHANCEMENT		WETLAND PRESERVE		UPLAND PRESERVE		OTHER	
	AREA	TARGET TYPE	AREA	TARGET TYPE	AREA	TARGET TYPE	AREA	TARGET TYPE	AREA	TARGET TYPE	AREA	TARGET TYPE
N/A												
PROJECT TOTALS:												

CODES (multiple entries per cell not allowed):
Target Type=target or existing habitat type from an established wetland classification system or land use classification for non-wetland mitigation

FORM #: 62-343.900 (1)
FORM TITLE: JOINT ENVIRONMENTAL RESOURCE PERMIT APPLICATION
DATE: October 3, 1995
Incorporated by Reference in subsection 62-343.070(2), F.A.C.

TABLE 4
DOCKING FACILITY SUMMARY

Type of Structure*	Type of Work**	Number of Identical Docks	Length (feet)	Width (feet)	Height (feet)	Total square feet over water	Number of slips

	TOTALS:	Existing	Proposed
*Dock, Pier, Finger Pier, or other structure (please specify what type)	Number of Slips		
**New, Replaced, Existing (unaltered), Removed, or Altered/Modified	Square Feet over the water		

Use of Structure:
TABLE 4 IS N/A. NO NEW DOCKS WILL BE CREATED FOR THIS PROJECT.

Will the docking facility provide:

Live-aboard Slips? If yes, Number:
Fueling Facilities: If yes, Number
Sewage Pump-out Facilities? If yes, Number:
Other Supplies or Services Required for Boating (excluding refreshments, bait and tackle)
☐ Yes ☐ No

Type of Materials for Decking and Pilings (i.e., CCA, pressure treated wood, plastic, or concrete)

Pilings
Decking
Proposed Dock-Plank Spacing (if applicable)

Proposed Size (length and draft), Type, and Number of Boats Expected to Use or Proposed to be Mooring at the facility)

Table 5: SHORELINE STABILIZATION
IF YOU ARE CONSTRUCTING A SHORELINE STABILIZATION PROJECT, PLEASE PROVIDE THE FOLLOWING:

Type of Stabilization Being Done	Length (in feet) of New	Length (in feet) of Replaced	Length (in feet) of Repaired	Length (in feet) of Removed	Slope: H: V:	Width of the Toe (in feet)
Vertical Seawall						
Seawall plus Rip-Rap						
Rip-Rap						
Rip-Rap plus Vegetation						
Other Type of Stabilization Being Done:						

Size of the Rip Rap: __________

Type of Rip Rap:__________

COMMENTS:

2,038' OF BULKHEAD WILL BE REPLACED AS PART OF THIS PROJECT, BUT THE PRIMARY USE OF THE BULKHEAD IS FOR DOCKING AND NOT SHORELINE STABILIZATION.

SUPPLEMENTAL INFORMATION
APPLICATION FOR ENVIRONMENTAL RESOURCE PERMIT

NAVAL STATION MAYPORT
WHARF BRAVO RECAPITALIZATION

Project Background

Naval Station Mayport includes approximately 3,400 acres of property located near the mouth of the St. Johns River in Duval County, Florida, and is the third largest naval facility in the continental United States. The port facilities at Mayport include a turning basin with wharves designated Wharf Alpha (A) through Foxtrot (F), plus a tug wharf. Wharf Bravo is located at the west side of Mayport Harbor. This wharf is approximately 2,008 feet long and the deck elevation is approximately EL 11.11' MLLW (8.00' NAVD88). The permitted dredge elevation at the wharf EL -42' MLLW. The U.S. Navy owns the submerged lands within Mayport Harbor, including those adjacent to Wharf Bravo.

The existing bulkhead at Wharf Bravo was constructed circa 1970 and is nearing the end of its useful service life. Corrosion of the steel sheet pile bulkhead has been observed and will eventually lead to the loss of backfill and reduced load carrying capacity of the wharf. Additionally, the supporting structure for the wharf is a diaphragm type, steel sheet pile cellular cofferdam bulkhead which is susceptible to progressive collapse if one cell fails. The U.S. Navy wishes to replace the bulkhead before the bulkhead deteriorates further and while funding is available.

Project Datum/Tidal Water Levels

Elevations indicated are referenced to the North American Vertical Datum of 1988 (NAVD88), feet, unless otherwise noted. Reference to Mean Lower Low Water, 1983-2001 tidal epoch, is based on observations performed and published by the National Oceanic and Atmospheric Administration, National Ocean Service (NOAA/NOS), tidal benchmark 8720211, Mayport Naval Station, St. Johns River, FL.

TIDAL DATUM (1983-2001 EPOCH)		
Datum	Relative to MLLW (feet)	Relative to NAVD88 (feet)
Highest Observed Water Level (09/27/2004)	7.81	4.70
Mean Higher High Water (MHHW)	5.11	2.00
Mean High Water (MHW)	4.82	1.71
North American Vertical Datum (NAVD88)	3.11	0.00
Mean Low Water (MLW)	0.15	-2.96
Mean Lower Low Water (MLLW)	0.00	-3.11
Lowest Observed Water Level (02/08/2005)	-1.87	-4.98

Existing Wharf Bravo

The existing wharf structure is a 2,008 foot long diaphragm type, steel sheet pile cellular cofferdam bulkhead structure constructed circa 1970. A concrete edge beam and fascia provide a smooth berthing face along the scallop-shaped cellular cofferdam bulkhead. The concrete extends vertically from the top of deck to approximately 12 feet below mean lower low water. Where the scallop-shaped cofferdam cells intersect, the edge beam and fascia are supported by prestressed concrete piles. Z-shaped steel sheet pile bulkheads connect Wharf Bravo to the Wharf Alpha bulkhead to the south and to the Wharf Charlie tug

berth to the north. Floating, foam filled fenders are attached to the concrete fascia to accommodate vessel berthing. Pile supported mooring hardware (double bitts and bollards) are located 12 to 18 feet landward of the face of wharf. Ship-to-shore utility connections for fuel, water, salt water, sewer, oily waste, steam, electrical, and communications services are spaced along the wharf.

The wharf backlands consists of an area approximately 110 feet wide bounded by a perimeter security fence to the west. The area slopes from west to east, with the majority of surface stormwater sheet flowing direct across the wharf into Mayport Harbor. A series of fourteen stormwater inlets are located near the western boundary of the project area. These inlets primarily collect offsite drainage and discharge directly into Mayport Harbor via stormwater outfalls through the bulkhead face.

Buried utilities located within the backland area include fuel, water, salt water, sewer, oily waste, steam, electrical and communications systems. Additionally, above ground steam lines are located along the western fence line.

Proposed Wharf Bravo Improvements

Structural Improvements

The primary structural improvement to Wharf Bravo is the installation of a new steel sheet pile bulkhead seaward of the existing bulkhead. The new bulkhead will be installed between 2.67 to 5.92 feet seaward of the existing bulkhead fascia and will be anchored to the existing wharf structure. The offset from the existing structure to the new face of wharf varies to correct for deviations in the alignment of the existing wharf face. The existing bulkhead (cellular cofferdam) structure will remain intact throughout the project and will be encased by the new sheet pile bulkhead. The area between the existing and new bulkheads will be backfilled with flowable fill. A concrete bulkhead cap will tie the new and existing bulkhead together and a concrete fascia will protect the bulkhead from splash zone and atmospheric corrosion. Seven foot diameter foam filled fenders will be anchored to concrete fascia to absorb berthing energy and provide vessel standoff.

Utility Improvements

Select ship-to-shore utility connection points along the wharf will be replaced and existing salt water and steam connections will be eliminated from the wharf. The existing site lighting will also be replaced as part of this project. New site lighting will be designed according to the NAVSTA Mayport Light Management Plan (LMP) to minimize light contribution to urban sky glow and minimize impacts to marine turtles.

Grading, Drainage, and Paving Improvements

A series of fourteen existing storm drain inlets are located near the western boundary of the project area. These inlets primarily collect offsite surface runoff from New Maine Street to the west of the project area and convey stormwater to Mayport Harbor via storm drain outfalls through the bulkhead face. As a result of structural overloading and settlement many of the outfall pipes from these inlets are damaged or misaligned. The damaged pipes will be replaced with Class V reinforced concrete pipe (RCP) suited for project conditions. The size of the storm drain pipes and number of outfalls will not be changed.

Following demolition, bulkhead, and utility construction activities, the existing asphalt surface within the project area will be milled and overlaid. The existing asphalt base course will remain intact except where trenching is required for demolition and utility installation activities.

Runoff from the project area currently drains, by sheet flow, directly across the wharf and into Mayport Harbor. Existing drainage patterns will not be altered by the wharf or paving improvements. Drainage will continue to sheet flow directly into Mayport Harbor.

Project Use

The intended use of Wharf Bravo will remain unchanged from its existing functions and the proposed improvements will not alter the number of vessels using the wharf. Existing wharf functions include:

1. Docking of vessels;
2. Minor dockside repairs to vessels;
3. Loading and unloading of ship crew and service personnel;
4. Loading and unloading of ship supplies, including munitions at select locations;
5. Providing shore power and communications services; and
6. Loading and unloading of ship fuel, potable water, oily waste, and sanitary waste.

Alternatives Analysis

Alternatives considered by the U.S. Navy as part of the Environmental Assessment (EA) process include:

1. No Wharf Bravo repairs or facilities maintenance (No Action Alternative);
2. Wharf Bravo repairs or facilities maintenance (Recapitalization);
3. Lease Berthing Space offsite; and
4. Constructing a new wharf.

Although four alternatives were considered, only recapitalization was determined to satisfy the project's purpose and need based on the EA selection criteria and alternatives evaluation process.

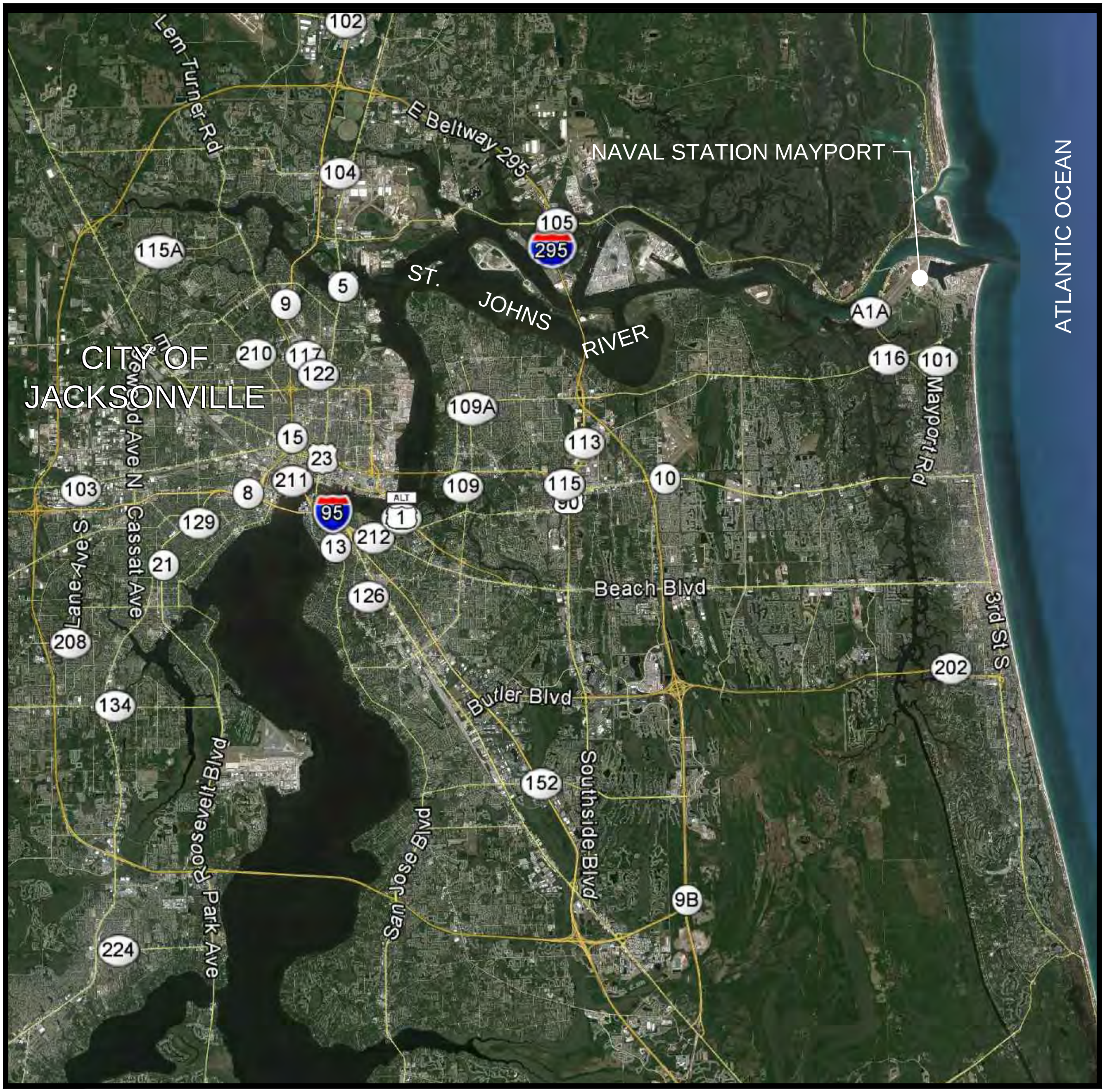
Construction Schedule and Techniques

The recapitalization of Wharf Bravo is expected to begin in late spring or early summer of 2016. All work will be performed as part of one construction contract and is expected to take between 15 and 18 months to complete. Construction will begin at Berth Bravo 3 and proceed south toward Berth Bravo 1. Construction at Berths Bravo 2 and 3 will be completed prior to beginning work at Berth Bravo 1.

New steel sheet piles will be installed outboard of the existing bulkhead using vibratory pile driving equipment. Impact pile driving equipment will only be used if hard driving conditions are encountered that cannot be overcome using typical vibratory pile driving equipment. Based on geotechnical investigations performed at the site, hard driving conditions are not anticipated. Following installation of the new sheet piling, the bulkhead will be anchored (tied back) to the existing bulkhead pile cap. The area between the existing and proposed bulkheads will be backfilled using flowable fill. The flowable fill will be placed in controlled lifts using tremie methods and will be contained by the new bulkhead. A new concrete cap and fascia will be constructed following backfill placement.

Operation and Maintenance and Legal Documentation

The selected project construction contractor will be responsible for completing monitoring, record drawings, and as-built certifications for the project construction. The U.S. Navy will be responsible for long-term maintenance and operation of the project site and stormwater mitigation area. An easement will be put in place to prevent future development of the stormwater mitigation area.



VICINITY MAP

N

PURPOSE: RECONSTRUCT WHARF BRAVO BULKHEAD

DATUM: 0.00 NAVD 88

ADJACENT PROPERTY OWNERS: NOTED IN NARRATIVE

VICINITY MAP

0 20,000 40,000

NAVAL FACILITIES ENGINEERING COMMAND
MAYPORT, FLORIDA

WHARF BRAVO RECAPITALIZATION

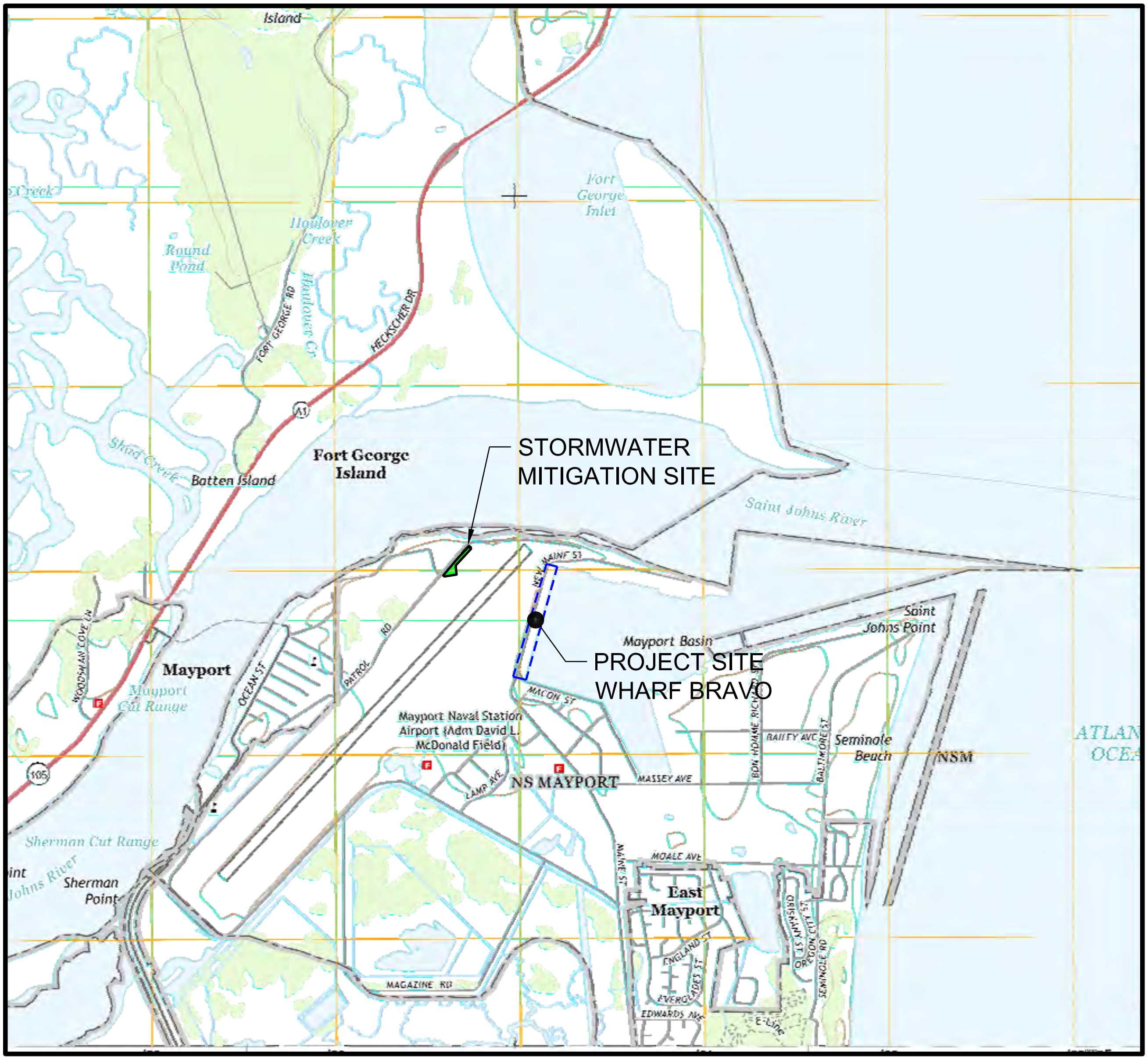
APPLICATION BY: NAVFAC

DATE: 09/2015

SHEET 1 OF 21

SK001

FILE NAME: P:\8500-08\500 CADD\520 Submittals\PERMIT DRAWINGS\WHARF-B1372158 SK001.dwg LAYOUT NAME: VICINITY MAP PLOTTED: Thursday, September 03, 2015 - 3:49pm USER: tthompson



USGS TOPOGRAPHICAL SITE LOCATION MAP

N

PURPOSE: RECONSTRUCT WHARF BRAVO BULKHEAD DATUM: 0.00 NAVD 88 ADJACENT PROPERTY OWNERS: NOTED IN NARRATIVE	USGS TOPOGRAPHICAL SITE LOCATION MAP 0 3000 6000 NAVAL FACILITIES ENGINEERING COMMAND MAYPORT, FLORIDA	WHARF BRAVO RECAPITALIZATION APPLICATION BY: NAVFAC DATE: 09/2015 SHEET 2 OF 21 SK002

FILE NAME: P:\8500-08\500 CADD\520 Submittals\PERMIT DRAWINGS\WHARF-B1372158 SK002.dwg LAYOUT NAME: USGS TOPOGRAPHICAL SITE LOCATION MAP PLOTTED: Thursday, September 03, 2015 - 3:58pm USER: tthompson

LOCATION PLAN

N

FILE NAME: P:\8500-08\500 CADD\520 Submittals\PERMIT DRAWINGS\WHARF-B1372158 SK003.dwg LAYOUT NAME: LOCATION PLAN PLOTTED: Thursday, September 03, 2015 - 3:49pm USER: tthompson

PURPOSE: RECONSTRUCT WHARF BRAVO BULKHEAD

DATUM: 0.00 NAVD 88

ADJACENT PROPERTY OWNERS: NOTED IN NARRATIVE

LOCATION PLAN

0 600' 1200'

NAVAL FACILITIES ENGINEERING COMMAND
MAYPORT, FLORIDA

WHARF BRAVO RECAPITALIZATION

APPLICATION BY: NAVFAC

DATE: 09/2015

SHEET 3 OF 21

SK003

2014 TRUE COLOR ORTHOPHOTO

N

PURPOSE: RECONSTRUCT WHARF BRAVO BULKHEAD DATUM: 0.00 NAVD 88 ADJACENT PROPERTY OWNERS: NOTED IN NARRATIVE	2014 TRUE COLOR ORTHOPHOTO 0 120' 240' NAVAL FACILITIES ENGINEERING COMMAND MAYPORT, FLORIDA	WHARF BRAVO RECAPITALIZATION APPLICATION BY: NAVFAC DATE: 09/2015 SHEET 4 OF 21 SK004

FILE NAME: P:\8500-08\500 CADD\520 Submittals\PERMIT DRAWINGS\WHARF-B1372158 SK004.dwg LAYOUT NAME: 2014 TRUE COLOR ORTHOPHOTO PLOTTED: Thursday, September 03, 2015 - 3:49pm USER: tthompson

Legend

Wharf Bravo Project Limits

06 - Aquic Quartzipsamments, 0 to 2 percent slopes
07 - Arents, nearly level
69 - Urban Land
99 - Water
100 - Waters of the Atlantic Ocean

USDA SOIL SURVEY

N

PURPOSE: RECONSTRUCT WHARF BRAVO BULKHEAD

DATUM: 0.00 NAVD 88

ADJACENT PROPERTY OWNERS: NOTED IN NARRATIVE

USDA SOIL SURVEY

0 600' 1200'

NAVAL FACILITIES ENGINEERING COMMAND
MAYPORT, FLORIDA

WHARF BRAVO RECAPITALIZATION

APPLICATION BY: NAVFAC

DATE: 09/2015

SHEET 5 OF 21

SK005

FILE NAME: P:\8500-08\500 CADD\520 Submittals\PERMIT DRAWINGS\WHARF-B1372158 SK005.dwg LAYOUT NAME: USDA SOIL SURVEY PLOTTED: Thursday, September 03, 2015 - 3:50pm USER: tthompson

Legend

Wharf Bravo Project Limits

1730 - Military
5100 - Streams and Waterways

LAND USE (FLUCS) MAP

N

PURPOSE: RECONSTRUCT WHARF BRAVO BULKHEAD

DATUM: 0.00 NAVD 88

ADJACENT PROPERTY OWNERS: NOTED IN NARRATIVE

LAND USE (FLUCS) MAP

0 600' 1200'

NAVAL FACILITIES ENGINEERING COMMAND
MAYPORT, FLORIDA

WHARF BRAVO RECAPITALIZATION

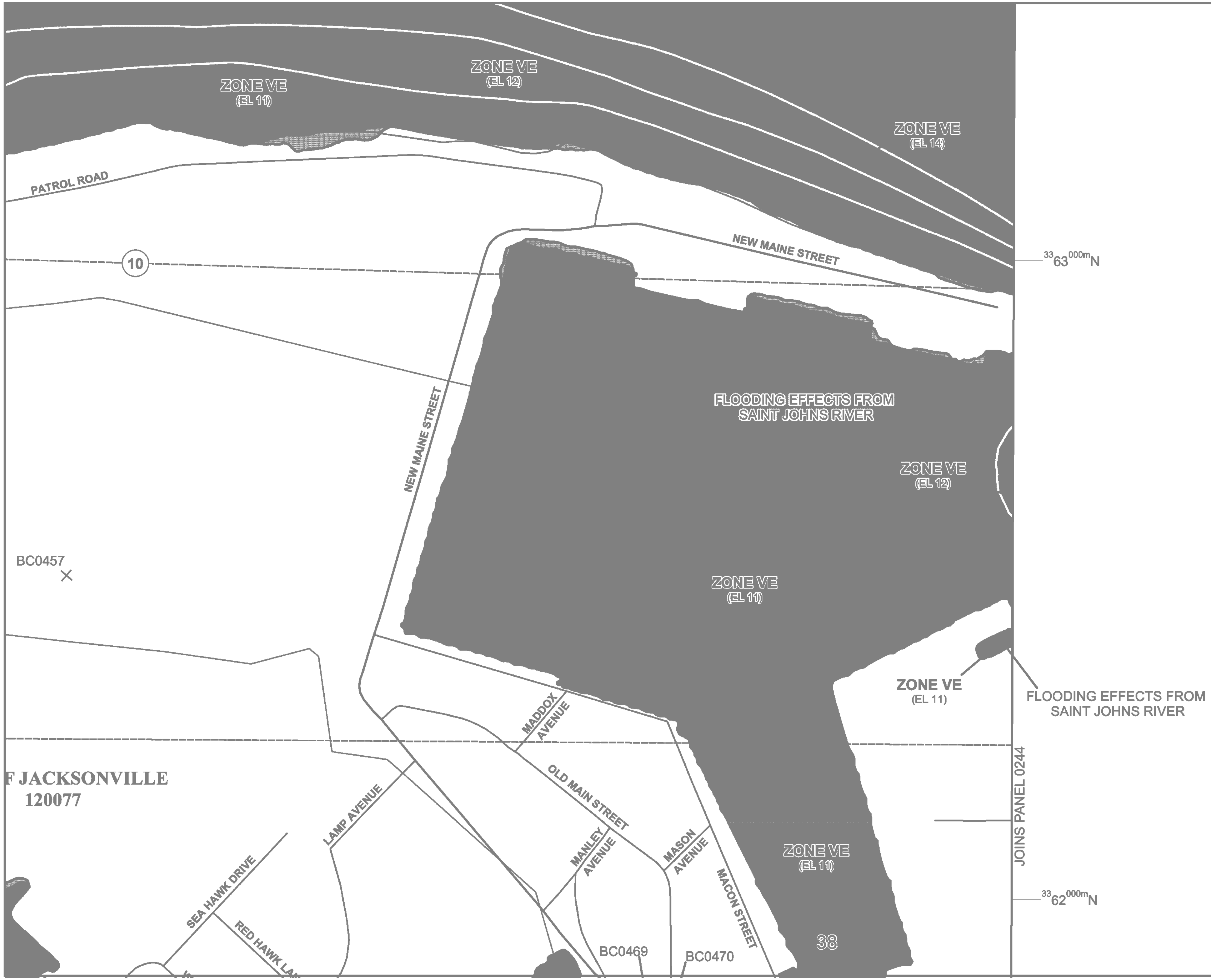
APPLICATION BY: NAVFAC

DATE: 09/2015

SHEET 6 OF 21

SK006

FILE NAME: P:\8500-08\500 CADD\520 Submittals\PERMIT DRAWINGS\WHARF-B1372158 SK006.dwg LAYOUT NAME: USDA SOIL SURVEY PLOTTED: Thursday, September 03, 2015 - 3:50pm USER: tthompson



MAP SCALE 1" = 500'

250 0 500 1000 FEET

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0243H

FIRM

FLOOD INSURANCE RATE MAP

DUVAL COUNTY, FLORIDA (ALL JURISDICTIONS)

PANEL 243 OF 675

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
JACKSONVILLE, CITY OF	120077	0243	H

-NOTE-

THIS MAP INCLUDES BOUNDARIES OF THE COASTAL BARRIER RESOURCES SYSTEM ESTABLISHED UNDER THE COASTAL BARRIER RESOURCES ACT OF 1982 AND/OR SUBSEQUENT ENABLING LEGISLATION.

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER 12031C0243H

EFFECTIVE DATE JUNE 3, 2013

Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov

SYM	DESCRIPTION	DATE	APPR

NAVFAC

PERMIT ONLY

NOT FOR CONSTRUCTION

SEAL

MN FST A JOINT VENTURE

A/E INFO

APPROVED

FOR COMMANDER NAVFAC / B.L.T.L.

ACTIVITY

SATISFACTORY TO DATE

DES -- DRW -- CHK --

PROJECT MANAGER

IPT TECH. BRANCH HEAD

CHIEF ENG/ARCH (CORE)

DEPARTMENT OF THE NAVY NAVAL FACILITIES ENGINEERING COMMAND

NAVAL FACILITIES ENGINEERING COMMAND

IPT SOUTH ATLANTIC NAVAL AIR STATION JACKSONVILLE

NAVAL STATION MAYPORT, FLORIDA

WHARF BRAVO RECAPITALIZATION

FEMA FLOOD MAP

SCALE: AS NOTED

EPROJECT NO.: 1372158

CONSTR. CONTR. NO. –

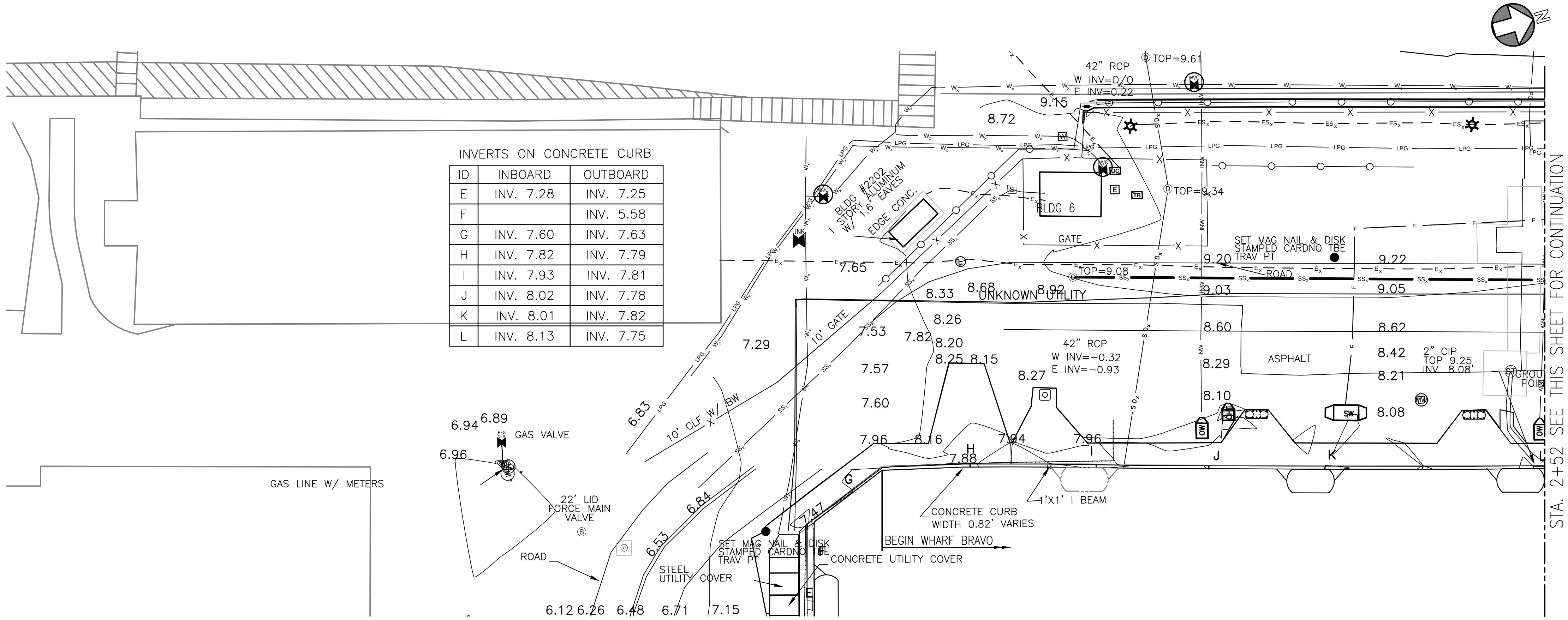
NAVFAC DRAWING NO. --

SHEET 7 OF 21

SK007

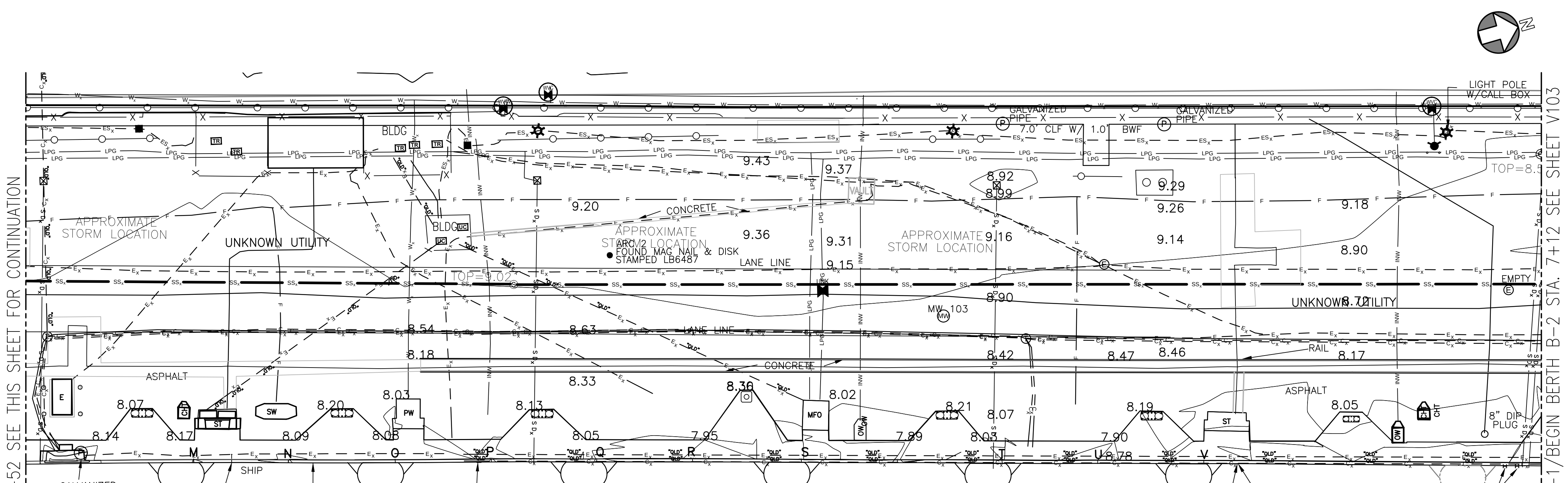
DRAWFORM REVISION: 7 AUGUST 2009

FILE NAME: P:\8500-08\500 CADD\520 Submittals\PERMIT DRAWINGS\WHARF-B1372158 SK007.dwg LAYOUT NAME: FEMA FLOOD MAP PLOTTED: Thursday, September 03, 2015 - 3:39pm USER: tthompson



INVERTS ON CONCRETE CURB

ID	INBOARD	OUTBOARD
E	INV. 7.28	INV. 7.25
F		INV. 5.58
G	INV. 7.60	INV. 7.63
H	INV. 7.82	INV. 7.79
I	INV. 7.93	INV. 7.81
J	INV. 8.02	INV. 7.78
K	INV. 8.01	INV. 7.82
L	INV. 8.13	INV. 7.75

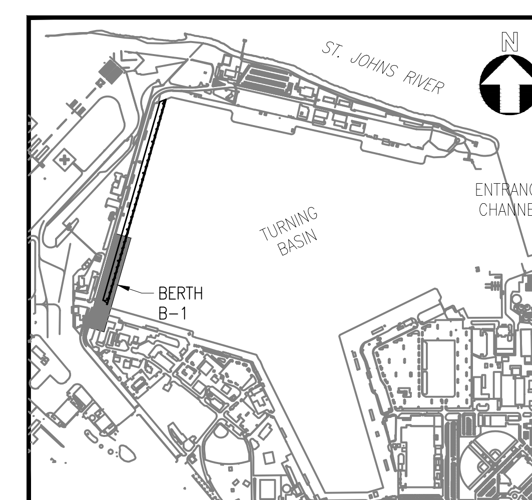


INVERTS ON CONCRETE CURB

ID	INBOARD	OUTBOARD
M	INV. 8.02	INV. 7.81
N	INV. 7.97	INV. 7.82
O	INV. 8.00	INV. 7.81
P	INV. 7.97	INV. 7.83
Q	INV. 7.93	INV. 7.73

INVERTS ON CONCRETE CURB

ID	INBOARD	OUTBOARD
R	INV. 7.83	INV. 7.72
S	INV. 7.86	INV. 7.81
T	INV. 7.94	INV. 7.78
U	INV. 7.91	INV. 7.79
V	INV. 7.85	INV. 8.29



KEYPLAN

NOT TO SCALE

1"=20' 0' 20' 40' 60' 80' 100'

PERMIT ONLY

NOT FOR CONSTRUCTION

MN FST A JOINT VENTURE

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
NAVAL FACILITIES ENGINEERING COMMAND
IPT SOUTH ATLANTIC NAVAL AIR STATION JACKSONVILLE

NAVAL STATION MAYPORT, FLORIDA

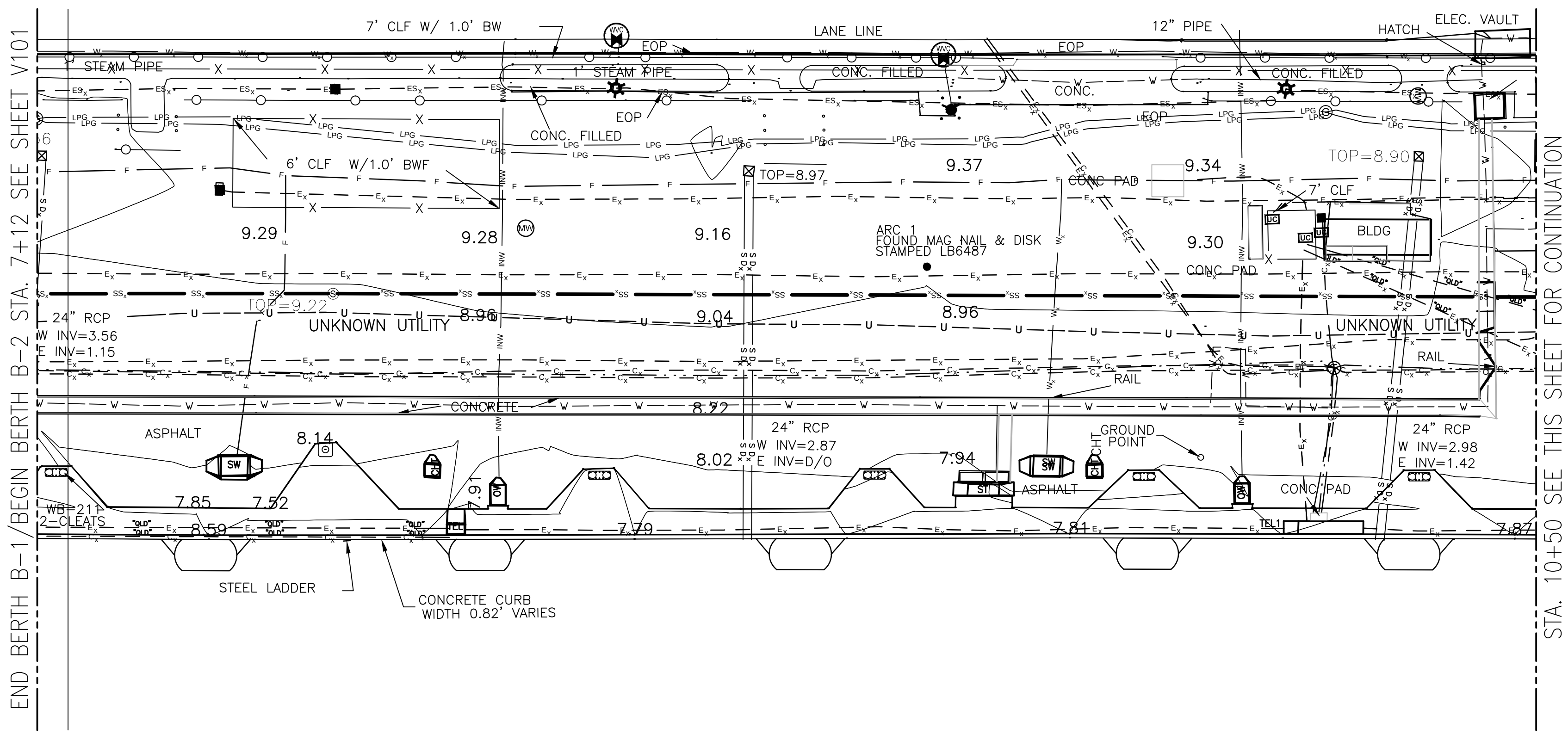
WHARF BRAVO RECAPITALIZATION

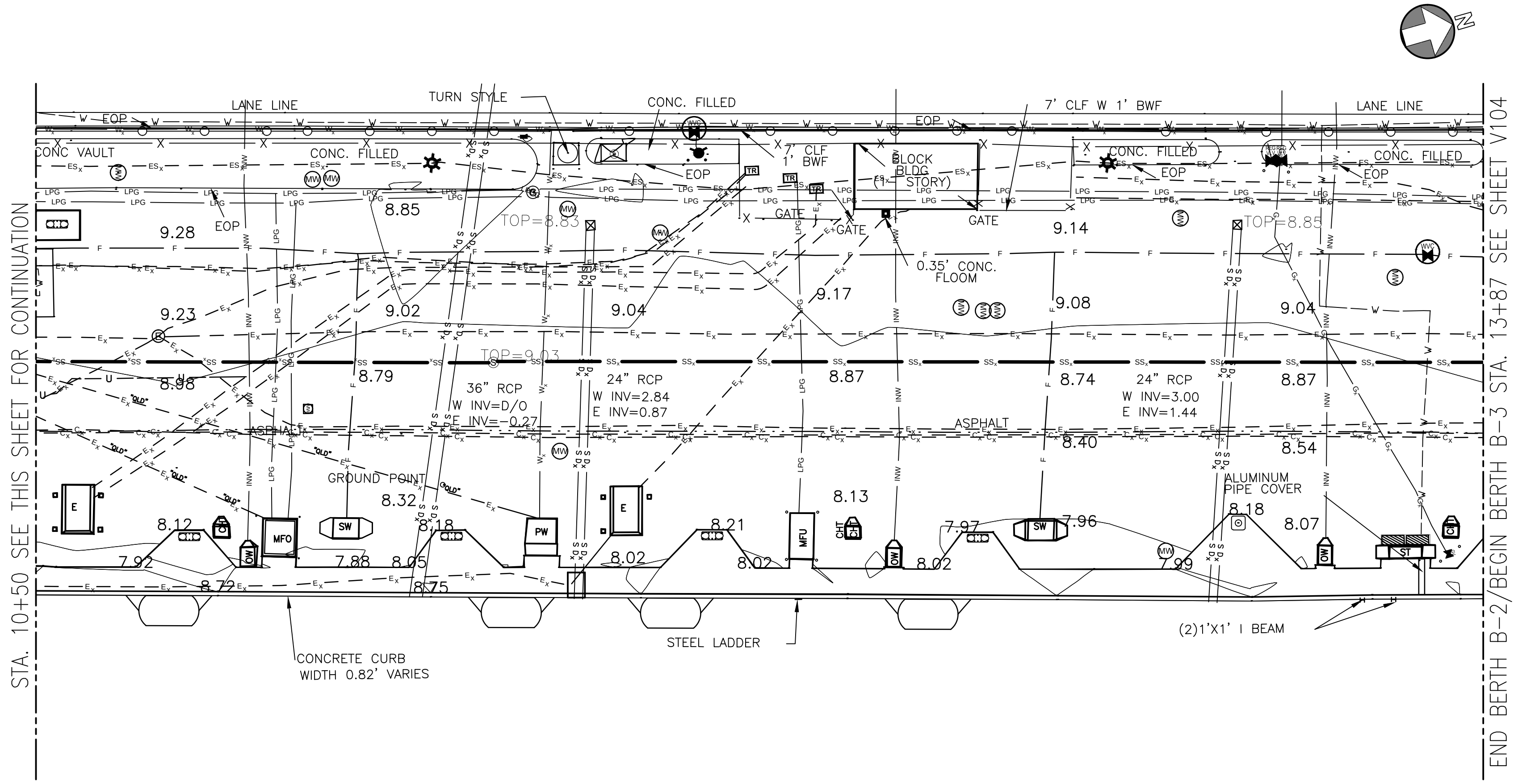
EXISTING CONDITIONS PLAN – BERTH B-1

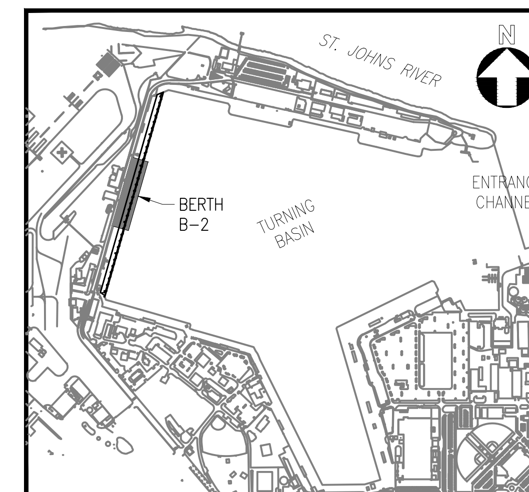
SCALE: AS NOTED
EPROJECT NO.: 1372158
SHEET 8 OF 21

SK008

DRAWFORM REVISION: 7 AUGUST 2009







KEYPLAN
NOT TO SCALE

1"=20' 0' 20' 40' 60' 80' 100'

NAVFAC

PERMIT ONLY
NOT FOR CONSTRUCTION

MN FST
A JOINT VENTURE

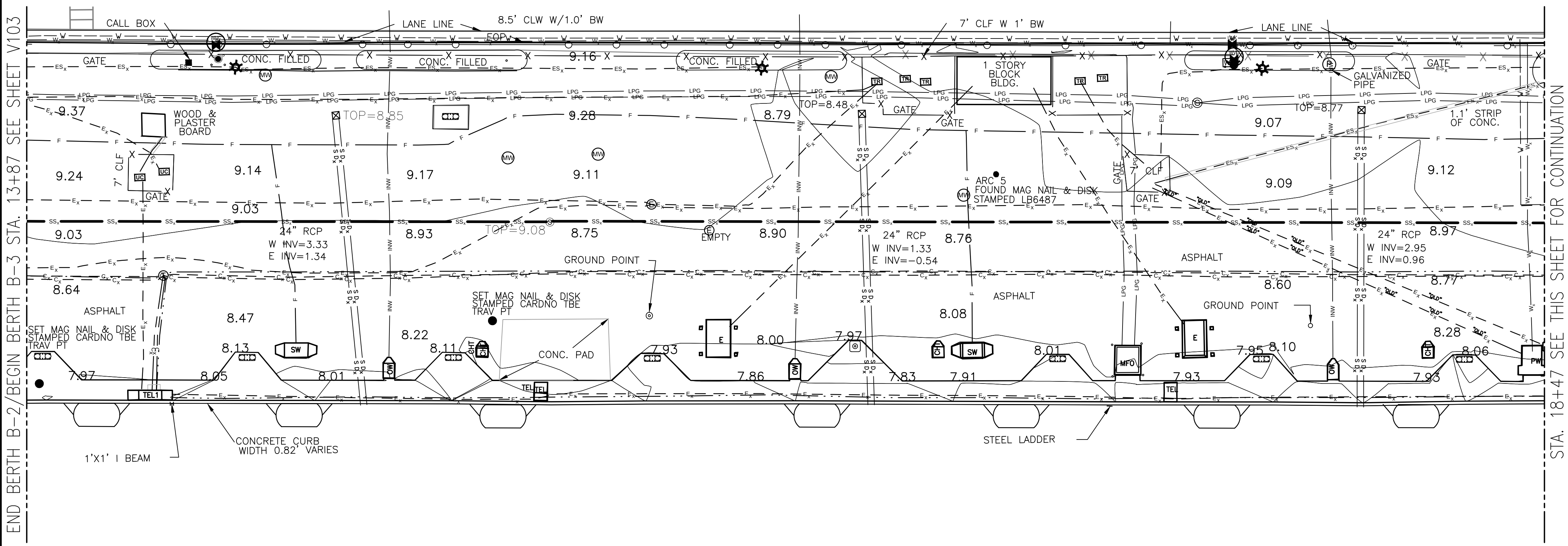
DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
NAVAL FACILITIES ENGINEERING COMMAND
IPT SOUTH ATLANTIC
NAVAL AIR STATION, JACKSONVILLE
NAVAL STATION
MAYPORT, FLORIDA

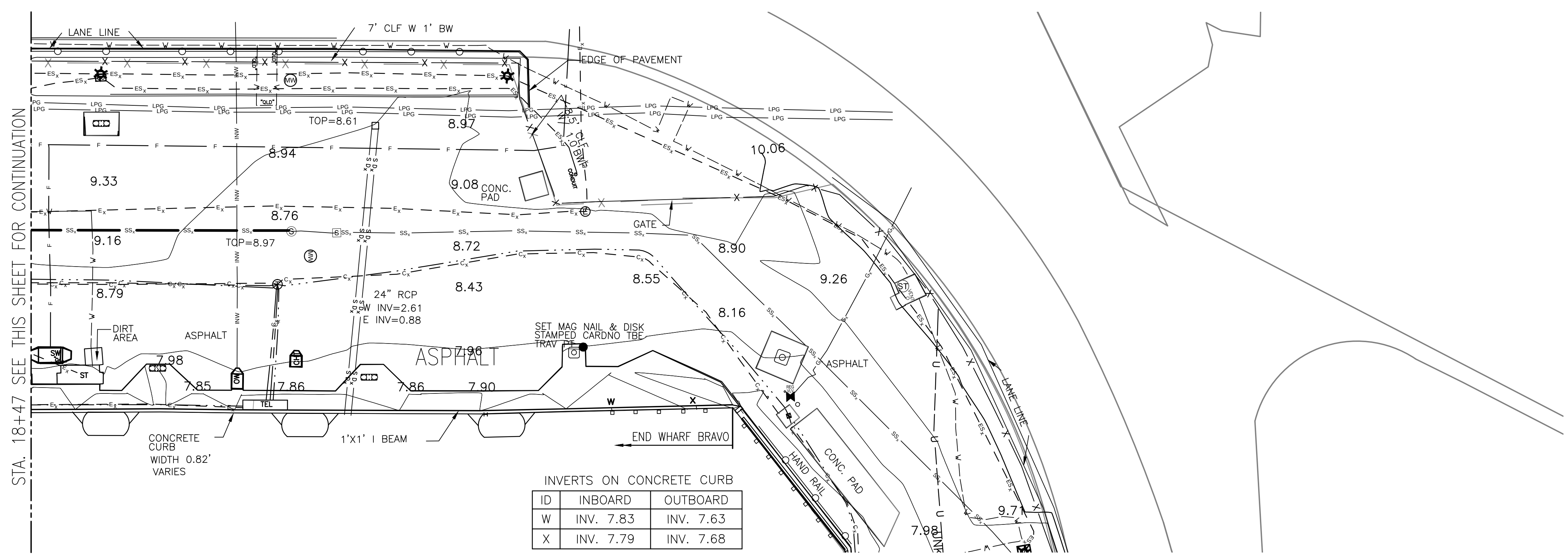
WHARF BRAVO RECAPITALIZATION
EXISTING CONDITIONS PLAN – BERTH B-2

SCALE: AS NOTED
EPROJECT NO.: 1372158
CONSTR. CONTR. NO. –
NAVFAC DRAWING NO. –
SHEET 9 OF 21
SK009

DRAWFORM REVISION: 7 AUGUST 2009

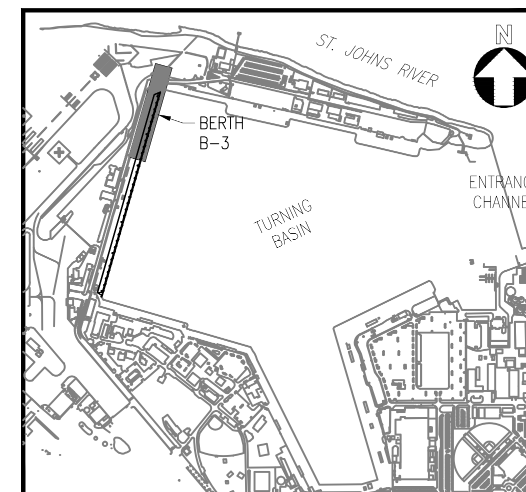
FILE NAME: P:\8500-08\500 CADD\520 Submittals\PERMIT DRAWINGS\WHARF-B1372158 SK009.dwg LAYOUT NAME: SURVEY PLANS – BERTH B-2 SHEET 3 OF 5 PLOTTED: Thursday, September 03, 2015 – 3:40pm USER: tthompson





INVERTS ON CONCRETE CURB

ID	INBOARD	OUTBOARD
W	INV. 7.83	INV. 7.63
X	INV. 7.79	INV. 7.68



KEYPLAN
NOT TO SCALE

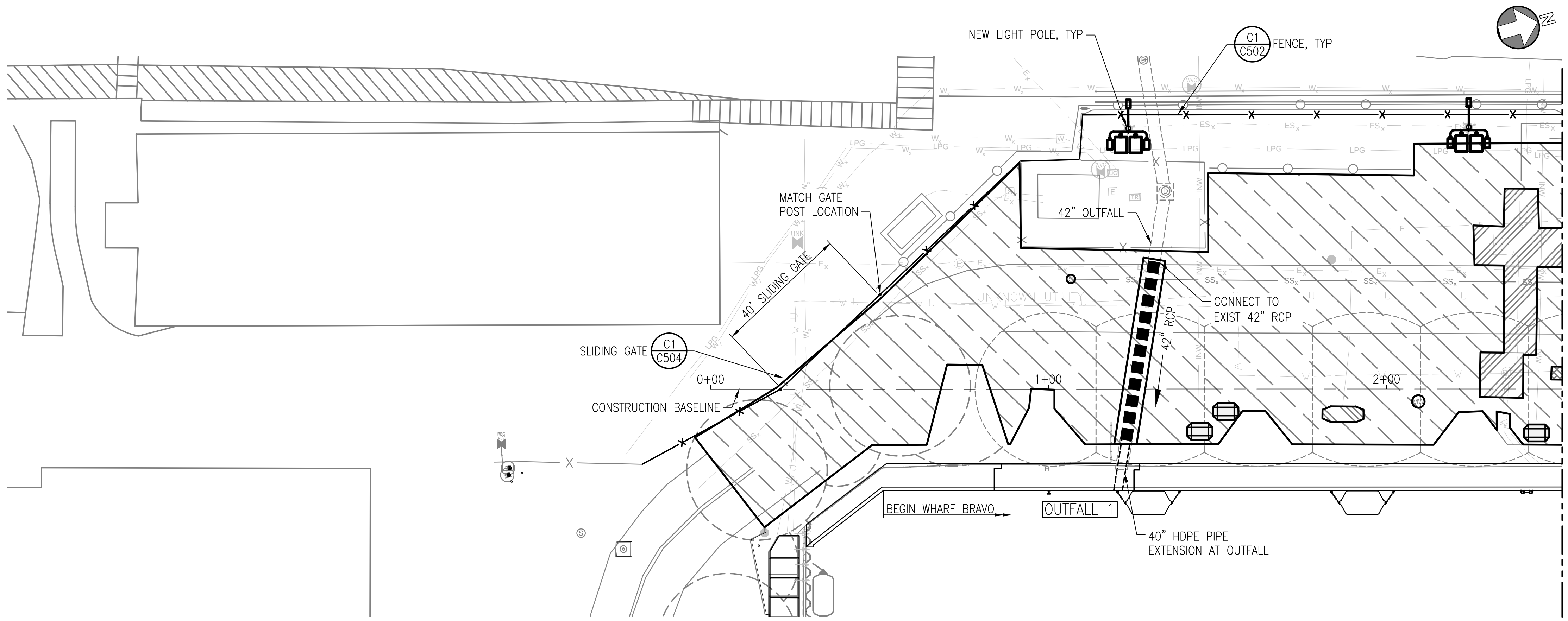
1"=20' 0' 20' 40' 60' 80' 100'

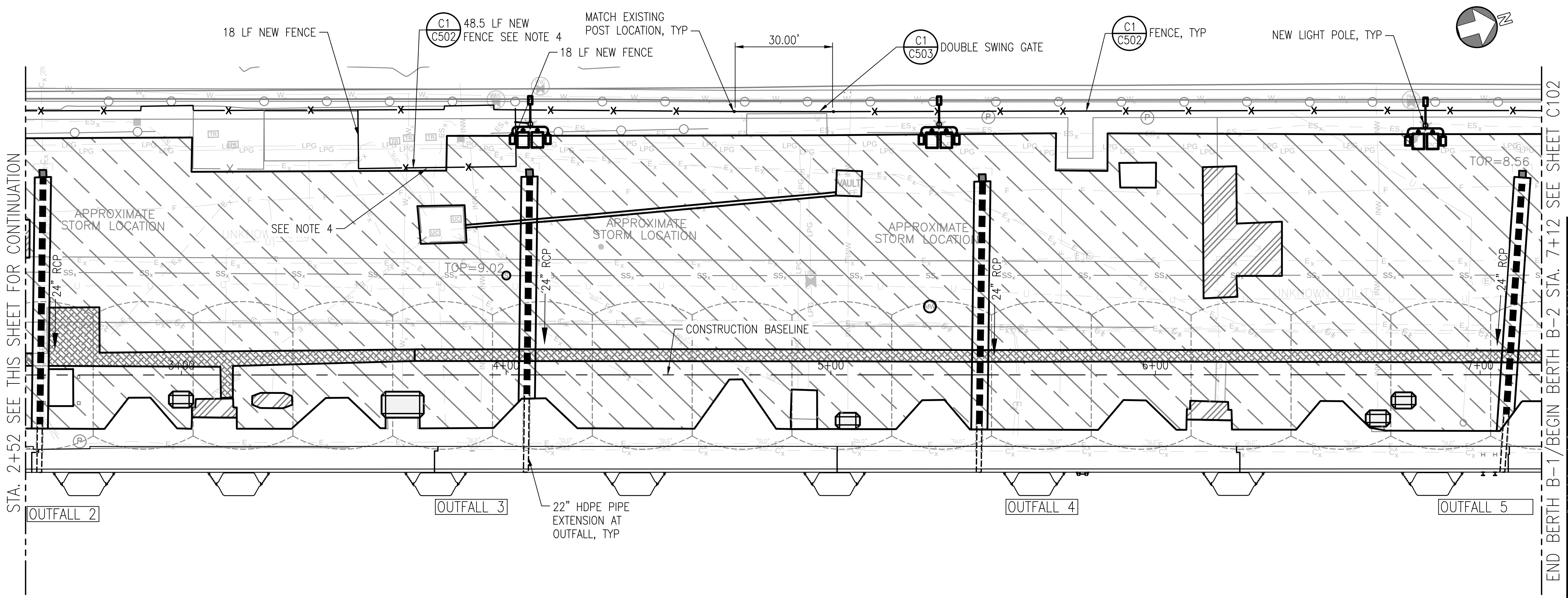
PERMIT ONLY
NOT FOR CONSTRUCTION

MN FST
A JOINT VENTURE

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
IPT SOUTH ATLANTIC NAVAL AIR STATION JACKSONVILLE
NAVAL STATION MAYPORT, FLORIDA
WHARF BRAVO RECAPITALIZATION
EXISTING CONDITIONS PLAN – BERTH B-3

SCALE: AS NOTED
EPROJECT NO.: 1372158
SHEET 10 OF 21
SK010





NOTES:

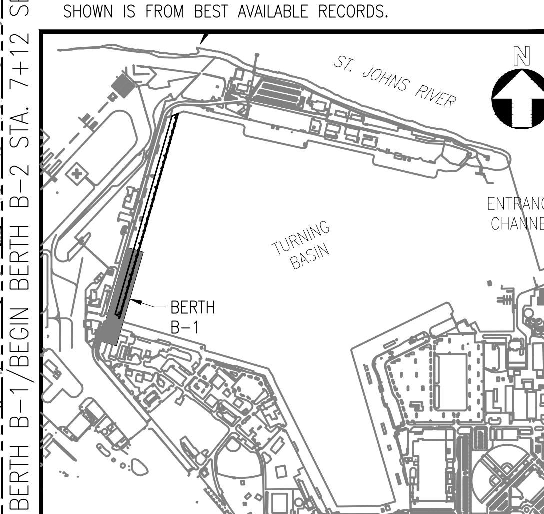
1. SEE G100 FOR CONSTRUCTION BASELINE INFORMATION AND PHASING PLAN.
2. SEE G004 FOR PROJECT GENERAL NOTES AND C001 FOR CIVIL NOTES.
3. SEE C301–C305 FOR STORM PIPE REPLACEMENT PROFILES. NEW PIPES SHALL BE AT SAME SLOPE AND ELEVATION AS EXISTING PIPES BEING REMOVED.
4. PROVIDE GATE LOCATIONS TO PROVIDE REQUIRED CLEARANCE FOR ELECTRICAL EQUIPMENT CONTAINED IN THE FENCE, SEE EP401. SUBMIT FENCING AND GATE PLAN FOR APPROVAL.
5. NEW ASPHALT OVERLAY SHALL MATCH EXISTING GRADES AT ALL EDGES WHEN CONNECTING TO EXISTING PAVEMENT. MAINTAIN EXISTING DRAINAGE PATTERNS.
6. ADJUST RIMS OF MANHOLE FRAMES AND COVERS, INLET FRAMES AND GRATES, VALVE BOXES AND COVERS, AND OTHER FEATURES TO BE FLUSH WITH PAVEMENT AS NEEDED TO MATCH FINAL PAVEMENT ELEVATION.

LEGEND:

- LIMITS OF VARIABLE DEPTH ASPHALT OVERLAY (C1 / C506)
- 8' CHAIN LINK SECURITY FENCE AND GATES
- STORM DRAIN PIPE & FULL DEPTH PAVEMENT REPAIR (A1 / C506)
- APPROXIMATE LIMITS OF FULL DEPTH PAVEMENT REPAIR (A3 / C506)
- STEAM TRENCH PAVEMENT REPAIR (B3 / C506)

NOTE:

ALL FEATURES IN THE B-1 AREA HAVE NOT BEEN FIELD LOCATED DUE TO BASE OPERATIONS ALONG THE BERTH. INFORMATION SHOWN IS FROM BEST AVAILABLE RECORDS.



KEYPLAN
NOT TO SCALE

1"=20' 0' 20' 40' 60' 80' 100'

NAVFAC

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MN FST
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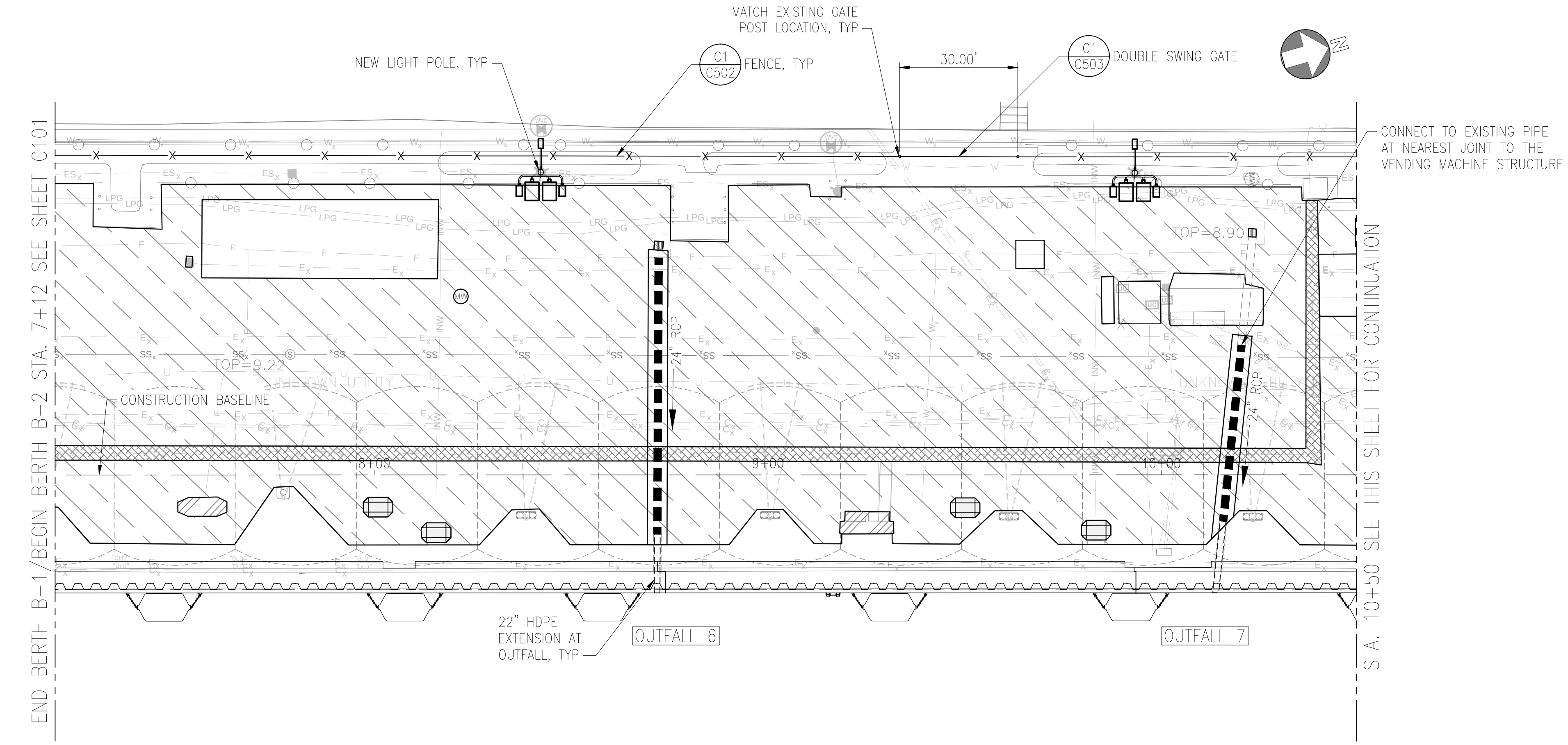
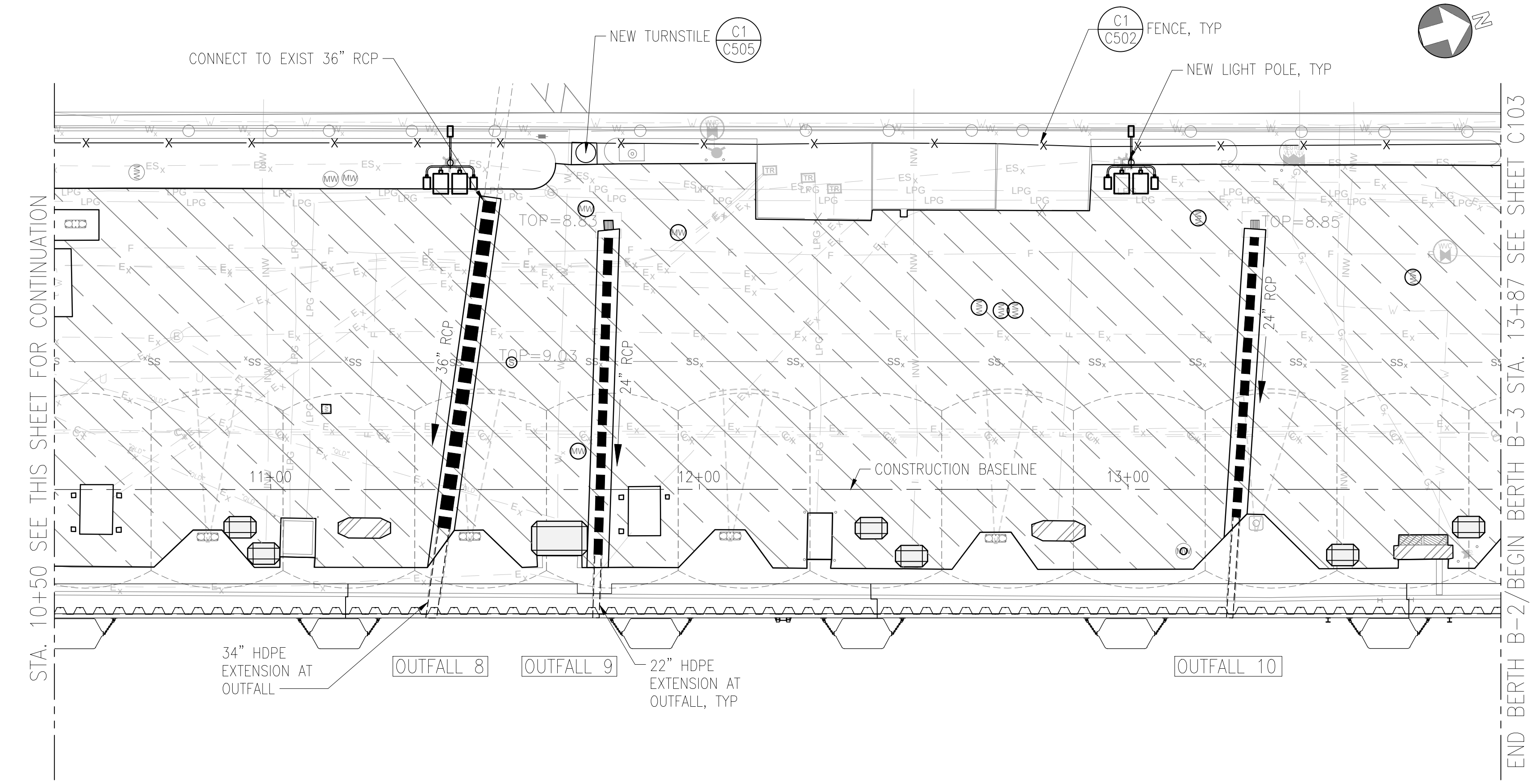
APPROVED
FOR COMMANDER NAVFAC / B.L.T.L.
ACTIVITY
SATISFACTORY TO DATE
DES — DRW — CHK —
PROJECT MANAGER
IPT TECH. BRANCH HEAD
CHIEF ENG/ARCH (CORE)

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
NAVAL FACILITIES ENGINEERING COMMAND
IPT SOUTH ATLANTIC
NAVAL AIR STATION JACKSONVILLE
NAVAL STATION MAYPORT, FLORIDA
WHARF BRAVO RECAPITALIZATION
CIVIL SITE PLAN – BERTH B-1

SCALE: AS NOTED
EPROJECT NO.: 1372158
CONSTR. CONTR. NO. —
NAVFAC DRAWING NO. —
SHEET 11 OF 21
SK011

FILE NAME: P:\8500-08\500 CADD\520 Submittals\PERMIT DRAWINGS\WHARF-B1372158 SK011.dwg LAYOUT NAME: CIVIL SITE PLAN – BERTH B-1 PLOTTED: Thursday, September 03, 2015 – 4:13pm USER: tthompson



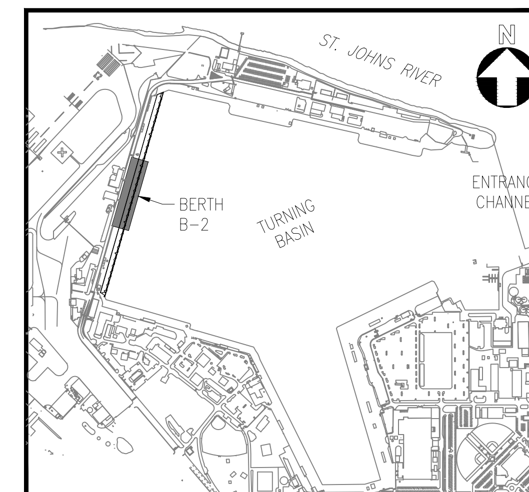


NOTES:

1. SEE G100 FOR CONSTRUCTION BASELINE INFORMATION AND PHASING PLAN.
2. SEE G004 FOR PROJECT GENERAL NOTES AND C001 FOR CIVIL NOTES.
3. SEE C301-C305 FOR STORM PIPE REPLACEMENT PROFILES. NEW PIPES SHALL BE AT SAME SLOPE AND ELEVATION AS EXISTING PIPS BEING REMOVED.
4. NEW ASPHALT OVERLAY SHALL MATCH EXISTING GRADES AT ALL EDGES WHEN CONNECTING TO EXISTING PAVEMENT. MAINTAIN EXISTING DRAINAGE PATTERNS.
5. ADJUST RIMS OF MANHOLE FRAMES AND COVERS, INLET FRAMES AND GRATES, VALVE BOXES AND COVERS, AND OTHER FEATURES TO BE FLUSH WITH PAVEMENT AS NEEDED TO MATCH FINAL PAVEMENT ELEVATION.

LEGEND:

- LIMITS OF VARIABLE DEPTH ASPHALT OVERLAY (C1/C506)
- 8' CHAIN LINK SECURITY FENCE AND GATES
- STORM DRAIN PIPE & FULL DEPTH PAVEMENT REPAIR (A1/C506)
- APPROXIMATE LIMITS OF FULL DEPTH PAVEMENT REPAIR (A3/C506)
- STEAM TRENCH PAVEMENT REPAIR (B3/C506)



KEYPLAN
NOT TO SCALE

1"=20' 0' 20' 40' 60' 80' 100'

NAVFAC

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MN FST
A JOINT VENTURE

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
NAVAL FACILITIES ENGINEERING COMMAND
IPT SOUTH ATLANTIC — NAVAL AIR STATION, JACKSONVILLE
NAVAL STATION — MAYPORT, FLORIDA

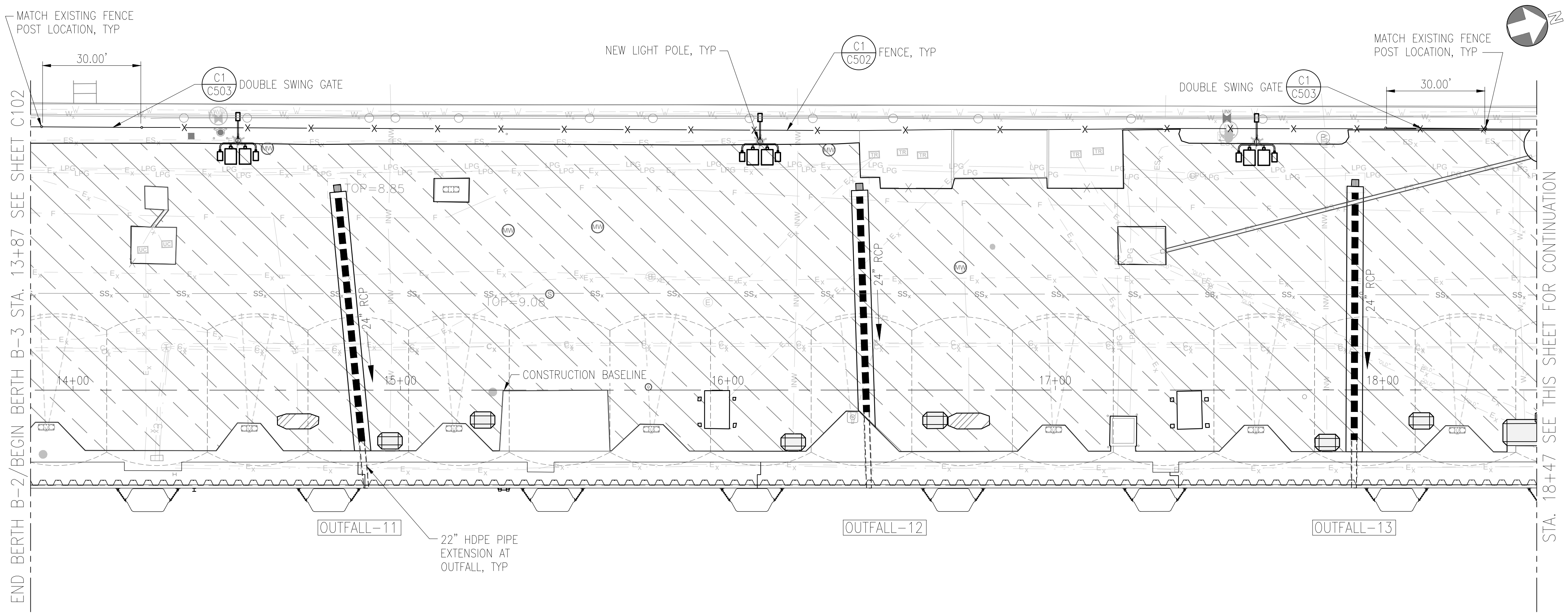
WHARF BRAVO RECAPITALIZATION
CIVIL/SITE PLAN - BERTH B-2

SCALE:	AS NOTED
EPROJECT NO.:	1372158
CONSTR. CONTR. NO.	—
NAVFAC DRAWING NO.	— —
SHEET	12 OF 21

SK012

DRAWFORM REVISION: 7 AUGUST 2009

FILE NAME: P:\8500-08\500 CADD\520 Submittals\PERMIT DRAWINGS\WHARF-B1372158 SK012.dwg LAYOUT NAME: CIVILSITE PLAN - BERTH B-2 PLOTTED: Thursday, September 03, 2015 - 4:16pm USER: tthompson

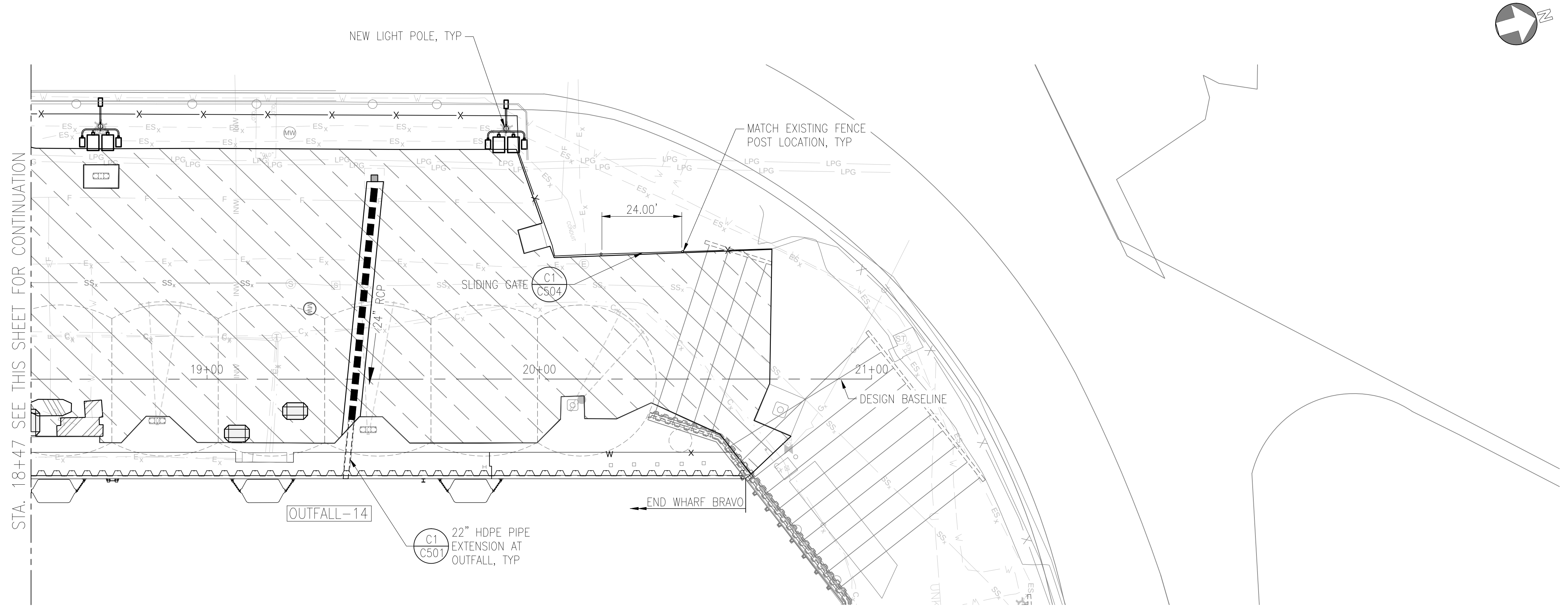


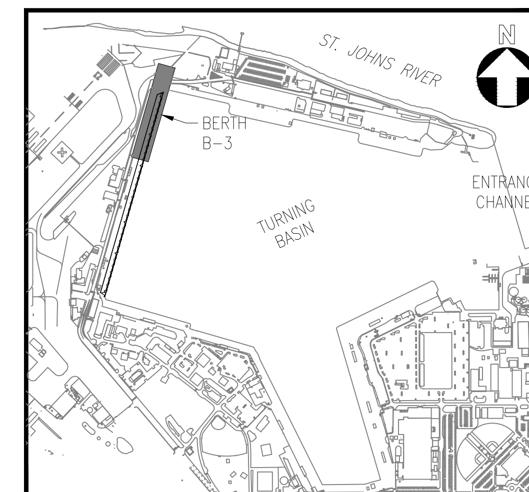
NOTES:

1. SEE G100 FOR CONSTRUCTION BASELINE INFORMATION AND PHASING PLAN.
2. SEE G004 FOR PROJECT GENERAL NOTES AND C001 FOR CIVIL NOTES.
3. SEE C301-C305 FOR STORM PIPE REPLACEMENT PROFILES. NEW PIPES SHALL BE AT SAME SLOPE AND ELEVATION AS EXISTING PIPS BEING REMOVED.
4. NEW ASPHALT OVERLAY SHALL MATCH EXISTING GRADES AT ALL EDGES WHEN CONNECTING TO EXISTING PAVEMENT. MAINTAIN EXISTING DRAINAGE PATTERNS.
5. ADJUST RIMS OF MANHOLE FRAMES AND COVERS, INLET FRAMES AND GRATES, VALVE BOXES AND COVERS, AND OTHER FEATURES TO BE FLUSH WITH PAVEMENT AS NEEDED TO MATCH FINAL PAVEMENT ELEVATION.

LEGEND:

	LIMITS OF VARIABLE DEPTH ASPHALT OVERLAY C1 C506
—X—	8' CHAIN LINK SECURITY FENCE AND GATES
	STORM DRAIN PIPE & FULL DEPTH PAVEMENT REPAIR A1 C506
	APPROXIMATE LIMITS OF FULL DEPTH PAVEMENT REPAIR A3 C506





KEYPLAN
NOT TO SCALE

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PERMIT ONLY
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MN FST
A JOINT VENTURE

APPROVED
FOR COMMANDER NAVFAC / B.L.T.L.
ACTIVITY
SATISFACTORY TO DATE
DES -- DRW -- CHK --
PROJECT MANAGER
IPT TECH. BRANCH HEAD
CHIEF ENG/ARCH (CORE)

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
NAVAL FACILITIES ENGINEERING COMMAND
IPT SOUTH ATLANTIC NAVAL AIR STATION, JACKSONVILLE
NAVAL STATION MAYPORT, FLORIDA

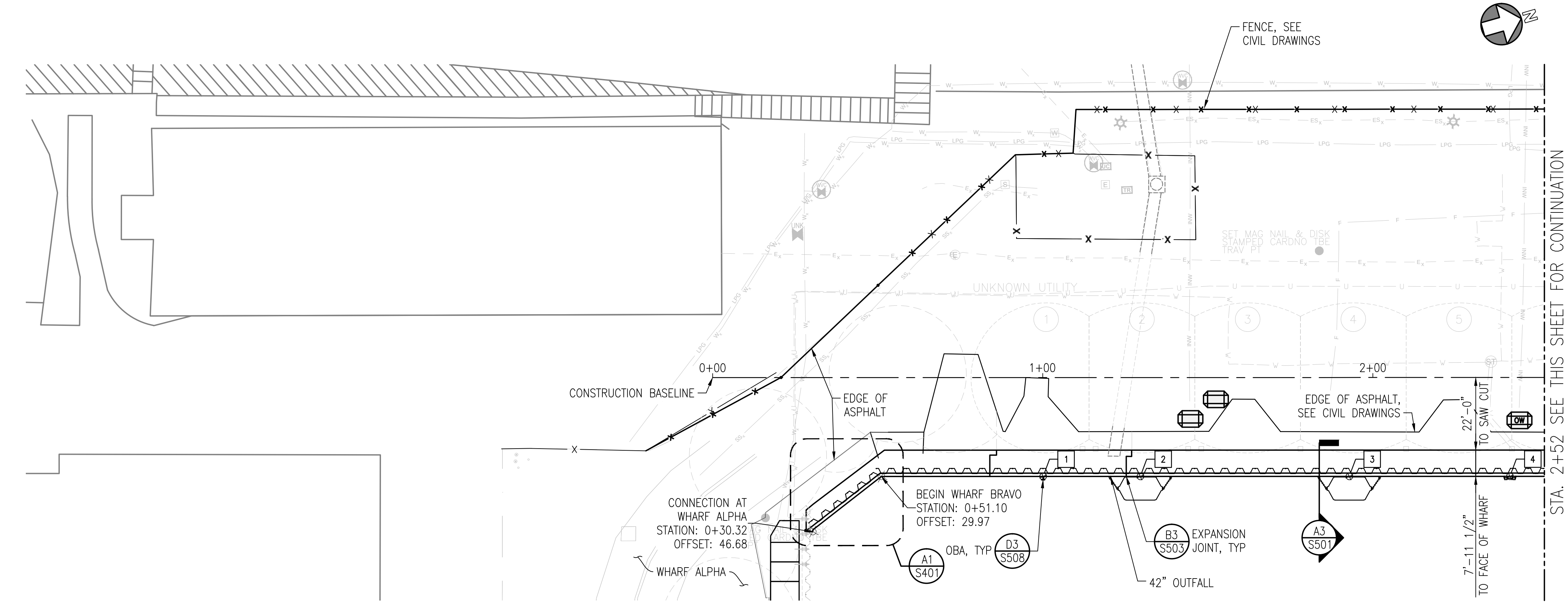
WHARF BRAVO RECAPITALIZATION

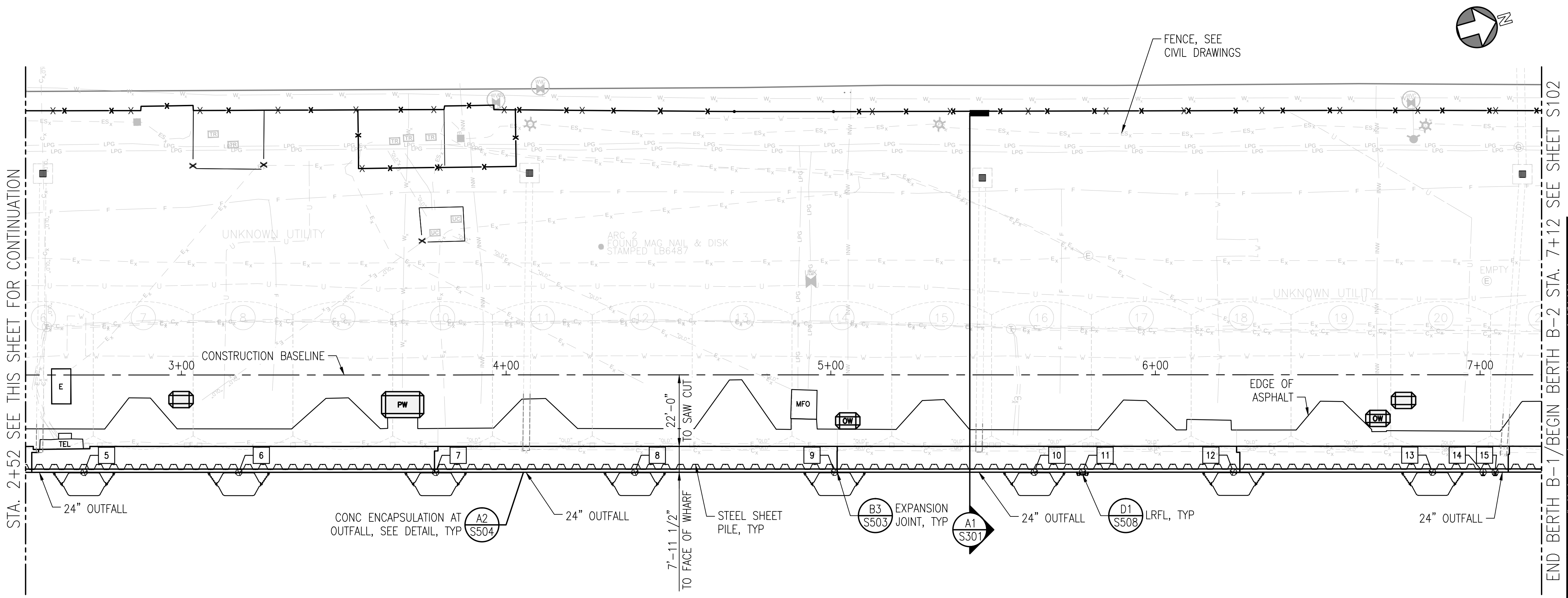
CIVIL SITE PLAN - BERTH B-3

SCALE: AS NOTED
EPROJECT NO.: 1372158
CONSTR. CONTR. NO. --
NAVFAC DRAWING NO. --
SHEET 13 OF 21
SK013

DRAWFORM REVISION: 7 AUGUST 2009

FILE NAME: P:\8500-08\500 CADD\520 Submittals\PERMIT DRAWINGS\WHARF-B1372158 SK013.dwg LAYOUT NAME: CIVIL SITE PLAN - BERTH B-3 PLOTTED: Thursday, September 03, 2015 - 4:18pm USER: tthompson





NOTES:

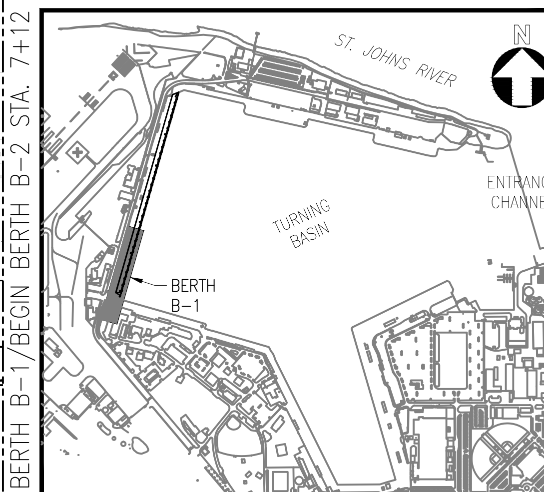
1. SEE G100 FOR CONSTRUCTION BASELINE INFORMATION AND PHASING PLAN.
2. SEE G004 FOR PROJECT GENERAL NOTES AND S001 FOR STRUCTURAL NOTES.

LEGEND:

- 7'øx14' FOAM FILLED FENDER (FFF)
- W12x54 OIL BOOM ATTACHMENT (OBA)
- LAMINATED RUBBER FENDER LADDER (LRFL)
- STEEL SHEET PILE (SSP) WALL
- OILY WASTE (OW) C1/S505
- COLLECTION HOLDING TRANSFER (CHT) C1/S506
- POTABLE WATER (PW) C1/S507

COMPONENT WORK POINT LOCATIONS

WP	COMPONENT	STATION
1	OBA	1+00.12
2	FFF	1+29.57
3	FFF	1+92.87
4	LRFL	2+41.52
5	FFF	2+70.00
6	FFF	3+17.66
7	FFF	3+78.30
8	FFF	4+39.63
9	FFF	5+01.15
10	FFF	5+62.66
11	LRFL	5+77.52
12	FFF	6+24.00
13	FFF	6+85.27
14	OBA	7+00.89
15	OBA	7+04.59



KEYPLAN

NOT TO SCALE

1"=20' 0' 20' 40' 60' 80' 100'

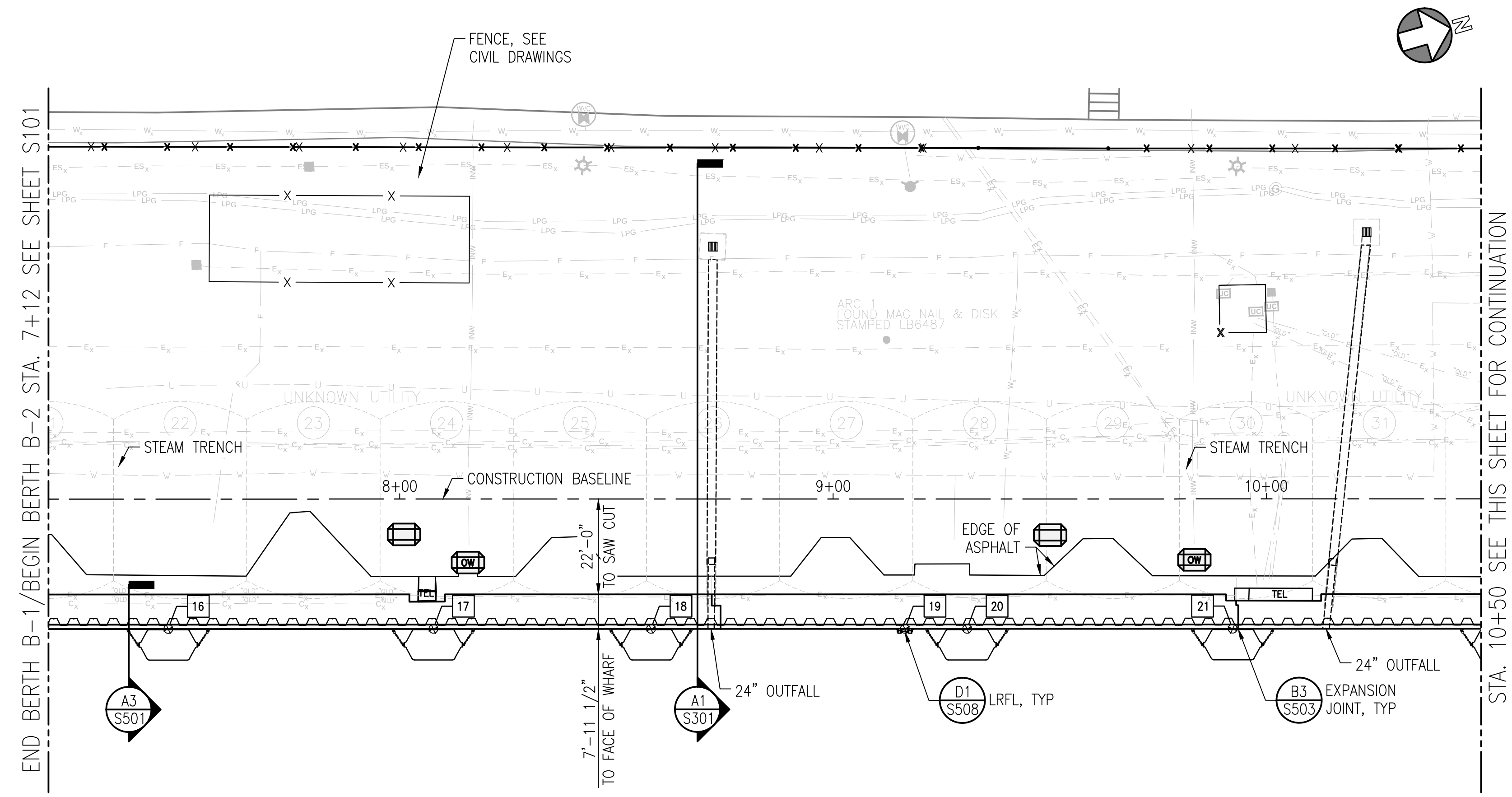
NAVFAC

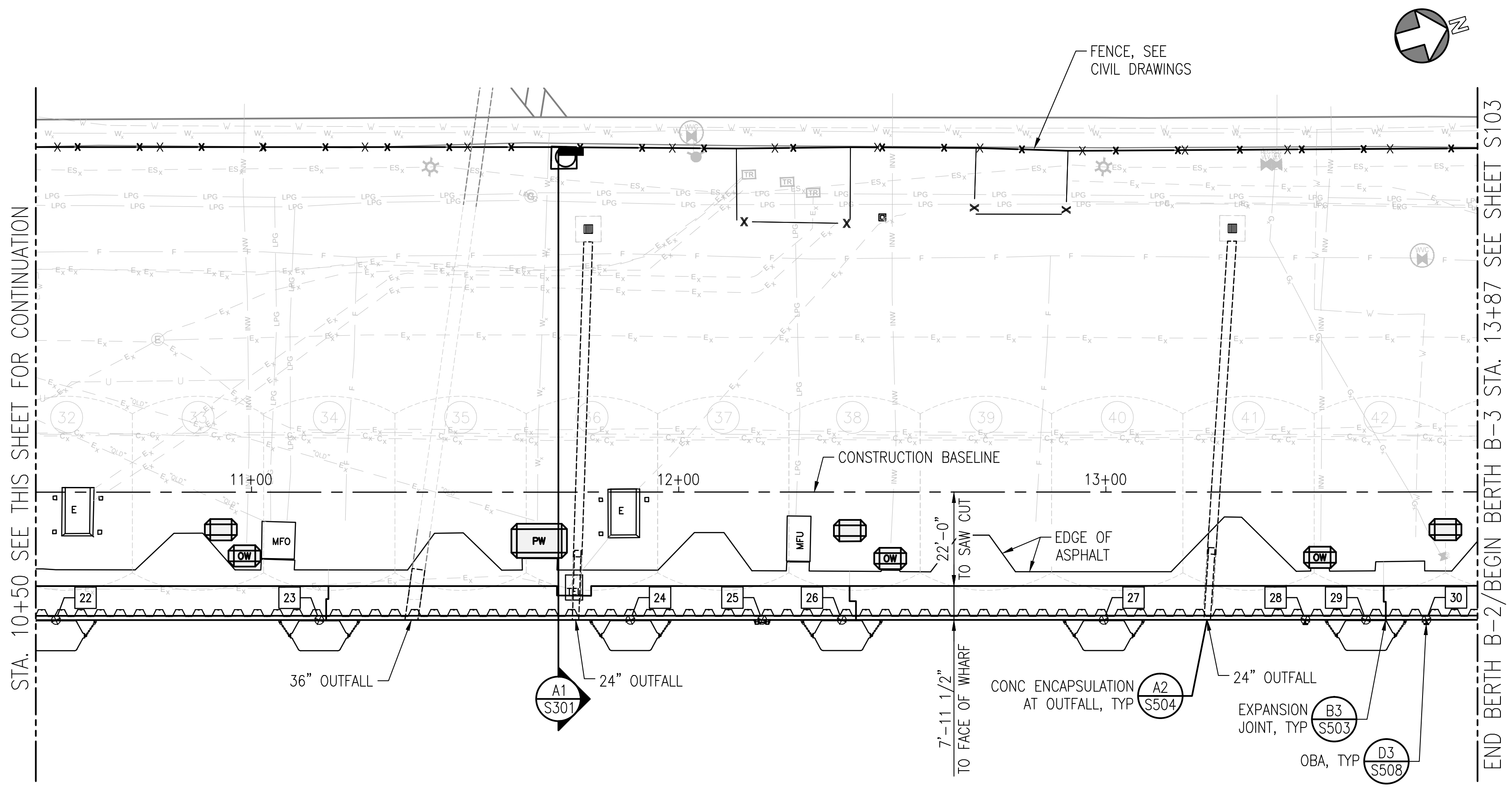
PERMIT ONLY NOT FOR CONSTRUCTION

MN FST A JOINT VENTURE

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
NAVAL FACILITIES ENGINEERING COMMAND
IPT SOUTH ATLANTIC NAVAL AIR STATION JACKSONVILLE
NAVAL STATION MAYPORT, FLORIDA
WHARF BRAVO RECAPITALIZATION
STRUCTURAL PLAN – BERTH B-1

SCALE: AS NOTED
EPROJECT NO.: 1372158
SHEET 11 OF 18
SK014





NOTES:

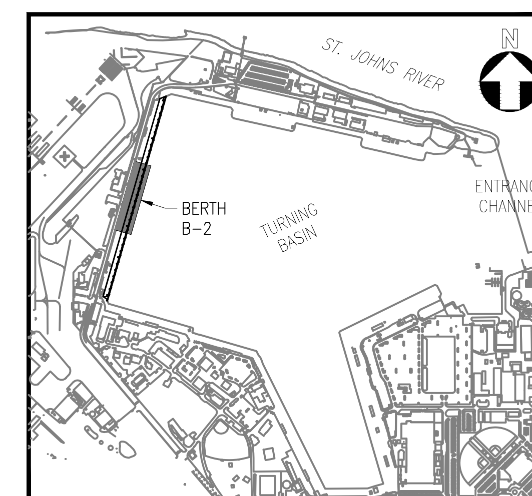
1. SEE G100 FOR CONSTRUCTION BASELINE INFORMATION AND PHASING PLAN.
2. SEE G004 FOR PROJECT GENERAL NOTES AND S001 FOR STRUCTURAL NOTES.

LEGEND:

- 7'ø x14' FOAM FILLED FENDER (FFF)
- W12x54 OIL BOOM ATTACHMENT (OBA)
- LAMINATED RUBBER FENDER LADDER (LRFL)
- STEEL SHEET PILE (SSP) WALL
- OILY WASTE (OW) C1/S505
- COLLECTION HOLDING TRANSFER (CHT) C1/S506
- POTABLE WATER (PW) C1/S507

COMPONENT WORK POINT LOCATIONS

WP	COMPONENT	STATION
16	FFF	7+46.57
17	FFF	8+07.74
18	FFF	8+57.95
19	LRFL	9+16.52
20	FFF	9+30.86
21	FFF	9+92.16
22	FFF	10+54.21
23	FFF	11+15.85
24	FFF	11+88.67
25	LRFL	12+19.52
26	FFF	12+38.15
27	FFF	12+99.50
28	OBA	13+46.67
29	FFF	13+60.84
30	OBA	13+75.01



KEYPLAN
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1"=20' 0' 20' 40' 60' 80' 100'

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MN FST
A JOINT VENTURE

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
NAVAL FACILITIES ENGINEERING COMMAND
IPT SOUTH ATLANTIC
NAVAL AIR STATION JACKSONVILLE
NAVAL STATION MAYPORT, FLORIDA

WHARF BRAVO RECAPITALIZATION

STRUCTURAL PLAN – BERTH B-2

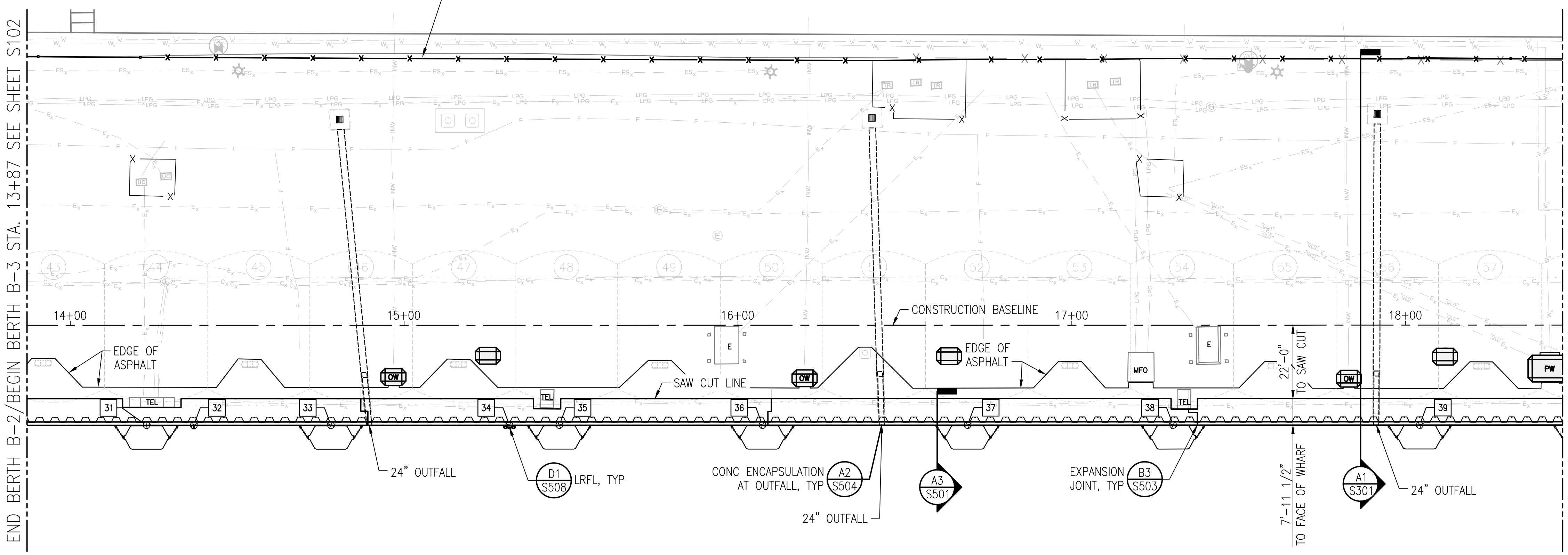
SCALE: AS NOTED
EPROJECT NO.: 1372158
SHEET 15 OF 21
SK015

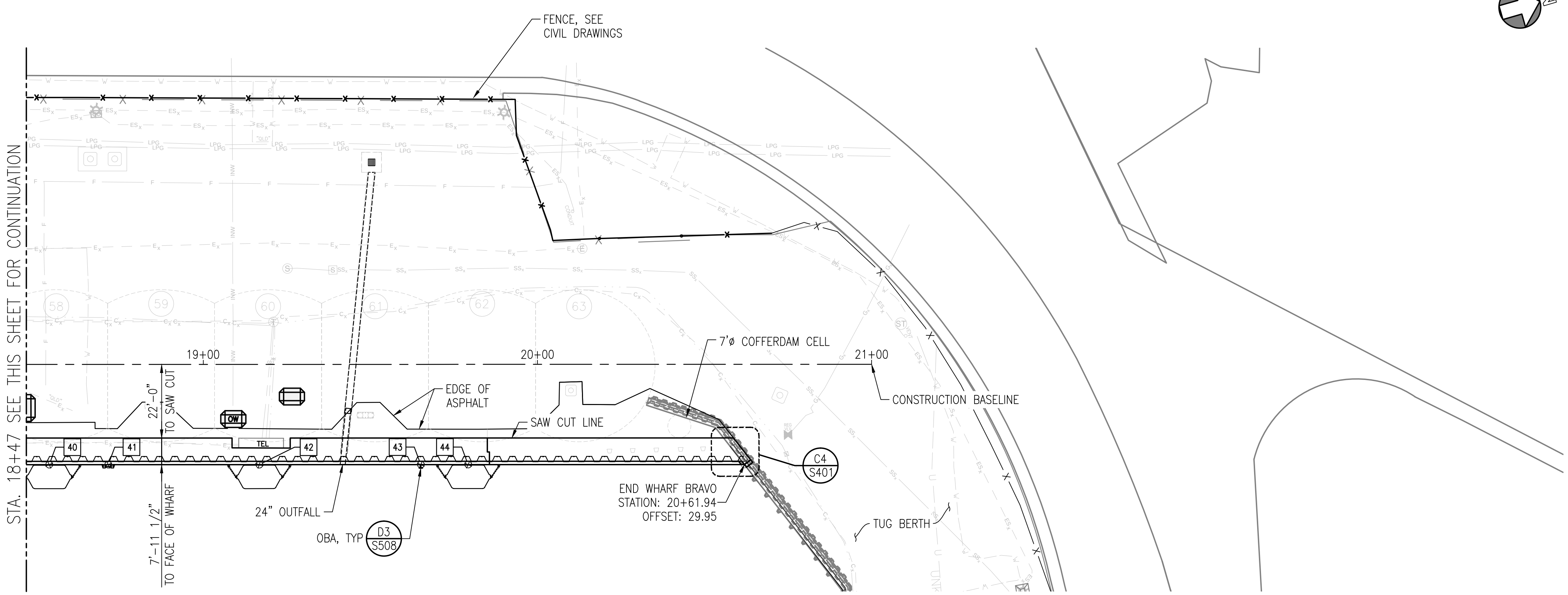
NOTES:

1. SEE G100 FOR CONSTRUCTION BASELINE INFORMATION AND PHASING PLAN.
2. SEE G004 FOR PROJECT GENERAL NOTES AND S001 FOR STRUCTURAL NOTES.

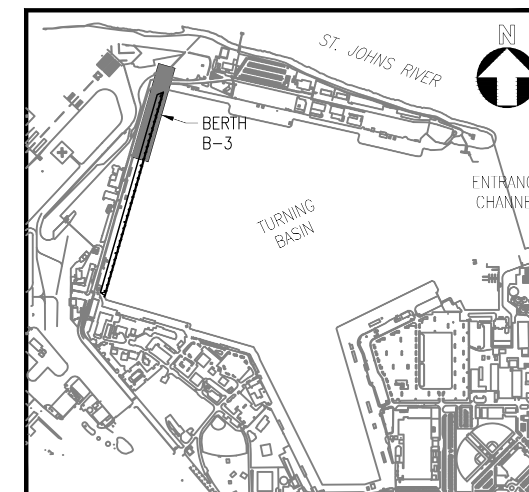
LEGEND:

- 7'ø x14' FOAM FILLED FENDER (FFF)
- W12x54 OIL BOOM ATTACHMENT (OBA)
- LAMINATED RUBBER FENDER LADDER (LRFL)
- STEEL SHEET PILE (SSP) WALL
- OILY WASTE (OW) C1/S505
- COLLECTION HOLDING TRANSFER (CHT) C1/S506
- POTABLE WATER (PW) C1/S507





COMPONENT WORK POINT LOCATIONS		
WP	COMPONENT	STATION
31	FFF	14+22.81
32	OBA	14+36.98
33	FFF	14+78.05
34	LRFL	15+31.52
35	FFF	15+46.46
36	FFF	16+07.33
37	FFF	16+68.74
38	FFF	17+30.32
39	FFF	18+04.17
40	FFF	18+53.85
41	LRFL	18+71.52
42	FF	19+16.74
43	OBA	19+65.08
44	FFF	19+76.25



KEYPLAN
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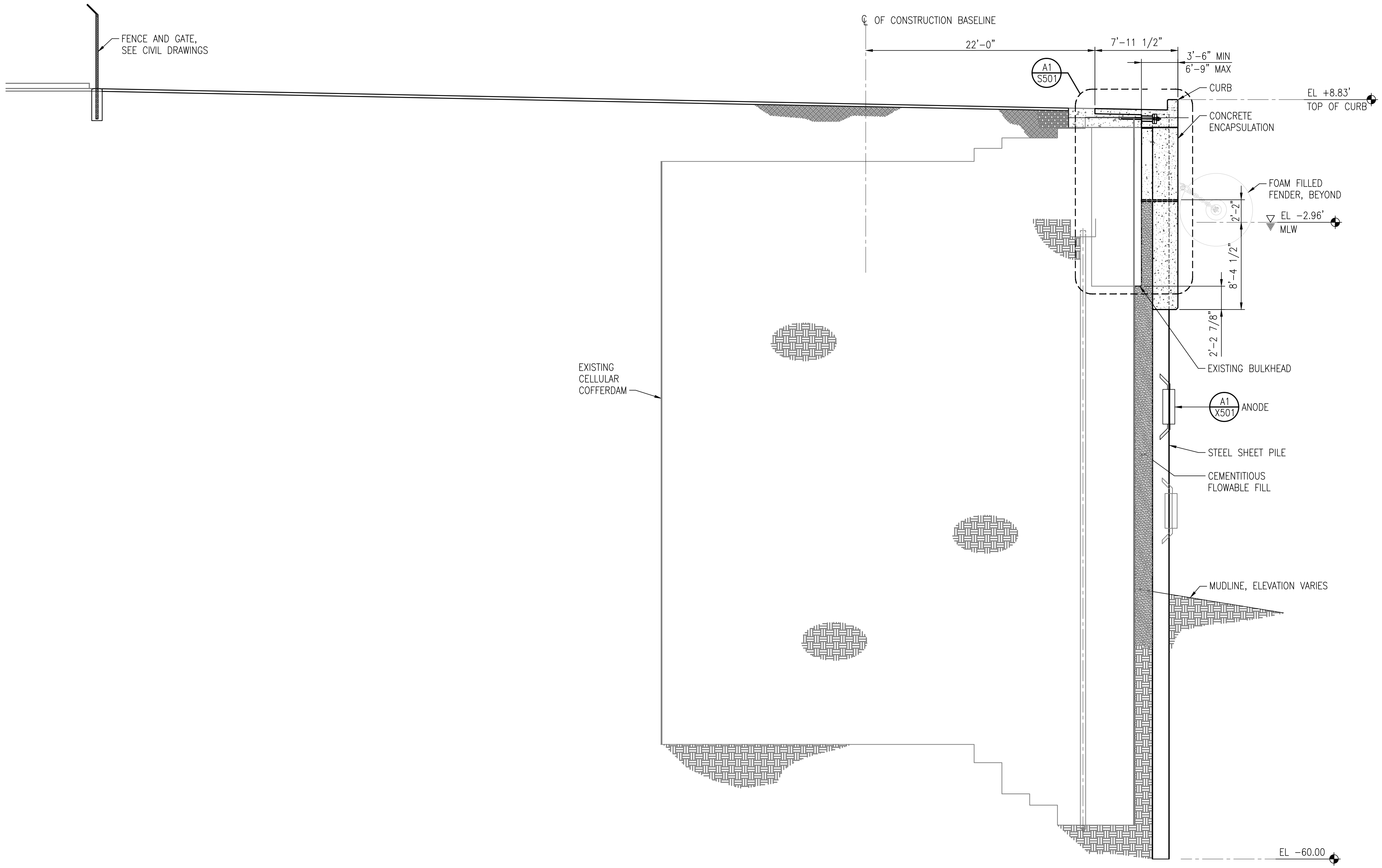
MN FST
A JOINT VENTURE

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
NAVAL FACILITIES ENGINEERING COMMAND
IPT SOUTH ATLANTIC NAVAL AIR STATION, JACKSONVILLE
NAVAL STATION MAYPORT, FLORIDA

WHARF BRAVO RECAPITALIZATION

STRUCTURAL PLAN – BERTH B-3

SCALE: AS NOTED
EPROJECT NO.: 1372158
SHEET 16 OF 21
SK016



A1 TYPICAL WHARF SECTION

Scale: 3/16" = 1'-0"

3/16"=1'-0" 0' 5' 10' 20'

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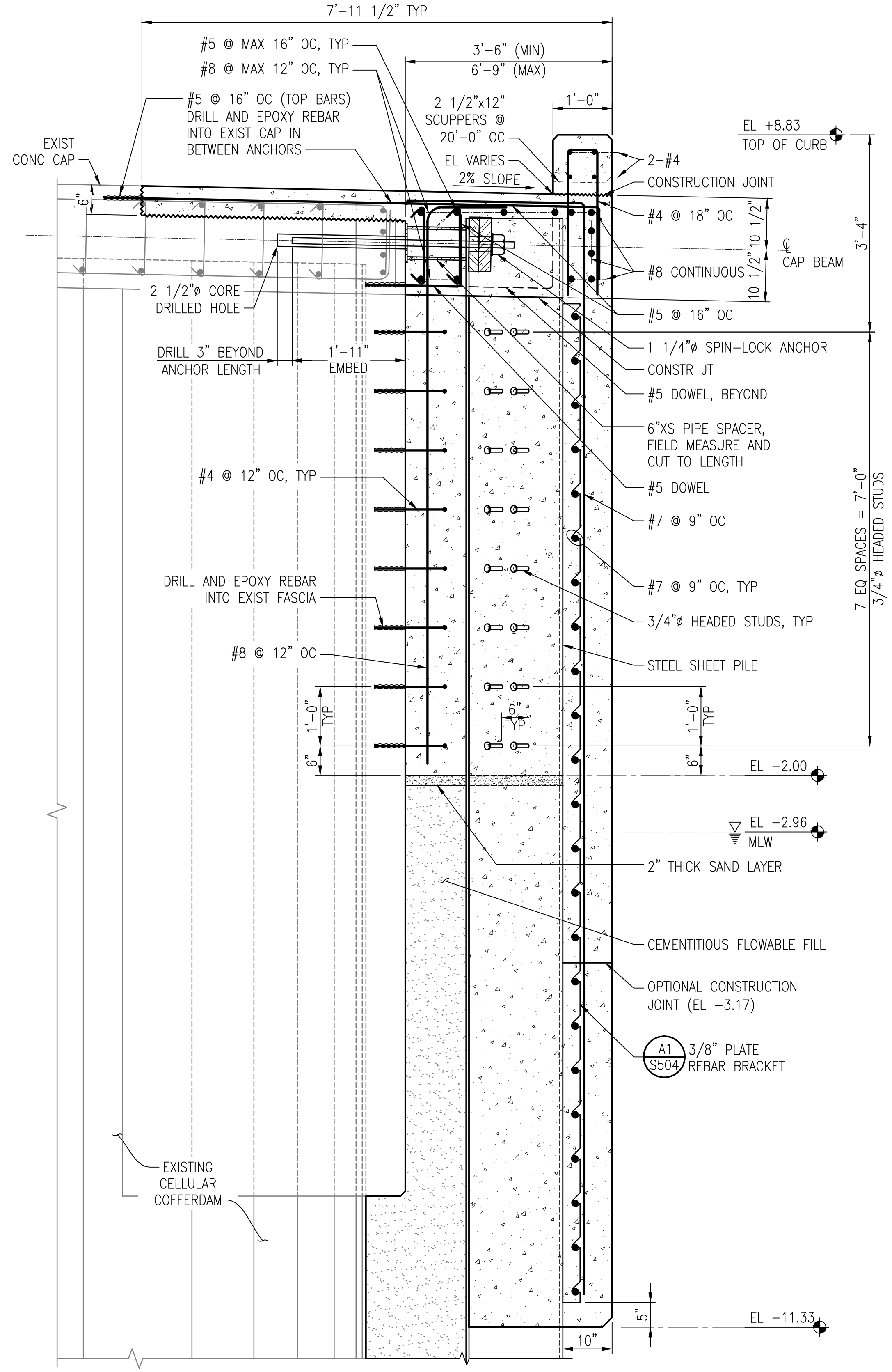
MN FST A JOINT VENTURE

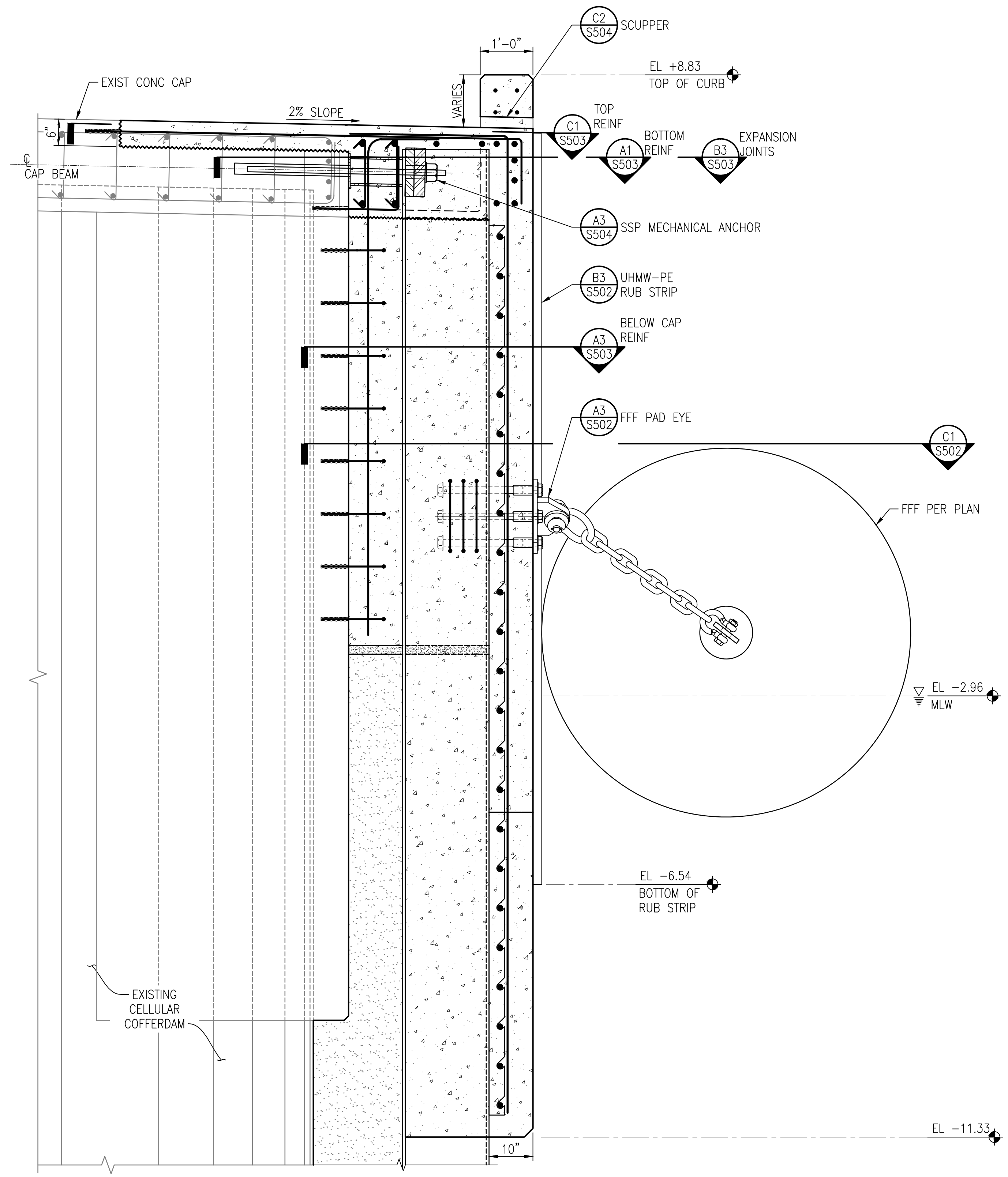
DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
NAVAL FACILITIES ENGINEERING COMMAND
IPT SOUTH ATLANTIC NAVAL AIR STATION, JACKSONVILLE
NAVAL STATION MAYPORT, FLORIDA
WHARF BRAVO RECAPITALIZATION
TYPICAL WHARF SECTION

SCALE: AS NOTED
EPROJECT NO.: 1372158
CONSTR. CONTR. NO. —
NAVFAC DRAWING NO. ——
SHEET 17 OF 21
SK017



A1 **TYPICAL BULKHEAD SECTION**

Scale: 3/4" = 1'-0"



A3 **TYPICAL SECTION AT FOAM FILLED FENDER**

Scale: 3/4" = 1'-0"

3/4"=1'-0" 1' 6" 0' 1' 2' 3' 4'

NAVFAC

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A JOINT VENTURE

APPROVED
FOR COMMANDER NAVFAC / B.L.T.L.
ACTIVITY
SATISFACTORY TO DATE
DES — DRW — CHK —
PROJECT MANAGER
IPT TECH. BRANCH HEAD
CHIEF ENG/ARCH (CORE)

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
NAVAL FACILITIES ENGINEERING COMMAND
IPT SOUTH ATLANTIC
NAVAL AIR STATION JACKSONVILLE
NAVAL STATION MAYPORT, FLORIDA

WHARF BRAVO RECAPITALIZATION

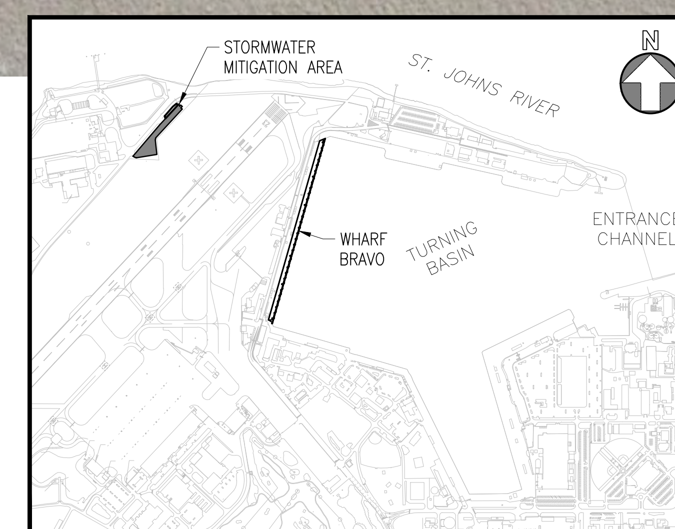
BULKHEAD SECTIONS

SCALE:	AS NOTED
EPROJECT NO.:	1372158
CONSTR. CONTR. NO.	—
NAVFAC DRAWING NO.	—
SHEET	18 OF 21

SK018

DRAWFORM REVISION: 7 AUGUST 2009

FILE NAME: P:\6500-08\500 CADD\520 Submittals\PERMIT DRAWINGS\WHARF-B1372158 SK018.dwg LAYOUT NAME: BULKHEAD SECTIONS PLOTTED: Thursday, September 03, 2015 - 3:46pm USER: tthompson



KEYPLAN
NOT TO SCALE

NOTES:

1. CONTRACTOR SHALL PERFORM A PRE-DEMOLITION TOPOGRAPHIC SURVEY OF MITIGATION AREA.
2. CONTRACTOR SHALL SUBMIT EROSION CONTROL PLAN FOR APPROVAL PRIOR TO COMMENCING DEMOLITION OPERATIONS.
3. SAWCUT PAVEMENT FULL DEPTH WHERE PAVEMENT TO BE DEMOLISHED ABUTS PAVEMENT TO REMAIN. ALL SAWCUTS SHALL BE CLEAN STRAIGHT LINES.
4. REMOVAL OF PAVEMENT SHALL CONSIST OF REMOVAL OF ALL ASPHALT, CONCRETE AND/ OR STONE ENCOUNTERED IN THE AREA INDICATED. CONTRACTOR SHALL ASSUME THE EXISTING PAVEMENT IS 10" THICK.
5. DURING DEMOLITION OPERATIONS, EXISTING DRAINAGE PATTERNS SHALL BE MAINTAINED.

LEGEND:

DEMOLISH PAVEMENT (57,000± SF)

1"=30' 0' 30' 60' 90' 120' 150'

PERMIT ONLY
NOT FOR CONSTRUCTION

MN FST
A JOINT VENTURE

A/E INFO

APPROVED	
FOR COMMANDER NAVFAC / B.L.T.L.	
ACTIVITY	
SATISFACTORY TO DATE	
DES -- DRW -- CHK --	
PROJECT MANAGER	
IPT TECH. BRANCH HEAD	
CHIEF ENG/ARCH (CORE)	

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
NAVAL FACILITIES ENGINEERING COMMAND
IPT SOUTH ATLANTIC
NAVAL AIR STATION JACKSONVILLE
NAVAL STATION
MAYPORT, FLORIDA

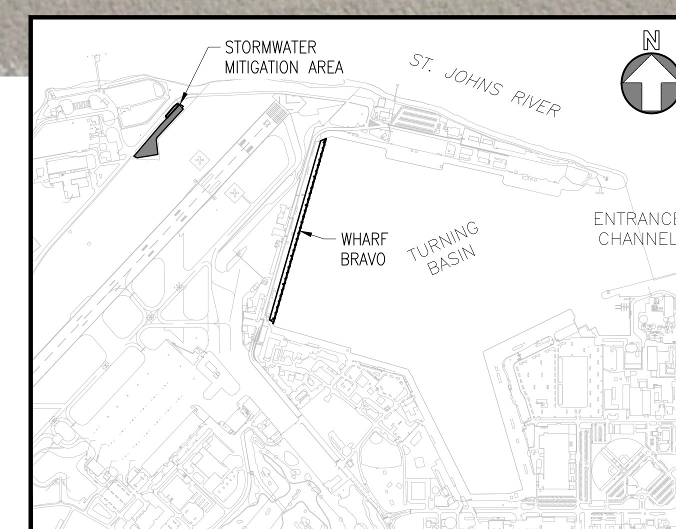
WHARF BRAVO RECAPITALIZATION

STORMWATER MITIGATION AREA DEMOLITION PLAN

SCALE:	AS NOTED
EPROJECT NO.:	1372158
CONSTR. CONTR. NO.	–
NAVFAC DRAWING NO.	--
SHEET	19 OF 21

SK019

DRAWFORM REVISION: 7 AUGUST 2009



KEYPLAN
NOT TO SCALE

NOTES:

1. ENTIRE AREA INDICATED FOR PLANTING SHALL BE GRADED TO DRAIN FOLLOWING EXISTING DRAINAGE PATTERNS. MAXIMUM SLOPE SHALL BE 4:1 HORIZONTAL:VERTICAL AND MINIMUM SLOPE SHALL BE 2%.
2. TOPSOIL INSTALLATION, SEEDING, FERTILIZING, AND MULCHING SHALL BE AS SPECIFIED.

LEGEND:

GRADING, SEEDING AND PLANTING (57,000± SF)

1"=30' 0' 30' 60' 90' 120' 150'

PERMIT ONLY
NOT FOR CONSTRUCTION

MN FST
A JOINT VENTURE

APPROVED	
FOR COMMANDER NAVFAC / B.L.T.L.	
ACTIVITY	
SATISFACTORY TO DATE	
DES --	DRW -- CHK --
PROJECT MANAGER	
IPT TECH. BRANCH HEAD	
CHIEF ENG/ARCH (CORE)	

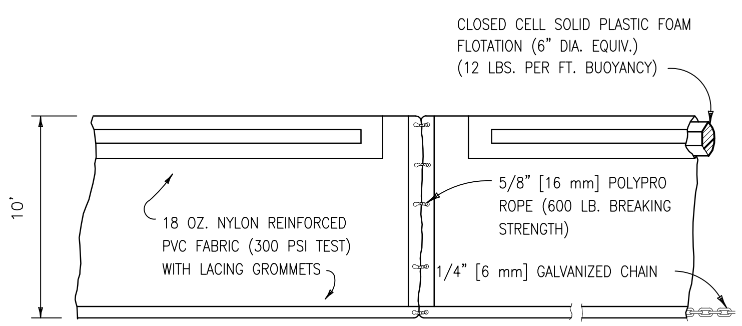
DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
NAVAL FACILITIES ENGINEERING COMMAND
IPT SOUTH ATLANTIC NAVAL AIR STATION JACKSONVILLE
NAVAL STATION MAYPORT, FLORIDA

WHARF BRAVO RECAPITALIZATION

STORMWATER MITIGATION AREA SITE PLAN

SCALE:	AS NOTED
EPROJECT NO.:	1372158
CONSTR. CONTR. NO.	–
NAVFAC DRAWING NO.	--
SHEET 20 OF 21	

SK020



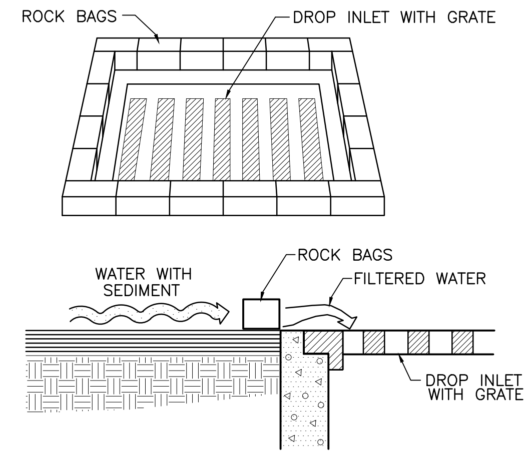
TYPE I

NOTE:

1. TWO (2) PANELS TO BE USED FOR DEPTH GREATER THAN 10 FEET [3.048 m] UNLESS SPECIAL DEPTH CURTAINS ARE SPECIFICALLY CALLED FOR IN THE PLANS OR AS DETERMINED BY THE ENGINEER.

C1 FLOATING TRIBUTARY BARRIERS

Scale: NONE

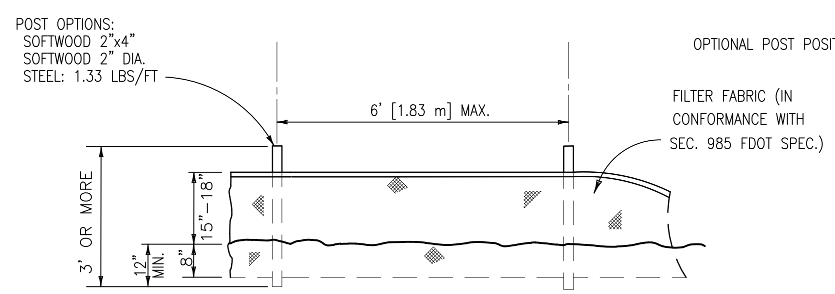


SPECIFIC APPLICATION

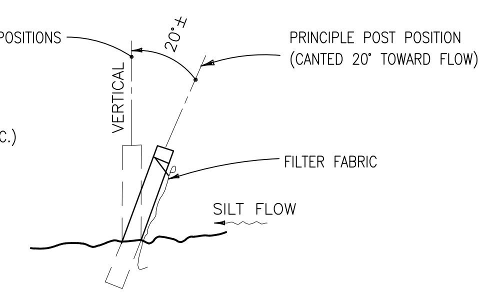
THIS METHOD OF INLET PROTECTION IS APPLICABLE WHERE HEAVY FLOWS ARE EXPECTED AND WHERE AN OVERFLOW CAPACITY IS NECESSARY TO PREVENT EXCESSIVE PONDING AROUND THE STRUCTURE.

C2 ROCK BAG DROP INLET SEDIMENT FILTER

Scale: NONE



ELEVATION



SECTION

B1 TYPE III SILT FENCE

Scale: NONE

PERMIT ONLY
NOT FOR CONSTRUCTION

MN FST A JOINT VENTURE

APPROVED

FOR COMMANDER NAVFAC / B.L.T.L.

ACTIVITY

SATISFACTORY TO DATE

DES -- DRW -- CHK --

PROJECT MANAGER

IPT TECH. BRANCH HEAD

CHIEF ENG/ARCH (CORE)

DEPARTMENT OF THE NAVY NAVAL FACILITIES ENGINEERING COMMAND
NAVAL FACILITIES ENGINEERING COMMAND
IPT SOUTH ATLANTIC NAVAL AIR STATION JACKSONVILLE
NAVAL STATION MAYPORT, FLORIDA
WHARF BRAVO RECAPITALIZATION
EROSION AND SEDIMENT CONTROL DETAILS

SCALE:	AS NOTED
EPROJECT NO.:	1372158
CONSTR. CONTR. NO.	–
NAVFAC DRAWING NO.	––
SHEET 21 OF 21	

SK021

DRAWFORM REVISION: 7 AUGUST 2009

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southeast Regional Office
263 13th Avenue South
St. Petersburg, Florida 33701-5505
http://sero.nmfs.noaa.gov

August 20, 2015 F/SER47:JDF/pw

(Sent via Electronic Mail)

C. R. Destafney
Department of the Navy
Naval Facilities Engineering Command Southeast
Jacksonville, Florida 32212-0030

Attention: Jered Jackson

Dear Ms. Destafney:

NOAA's National Marine Fisheries Service (NMFS) reviewed the draft *Environmental Assessment for the Wharf Bravo Recapitalization at Naval Station Mayport, Jacksonville, Florida* (EA), dated July 2015 and the letter from the Department of the Navy dated July 30, 2015, initiating an Essential Fish Habitat (EFH) consultation for the subject work. The Navy's preferred alternative includes constructing a new steel sheet-pile bulkhead that ties into an existing steel sheet-pile structure, placing fill between existing and new steel sheet-pile bulkheads, installing a concrete pile cap and concrete encasement of sheet pile, paving the wharf deck, repairing electrical and mechanical shore utilities, and upgrading lighting and antiterrorism facilities. The Navy's initial determination is the proposed impacts to EFH within the project area would not constitute a substantial adverse impact to EFH or federally managed fishery species. As the nation's federal trustee for the conservation and management of marine, estuarine, and anadromous fishery resources, the following comments and recommendations are made pursuant to authorities of the Fish and Wildlife Coordination Act and the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act).

EA Section 3.2.4 provides an EFH Assessment that fully meets the requirements of 50 CFR 600.920(e). Impacts to fish may result from use of vibratory and impact pile driving to construct the new bulkhead in front of the existing structure and from placing fill between the existing and new bulkheads. These activities may result in short-term loss of existing oyster growth, attached macroalgae, and potential foraging habitat. The attached macroalgae would likely recolonize the new Wharf Bravo bulkhead in less than one year, while the oyster aggregations on the new bulkhead may require two or more years to reach the pre-construction densities seen on the existing bulkhead. The small area of unconsolidated bottom permanently lost by the new bulkhead is discountable due to the small amount and location within a highly developed and active basin. Standard best management practices described in EA Section 4 should be sufficient for minimizing water quality impacts and for limiting those impacts to the immediate construction area. The NMFS agrees with the Navy's assessments and offers no EFH conservation recommendations for the proposed rehabilitation of Wharf Bravo at Naval Station Mayport.

In accordance with section 7 of the Endangered Species Act of 1973, as amended, it is the responsibility of the Navy to review and identify any proposed activity that may affect endangered or threatened species and their designated critical habitat. Determinations involving species under NMFS jurisdiction should be reported to the NMFS Protected Resources Division at the letterhead address. The Marine Mammal Protection Act of 1972, as amended, prohibits, with certain exceptions, the "take" of marine mammals in U.S. waters. If the proposed action may incidentally take, by harassment, a marine mammal, the Navy should contact the NMFS Office of Protected Resources, Permits Division, at NOAA Headquarters, Silver Spring, Maryland.

The NMFS appreciates the opportunity to provide these comments. Please direct related correspondence to the attention of Ms. Jaclyn Daly-Fuchs at our Charleston Area Office. She may be reached at (843) 762-8610 or by e-mail at Jaclyn.Daly@noaa.gov.

Sincerely,

/ for

Virginia M. Fay
Assistant Regional Administrator
Habitat Conservation Division

cc: Navy, Jered.Jackson@navy.mil
SAFMC, Roger.Pugliese@safmc.net
F/SER4, David Dale@noaa.gov
F/SER47, Jaclyn.Daly@noaa.gov

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND SOUTHEAST
JACKSONVILLE, FL 32212-0030

5090
Ser EV22/288
July 30, 2015

Dr. Pace Wilber
Atlantic Branch Supervisor
NOAA Fisheries
Habitat Conservation Division
219 Fort Johnson Road
Charleston, SC 29412

Dear Dr. Wilbur:

SUBJECT: ESSENTIAL FISH HABITAT CONSULTATION FOR THE RECAPITALIZATION OF WHARF BRAVO AT NAVAL STATION MAYPORT, FLORIDA

The Department of the Navy (Navy) is preparing an Environmental Assessment (EA) for the recapitalization of Wharf Bravo at Naval Station Mayport (NAVSTA Mayport), located in Duval County, Florida. The purpose of this letter is to request consultation for the potential effects of the proposed action on essential fish habitat (EFH).

A concurrent consultation is ongoing with the National Marine Fisheries Service's (NMFS) Protected Resources Division for federally-protected fish species including the endangered shortnose sturgeon (*Acipenser brevirostrum*), Atlantic sturgeon (*Acipenser oxyrinchus oxyrinchus*), and smalltooth sawfish (*Pristis pectinata*), and federal candidate American eel (*Anguilla rostrata*), common thresher shark (*Alopias vulpinus*), and dwarf seahorse (*Hippocampus zosterae*); there is no designated critical habitat within the action area. Consultation is also ongoing with the NMFS Protected Resources Division to acquire an incidental harassment authorization for Level B harassment of bottlenose dolphins (*Tursiops truncatus*) and Atlantic spotted dolphins (*Stenella frontalis*) as the result of in-water pile driving.

The proposed action is fully described in the enclosed Draft Environmental Assessment (EA) entitled: *Draft Environmental Assessment, Wharf Bravo Recapitalization at Naval Station Mayport, FL*, includes the EFH Assessment. Specifically, potential effects to EFH are assessed in sections 3.2.4, 3.2.5, and 3.2.6 of the enclosed Draft EA. The Navy will employ the measures described in Section 4 of the enclosed Draft EA to

avoid and minimize impacts to marine mammals, fish, and sea turtles, their habitats, and forage species.

Pursuant to EFH requirements of the Magnuson-Stevens Fishery Conservation and Management Act (MSA) and implementing regulations, the attached macroalgae (summer flounder EFH) will experience a temporary adverse impact. Oyster reefs (snapper-grouper EFH) will experience long-term adverse impact before regrowth of oysters on the new structures is established. Water column habitats (EFH for all managed species inhabiting the water column) will experience temporary impacts of minimum intensity.

The Navy is providing this EFH Assessment pursuant to 50 CFR 600.920(e) and requests NMFS' Conservation Recommendations to avoid and minimize adverse effects to EFH, pursuant to MSA § 305(b)(4)(A).

The Navy and the NMFS Habitat Conservation Division have a history of effective partnering and we look forward to continuing that relationship with this project that is vital to our country's national security. We would appreciate receiving your comments no later than August 31, 2015.

If you have any questions or need further information, please feel free to contact Mr. Jered Jackson, Natural Resource Specialist at (904) 542-6308 or email: jered.jackson@navy.mil.

Sincerely,

C. R. DESTAFNEY, PE
Environmental Business Line
Coordinator
By direction of the Commanding
Officer

Enclosure: Draft Environmental Assessment, Wharf Bravo Recapitalization at Naval Station Mayport, Jacksonville, Florida

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southeast Regional Office
263 13th Avenue South
St. Petersburg, Florida 33701-5505
http://sero.nmfs.noaa.gov

F/SER31:KBD

C.R. Destafney, Professional Engineer
Environmental Business Line Coordinator
Naval Facilities Engineering Command, Southeast
Department of the Navy
Jacksonville, Florida 32212-0030

FEB 0 4 2016

Dear Sir or Madam:

This letter responds to your requests for consultation with us, the National Marine Fisheries Service (NMFS), pursuant to Section 7 of the Endangered Species Act (ESA) for the following actions.

Applicant	SER Number	Project Type
Department of the Navy, Kings Bay Naval Submarine Base	SER-2015-17389	Infrastructure Repair and Maintenance
Department of the Navy, Naval Station Mayport	SER-2015-17189	Wharf Recapitalization

Consultation History
We received letters on August 6, 2015, and September 15, 2015, requesting consultation for the projects referenced above. They were assigned to a Consultation Biologist on October 23, 2015, and consultation was initiated for both projects on November 18, 2015.

Project Locations

Address	Latitude/Longitude (North American Datum 1983)	Water body
Naval Submarine Base Kings Bay, Camden County, Georgia	30.7978°N, 81.5125°W	Cumberland Sound
Wharf Bravo, Naval Station Mayport, Jacksonville, Duval County, Florida	30.3950°N, 81.4150°W	St. Johns River

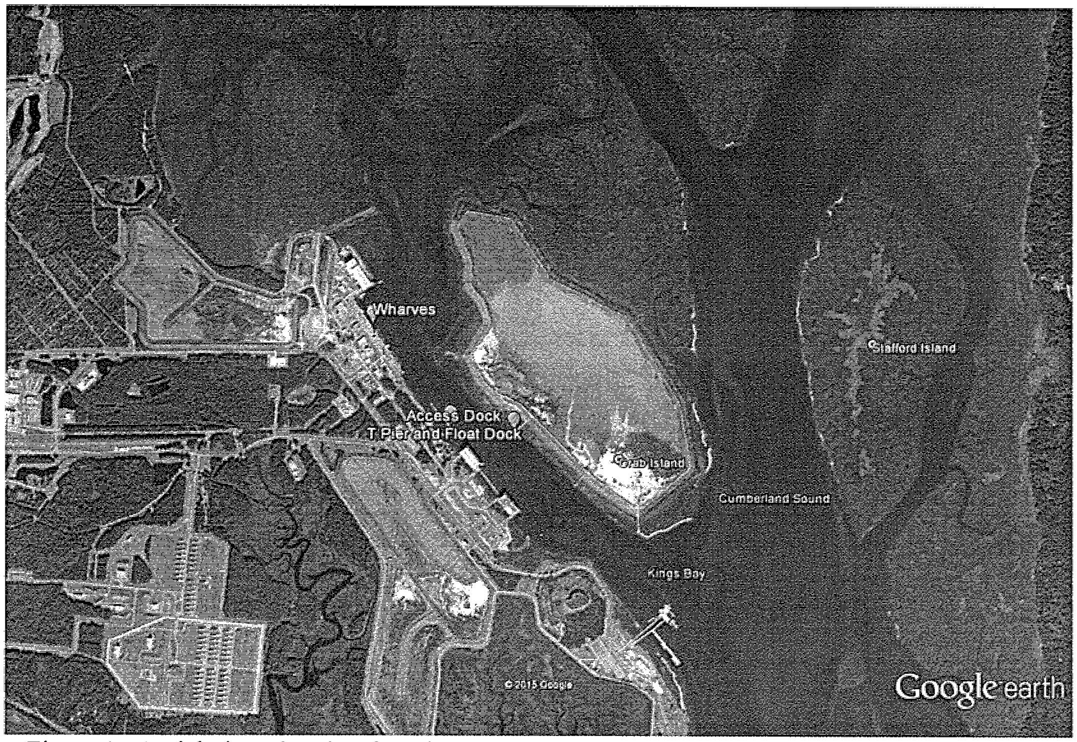


Figure 1. Aerial view showing the Kings Bay Naval Submarine Base location in a side channel of the Crooked River, Camden County, Georgia (©2015 Google Earth)

Figure 2. Aerial view showing Naval Station Mayport wharf recapitalization location in the St. Johns River, Duval County, Florida (©2015 Google Earth)

Existing Site Conditions
The bottom sediments found adjacent to both project sites consist of sand and unconsolidated mud.

Project Descriptions
Naval Submarine Base Kings Bay
The Navy has proposed infrastructure repairs and maintenance along several locations at Naval Submarine Base Kings Bay to allow for mooring of submarines that are fitted with Conformal Acoustic Velocity and Sonar Large Vertical Arrays. The project consists of modification of wharves 1, 2, and 3, rehabilitation of the T Pier, replacement of the small craft floating dock and its guide piles, and replacement of the General Access Pier and guide piles on Crab Island.

Reconfiguration of the 3 wharves will require the removal of 3 concrete fender piles and installation of 3 steel guide piles with 24 inch (in) diameters using an impact hammer. Guide piles would be filled with concrete once they are installed. The installation of each 24-in steel pile is expected to require no more than 70 strikes from the impact hammer. In-water pile removal and installation is projected to take no more than 90 minutes per pile. One day of removal and one day of installation would occur at each wharf, for a total of 6 days of in-water work.

Rehabilitation of the T Pier will require the removal of 179 timber piles and the installation of 140 square pre-stressed concrete piles with 18 in diameters using an impact hammer. Each pile is expected to take up to 60 minutes to extract or to install. Up to 7 piles may be installed each day, for a total of 50 days of active pile driving. Replacing the small craft floating dock will require placing polyethylene jackets on 4 existing steel guide piles and installation of 1 new 24-in fiber-reinforced polymer pile by impact hammer. The new pile will be filled with concrete and will require approximately 2 hours of active pile driving. Repair of the General Access Pier at Crab Island will require the removal of 3 timber guide piles and the installation of 2 square pre-stressed concrete guide piles with 18-in diameters by impact hammer. Pile driving of the concrete piles will require approximately 2 hours. Removal of all of the piles for the different aspects of the project will be conducted by vibratory extraction.

Construction Conditions
A "soft start" procedure will be used in the event that impact hammer pile driving is utilized. Pile driving will occur only during daylight hours. The Navy will comply with NMFS's *Sea Turtle and Smalltooth Sawfish Construction Conditions*, dated March 23, 2006. In the event that an ESA species is observed in the immediate vicinity of pile driving and extraction activities, work will cease until the listed species has moved beyond the 50-ft shutdown zone.

Wharf Bravo Naval Station Mayport
The Navy has proposed the recapitalization of Wharf Bravo, which is located along the west wall of the turning basin at Naval Station Mayport. The project consists of construction of a new steel sheet pile bulkhead that ties into an existing steel sheet pile structure, placement of fill between existing and new steel sheet pile bulkheads, installation of a concrete pile cap and concrete encasement of sheet pile, asphalt wharf deck paving, repairs to electrical and mechanical shore utilities, and upgrades to area lighting and antiterrorism force protection waterfront enclave facilities.

Piles would be driven using vibratory and impact driving methods, but impact driving methods would only be used for areas with obstructions when vibratory methods are inadequate. Existing concrete and timber piles in the project site would be removed by divers and cranes. Construction of the bulkhead would include the installation of approximately 880 single sheet piles to be conducted

in 2 phases. Phase I would include the installation of approximately 590 single sheet piles over 73 days, averaging approximately 10 sheet pile pairs installed per day. Phase II would include the installation of approximately 290 single sheet piles during 37 days, averaging approximately 8-9 sheet piles installed per day. Vibratory hammering is planned with impact driving reserved as a contingency.

Construction Conditions
The Navy will comply with NMFS's *Sea Turtle and Smalltooth Sawfish Construction Conditions*, dated March 23, 2006. In the event that an ESA species is observed in the immediate vicinity of pile driving and extraction activities, work will cease until the listed species has moved beyond the 50-ft shutdown zone. Construction of the wharf is anticipated to occur over a 1-2 year period with a maximum of 130 days of in-water pile driving work. Pile driving will occur only during daylight hours. A "soft start" procedure will be used when impact hammers are used.

Pile Installation at Kings Bay Naval Submarine Base

Pile Types	Number of Piles	Installation Method	Confined Space or Open Water
24-in steel guide	3	impact	open water
18-in concrete	142	impact	open water
24-in polymer	1	impact	open water

Pile Installation at Naval Station Mayport

Pile Types	Number of Piles	Installation Method	Confined Space or Open Water
Steel sheet	880	vibratory or impact	confined space

Action Agency's and NMFS's Effects Determinations

Species	ESA Listing Status	Kings Bay Submarine Base Effect Determination	NMFS Effect Determination	Naval Station Mayport Effect Determination	NMFS Effect Determination
Sea Turtles					
Green	E/T[1]	NLAA	NLAA	NLAA	NLAA
Kemp's ridley	E	NLAA	NLAA	NLAA	NLAA
Leatherback	E	NLAA	NE	NLAA	NE
Loggerhead (Northwest Atlantic Ocean distinct population segment [DPS])	T	NLAA	NLAA	NLAA	NLAA
Hawksbill	E	NLAA	NE	NE	NE
Fish					
Smalltooth sawfish (U.S. DPS)	E	NLAA	NP	NLAA	NP
Shortnose sturgeon	E	NLAA	NLAA	NLAA	NP
Atlantic sturgeon (South Atlantic DPS)	E	NLAA	NLAA	NLAA	NLAA
Whales					
North Atlantic Right	E	NP	NP	NLAA	NP
Humpback	E	NP	NP	NLAA	NP
E = endangered; T = threatened; NLAA = may affect, not likely to adversely affect; NP = not present; NE = no effect					

We believe the projects will have no effect on hawksbill and leatherback sea turtles, due to the species' very specific life history strategies, which are not supported at the project sites. Leatherback sea turtles have pelagic, deepwater life history, where they forage primarily on jellyfish. Hawksbill sea turtles typically inhabit inshore reef and hard bottom areas where they forage primarily on encrusting sponges. In addition, we do not believe smalltooth sawfish would be found in either of the project areas. Kings Bay Submarine Base is situated adjacent to Cumberland Sound, which is

[1] Green turtles are listed as threatened except for the Florida and Pacific coast of Mexico breeding populations, which are listed as endangered.

located in the extreme northern end of the known range for smalltooth sawfish, and the inshore habitat is salt marsh and not the typical red mangrove habitat preferred by the species. The turning basin at Naval Station Mayport is a small area that was excavated from upland that also doesn't offer preferred red mangrove habitat. We also do not believe that North Atlantic right and humpback whales would be found within the small area of the turning basin at Naval Station Mayport. Although historically they were found as far south as the St. Johns River in northern Florida, shortnose sturgeon are thought to no longer occur south of the Altamaha River in Georgia. Extensive sampling in 2002 and 2003 in the St. Johns River resulted in only 1 sturgeon being captured. Even if they do still occur in the St. Johns River, they would not be expected to be present in the turning basin of Naval Station Mayport as it does not offer suitable habitat for foraging or resting.

Critical Habitat

While North Atlantic right whale designated critical habitat borders the project area on the Atlantic Ocean side of Naval Station Mayport, the actual footprint of the project is not located in designated critical habitat, and there are no potential routes of effect to any other designated critical habitat.

Analysis of Potential Routes of Effects to Species

Kings Bay Naval Submarine Base

We believe that Atlantic and shortnose sturgeon and green, loggerhead, and Kemp's ridley sea turtles may be present in the action area and may be affected by the project. We have identified the following potential effects to these species and concluded that the species are not likely to be adversely affected:

Effects to Atlantic and shortnose sturgeon, and green, loggerhead, and Kemp's ridley sea turtles include the risk of injury from the physical action of pile driving and the removal of existing structures, which will be discountable due to the species' ability to move away from the project site. The Navy's compliance with NMFS's *Sea Turtle and Smalltooth Sawfish Construction Conditions*, dated March 2006, will provide an additional measure of protection.

Atlantic and shortnose sturgeon, and green, loggerhead, and Kemp's ridley sea turtles may be affected by noise from the impact driving of the steel piles.

Concrete piles (18-in-diameter): Based on noise data calculations regarding the impact hammer installation of the 18-in-diameter concrete piles (Appendix I – Compendium of Pile Driving Sound Data, updated in 2012) from the California Department of Transportation,[2] this project's noise levels will likely be below the NMFS-accepted peak pressure and single-strike sound exposure level (sSEL) thresholds for injury to fish and sea turtles. Peak pressure noise levels at the source will be 200 decibels (dB) or less, while the peak-pressure injury threshold is 206 dB. The sSEL noise levels will be 170 dB or less at the source, while the sSEL injury threshold is 187 dB. Based on the installation schedule and an sSEL level of 170 dB at the source, according to the model, cumulative sound exposure level (cSEL) injury may occur at a distance of up to 5 meters (m) from the pile-driving activities.

In terms of behavioral effects, the project's impact pile driving will produce about 181 dB root mean square (RMS) of noise at the source, while the NMFS-accepted threshold for behavioral disturbance

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[2] California Department of Transportation. 2009. Technical Guidance for Assessment and Mitigation of the Hydroacoustic Effects of Pile Driving on Fish (with updated 2012 Compendium). Final. February (ICF 645.10). Prepared by ICF Jones & Stokes, Sacramento, CA and Illingworth & Rodkin, Inc., Petaluma, CA.

is 150 dB RMS for fishes and 160 dB RMS for sea turtles. Based on this information, sturgeon may exhibit behavioral changes when within 117 m of the project's active impact pile driving and sea turtles when within 25 m, because that is the distance at which noise levels are expected to dissipate to the respective behavioral disturbance thresholds.

Polymer piles: No noise information was available on the polymer piles, but it is assumed that installation would be quieter than the concrete piles, so it was included in the analysis for the 18-in-diameter concrete piles.

Steel guide piles (24-in-diameter): Based on noise data calculations regarding the installation of the 24-in-diameter steel guide piles by impact hammer, this project's noise levels could result in peak pressure or sSEL injury to fish and sea turtles. Peak-pressure noise levels at the source will be 218 dB, while the peak pressure injury threshold is 206 dB. The sSEL noise levels will be 192 dB at the source, while the sSEL injury threshold is 187 dB. Peak pressure injury may occur within 6 m of the pile-driving activities, and sSEL injury within 2.16 m. Based on the installation schedule and an sSEL level of 192 dB at the source, according to the model, cSEL injury may occur at a distance of up to 76 m from the pile-driving activities.

In terms of behavioral effects, the project's impact pile driving will produce about 205 dB RMS of noise at the source, while the NMFS-accepted threshold for behavioral disturbance is 150 dB RMS for fishes and 160 dB RMS for sea turtles. Based on this information, sturgeon may exhibit behavioral changes when within 4,642 m of the project's active impact pile driving and sea turtles when within 1,000 m, because that is the distance at which noise levels are expected to dissipate to the respective behavioral disturbance thresholds.

Due to their expected avoidance of project noise and activity, we would not expect a sturgeon or sea turtle to remain stationary within the injury or behavioral disturbance radii during pile-installation operations. The use of the "soft start" technique will give sturgeon and sea turtles ample time to leave the area as noise levels increase incrementally and before injury occurs. The site has adequate avenues for animals to escape or avoid the project area during pile-driving activities. There are many other suitable foraging and resting areas in the vicinity of the project that lie outside of the injury and behavioral disturbance zones that listed species could utilize when pile driving is occurring. If an individual chooses to remain within the behavioral disturbance zone, it could be exposed to behavioral noise impacts during pile installations. However, the project area could still be used by these species during quiet periods between pile installations, and during early evening and night hours when pile driving and other construction activities will not occur. In addition, the channel adjacent to the action area terminates into a shallow salt marsh habitat just beyond the action area and would not be expected to be used as a pathway by migrating sturgeon especially since the adjacent Crooked River is a tributary of the St. Marys River and there are no known breeding Atlantic or shortnose sturgeon in the St. Marys River. In summary, we believe the effects on sturgeon and sea turtles caused by noise generated during the installation of piles via impact hammer during this project will be discountable for potential injury effects and insignificant for potential behavioral effects.

Wharf Bravo Naval Station Mayport

We believe that Atlantic sturgeon and green, loggerhead, and Kemp's ridley sea turtles may be present in the action area and may be affected by the project. We have identified the following potential effects to these species and concluded that the species are not likely to be adversely affected.

Effects to Atlantic sturgeon, and green, loggerhead, and Kemp's ridley sea turtles include the risk of injury from the physical action of pile driving and the removal of existing structures, which will be discountable due to the species' ability to move away from the project site. The Navy's compliance with NMFS's *Sea Turtle and Smalltooth Sawfish Construction Conditions*, dated March 2006, will provide an additional measure of protection.

Atlantic sturgeon, and green, loggerhead, and Kemp's ridley sea turtles may be affected by noise from the vibratory driving of the 24-in-wide steel sheet piles.

Vibratory hammer: Based on noise data calculations regarding the vibratory hammer installation of the steel sheet piles, this project's noise levels will likely be below the NMFS-accepted peak-pressure, sSEL, and cSEL thresholds for injury to fish and sea turtles. Peak pressure noise levels at the source will be 192 dB or less, while the peak-pressure injury threshold is 206 dB. The sSEL noise levels will be 178 dB or less at the source, while the sSEL injury threshold is 187 dB. Based on the installation schedule and an sSEL level of 178 dB at the source, according to the model, there will be no cSEL injury.

In terms of behavioral effects, the project's vibratory pile driving will produce about 178 dB RMS of noise at the source, while the NMFS-accepted threshold for behavioral disturbance is 150 dB RMS for fishes and 160 dB RMS for sea turtles. Based on this information, sturgeon may exhibit behavioral changes when within 74 m of the project's active vibratory pile driving and sea turtles when within 16 m, because that is the distance at which noise levels are expected to dissipate to the respective behavioral disturbance thresholds.

Impact Hammer: Because impact hammer pile driving may be used for installation of some of the 24-in-wide steel sheet piles, we also calculated noise data regarding the impact hammer installation of the piles. This project's noise levels will likely be above the NMFS-accepted peak pressure and sSEL thresholds for injury to fish and sea turtles. Peak pressure noise levels at the source will be 220 dB or less, while the peak pressure injury threshold is 206 dB. The sSEL noise levels will be 194 dB or less at the source, while the sSEL injury threshold is 187 dB. Peak pressure injury may occur within 9 m of the pile-driving activities, and sSEL injury within 2.9 m. Based on the installation schedule and an sSEL level of 194 dB at the source, according to the model, cSEL injury may occur at a distance of up to 100 m from pile-driving activities.

In terms of behavioral effects, the project's impact pile driving will produce about 204 dB RMS of noise at the source, while the NMFS-accepted threshold for behavioral disturbance is 150 dB RMS for fishes and 160 dB RMS for sea turtles. Based on this information, sturgeon may exhibit behavioral changes when within 3,981 m of the project's active impact pile driving and sea turtles when within 858 m, because that is the distance at which noise levels are expected to dissipate to the respective behavioral disturbance thresholds.

Due to their expected avoidance of project noise and activity, we would not expect a sturgeon or sea turtle to remain stationary within the injury or behavioral disturbance radii during sheet pile installation operations. The use of the "soft start" technique will give sturgeon and sea turtles ample time to leave the area as noise levels increase incrementally and before injury occurs. The project has adequate avenues for animals to escape or avoid the project area during sheet pile-driving activities. There are many other suitable foraging and resting areas in the vicinity of the project that lie outside of the injury and behavioral disturbance zones that listed species could utilize when pile

driving is occurring. If an individual chooses to remain within the behavioral disturbance zone, it could be exposed to behavioral noise impacts during sheet pile installations. However, the project area could still be used by these species during quiet periods between pile installations, and during early evening and night hours when pile driving and other construction activities will not occur. In addition, the project area is located in a man-made basin created from upland and does not offer resting or foraging habitat for sturgeon or sea turtles. In summary, we believe the effects on sturgeon and sea turtles caused by noise generated during the installation of sheet piles via vibratory hammer or impact hammer during this project will be discountable for potential injury effects and insignificant for potential behavioral effects.

Conclusion
Because all potential project effects to listed species were found to be discountable, insignificant, or beneficial, we conclude that the proposed actions are not likely to adversely affect listed species under NMFS's purview. This concludes the Navy's consultation responsibilities under the ESA for species under NMFS's purview. Consultation must be reinitiated if a take occurs or new information reveals effects of the action not previously considered, or the identified actions are subsequently modified in a manner that causes an effect to the listed species or critical habitat in a manner or to an extent not previously considered, or if a new species is listed or critical habitat designated that may be affected by the identified action. NMFS's findings on the project's potential effects are based on the project description in this response. Any changes to the proposed action may negate the findings of this consultation and may require reinitiation of consultation with NMFS.

We have enclosed additional relevant information for your review. We look forward to further cooperation with you on other projects to ensure the conservation of our threatened and endangered marine species and designated critical habitat. If you have any questions on this consultation, please contact Kay Davy, Consultation Biologist, at (727) 415-9271, or by email at kay.davy@noaa.gov.

Sincerely,

Roy E. Crabtree, Ph.D.
Regional Administrator

Enc.: *PCTS Access and Additional Considerations for ESA Section 7 Consultations* (Revised March 10, 2015)

File: 1514-22.F.3

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND SOUTHEAST
JACKSONVILLE, FL 32212-0030

5090
Ser EV22/287
July 30, 2015

Mr. David Bernhart
National Marine Fisheries Service
Southeast Regional Office
263 13th Avenue South
St. Petersburg, FL 33701-5511

Dear Mr. Bernhart:

SUBJECT: ENDANGERED SPECIES ACT CONSULTATION FOR THE RECAPITALIZATION OF WHARF BRAVO AT NAVAL STATION MAYPORT, FLORIDA

The Department of the Navy (Navy) is preparing an Environmental Assessment (EA) for the recapitalization of Wharf Bravo at Naval Station Mayport (NAVSTA Mayport), located in Duval County, Florida. In accordance with Section 7(a)(2) of the Endangered Species Act (ESA), the Navy is requesting coordination and informal consultation with the National Marine Fisheries Service's (NMFS) concerning the potential affects to Threatened and Endangered species and Critical Habitat within the project area.

The purpose of this consultation is to review the proposed recapitalization of Wharf Bravo by the U.S. Navy (Navy) inside the turning basin at Naval Station Mayport, Florida (NAVSTA Mayport), and the potential effects on species listed under the Endangered Species Act (ESA). The review is summarized in the enclosed Biological Assessment (BA) entitled: *Biological Assessment for the Wharf Bravo Recapitalization at Naval Station Mayport, Jacksonville, Florida.* NAVSTA Mayport is located in Duval County, Florida, along the south side of the mouth of the St. Johns River.

A concurrent consultation is ongoing with the National Marine Fisheries Service's (NMFS) Habitat Conservation Division to review potential effects to essential fish habitat. Consultation is also ongoing with the NMFS Protected Resources Division to acquire an incidental harassment authorization for Level B harassment of bottlenose dolphins (*Tursiops truncatus*) and Atlantic spotted dolphins (*Stenella frontalis*) as the result of in-water pile driving. The U.S. Fish and Wildlife Service is being consulted to review potential effects to ESA-listed species under its purview.

The proposed action is fully described in the July 2015 Draft Environmental Assessment (EA) entitled: *Draft Environmental Assessment, Wharf Bravo Recapitalization at Naval Station Mayport, FL*, which is an enclosure to this letter. The primary potential effects to species under NMFS purview would be associated with the in-water vibratory pile driving (and contingency impact pile driving) of up to

880 single sheet piles. The time required to drive each pile with a vibratory driver would be less than 60 seconds. The maximum in-water action area includes the NAVSTA Mayport turning basin and extends in a narrow band almost 7 kilometers into the Atlantic Ocean, but does not extend into the primary migration corridor of the St. Johns River. The airborne action area extends approximately 750 meters in radius around the pile driving activity, extending nearly three quarters of the way across the surface of the St. Johns River (see Figure 2 in the attached BA for a depiction of the maximum in-water and airborne action areas).

Species under NMFS purview that are considered in the attached BA and EA include the endangered North Atlantic right whale (*Eubalaena glacialis*) and its designated and proposed critical habitat, humpback whale (*Megaptera novaeangliae*), shortnose sturgeon (*Acipenser brevirostrum*), Atlantic sturgeon (*Acipenser oxyrinchus oxyrinchus*), smalltooth sawfish (*Pristis pectinata*), green sea turtle (*Chelonia mydas*), hawksbill sea turtle (*Eretmochelys imbricate*), Kemp's ridley sea turtle (*Lepidochelys kempii*), and leatherback sea turtle (*Dermochelys coriacea*), the threatened loggerhead sea turtle (*Caretta caretta*), and federal candidate species, including the American eel (*Anguilla rostrata*), common thresher shark (*Alopias vulpinus*), and dwarf seahorse (*Hippocampus zosterae*).

The Navy has determined that the proposed action will have no effect on the hawksbill sea turtle and dwarf seahorse and may affect but is not likely to adversely affect other listed, threatened, or endangered species nor result in the destruction or adverse modification of federally-designated critical habitat for the North Atlantic Right Whale. Pursuant to Section 7 of the ESA, we request your concurrence with these findings.

The Navy and the NMFS Protected Resources Division have a history of effective partnering and we look forward to continuing that relationship with this project. We would appreciate receiving your comments no later than August 31, 2015.

If you have any questions or need further information, please feel free to contact Mr. Jered Jackson, Natural Resources Specialist at (904) 542-6308 or email: jered.jackson@navy.mil.

Sincerely,

C. R. DESTAFNEY, PE
Environmental Business Line
Coordinator
By direction of the Commanding
Officer

5090
Ser EV22/287
July 30, 2015

Enclosures: 1. Biological Assessment for the Wharf Bravo Recapitalization at Naval Station Mayport, Jacksonville, Florida

2. Draft Environmental Assessment, Wharf Bravo Recapitalization at Naval Station Mayport, Jacksonville, Florida

2 September 2015

Ms. Jolie Harrison, Chief
Permits and Conservation Division
Office of Protected Resources
National Marine Fisheries Service
1315 East-West Highway
Silver Spring, MD 20910-3225

Dear Ms. Harrison:

The Marine Mammal Commission (the Commission), in consultation with its Committee of Scientific Advisors on Marine Mammals, has reviewed the U.S. Navy's (the Navy) application seeking authorization under section 101(a)(5)(D) of the Marine Mammal Protection Act to take marine mammals by harassment. The taking would be incidental to pile driving in association with a wharf repair project in Mayport, Florida. The authorization would be in effect for one year—this will be the second and final year of activities. The Commission also has reviewed the National Marine Fisheries Service's (NMFS) 8 August 2015 notice (80 Fed. Reg. 46545) announcing receipt of the application and proposing to issue the authorization, subject to certain conditions.

The Navy plans to install piles during repair of a berthing wharf at Naval Station Mayport, east of Jacksonville, Florida. During this second year, the Navy would install up to 36 single sheet steel piles, 38 steel king piles, and 50 polymeric piles using a vibratory and/or an impact hammer. The Navy expects installation of the piles to take up to 47 days, 27 days of vibratory and 20 days of impact pile driving. It does not expect that impact pile driving would be needed for most of the piles. The Navy would use only one hammer, either vibratory or impact, at any given time. Activities would be limited to daylight hours only.

NMFS preliminarily has determined that, at most, the proposed activities would modify temporarily the behavior of small numbers of bottlenose dolphins. It also anticipates that any impact on the affected species and stocks would be negligible. NMFS does not anticipate any take of marine mammals by death or serious injury and believes that the potential for temporary or permanent hearing impairment would be at the least practicable level because of the proposed mitigation measures. The mitigation, monitoring, and reporting measures include—

- using soft-start, delay, and shut-down procedures;
- using delay and shut-down procedures if a species for which authorization has not been granted, including spotted dolphins, approaches or is observed within the Level B harassment zone;
- using two qualified protected species observers to monitor the harassment zones for 15 minutes before, during, and for 30 minutes after pile-driving activities—including one observer that would be required to monitor the turning basin, the entrance to that basin, and portions of the Atlantic Ocean that would be ensonified, to the extent possible and a third

shore-based observer to monitor solely the entrance to the turning basin and surrounding, observable portions of the Atlantic Ocean during vibratory pile driving on three separate days;

- reporting injured and dead marine mammals to NMFS and local stranding network using NMFS's phased reporting approach and suspending activities, if appropriate; and
- submitting a final monitoring report to NMFS.

Acoustic monitoring measures

In the previous incidental harassment authorization, NMFS required the Navy to conduct empirical in-water and in-air sound[1] measurements of (1) installation of the various types of piles using a vibratory and impact hammer and (2) ambient underwater sound[2]. The Navy collected empirical in-water and in-air data during vibratory pile driving of the king and sheet piles. The polymeric piles have yet to be installed, and impact driving was not necessary during the first year of activities. The Commission understands that impact pile driving likely would not be necessary during the second year either but was included by the Navy as a contingency. Therefore, the Commission recommends that NMFS require the Navy to conduct empirical sound measurements of installation of the polymeric piles using a vibratory hammer and, opportunistically, of installation of any other piles that are driven with an impact hammer on those days that sound measurements of the polymeric piles are made.

The Commission hopes you find its comments useful. Please contact me if you have questions regarding the Commission's comments and recommendation.

Sincerely,

Rebecca J. Lent

Rebecca J. Lent, Ph.D.
Executive Director

[1] Which were overpowered by other construction sound.
[2] It is unclear if the Navy collected ambient sound measurements during the first year of activities.

United States Department of the Interior

U. S. FISH AND WILDLIFE SERVICE

7915 BAYMEADOWS WAY, SUITE 200
JACKSONVILLE, FLORIDA 32256-7517

IN REPLY REFER TO:
FWS Log. No. 04EF1000-2015-I-0367

November 20, 2015

C.R. Destafney, PE
Environmental Business Line Coordinator
Department of the Navy
Naval Facilities Engineering Command Southeast
Naval Air Station, Jacksonville
Jacksonville, Florida 32212-0030
(Attn: Jered Jackson)

Re: Recapitalization of Wharf Bravo: Naval Station Mayport, Florida

Dear Ms. Destafney:

Our office has reviewed your correspondence dated July 30th, 2015, its accompanying Biological (BA) and Environmental Assessments (EA), and email responses to our request for additional information. The Navy proposes to recapitalize Wharf Bravo, which is located along the western border of the Naval Station Mayport (NAVSTA Mayport) Turning Basin. Recapitalization activities include the installation of 880 individual sheet piles through vibratory or impact hammer driving waterward of the existing wharf's sheet pile wall, fill placement between the old and new sheet piles, installation of a concrete pile cap and foam-filled fenders, concrete encasement of sheet pile, wharf deck paving with asphalt, repairs to electrical and mechanical shore utilities, and upgrades to area lighting and anti-terrorism/force protection waterfront enclave facilities. This project will increase the existing wharf footprint by approximately 12,000 square feet. The existing lighting on the current 14, 30-foot pole lights at Wharf Bravo would be replaced by a lighting system consisting of downward facing, shielded (full cut-off) fixtures supporting two (2) LED white flood lights for use during wharf operations, two (2) amber LED sea turtle lights for wharf illumination during non-operational periods, one (1) LED street light fixture providing adjacent roadway lighting, and one (1) Federal Aviation Authority-mandated obstruction light fixture. Sheet pile driving is planned to occur in two phases. Phase 1 (Wharves B-2 and B-3) involves installing 590 single sheet piles, averaging 10 sheet pile pairs per day over approximately 73 days. Phase II (Wharf B-1) involves installing 290 single sheet piles, averaging 8 - 9 sheet piles per day for approximately 37 days. About 85% of the time required for sheet pile installation is reserved for vibratory driving, with the remaining 15 % for contingency impact driving. We provide the following comments in accordance with Section 7 of the Endangered Species Act of 1973, as amended (Act) (16 U.S.C. 1531 *et seq.*).

The Navy determined that the proposed project occurs within the range of the endangered West Indian (Florida) manatee (*Trichechus manatus latirostris*) and its designated critical habitat, the threatened wood stork (*Mycteria americana*), piping plover (*Charadrius melodus*) and one of its designated critical wintering habitat units (FL-35), the federally threatened red knot (*Calidris canutus rufa*), and the threatened loggerhead (*Caretta caretta*) and endangered green (*Chelonia mydas*) and

leatherback (*Dermochelys coriacea*) sea turtles. The Navy determined that the proposed activities, including the noise generated by those activities, are not likely to adversely affect the wood stork, piping plover, and rufa red knot, and have no effect on FL-Unit 35 of piping plover critical wintering habitat. We concur with those determinations. Regarding nesting and hatchling sea turtles, the Navy concluded that replacement of the current cobra head fixtures and high pressure sodium lights present on the 14 pole lights at Wharf Bravo with a lighting system that includes full cut-off, downward directed white LED flood lights for wharf operations, and red/amber (ca 590 nanometers wavelength) LED lighting for use during non-operational periods, is expected to substantially reduce any direct and indirect lighting and sky glow associated with the existing lighting. We agree with this assessment, and therefore support these construction specifications. The Navy in its EA also stated that these and all other permanent exterior project lighting fixtures will be designed to be consistent with the NAVSTA Mayport Light Management Plan. We support this position, and in addition recommend that the Navy apply the Florida Fish and Wildlife Conservation Commission's Sea Turtle Lighting Guidelines (http://myfwc.com/media/418417/SeaTurtle_LightingGuidelines.pdf) and approved lighting reference http://www.myfwc.com/wildlifehabitats/managed/sea-turtles/turtles-lights/recommendations to such lighting to the maximum possible extent. The Navy has agreed to add this recommendation as an additional project specification. With respect to project construction, the EA included a requirement to implement sea turtle lighting conditions that seek to avoid direct and indirect lighting and minimize sky glow visible from adjacent nesting beaches through light reduction, shielding, lowering, and placement consistent with human safety requirements. In-water work will be restricted to daylight hours (one-half hour after sunrise to one-half hour before sunset). Non in-water construction will be restricted to the hours between 6:00 am and 10:00 pm year round. We also support implementation of these conditions.

The Navy determined that the proposed project would not adversely affect three species of nesting and hatchling sea turtles. The project site is between approximately 0.75 and 1.25 miles from the nearest sea turtle nesting beaches. These distances, and the presence of intervening sand dunes and man-made structures are also expected to contribute to the avoidance of adverse impacts to nesting and hatchling sea turtles from direct and indirect lighting and sky glow. Based on these and the preceding conditions, we concur with the Navy's determination.

With respect to the manatee, anecdotal sightings reported to NAVSTA Mayport indicate that individuals occur regularly within the Turning Basin, predominantly from early-spring through mid-fall. Watercraft moored and operating within the basin is restricted to military and other DON-authorized vessels; basin access to the general boating public is prohibited. As a result, ship activity within the basin at any given time is generally less than adjacent waters within the St. Johns River. Such conditions, the presence of attached aquatic vegetation on spill containment booms and permanent in-water structures along the edges of the basin, and irregular discharges of fresh water from ships and storm water and other facilities and operations seasonally attract manatees into the basin. The sighting reports indicated that the majority of animals were observed along the shorelines on the southern side of the turning basin between the tug basin and Alpha wharf. Most of the observations were of single individuals.

The Navy evaluated potential adverse impacts to manatees from all in-water activities including watercraft movement, demolition and removal of underwater obstructions and debris, installation of a new steel, sheet pile bulkhead primarily through vibratory driving and contingency impact hammer driving, installation of new foam-filled fenders, and placement of gravel or concrete flowable fill

between the old and new walls. Due to the structural integrity of the existing wharf, the Navy has deemed the use of barge-based cranes unlikely, and anticipates deploying shore-based equipment and the land-based storage of materials and supplies. Some small vessel use is expected with the project. The Navy has agreed to abide by the 2011 Standard Manatee Conditions for In-Water Work (Standard Conditions), which include a restriction on project-related vessels to travel no faster than slow speed, minimum wake when and where operating in a project-related capacity within the turning basin, and obeying all manatee protective speed zones. The demolition and removal of in-water obstructions and debris will occur physically and mechanically; no blasting is anticipated. The Standard Conditions also will apply to this work, as well as the filling of the space between the old and new bulkhead walls. We further recommend that to avoid potential crushing of manatees between vessels and the new bulkhead, the Navy include in its project plans and specifications the requirement for the new foam-filled fenders to have a stand-off distance of four feet under maximum compression. The Navy has agreed to this inclusion.

With respect to pile driving, the Navy estimated that once positioned, it would take less than 60 seconds to drive each single and paired sheet pile using vibratory driving. Any contingency driving by impact hammer will not exceed 20 strikes per day, and no more than 5 -10 minutes to complete. The Navy used existing sound pressure levels measured from both vibratory and impact hammer driving on steel sheet piles and steel pipe piles for other projects to model potential auditory impacts from the proposed project.

Applying injury/disturbance threshold levels to cetaceans representing National Marine Fisheries Service and Navy estimates for impact hammer (180/120 dB re 1 uPa rms) and vibratory driving (180/160 dB re 1 uPa rms), respectively, to its model, the Navy found injury/disturbance distances of 40/858 m and < 1/7,356 m for impact and vibratory driving, respectively. The calculations assumed a field free of obstruction (open water conditions). Sound attenuation is expected to occur at shorter distances due its encounters with the bottom substrate, basin shorelines, and other solid objects.

Manatee response to in-water sounds is highly variable. Most of the studies have involved movement towards or away from such sounds. When encountering sound at levels within and above the species' range of hearing and vocalization, the most notable response by manatees was to increase the level of vocalization, presumably to maintain communication with other manatees in the same proximity. There is no clear or consistent evidence that anthropogenic sounds at the levels described as resulting in behavioral disturbance to cetaceans causes disruption of behavioral patterns in manatees. Unlike large cetaceans, manatees occupy environments where they can be exposed to ambient sounds that have a significant anthropogenic component. Observations of manatees within the Mayport Ship Turning Basin during the Wharf Charlie 1 (C-1) and Charlie 2 (C-2) recapitalization projects, which included primarily vibratory pile driving over multiple months, did not reveal any disruption of behavioral patterns. Three animals were observed on three different days during the 2012 pile driving activities for C-1 that occurred between January 16th and April 23rd. Nineteen observations of manatees occurred over 9 days out of 48 total pile driving days in 2015 for the C-2 project that began on May 26th and ended September 11th. The observations included adults and calves, some of which were close enough to the pile driving to necessitate shutdowns of the operation. There were 126 anecdotal manatee observations within the Mayport Ship Turning Basin from January through September 2015.

The Wharf Bravo project involves nearly three times the number of sheet piles compared to both the C-1 and C-2 projects. In contrast to the 2 days of impact hammer pile driving that occurred during

the C-1 project, the Navy has reserved 20 days for contingency impact hammer driving. Due to this order of magnitude increase, we recommend that the shutdown zone for manatees during impact hammer use be extended to the same distance (40 meters) as cetaceans. The Navy agreed to incorporate this recommendation into its Marine Mammal Monitoring Plan.

The Navy has determined that the proposed project is not likely to adversely affect the manatee. We concur with this determination and the Navy's agreement to incorporate the two additional manatee protection and conservation recommendations into the project plans and specifications.

Although this does not represent a biological opinion as described in section 7 of the Act, it does fulfill the requirements of the Act and no further action is required. However, if the Navy modifies the project to the extent that affects its determination, it is unable to implement the stated specifications for protected species, if additional information involving effects to the above or other listed species potentially affected by the action becomes available, or if take of any of the above species occurs during the activities identified and considered previously, the Navy shall contact our office within 24 hours to determine what additional actions may be required. For any unauthorized take, the Navy shall further attempt to identify the cause of the take, and provide the Service that information at the initial contact. If after coordination with the Service it appears additional take is imminent from continued operations, we strongly recommend cessation of the operation(s) to avoid potential criminal/civil liability under section 9 of the Act.

If you have any questions regarding this response, please contact Mr. John Milio of my staff at the address on the letterhead, by e-mail at john_milio@fws.gov, or by calling 904-731-3098.

Sincerely,

for Jay B. Herrington
Field Supervisor

cc:
FWC (R. Mezich)

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND SOUTHEAST
JACKSONVILLE, FL 32212-0030

5090
Ser EV22/286
July 30, 2015

Mr. Jay Herrington
Field Supervisor
U.S. Fish and Wildlife Service
7915 Baymeadows Way, Suite 200
Jacksonville, FL 32256-7517

Dear Mr. Herrington:

SUBJECT: ENDANGERED SPECIES ACT CONSULTATION FOR THE RECAPITALIZATION OF WHARF BRAVO AT NAVAL STATION MAYPORT, FLORIDA

The Department of the Navy (Navy) is preparing an Environmental Assessment (EA) for the recapitalization of Wharf Bravo at Naval Station Mayport (NAVSTA Mayport), located in Duval County, Florida. In accordance with Section 7 (a) (2) of the Endangered Species Act (ESA), the Navy is requesting coordination and informal consultation with the U.S. Fish and Wildlife Service (USFWS) concerning the potential affects to Threatened and Endangered species and Critical Habitat within the project area.

The purpose of this consultation is to review the proposed recapitalization of Wharf Bravo by the U.S. Navy (Navy) inside the turning basin at Naval Station Mayport, Florida (NAVSTA Mayport), and the potential effects on species listed under the Endangered Species Act (ESA). The review is summarized in the enclosed Biological Evaluation (BE) entitled: *Biological Evaluation for the Wharf C-2 Recapitalization Project at Naval Station Mayport, Florida*. NAVSTA Mayport is located in Duval County, Florida, along the south side of the mouth of the St Johns River.

A concurrent consultation is ongoing with the National Marine Fisheries Service (NMFS) Protected Resources Division to review potential effects to ESA-listed species under its purview. The NMFS Habitat Conservation Division is also being consulted to review potential effects to essential fish habitat.

The proposed action is fully described in the July 2015 Draft Environmental Assessment (EA) entitled: *Draft Environmental Assessment, Wharf Bravo Recapitalization at Naval Station Mayport, FL*, which is an enclosure to this letter. The

primary potential effects to species under NMFS purview would be associated with the in-water vibratory pile driving (and contingency impact pile driving) of up to 880 single sheet piles. The time required to drive each pile with a vibratory driver would be less than 60 seconds. The maximum in-water action area includes the NAVSTA Mayport turning basin and extends in a narrow band almost 7 kilometers into the Atlantic Ocean, but does not extend across the primary manatee migration corridor of the St Johns River (see Figure 6-2 in the attached BA for a depiction of the maximum in-water action area). The airborne action area extends approximately 750 meters in radius around the pile driving activity, extending nearly three quarters of the way across the surface of the St. Johns River.

Species under USFWS purview that are considered in the attached BE and EA include the endangered West Indian manatee (*Trichechus manatus*) and wood stork (*Mycteria americana*)and the threatened piping plover (*Charadrius melodus*) andred knot (*Calidris canutus* ssp. *rufa*). Critical habitat has been designated for the West Indian manatee in the action area and was also analyzed.

The Navy has determined that the proposed action may affect but is not likely to adversely affect the listed species and will have no effect on West Indian manatee critical habitat. Pursuant to Section 7 of the ESA, we request your concurrence with these findings.

The Navy and the USFWS have a history of effective partnering and we look forward to continuing that relationship with this project. We would appreciate receiving your comments no later than August 31, 2015.

If you have any questions or need further information, please feel free to contact Mr. Jered Jackson, Natural Resources Specialist at(904) 542-6308 or email: jered.jackson@navy.mil.

Sincerely,

C. R. DESTAFNEY, PE
Environmental Business Line
Coordinator
By direction of the Commanding
Officer

5090
Ser EV22/286
July 30, 2015

Enclosures: 1. Biological Evaluation for the Wharf Bravo Recapitalization Project at Naval Station Mayport, Jacksonville, Florida
2. Draft Environmental Assessment, Wharf Bravo Recapitalization at Naval Station Mayport, Jacksonville Florida

APPENDIX B
Air Quality Analyses

Air Quality Assumptions

USEPA's Office of Transportation and Air Quality has developed the Motor Vehicle Emission Simulator (MOVES) to provide accurate estimates of emissions from cars, trucks, and non-highway mobile sources under a wide range of user-defined conditions. MOVES is able to perform a series of calculations to provide estimates of bulk emissions or emission rates based on a default database that summarizes emission relevant information for the entire U.S. For the purpose of this study, MOVES2014, the latest version of MOVES, was used to estimate emissions from both on-road and non-road activities as MOVES2014 includes the NONROAD2008 model. MOVES2014 was used to estimate air emissions from common construction equipment identified in Table 1.

Table 1. Engine Horse Power Estimates of Common Construction Equipment

Equipment Types	Engine Horse Power[1]
Impact Pile Driver	700
Vibratory Pile Driver	375 & 630
Excavator	171
Grader	204
Tractors/Loaders/Backhoes	94
Crane	231
Generator	603
Hydroseeder	40
Paving Equipment	70
Rollers	92
Trenchers	76
Bore/Drill Rigs	76
Paver	124

1. The average horsepower (hp) corresponding to each equipment type was estimated from Appendix A of *Nonroad Engine Population Estimates*, Report No. NR-006e (EPA-420-R-10-017). Actual hp for the Vibratory Pile Drivers were provided by spec sheets for APE 300 and APE 150 Vibratory Drivers.

Construction-worker vehicle emissions were also included in the analyses for driving within Installation boundaries (e.g., entry onto the Installation, lunch break, and exit from the Installation). The average number of miles used each day for each vehicle was 30 miles per day. It was assumed construction workers drive individually to the job site. MOVES2014 was also used to estimate air emissions from personally-owned vehicles, dump trucks, and delivery trucks coming on-site to support construction activities under Alternative 2.

Air emissions from hot mix asphalt paving and a diesel-fired 450-kilowatt generator were estimated using factors from USEPA's AP-42 Chapter 11.1 and Chapter 3.4, respectively. Assumptions were made regarding the total number of days and hours each piece of equipment would be used, as well as the total number of miles traveled by the personally-owned vehicles, dump trucks, and delivery trucks.

The assumptions for the construction equipment and vehicles needed to support Alternative 2 activities are summarized in Table 2. Table 3 provides an estimate of the total air emissions (tons/year) resulting from the equipment employed to support Alternative 2 activities versus the *de minimis* threshold levels.

Table 2. Equipment and Vehicle Assumptions for Alternative 2

Phase	Duration (days)	Equipment Type	Fuel	Number of Equipment	Hours/Day in Operation	Roundtrip (miles/day)	Notes
Demolition	10	Personally-owned Vehicle (POV) – Passenger Car	Gasoline	8	-	30	Assume 16 workers/day
	10	POV – Passenger Truck	Gasoline	8	-	30	Assume 16 workers/day
	10	Crane	Diesel	1	8	-	
	10	Dump Truck	Diesel	1	-	36	18 miles to Blasius Rd C&D Landfill
	10	Tractor/Loader/Backhoe	Diesel	1	8	-	
Sheet Piles	128	POV – Passenger Car	Gasoline	20	-	30	Assume 40 workers/day
	128	POV – Passenger Truck	Gasoline	20	-	30	Assume 40 workers/day
	128	Crane	Diesel	1	6	-	
	10	Delivery Truck	Diesel	1	-	30	
	20	Impact Pile Driver	Diesel	1	0.5	-	
	110	APE 300 Vibratory Driver (Model 630 Power Unit)	Diesel	1	4	-	
	110	APE 150 Vibratory Driver (Model 150 Power Unit)	Diesel	1	4	-	
Stormwater Basin	10	POV – Passenger Car	Gasoline	5	-	30	Assume 10 workers/day
	10	POV – Passenger Truck	Gasoline	5	-	30	Assume 10 workers/day
	8	Excavator	Diesel	1	8	-	
	8	Grader	Diesel	1	8	-	
	8	Tractor/Loader/Backhoe	Diesel	1	8	-	
	1	Hydroseeder	Diesel	1	4	-	
Milling and Paving	5	POV – Passenger Car	Gasoline	5	-	30	
	5	POV – Passenger Truck	Gasoline	5	-	30	
	5	Paver	Diesel	1	8	-	
	2	Paving Equipment	Diesel	1	8	-	
	5	Roller	Diesel	1	8	-	
	5	Asphalt Delivery Truck	Diesel	32	-	30	Assume one ton = 79 square feet; Assume 3164 tons = 159 loads
Concrete Fill/Pour	20	POV – Passenger Car	Gasoline	5	-	30	Assume 10 workers/day
	20	POV – Passenger Truck	Gasoline	5	-	30	Assume 10 workers/day
	20	Concrete Delivery Truck	Diesel	30	-	30	Assume 10 cubic yards per load; Assume 592 loads
	10	Clean Fill Delivery Truck	Diesel	4	-	30	
Utilities	20	POV – Passenger Car	Gasoline	5	-	30	Assume 10 workers/day
	20	POV – Passenger Truck	Gasoline	5	-	30	Assume 10 workers/day
	20	Trencher	Diesel	1	8	-	
	20	Bore/Drill Rig	Diesel	1	8	-	
Asphalt Paving	-	-	-	-	-	-	Assume 3164 tons of asphalt
Generator	193	-	Diesel	1	4	-	

Table 3. Total Air Emissions (tons/year) from Alternative 2 versus the *de minimis* Threshold Levels[1]

Pollutant	Total	*de minimis* Thresholds
CO	3.05	100
VOC	0.37	100
NO_x	8.33	100
PM-10	0.26	100
PM-2.5	0.25	100
SO_2	0.01	100
CO_2 and CO_2 equivalents	823.5	27,557

1. Source: *de minimis* thresholds are from 40 CFR 51.853 and results are GSRC model projections
Note that all six Georgia coastal counties are in attainment for all NAAQS (USEPA 2011).

Air Quality impacts would be significant if emissions would: 1) increase ambient air pollution concentrations above the NAAQS, 2) contribute to an existing violation of the NAAQS, 3) interfere with, or delay timely attainment of the NAAQS, 4) impair visibility within federally-mandated Prevention of Significant Deterioration Class I areas, 5) result in the potential for any new stationary source to be considered a major source of emissions as defined in 40 CFR Part 52.21 (total emissions of any pollutant subject to regulation under the CAA that is greater than 250 tons per year for attainment areas), 6) for mobile source emissions, the increase in emissions to exceed 250 tons per year for any pollutant, or 7) for GHG emissions, exceed 25,000 metric tons (27,557 U.S. tons) of direct CO_2-equivalent emissions on an annual basis.

Duval County, Florida is in attainment for NAAQS pollutants and therefore the General Conformity Rule does not apply (USEPA 2011a). Since the total emissions from activities are demonstrated to be below General Conformity Rule *de minimis* thresholds, there would be no significant impacts on air quality with the implementation of the Preferred Alternative.

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APPENDIX C
Coastal Consistency Determination

FEDERAL AGENCY COASTAL ZONE MANAGEMEENT ACT (CZMA) CONSISTENCY DETERMINATION FOR THE STATE OF FLORIDA

INTRODUCTION

This document provides the State of Florida with the Department of the Navy's (Navy) Consistency Determination under CZMA 16 United States Code (U.S.C.) § 1456 Section 307 (c) (1) [or (2)] and 15 Code of Federal Regulations (CFR) § 930 (c), for the Wharf Bravo recapitalization at Naval Station Mayport, Jacksonville, Florida. The information in this Consistency Determination is provided pursuant to 15 CFR § 930.39 and is based on the Preferred Alternative supporting the Proposed Action identified in the *Draft Environmental Assessment (EA) for the Recapitalization of Wharf Bravo at Naval Station Mayport, Jacksonville, Florida* (Enclosure 1).

PROPOSED FEDERAL AGENCY ACTION

The Navy proposes to recapitalize (repairs and facilities maintenance) Wharf Bravo at Naval Station (NAVSTA) Mayport. NAVSTA Mayport is located in northern Florida east of Jacksonville along the St. Johns River and the Atlantic Ocean (Figure A-1). NAVSTA Mayport maintains and operates facilities that provide operational deployment support to home-based and transient Navy ships, aviation units, and staff. NAVSTA Mayport also provides logistic support for operating forces, dependent activities, and other commands as assigned. NAVSTA Mayport covers approximately 3,409 acres and supports more than 60 commands, detachments, and private organizations. NAVSTA Mayport is homeport to 17 surface combatants, one Military Sealift Command (MSC) ship, and one Coast Guard cutter. NAVSTA Mayport routinely hosts port visits by various deep-draft ships up to and including nuclear aircraft carriers and nuclear-powered ballistic missile submarines, as well as visiting ships undergoing afloat training group exercises.

The Proposed Action is to recapitalize Wharf Bravo at NAVSTA Mayport. Activities include the construction of a new steel sheet pile bulkhead that ties into an existing steel sheet pile structure, placement of fill between the existing and new steel sheet pile bulkheads, installation of a concrete pile cap and concrete encasement of sheet pile, asphalt wharf deck paving, repairs to electrical and mechanical shore utilities, and upgrades to area lighting and antiterrorism/force protection (AT/FP) waterfront enclave facilities. The Project would result in a wharf footprint increase of approximately 12,000 square feet (ft^2; 1,115 square meters [m^2]) and installation of downward-facing, shielded lighting on and around the wharf surface.

Construction using metal sheet piles would be configured as interlocking pairs where each single pile dimension is approximately 27.56 inches (70 centimeters [cm]) by 19.69 inches (50 cm). Since piles would be driven in pairs, the disturbance footprint is estimated to be approximately 7.535 ft^2 (0.70 m^2). A sheet pile in the form of a plank would be driven in close contact or interlocking with others to provide a tight wall to resist the lateral pressure of water, adjacent earth, or other materials. The wall would be anchored at the top, and fill consisting of clean gravel or flowable concrete would be placed behind the wall. A concrete cap would be formed along the top and outside face of the wall to tie the entire structure together and provide a berthing surface for vessels.

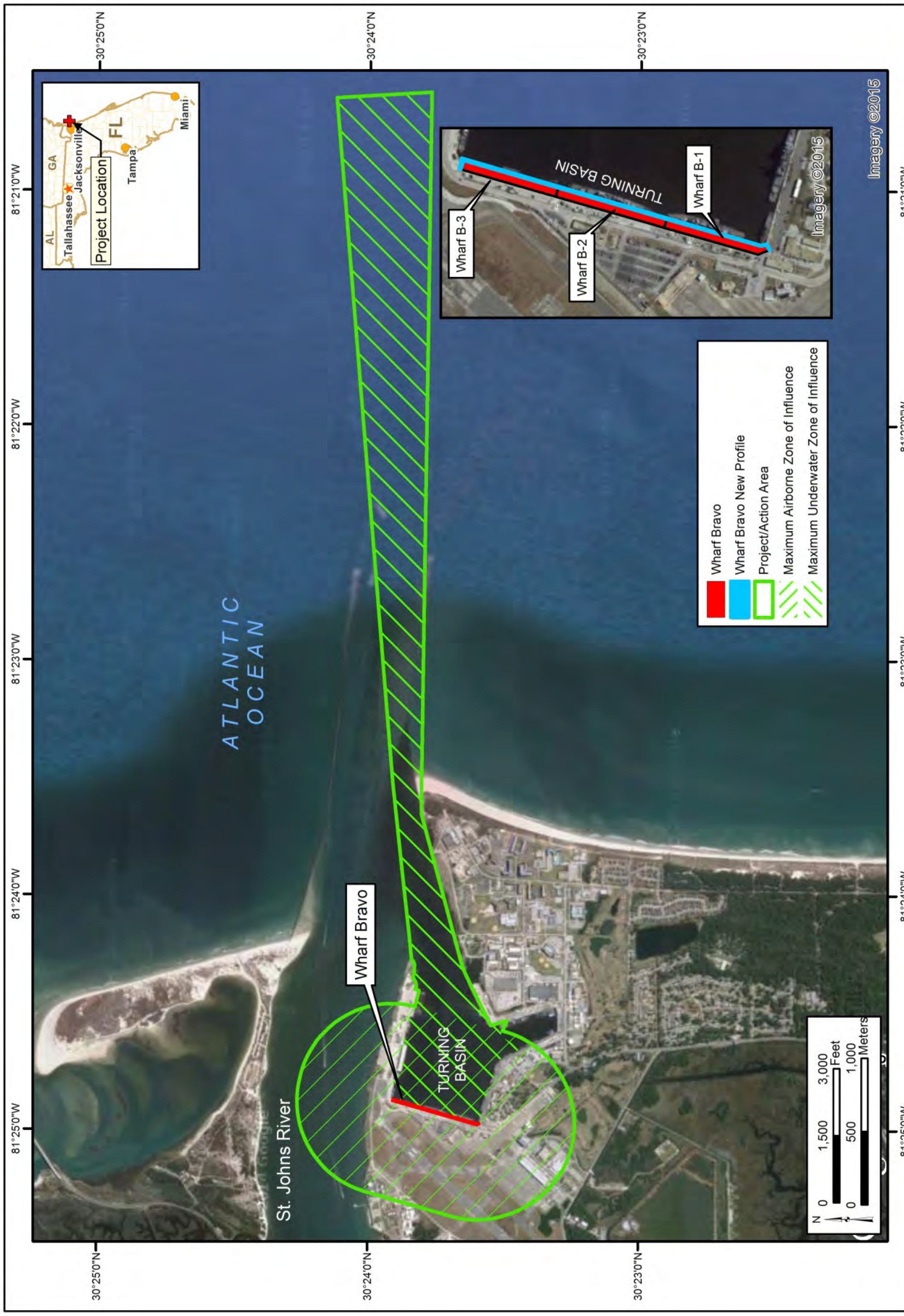

Figure A-1. Study Area Defined by the Overall Airborne and Underwater Zones of Influence

Overall, the Project would include the installation of approximately 880 single sheet piles conducted in two phases. Phase I (Wharves B-2 and B-3) would include the installation of approximately 590 single sheet piles over the course of approximately 73 days, averaging approximately 10 sheet pile pairs installed per day. Phase II (Wharf B-1) would include the installation of approximately 290 single sheet piles over the course of approximately 37 days, averaging approximately eight to nine sheet piles installed per day.

Of the 130 days of installation, 110 days are reserved for vibratory hammer driving, and the remaining 20 days are reserved for contingency impact driving. Impact pile driving, if it were to be necessary, could occur on the same day as vibratory pile driving, but driving rigs would not be operated simultaneously. No net change in the amount of vessel traffic in or around the NAVSTA Mayport Turning Basin is anticipated as a result of the Project. No dredging is required or anticipated during the Project.

Currently, the wharf is in poor condition due to the advanced deterioration of the steel sheeting and lack of corrosion protection. A major structural repair of the wharf is needed to maintain the long-term serviceability of the structure because of widespread pitting and section loss of the steel sheet piles. Also, Wharf Bravo berth two (B-2) has inadequate cold iron electrical capacity to support nesting of ships. Cold iron support provides shore-based power and support to vessels during periods of maintenance and long-term shutdown of main and auxiliary engines.

Federal Consistency Review

Florida's Coastal Management Plan (CMP) is composed of state statutes, which constitute the enforceable policies of the CMP. Statutes addressed as part of the Florida CMP Consistency review and considered in the analysis of the Proposed Action are discussed in Table A-1, below. The U.S. Navy has determined that the recapitalization of Wharf Bravo at NAVSTA Mayport is consistent to the maximum extent practicable with the enforceable policies of the Florida CMP based on the following information, data, and analysis (given as a summary in Table A-1) and presented as a comprehensive analysis in Chapter 3 of the Draft EA (Enclosure 1).

Table A-1. Florida Coastal Management Program Consistency Review

Florida Statute	Legal Scope	Consistency Evaluation
Chapter 161 *Beach and Shore Preservation*	Authorizes the Bureau of Beaches and Coastal Systems within Department of Environmental Protection (DEP) to regulate construction on or seaward of the state's beaches.	The Proposed Action would not adversely affect beach and shore management, specifically as it pertains to: • The Coastal Construction Permit Program. • The Coastal Construction Control Line Program (CCCL). • The Coastal Zone Protection Program. The Proposed Action would not occur seaward of the CCCL and would occur within the NAVSTA Mayport turning basin property.
Chapter 163, Part II *Growth Policy; County and Municipal Planning; Land Development Regulation*	Requires local governments to prepare, adopt, and implement comprehensive plans that encourage the most appropriate use of land and natural resources in a manner consistent with the public interest.	The Proposed Action would not affect local (municipal or county) government comprehensive plans.
Chapter 186 *State and Regional Planning*	Details state-level planning requirements. Requires the development of special statewide plans governing water use, land development, and transportation.	The Proposed Action would not affect Florida state- or regional-level planning requirements.
Chapter 252 *Emergency Management*	Provides for planning and implementation of the state's response to, efforts to recover from, and mitigation of natural and man-made disasters.	The Proposed Action would not have an effect on the ability of the state to respond to or recover from natural or man-made disasters.
Chapter 253 *State Lands*	Addresses the state's administration of public lands and property of this state and provides direction regarding the acquisition, disposal, and management of all state lands.	The Proposed Action would occur entirely within NAVSTA Mayport property. No state lands would be disturbed during the recapitalization of Wharf Bravo and, therefore, would not be affected.
Chapter 258 *State Parks and Preserves*	Addresses administration and management of state parks and preserves.	The Proposed Action would not impact the administration or management of state parks and preserves.

Florida Statute	Legal Scope	Consistency Evaluation
Chapter 259 *Land Acquisition for Conservation or Recreation*	Authorizes acquisition of environmentally endangered lands and outdoor recreation lands.	The Proposed Action would not have an effect on the acquisition of environmentally endangered and outdoor recreation lands.
Chapter 260 Recreational Trails System	Authorizes acquisition of land to create a recreational trails system and to facilitate management of the system.	The Proposed Action would not have an impact on the acquisition of land to create a recreational trails system.
Chapter 267 *Historical Resources*	Addresses management and preservation of the state's archaeological and historical resources.	The Proposed Action would not affect cultural resources of the State of Florida, as no known sites have been identified within the Project footprint. However, should any cultural resources be discovered during recapitalization, the activity would cease and the discovery would be immediately reported to the NAVSTA Mayport Environmental Director and the Florida State Historic Preservation Officer.
Chapter 288 *Commercial Development and Capital Improvements*	Provides the framework for promoting and developing the general business, trade, and tourism components of the state economy.	The Proposed Action would not have an effect on commercial development or capital improvements.
Chapter 334 *Transportation Administration*	Addresses the state's policy concerning transportation administration.	The Proposed Action would not have an impact on the state's transportation administration policies.
Chapter 339 *Transportation Finance and Planning*	Addresses the finance and planning needs of the state's transportation system (Chapter 339).	The Proposed Action would not have an effect on the finance and planning needs of the state's transportation system.
Chapter 373 *Water Resources*	Addresses the state's policy concerning water resources.	The Proposed Action would have no effect on wetlands as none are located within or adjacent to the Study Area. Potential impacts on nearby surface waters from sedimentation associated with construction activities would be minimized by the use of appropriate best management practices (BMPs), and all applicable regulatory requirements and stormwater permits would be obtained prior to any construction activities.

Florida Statute	Legal Scope	Consistency Evaluation
Chapter 375 *Outdoor Recreation and Conservation Lands*	Develops comprehensive multipurpose outdoor recreation plan to document recreational supply and demand, describe current recreational opportunities, estimate need for additional recreational opportunities, and propose means to meet the identified needs.	The Proposed Action would not impact the state's development or evaluation of multipurpose outdoor recreation plans.
Chapter 376 *Pollutant Discharge Prevention and Removal*	Regulates transfer, storage, and transportation of pollutants, and cleanup of pollutant discharges.	All required permits would be procured, and established procedures for transport, storage, and handling of hazardous materials would be followed. The Navy does not anticipate the discharge of any pollutants in the marine environment or upon surface or ground waters. In the event of a spill, a written Spill Prevention, Control, and Countermeasure Plan would be followed. BMPs would be incorporated to minimize impacts on water quality.
Chapter 377 *Energy Resources*	Addresses regulation, planning, and development of energy resources of the state.	The Proposed Action would not have an impact on oil and gas exploration. The Department of Defense (DoD) collaborates with institutional and commercial interests for alternative energy development within the Study Area.
Chapter 379 *Fish and Wildlife Conservation*	Addresses management and protection of fish and wildlife in the state.	Individual marine mammals may be exposed to high sound pressure levels during pile installation, which may result in Level B Behavioral Harassment. Any exposures would likely have only a minor effect on individuals and no effect on their populations. The sound generated from vibratory pile driving is non-impulsive, which is not known to cause injury to marine mammals. Minimization measures are expected to reduce or avoid most potential adverse underwater impacts on marine mammals from pile driving. The Navy is applying for an Incidental Harassment Authorization with the National Marine Fisheries Service (NMFS) for the first year of in-water work associated with the Wharf Bravo recapitalization Project. The Navy also submitted a Biological Assessment (BA) to NMFS for the Project. A "may affect, but not likely to adversely affect" determination was made for the North Atlantic right whale (*Eubalaena glacialis*), humpback whale (*Megaptera novaeangliae*), and West Indian (Florida) manatee (*Trichechus manatus latirostris*) because effects from temporary water quality depletion, resuspended sediments, and noise are expected to be highly localized and discountable.

Florida Statute	Legal Scope	Consistency Evaluation
Continued – Chapter 379 *Fish and Wildlife Conservation*	Addresses management and protection of fish and wildlife in the state.	No significant effects from pile driving are anticipated on ESA-listed loggerhead sea turtles (*Caretta caretta*), green sea turtles (*Chelonia mydas*), leatherback sea turtles (*Dermochelys coriacea*), hawksbill sea turtles (*Eretmochelys imbricata*), or Kemp's ridley sea turtles (*Lepidochelys kempii*). However, there is a small chance that individuals of these species may be present during in-water construction and exposed to levels of sound that could cause behavioral disturbances. As such, a "may affect, but not likely to adversely affect" determination was made for green sea turtles, Kemp's ridley sea turtles, and leatherback sea turtles. The Proposed Action "may affect, but is not likely to adversely affect" ESA-listed Atlantic sturgeon (*Acipenser oxyrinchus oxyrinchus*), shortnose sturgeon (*Acipenser brevirostrum*), and smalltooth sawfish (*Pristis pectinata*) because effects from temporary water quality depletion, resuspended sediments, and noise are expected to be highly localized and discountable. A "not likely to jeopardize the continued existence" determination was made for candidate species American eel (*Anguilla rostrata*), common thresher shark (*Alopias vulpinus*), and dwarf seahorse (*Hippocampus zosterae*). The Navy also submitted a BA to the U.S. Fish and Wildlife Service (USFWS) for the Project. No sea turtle nesting is present in the immediate Study Area; however, it is anticipated that lighting upgrades would serve as a net beneficial change and improvement in the overall lighting profile, thus further minimizing any potential adverse effects on any nearby emerging hatchlings. The Navy concludes that a "may affect, but not likely to adversely affect" determination is appropriate for nesting loggerhead, green, and leatherback sea turtles. No critical habitat for any Federally listed sea turtle species is present in or near the Study Area. The Navy concludes that a "no effect" determination is appropriate for sea turtle critical habitat. The Navy concludes that the Proposed Action activities would result in a "may affect, but not likely to adversely affect" determination for the West Indian manatee (*Trichechus manatus latirostris*) due to harbor vessel traffic, noise, human activity, increased turbidity, and possible temporary disruptions in forage availability. Critical habitat is designated in the St. Johns River; however, no primary constituent elements are defined for this area. The Navy concludes that a "no effect" determination would be appropriate for the West Indian manatee critical habitat.

Florida Statute	Legal Scope	Consistency Evaluation
Continued – Chapter 379 *Fish and Wildlife Conservation*	Addresses management and protection of fish and wildlife in the state.	The Navy concludes that a “may affect, but not likely to adversely affect” determination is appropriate for the piping plover (*Charadrius melodus*), wood stork (*Mycteria americana*), and rufa red knot *(Calidris canutus rufa)* due to airborne, pile driving, noise-related injury, or disturbance impacts. Designated critical habitat for wintering piping plovers is found to the north of the Study Area, and includes a portion of the St. Johns River on Fort George Island within Huguenot Memorial Park. The Navy concludes that a “no effect” determination is appropriate for piping plover critical habitat. No significant impacts on unregulated bird populations or fish species are anticipated. Attached macroalgae will experience temporary adverse impacts, whereas oyster reefs will experience long-term adverse impacts before regrowth on the new structures (pilings) is established.
Chapter 380 *Land and Water Management*	Establishes land and water management policies to guide and coordinate local decisions relating to growth and development.	The Proposed Action would not have an impact on the development of : • State lands with regional (i.e., more than one county) concerns • Areas of Critical State Concern • Areas with approved state resource management plans The Proposed Action activities do not provide for or affect changes to coastal infrastructure or require state funds for infrastructure planning, designing, or construction.
Chapter 381 *Public Health, General Provisions*	Establishes public policy concerning the state’s public health system.	The Proposed Action does not involve the construction of an on-site sewage treatment and disposal system. Construction activities associated with the Proposed Action are governed by regulations established in the Navy Safety and Occupational Health Program and the Occupational Safety and Health Administration. The NAVSTA Mayport Turning Basin and entrance channel are restricted from public access.
Chapter 388 *Mosquito Control*	Addresses mosquito control efforts in the state.	The Proposed Action would not affect mosquito control efforts of the State of Florida.

Florida Statute	Legal Scope	Consistency Evaluation
Chapter 403 *Environmental Control*	Establishes public policy concerning environmental control in the state.	The Proposed Action would comply with applicable state regulations for air and water quality, solid and hazardous waste management, pollution prevention, and ecosystem management. The Navy would coordinate for all applicable permits as required by law.
Chapter 553 *Building Construction Standards*	Provides a mechanism for the uniform adoption, updating, amendment, interpretation, and enforcement of a single, unified state building code, to be called the Florida Building Code. Obtain a permit from the appropriate enforcing agency.	The Proposed Action would not affect the Building Construction Standards of the State of Florida. The Navy would coordinate for all applicable permits as required by law.
Chapter 582 *Soil and Water Conservation*	Provides for the control and prevention of soil erosion.	The NAVSTA Mayport Erosion and Sediment Control Plan and a Stormwater Pollution Prevention Plan would be followed, and BMPs addressing erosion and sediment controls would be implemented to minimize impact on soils and water quality. The Proposed Action would be consistent with the current characteristic features of the area and landscape and would not result in any changes to land use.
Chapter 597 *Aquaculture*	Establishes public policy concerning the cultivation of aquatic organisms.	The Proposed Action has no activities related to the cultivation of marine species in the Study Area. The Proposed Action would not affect aquaculture.

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APPENDIX D
Incidental Harassment Authorization

DEPARTMENT OF THE NAVY
NAVAL STATION MAYPORT
P.O. BOX 280112
JACKSONVILLE, FLORIDA 32228-0112

5090.2
Ser N4E/0671
July 13, 2015

Certified Mail - Return Receipt Requested

Ms. Jolie Harrison
National Marine Fisheries Service
B-SSMC3, Room 13822
1315 East-West Highway
Silver Spring, MD 20910-3282

Ms. Jolie Harrison:

SUBJECT: REQUEST FOR INCIDENTAL HARASSMENT AUTHORIZATION, BRAVO WHARF RECAPITALIZATION, NAVAL STATION MAYPORT

In accordance with the Marine Mammal Protection Act (MMPA), as amended and 50 Code of Federal Regulations Part 216.106, the United States Navy requests subject Incidental Harassment Authorization (IHA) for the take of marine mammals associated with the Navy's Bravo Wharf Recapitalization Project at Naval Station (NAVSTA) Mayport, Florida, from July 1, 2016 through June 30, 2017.

The proposed action would expose marine mammals that are National Marine Fisheries Service (NMFS) trust species to sound from pile driving as needed to complete recapitalization of the wharf. Exposure would be confined to the NAVSTA Mayport turning basin and an adjacent minor portion of the St. Johns River. Enclosures (1), (2) and (3) focus on the specific information required by NMFS for consideration of the incidental harassment request. Enclosure (4) contains electronic versions of the IHA application, Marine Mammal Monitoring Plan and the Draft Bravo Wharf Recapitalization Environmental Assessment (EA).

We appreciate your continued support in helping the Navy to meet its environmental responsibilities and are requesting comments be returned to our POC by August 30, 2015. The Navy's point of contact is NAVSTA Mayport Environmental Director, Ms. Cheryl Mitchell, who can be reached at (904)270-6070 or E-mail cheryl.mitchell@navy.mil.

Sincerely,

LUKE B GREENE
CDR, CEC, USN
Public Works Officer
By direction of the
Commanding Officer

Enclosures:
1. IHA application
2. Marine Mammal Monitoring Plan, Wharf Bravo Recapitalization at Naval Station Mayport, FL
3. Draft Environmental Assessment, Wharf Bravo Recapitalization at Naval Station Mayport, FL
4. CD-ROM with IHA application and Draft EA

SUBJECT: REQUEST FOR INCIDENTAL HARASSMENT AUTHORIZATION, BRAVO WHARF RECAPITALIZATION, NAVAL STATION MAYPORT

Copy to:
National Marine Fisheries Service (Mr. Benjamin Laws)
NMFS Southeast Fisheries Science Center (Dr. Jim Bohnsack)

REQUEST FOR AN
INCIDENTAL HARASSMENT AUTHORIZATION
UNDER THE MARINE MAMMAL PROTECTION ACT
FOR THE
BRAVO WHARF RECAPITALIZATION
AT
NAVAL STATION MAYPORT, JACKSONVILLE, FLORIDA
NAVY REGION SOUTHEAST

Submitted to:

Office of Protected Resources,
National Marine Fisheries Service,
National Oceanographic and Atmospheric Administration

Prepared by:

Naval Facilities Engineering Command Southeast
and
Naval Facilities Engineering Command Atlantic

Submitted June 2015

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List of Acronyms

B	logarithmic loss
B-1	Berth Bravo One
B-2	Berth Bravo Two
B-3	Berth Bravo Three
BMP	best management practice
C	linear (scattering and absorption) loss
C-1	Wharf Charlie One
CFR	Code of Federal Regulations
CV	coefficient of variation
dB	decibel
dBA	decibel (A-weighted)
ft.	feet
FR	Federal Register
h	height
Hz	Hertz
in.	inch
km	kilometer
kHz	kiloHertz
µPa	microPascal
m	meter
MLLW	mean lower low water
MMPA	Marine Mammal Protection Act
MSDD	Marine Species Density Database
NAVFAC	Naval Facilities Engineering Command
NAVFAC SE	Naval Facilities Engineering Command, Southeast
n.d.	no date
NMFS	National Marine Fisheries Service
NS	Naval Station
POC	point of contact
PTS	permanent threshold shift
R_1	range from source in meters
R_2	range from driven pile to original measurement location
rms	root-mean-square
SPL	sound pressure level
SSP	steel sheet pile
TL	transmission loss
U.S.	United States
USFWS	United States Fish and Wildlife Service
W	width
YONAH	Years of the North Atlantic Humpback

Executive Summary

In accordance with the Marine Mammal Protection Act of 1972, as amended, the United States Navy is applying for an Incidental Harassment Authorization to perform recapitalization of Bravo Wharf at Naval Station Mayport, Jacksonville, Florida. Five species of marine mammals may be present within the waters surrounding Naval Station Mayport: the North Atlantic right whale (*Eubalaena glacialis*), the humpback whale (*Megaptera novaeangliae*), the bottlenose dolphin (*Tursiops truncatus*), the Atlantic spotted dolphin (*Stenella frontalis*), and the West Indian manatee (*Trichechus manatus*). These species may occur year-round with the exception of North Atlantic right whales, which are more likely to occur between November and April due to close proximity of calving waters. The West Indian manatee is regulated by the U.S. Fish and Wildlife Service and will be managed in compliance with the *Standard Manatee Conditions for In-water Work, 2011*; it is not considered in this application.

The Navy proposes installation of approximately 880 single steel sheet piles as a part of the overall recapitalization project at Bravo Wharf. The project may require up to 24 months for completion; in-water activities are limited to a maximum of 130 days, separated into two phases. If in-water work will extend into months 13 – 24, a second IHA application will be submitted. Phase I will consist of work at berths B-2 and B-3; Phase II will consist of work at berth B-1. All piles will be driven with a vibratory hammer. Impact driving will be a contingency employed only if vibratory methods are inadequate; a similar project that has been completed at adjacent Wharf C-1 required impact pile driving on only seven piles.

The Navy used National Marine Fisheries Service promulgated thresholds for assessing pile driving impacts (National Marine Fisheries Service 2005b, 2009), outlined in Chapter 6. The Navy used the practical spreading loss equation for underwater sounds and empirically measured source levels from other similar pile driving events to estimate potential marine mammal exposures. Predicted exposures are described in Chapter 5. Shut-down procedures will ensure no Level A harassments (injury) would occur, but modeling predicted that 920 Level B harassments (behavior) may occur for bottlenose dolphins and 110 Level B harassments may occur for Atlantic spotted dolphins as a result of pile driving activities associated with the Bravo Wharf recapitalization project. Conservative assumptions (including marine mammal densities) used to estimate the exposures have likely overestimated the potential number of exposures and their severity.

Pursuant to the Marine Mammal Protection Act Section 101(a)(5)(D), the Navy submits this application to the National Marine Fisheries Service for an Incidental Harassment Authorization for the incidental taking of bottlenose dolphins and Atlantic spotted dolphins during pile driving activities as part of the Bravo Wharf Recapitalization project between 1 October 2016 and 30 September 2017. Takes would be in the form of non-lethal, temporary harassment and are expected to have a negligible impact on these species. In addition, takes would not have an immitigable adverse impact on the availability of these species for subsistence use.

1. Description of Activities

A detailed description of the specific activity or class of activities that can be expected to result in incidental taking of marine mammals.

Pursuant to the Marine Mammal Protection Act (MMPA) Section 101(a)(5)(D), the Navy submits this application to National Marine Fisheries Service for an Incidental Harassment Authorization for the incidental, but not intentional, taking of marine mammal species during pile driving activities associated with the Bravo Wharf (berths B-1, B-2, and B-3) Recapitalization project (Project) at Naval Station (NAVSTA) Mayport between 1 October 2016 and 30 September 2017. 50 Code of Federal Regulations (CFR) 216.104 sets out 14 specific items that must be included in requests for take pursuant to Section 101(a)(5)(A) of the MMPA; those 14 items are represented by the 14 sections of this application.

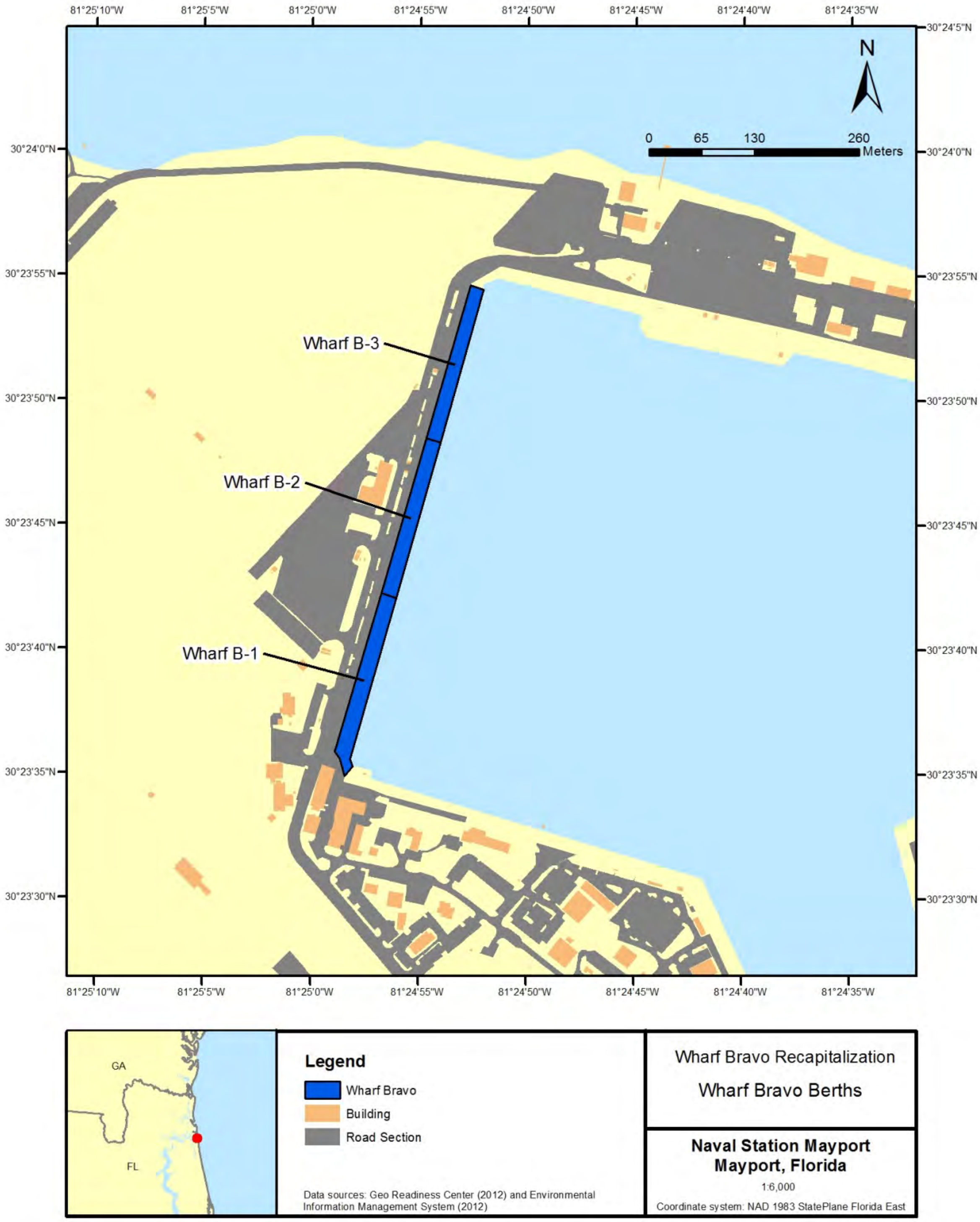
1.1. Proposed Action

The proposed action is the recapitalization, or renovation, of Bravo Wharf, consisting of berths B-1, B-2, and B-3 at NAVSTA Mayport (Figure 1-1). Recapitalization activities include the replacement of the steel sheet pile bulkhead which ties into existing steel sheet pile structure, concrete fill between existing and new steel sheet pile bulkheads, concrete pile cap and concrete encasement of sheet pile, asphalt wharf deck paving, repairs electrical and mechanical shore utilities, area lighting and anti-terrorism/force protection (AT/FP) waterfront enclave facilities. In-water work is expected to be completed within 24 months. If in-water work will extend into months 13 – 24, a second IHA application will be submitted.

The project will include the installation of approximately 880 single sheet piles to be conducted in two phases. Phase I (berths B-2 and B-3) will include the installation of approximately 590 single sheet piles over the course of approximately 73 days; averaging approximately 10 sheet pile pairs installed per day. Phase II (berth B-1) will include the installation of approximately 290 single sheet piles over the course of approximately 37 days; averaging approximately 8 to 9 sheet piles installed per day. Of the 130 days of installation, 110 days are reserved for vibratory driving and the remaining 20 days are reserved for contingency impact driving.

The use of impact driving shall be restricted to when vibratory driving is insufficient. A similar project that has been completed at adjacent Wharf C-1 required impact pile driving on only seven piles. Section 1.2 describes the elements of the proposed action in more detail.

FIGURE 1-1. BRAVO WHARF (BERTHS B-1, B-2, AND B-3) AT NAVSTA MAYPORT



1.2. Project Description

Bravo Wharf is a medium draft, general purpose berthing wharf that was constructed in 1970 and lies at the western edge of the NAVSTA Mayport turning basin. Bravo Wharf is approximately 2,000 ft long, 125 ft wide, and has a berthing depth of 50 ft mean lower low water. The wharf is one of two primary deep draft berths at the basin and is capable of berthing ships up to and including large amphibious ships; it is one of three primary ordnance handling berths at the basin. The wharf is a diaphragm steel sheet pile cell structure with a concrete apron, partial concrete encasement of the piling and asphalt paved deck.

Currently, the wharf is in poor condition due to the advanced deterioration of the steel sheeting and lack of corrosion protection. A major structural repair of the wharf is needed to maintain the long term serviceability of the structure because of widespread pitting and section loss of the steel sheet piles. Bravo Wharf berth two (B-2) has inadequate cold iron electrical capacity to support nesting of ships. Due to the structural deterioration of the wharf, load restrictions have been instituted that limit loads to a maximum of 4,500 pounds within 60 ft of the face of the wharf.

The Navy will install a new steel sheet pile bulkhead at Bravo Wharf. The wall will be anchored at the top and fill consisting of clean gravel and flowable concrete fill will be placed behind the wall. A concrete cap will be formed along the top and outside face of the wall to tie the entire structure together and provide a berthing surface for vessels. The new bulkhead will be designed for a 50-year service life.

Construction activities include:

- demolition of the existing concrete pile cap, wharf deck and utilities (including laterals and igloos);
- installation of a new steel combination wall with tieback anchors;
- placement of a combination of self-hardening fill, flowable fill, and clean fill between existing and new walls;
- installation of a new concrete cap which partially encases the new steel wall;
- installation of a sacrificial anode cathodic protection system for the new steel wall;
- installation of new foam filled fenders;
- installation of new utilities (including lateral supply lines from utilities such as water, fuel and electrical);
- repair of the wharf deck by milling and re-paving;
- replacement of lighting fixtures on galvanized steel standards; and
- replacement of security fencing

The following steps describe the construction sequence for placing the new SSP system in front of the existing deteriorated wall.

Preparation and Demolition

Existing underwater obstructions and debris (such as broken timber piles or segments of ship rails) interfering with the installation of the new SSP wall will be removed utilizing divers and cranes. The points where the new SSP is to attach to the existing sheet pile wall will be demolished above and below the waterline to expose the existing steel and any marine growth is removed from the existing wall. Along the face of the existing wall, the curb and a portion of existing concrete cap will be removed to accommodate the new concrete pavement will be placed between the new wall and the existing wall. The concrete apron along the waterside perimeter of the wharf and the utilities (including laterals and igloos) will be removed. Utilities to be installed include water, steam, fuel, waste, electrical and communications.

Installation of a New Bulkhead

Shore based equipment and/or barges will be used to install piles. If barges are necessary, a crane barge with a pile installation suite (pile leads, vibratory hammer and an impact hammer) will mobilize to the project site with a material barge. Otherwise, cranes and materials will be based on shore adjacent to the installation sites. Piles will be driven to the appropriate depth using the vibratory driver. A total of approximately 880 single sheet piles (Phase I – berths B-2 and B-3: 590; Phase II – berth B-1: 290) will be installed. Figure 1-2 and 1-3 illustrate sheet piles as installed at NAVSTA Mayport. Installation of up to 27 sheet pile pairs per pile-driving day is anticipated. Impact pile driving would only be used as a contingency in cases when vibratory driving is insufficient (A similar project that has been completed at adjacent Wharf C-1 required impact pile driving on only seven piles). Once all of the piles are driven, closure plates will be attached between the existing adjacent sheet pile wall and the new wall end terminations. Typically, these are welded in place using underwater welding techniques.

In general, the pile-driving process begins by placing a choker cable around a pile and lifting it into vertical position with a crane. The pile is then lowered into position inside the template and set in place at the mud line. During vibratory driving, the pile is stabilized by the template while the vibratory driver installs the pile to the required tip elevation. Once piles are in position, vibratory installation would take less than 60 seconds to reach the required tip elevation. Time intervals between driving of each pile pair will vary, but will be a minimum of several minutes due to time required for positioning, etc.

Impact hammers have guides holding the hammer in alignment with the pile while a heavy piston moves up and down, striking the top of the pile, driving the pile into the substrate from the downward force of the hammer.

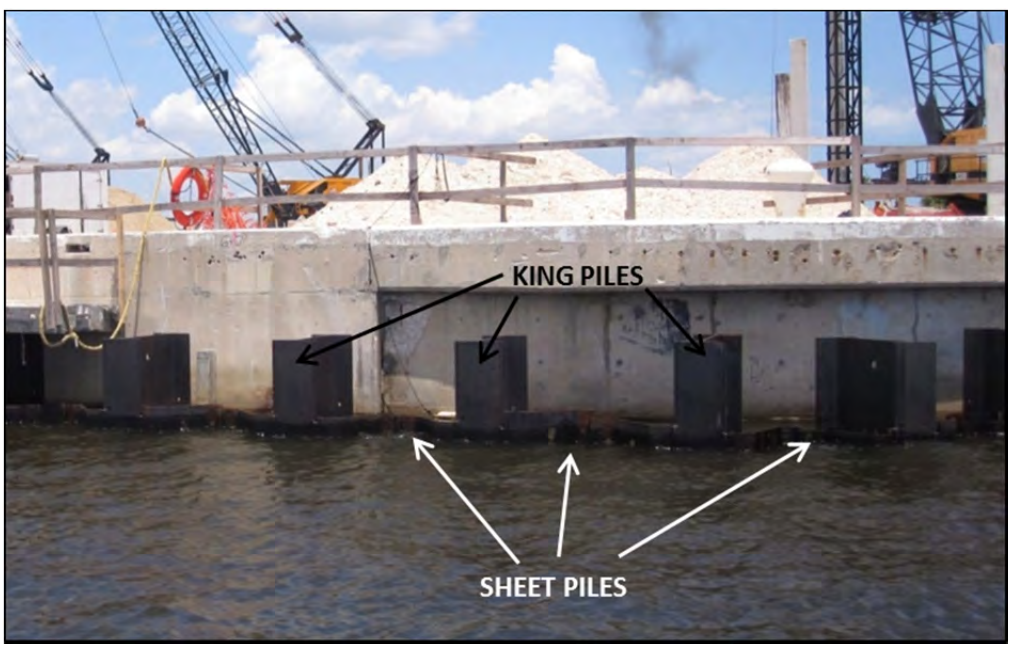
Installation of Anchors

There are multiple types of anchoring systems utilized for a sheet pile wall, including a grouted soil anchor system and a tie back wall system. Anchor rods will be installed from the new SSP wall to the anchor system. This requires drilling through the old wall to the anchor location behind the wall. In general, this anchor location may lie 40-60 feet behind (shoreward) the existing wall. After the anchor holes are driven, the anchors are placed in the holes and either the end of the anchor is grouted into the soil or the end of the anchor is attached to the tie back wall

system. The tie back wall system normally consists of sheet piles of shortened lengths that are buried below grade.

FIGURE 1-2. VIBRATORY INSTALLATION OF SHEET PILE AT NAVSTA MAYPORT

FIGURE 1-3. SHEET AND KING PILES AT NAVSTA MAYPORT



Placement of Fill

After the anchors are installed, fill operations will be conducted behind the new wall. This consists of placing either gravel fill or concrete flowable fill into the space behind the wall; trapped water behind the wall would be displaced.

Form and Placement of Pile Cap

After the fill operation is completed, the concrete pile cap will be formed and placed along the top of the new SSP wall. This consists of installing either wood or steel forms along the top of the wall down to some point below mean low water elevation. Water would be removed from the forms, steel reinforcement would be placed in the forms, and concrete would be poured to the required elevations.

Deck and Utility Placement

After the pile cap is in place, a new reinforced concrete apron will be installed and the wharf deck repaired by milling and paving. A new high mast lighting system, new security fencing, and new utilities will be installed to replace those that were removed.

Summary

The Project will entail installation of approximately 880 single sheet piles, requiring a maximum of 130 days of in-water vibratory pile driving work conducted in two phases over a 24-month period. If in-water work will extend into months 13 – 24, a second IHA application will be submitted. The acoustic analysis for vibratory pile driving used the assumption that a maximum of 27 sheet pile pairs would be driven each day, for a maximum linear distance of approximately 124 ft. Impact pile driving would only be used as a contingency in cases when vibratory driving is insufficient (A similar project that has been completed at adjacent Wharf C-1 required impact pile driving on only seven piles). Twenty days have been conservatively allotted for contingency impact driving even though only two days of impact pile driving occurred during the adjacent Wharf C-1 project. Impact pile driving, if it were to be necessary, could occur on the same day as vibratory pile driving, but driving rigs would not be operated simultaneously. Because activities are for the repair of existing facilities only, no increase in level of use or operation is expected. No net change in the amount of vessel traffic in and around the turning basin is expected as a result of the project.

2. Location and Duration of Activities

The dates and duration of such activity and the specific geographical region where it will occur.

NAVSTA Mayport is located in northern Florida, east of Jacksonville and adjacent to the St. Johns River and the Atlantic Ocean (Figure 2-1). Ship berthing facilities are provided at 16 locations along wharves A through F around the turning basin perimeter. The turning basin is approximately 2,000 by 3,000 feet in area, and is connected to the St. Johns River by a 500-ft-wide entrance channel. Bravo Wharf is located in the northeastern corner of the Mayport turning basin (Figure 2–2).

The project area is defined as the immediate vicinity of Bravo Wharf, out to the limit of the most distant of the underwater threshold for all marine mammal species being addressed. The most distant underwater threshold is the marine mammal behavioral disturbance (120 dB re 1 µPa rms) threshold. Under certain conditions, areas in and outside of the turning basin may have average ambient noise levels exceeding the 120 dB threshold. However, given the lack of actual ambient sound-recording data for this location, the Navy has assumed ambient noise levels are below 120 dB re 1 µPa rms. The distance to the 120 dB threshold is therefore the maximum range at which the Navy expects to exert an environmental impact underwater, and represents a reasonable boundary for the project area (Figure 2-2).

The Project is scheduled to begin on 1 October 2016. A maximum of 110 days of in-water vibratory pile driving work will take place over a 24-month period during the two phases of the project. Twenty additional days were modeled in case contingency impact pile driving becomes necessary, but this duration is an extremely conservative estimate; a similar project that has been completed at adjacent Wharf C-1 required impact pile driving on only seven piles, which required just two days.

FIGURE 2-1. BRAVO WHARF PROJECT REGIONAL OVERVIEW

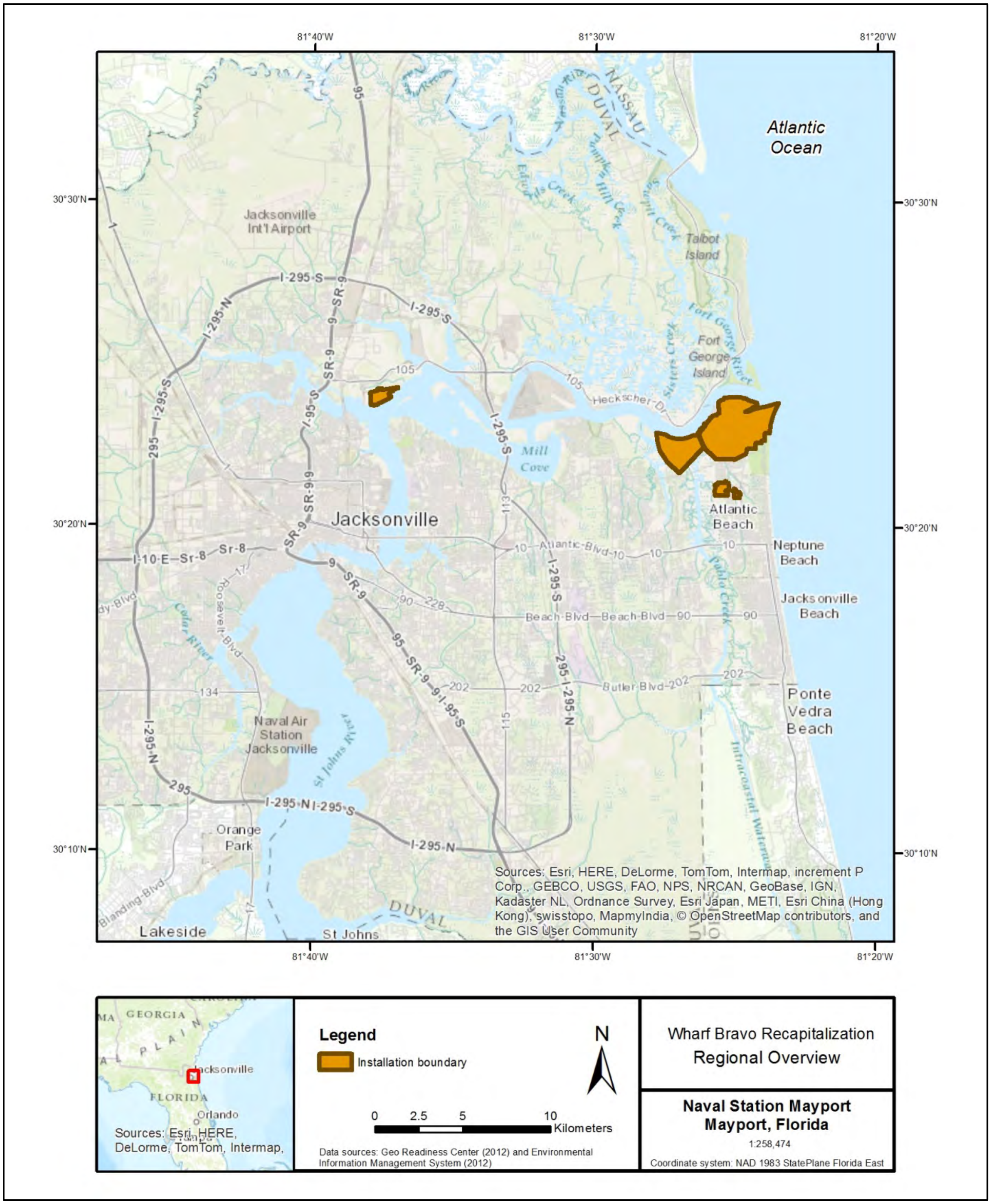
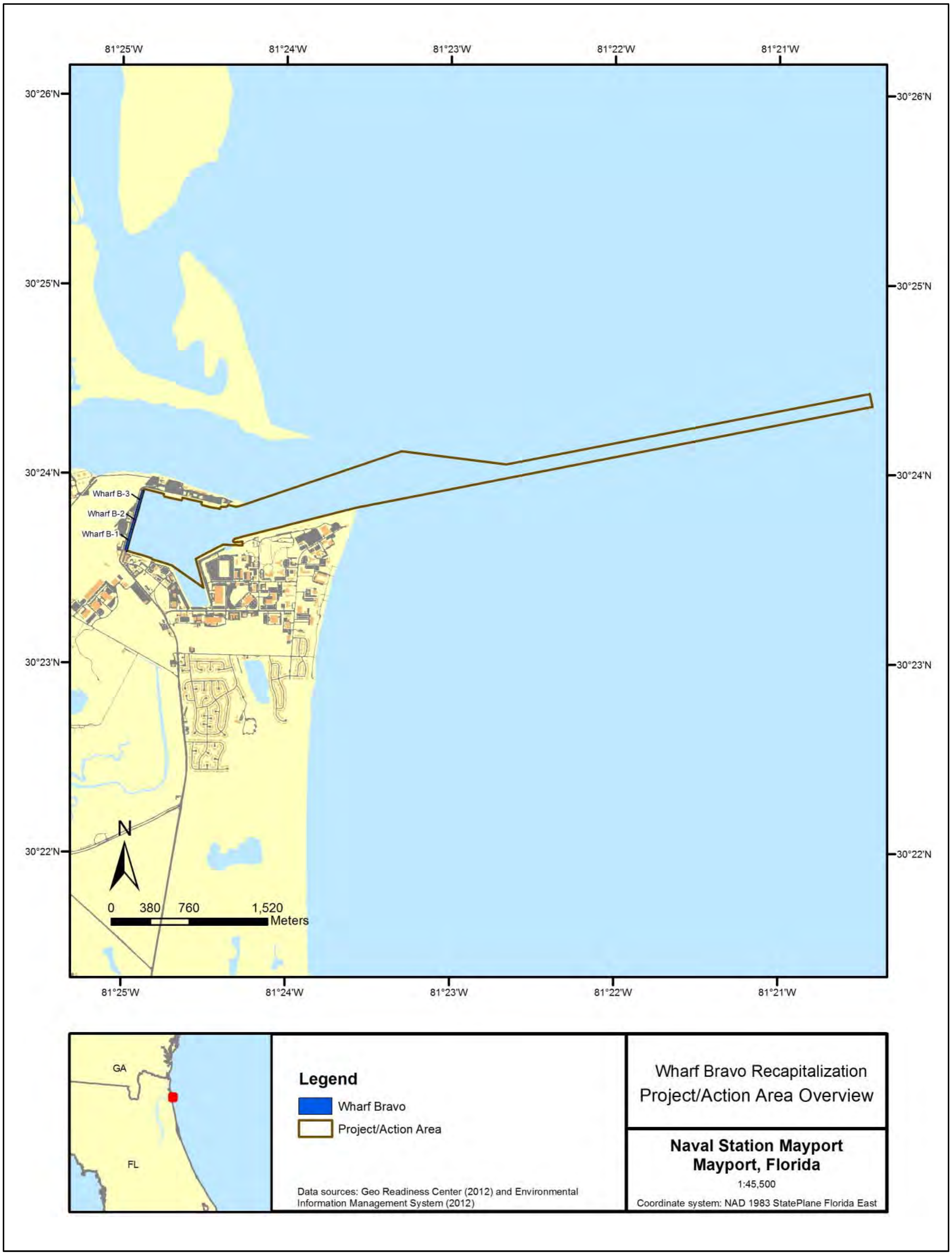


FIGURE 2-2. BRAVO WHARF RECAPITALIZATION PROJECT AREA



The Mayport turning basin is regularly dredged to a depth of 50 ft to allow for berthing of large military vessels. Salinity and temperature data for the project area are summarized in Table 2-1 and Figure 2-3, respectively.

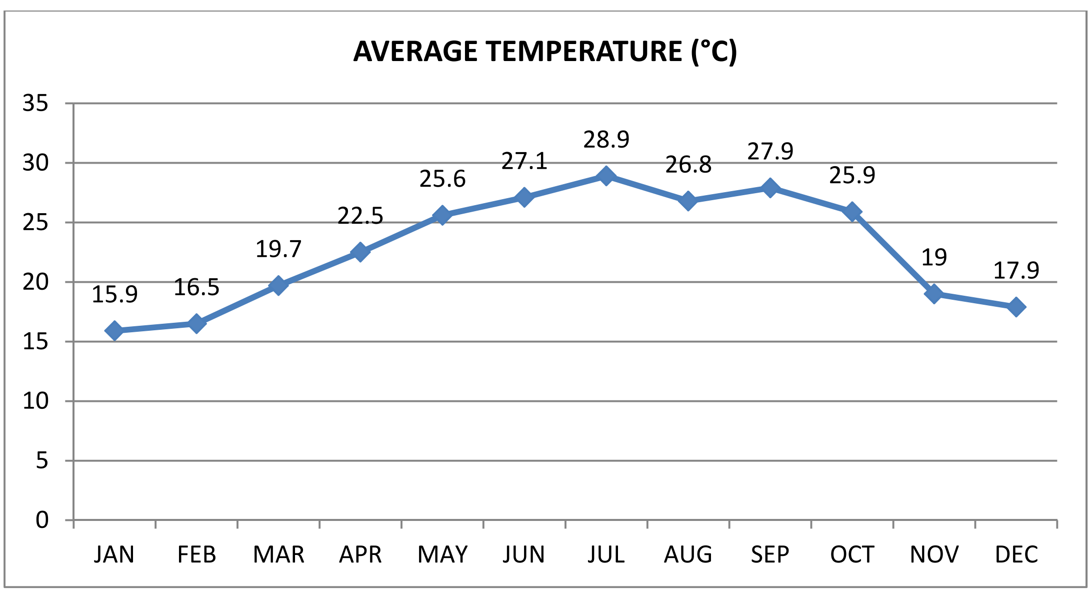
TABLE 2-1. MINIMUM AND MAXIMUM SURFACE AND BOTTOM SALINITIES

LOCATION	TIDE	WATER COLUMN	SALINITY
NAVSTA Mayport Turning Basin	Ebb	surface	30.6
		bottom	33.8
	Flood	surface	30.2
		bottom	33.6
NAVSTA Mayport Entrance Channel	Ebb	surface	30.0
		bottom	32.4
	Flood	surface	33.4
		bottom	34.7
Federal Navigation Channel	Ebb	surface	32.5
		bottom	33.8
	Flood	surface	33.3
		bottom	35.2

Source: U.S. Department of the Navy 2008a

While water temperatures for the project area are not regularly recorded, average monthly temperatures at the closest NOAA station (Bar Pilot's Dock) ranged from 15.9 degrees Celsius (°C) (60.6 degrees Fahrenheit [°F]) in January to 28.9 °C (84°F) in August (Figure 2-3).

FIGURE 2-3. 2012 MONTHLY WATER TEMPERATURES AT BAR PILOT'S DOCK, FLORIDA



Source: National Oceanic and Atmospheric Administration 2012

3. Marine Mammal Species and Numbers

The species and numbers of marine mammals likely to be found within the activity area

The Navy has reviewed information about marine mammal species occurring in the western Atlantic along the east coast of Florida, and has determined that those listed in Table 3-1 may occur in the vicinity of the Project. The West Indian manatee (*Trichechus manatus*) is not regulated by NMFS and therefore is not considered further in this application. The responsible regulator for manatees is the U.S. Fish and Wildlife Service (USFWS). USFWS has promulgated guidance for protecting manatee occurring in the vicinity of near shore construction. The Navy and its contractors shall comply with the conditions intended to protect manatees from in-water work as outlined in Appendix A.

North Atlantic right whale, humpback whale, and Atlantic spotted dolphin densities were calculated from the Navy's Marine Species Density Database and Technical Report (U.S. Department of the Navy 2012). Bottlenose dolphin density was calculated based on surveys of the Mayport turning basin during late 2012 and early 2013 (U.S. Department of the Navy 2014).

TABLE 3-1. SPECIES POTENTIALLY OCCURRING IN THE PROJECT AREA

SPECIES and ESTIMATED DENSITY	STOCK	OCCURRENCE and ABUNDANCE BEST (CV) / MIN	STATUS	
			MMPA	ESA
North Atlantic right whale 0.00005 / km^2	Western Atlantic	Rare / Seasonal – November to April 444 (0) / 444[2]	depleted	endangered
humpback whale 0.000113 / km^2	Gulf of Maine	Extralimital[1] 823 (0) / 823[2]	depleted	endangered
Atlantic spotted dolphin 0.680256 / km^2	Western North Atlantic	Rare / Seasonal – November to May 26,798 (0.66) / 16,151[2]	n/a	n/a
bottlenose dolphin 4.15366 / km^2	Western North Atlantic Offshore	Rare 81,588 (0.17) / 70,775	n/a	n/a
	Western North Atlantic Northern Florida Coastal	Likely – year round 3,064 (0.24) / 2,511[2]		
	Jacksonville Estuarine System	Likely - year round, numbers may be slightly lower in winter 412 (0.06) / unknown[4]		
	Western North Atlantic Southern Migratory Coastal	Seasonal - January to March 12,482 (0.32) / 9,591[6]		

Sources: U. S. Department of the Navy 2012; U.S. Department of the Navy (2014) Turning Basin Bottlenose Dolphin Surveys; [1]Extralimital: there may be a small number of sighting or stranding records, but the activity area is outside the species' range of normal occurrence; Rare: there may be a few confirmed sightings, or the distribution of the species is near enough to the area of concern that the species could occur there; the species may occur but only infrequently or in small numbers; Likely: confirmed and regular sightings of the species occur year-round; [2]Waring et al. 2013; [4]National Marine Fisheries Service 2009; this is an overestimate of the stock abundance in the area covered by the study because it includes non-resident and seasonally resident dolphins; [5]National Marine Fisheries Service 2010; [6]National Marine Fisheries Service 2010a

4. Affected Species Status and Distribution

A description of the status, distribution, and seasonal distribution (when applicable) of the affected species or stocks of marine mammals likely to be affected by such activities.

4.1. North Atlantic Right Whale

The North Atlantic Right Whale was listed as endangered in 1970 (35 FR 18319) under the Endangered Species Conservation Act of 1969; its listing was revised in 2008 (73 FR 12024). A five year review was completed in August 2012 with a recommendation to maintain the species' classification as endangered (National Marine Fisheries Service 2012). North Atlantic right whales are designated as depleted under the MMPA.

The western North Atlantic minimum stock size is based on a census of individual whales identified using photo-identification techniques. A review of the photo-ID recapture database as it existed on 21 October 2011 indicated that 425 individually recognized whales in the catalog were known to be alive during 2009. Whales catalogued by this date included 20 of the 39 calves born during that year. Thus adding the 19 calves not yet catalogued brings the minimum number alive in 2009 to 444. This number represents a minimum population size. This count has no associated coefficient of variation (Waring et al. 2013).

North Atlantic right whales are most often seen as individuals or pairs (New England Aquarium 2013). They migrate annually between the north and south Atlantic coasts of the United States. They can generally be found in calving grounds off Georgia and Florida from mid-November to mid-April; and then move to feeding grounds in the Gulf of Maine and Cape Cod in the summer (though sightings may occur year-round in this area) (National Marine Fisheries Service n.d.). North Atlantic right whale calves are born during December through March after 12 to 13 months of gestation (Kraus et al. 2001)

Dives of 5 to 15 min or longer have been reported (Cetacean and Turtle Assessment Program 1982; Baumgartner and Mate 2003), but can be much shorter when feeding (Winn et al. 1995) Longer surface intervals have been observed for reproductively-active females and their calves (Baumgartner and Mate 2003). In the Cape Cod Bay foraging area, this species has been observed feeding in the top 5 meters of the water column for long periods of time (Parks et al. 2011).

Based on annual surveys conducted from December through March between 1996 -2009, North Atlantic right whales are relatively common visitors to waters offshore from NAVSTA Mayport and the adjacent federal navigation channel (New England Aquarium 2013a; Loop pers. comm. 2012). Incidental sightings of North Atlantic right whales are a regular, although infrequent, occurrence in the St. Johns River and NAVSTA Mayport turning basin, with the most recent sighting of two individuals occurring at the mouth of the St. Johns River in December 2012 (Gibbons 2011, Loop pers. comm. 2012).

Based on data in the Navy's Marine Species Density Database (MSDD), a density of 0.00005 individuals / square kilometer (km^2) has been estimated for the activity area.

4.2. Humpback Whale

Humpback whales were also listed as endangered in 1970 (35 FR 18319) under the Endangered Species Conservation Act of 1969. A status review was initiated in 2009 (74 FR 40568). Humpback whale abundance is increasing through much of the species' range. Individuals that may occur in the vicinity of Bravo Wharf are from the Gulf of Maine stock. Humpback whales are designated as depleted under the MMPA.

The most recent line-transect survey, which did not include the Scotian Shelf portion of the stock, produced an estimate of abundance for Gulf of Maine humpback whales of 331 animals (CV=0.48) with a resultant minimum population estimate for this stock of 228 animals. The line-transect based minimum estimate is unrealistic because at least 500 uniquely identifiable individual whales from the Gulf of Mexico stock were seen during the calendar year of that survey and the actual population would have been larger because re-sighting rates have historically been <1. Using the minimum count from at least 2 years prior to the year of a stock assessment report has allowed NMFS time to resight whales known to be alive prior to and after the focal year. Thus the minimum population estimate is set to the 2008 mark-recapture based count of 823.Current data suggest the Gulf of Maine stock is steadily increasing in numbers (Waring et al. 2013)

Humpback whales feed on a variety of invertebrates and small schooling fishes. The most common invertebrate prey are krill; the most common fish prey are herring, mackerel, sand lance, sardines, anchovies, and capelin (Clapham and Mead 1999). Feeding occurs both at the surface and in deeper waters, wherever prey is abundant. The humpback whale is the only species of baleen whale that shows strong evidence of cooperation when feeding in large groups (D'Vincent et al. 1985).

During the winter, most of the North Atlantic population of humpback whales is believed to migrate south to calving grounds in the West Indies region (Whitehead and Moore 1982; Smith et al. 1999; Stevick et al. 2003b), over shallow banks and along continental coasts, where calving occurs. Calving peaks from January through March, with some animals arriving as early as December and a few not leaving until June. Individuals from the U.S. and Canada are typically sighted in the West Indies in mid-February (Stevick et al. 2003b). Since humpback whales migrate south to calving grounds during the fall and make return migrations to the northern feeding grounds in spring, they are not expected off the coast of Florida during summer. There has been an increasing occurrence of humpbacks, which appear to be primarily juveniles, during the winter along the U.S. Atlantic coast from Florida north to Virginia (Clapham et al. 1993; Swingle et al. 1993; Wiley et al. 1995; Laerm et al. 1997).

The coastal region of Florida is not designated as an area of concentrated occurrence for humpback whales (U.S. Department of the Navy 2008). Examination of whaling catches revealed both northward and southward migrations are characterized by a staggering of sexual and maturational classes; lactating females are among the first to leave summer feeding grounds in the fall, followed by subadult males, mature males, non-pregnant females, and pregnant

females (Clapham 1996). On the northward migration, this order is broadly reversed, with newly pregnant females among the first to begin the return migration to high latitudes. Based on sightings, strandings, and life history, humpbacks would be expected to occur in waters off NAVSTA Mayport during fall, winter, and spring. The likelihood of occurrence is low, however, and even lower for the turning basin and Bravo Wharf activity area.

Based on data in the Navy's MSDD, a year-round density of 0.000113 individuals / km^2 has been estimated for the activity area.

4.3. Atlantic Spotted Dolphin

Atlantic spotted dolphins occurring in the Bravo Wharf activity area belong to the Western North Atlantic Stock.

The Atlantic spotted dolphin is found in nearshore tropical to warm-temperate waters, predominantly over the continental shelf and upper slope. In the western Atlantic, this species is distributed from New England to Brazil and is found in the Gulf of Mexico as well as the Caribbean Sea (Perrin 2002).

Atlantic spotted dolphins in the Gulf of Mexico were observed feeding cooperatively on clupeid fishes and are known to feed in association with shrimp trawlers (Fertl and Leatherwood 1997; Fertl and Wursig 1995). In the Bahamas, this species was observed to chase and catch flying fish (MacLeod et al. 2004). The diet of the Atlantic spotted dolphin varies depending on location, and can include burrowing and schooling fish, and squid (Jefferson et al. 2008; Herzing and Elliser 2013).

While specific seasonal occurrence information for Atlantic spotted dolphins on Florida's Atlantic coast does not exist, studies have indicated that higher numbers of individuals reported over the west Florida continental shelf from November to May than during the rest of the year, suggesting that this species may migrate seasonally (Griffin and Griffin 2003). Atlantic spotted dolphins are typically observed in deeper offshore waters. They could potentially occur in shallower coastal waters in and around the activity area, but the likelihood is low.

Based on data in the Navy's MSDD, a year-round density of 0.680256 individuals / km^2 has been estimated for the activity area.

4.4. Bottlenose Dolphin

Bottlenose dolphins occurring in the Bravo Wharf activity area may be individuals belonging to any of the following stocks: the Western North Atlantic Offshore Stock, the Western North Atlantic Northern Florida Coastal Stock, the Jacksonville Estuarine System Stock; and the Western North Atlantic Southern Migratory Coastal Stock.

Along the Atlantic coast of the U.S., where the majority of detailed work on bottlenose dolphins has been conducted, male and female bottlenose dolphins reach physical maturity at 13 years,

with females reaching sexual maturity as early as seven years (Mead and Potter 1990). Bottlenose dolphins are flexible in their timing of reproduction. Seasons of birth for bottlenose dolphin populations are likely responses to seasonal patterns of availability of local resources (Urian et al. 1996). Thayer et al. (2003) found bottlenose dolphins in North Carolina to exhibit a strong calving peak in spring, particularly May and June, and a diffuse peak from late spring to early fall. There is a gestation period of one year (Caldwell and Caldwell 1972). Calves are weaned as early as one and a half years of age (Reynolds et al. 2000), and typically remain with their mothers for a period of three to eight years (Wells et al. 1987), although longer periods are documented (Reynolds et al. 2000). There are no specific breeding locations for this species.

Dive durations as long as 15 min are recorded for trained individuals (Ridgway et al. 1969). Typical dives, however, are shallower and have a much shorter duration. Mean dive durations of Atlantic bottlenose dolphins typically range from 20 to 40 seconds at shallow depths (Mate et al. 1995)

Bottlenose dolphins typically occur in groups of 2 – 15 individuals, but significantly larger groups have also been reported (Shane et al. 1986; Kerr et al. 2005). Coastal bottlenose dolphins typically exhibit smaller group sizes than larger forms, as water depth appears to be a significant influence on group size (Shane et al. 1986). Shallow, confined water areas typically support smaller group sizes, some degree of regional site fidelity, and limited movement patterns (Shane et al. 1986; Wells et al. 1987).

Recent surveys have shown that bottlenose dolphins in the vicinity of Bravo Wharf occur in groups of 5 or more, pairs, and individually. Larger groups, observed infrequently, are generally seen at the entrance of the turning basin. These groups navigate into the basin, but generally not very far. A mother / calf pair was observed regularly during the winter and early spring of 2012 / 2013. Bottlenose dolphins are rarely observed lingering in a particular area in the turning basin; rather, they appear to move purposefully through the basin and then leave (Peters pers. comm. 2013).

Based on surveys being conducted in the NAVSTA Mayport turning basin during late 2012 and early 2013 (U.S. Department of the Navy n.d.), a density of 2.53 individuals / km^2 has been estimated for the project area.

5. Incidental Take Authorization Requested

The type of incidental taking authorization that is being requested (i.e., takes by harassment only, takes by harassment, injury, and/or death), and the method of incidental taking.

Under the 1994 Amendments to the MMPA, harassment is statutorily defined as any act of pursuit, torment, or annoyance which:

- **Level A Harassment** has the potential to injure a marine mammal or marine mammal stock in the wild; or,
- **Level B Harassment** has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering but which does not have the potential to injure a marine mammal or marine mammal stock in the wild (National Marine Fisheries Service 2013).

The marine mammal density data used for this analysis was retrieved from the Navy's Marine Species Density Database, and the current turning basin survey effort at NAVSTA Mayport. Table 5-1 summarizes the species densities. The estimated number of exposures that could result for the one year period of construction for the Project from 1 October 2016 to 30 September 2017 is summarized in Table 5-2. Estimation of bottlenose dolphin density was based on surveys of the basin, detailed in U.S Department of the Navy (2014).

TABLE 5-1. SPECIES DENSITIES

Species	Highest Density (season)	Source Method[1]
North Atlantic right whale	0.00005 / km^2 (all)	Kaschner GDE
humpback whale	0.000113 / km^2 (all)	Kaschner GDE
Atlantic spotted dolphin	0.680256 / km^2 (spring)	SMRU Ltd.
bottlenose dolphin	4.15366/ km^2 (all)	Turning Basin surveys[2]

[1]Refer to Commander Task Force 20, 4th and 6th Fleet Navy Marine Species Density Database Technical Report, 30 March 2012; [2]U.S. Department of the Navy (2014) Survey Report.

Assumptions to be considered for the bottlenose dolphin incidental take estimate:

1) Individual animals may have been counted more than once.
2) The number of animals per square kilometer is assumed to be static, therefore indicating a resident population with no "refreshment" of new animals entering or leaving the area.

This is not a reasonable real world assumption, but in the absence of specific data on bottlenose dolphin movements in and out of the project area it has been applied for modeling purposes and represents a conservative approach.

3) Animals with a Level B exposure can be re-exposed every 24 hours, according to the standard of analysis for incidental takes. Therefore, while 920 incidental takes are being requested, the same animal could be affected on multiple days instead of 920 different dolphins being exposed once each. For example, 92 animals could each be exposed to noise levels that reach Level B criteria ten times over the course of the 130 day in-water work period.

The density of each species was multiplied by the size of the relevant zone of influence to determine the estimated number of exposures per day. This number was rounded to the nearest whole number and multiplied by the estimated number of pile-driving days to calculate takes for the entire Project. The Navy is requesting authorization for a total of 920 Level B (behavioral) incidental takes of bottlenose dolphins, and 110 Level B (behavioral) incidental takes of Atlantic spotted dolphins over the course of the Project (Table 5–2). Exposures may be to any age / reproductive class of the species. No incidental takes are requested for any other marine mammal species.

The Navy has committed to avoiding Level A takes during this project and shall monitor the entire injury zone for both types of driving; in-water work shall be shut down should a protected species approach or enter these zones. Therefore, no Level A exposures are anticipated or requested.

Methods for developing the incidental take estimate are detailed in Chapter 6 and Appendix B.

TABLE 5-2. ESTIMATED MARINE MAMMAL EXPOSURES

SPECIES	DENSITY (per km^2)	CALCULATED EXPOSURES		TOTALS
		Level A	Level B	
VIBRATORY DRIVING – Phase I (berths B-2 and B-3)				
North Atlantic right whale	0.00005 / km^2	0	0	0
humpback whale	0.000113 / km^2	0	0	0
Atlantic spotted dolphin	0.680256 / km^2	0	73	73
bottlenose dolphin	4.15366 / km^2	0	584	584
VIBRATORY DRIVING – Phase II (berth B-1)				
North Atlantic right whale	0.00005 / km^2	0	0	0
humpback whale	0.000113 / km^2	0	0	0
Atlantic spotted dolphin	0.680256 / km^2	0	37	37
bottlenose dolphin	4.15366 / km^2	0	296	296
CONTINGENCY IMPACT DRIVING – Phases I and II				
North Atlantic right whale	0.00005 / km^2	0	0	0
humpback whale	0.000113 / km^2	0	0	0
Atlantic spotted dolphin	0.680256 / km^2	0	0	0
bottlenose dolphin	4.15366 / km^2	0	40	40
SPECIES CALCULATED EXPOSURE TOTALS		**0**	**1,030**	**1,030**

Sources: U.S. Department of the Navy 2012; U.S. Department of the Navy (2014) Survey Report

6. Numbers and Species Taken

By age, sex, and reproductive condition (if possible), the number of marine mammals (by species) that may be taken by each type of taking identified in Section 5, and the number of times such takings by each type of taking are likely to occur.

The methods for estimating the number and types of exposure are described in the sections below, followed by the method for quantifying exposures of marine mammals to sources of energy exceeding those threshold values. Exposure of each was determined by:

- The potential of each species to be impacted by the acoustic sources as determined by the acoustic criterion for marine mammals.
- The potential presence of each species and their estimated density in the zone of influence for the Project.
- The area of impact for each pile driving sound source (estimated by taking into account the source levels, propagation loss and thresholds at which each acoustic criterion are met).

Potential exposures were calculated by multiplying the density of each marine mammal species potentially present by the total impacted area for each threshold value by the potential number of days of pile driving.

An introduction to the fundamentals of acoustics and use of the decibel unit can be found in Appendix B.

Assessing whether a sound may disturb or injure a marine mammal involves understanding the characteristics of the acoustic source and the potential effects that sound may have on the animal's physiology and behavior. Although it is known that sound is important for marine mammal communication, navigation, and foraging (National Research Council 2003, 2005), there are many unknowns in assessing impacts such as the potential interaction of different effects and the biological significance of responses by marine mammals to sound exposures (Nowacek et al. 2007; Southall et al. 2007). Furthermore, many factors other than the received level of sound may affect an animal's reaction, such as the animal's physical condition, prior experience with the sound, and proximity to the source of the sound (Nowacek et al. 2007).

Acoustically-mediated behaviors, including social interactions, foraging, and navigation, may be particularly vulnerable to disturbance during pile-driving activities, and it is important to understand the source characteristics of marine mammal vocalizations in order to address potential masking (see Appendix B) and disturbance. The following sections address hearing and sound production of all marine mammals that may be present in the project area during pile driving.

6.1. Hearing and Vocalization for North Atlantic Right Whales

Hearing in North Atlantic right whales and other large baleen whales is poorly understood due to the difficulty of performing experimental tests on live whales. Mathematical models and anatomical studies of whale ears have been used to estimate hearing in baleen whales. Recent morphometric analyses of North Atlantic right whale inner ears estimates a hearing range of approximately 0.01 to 22 kHz based on established marine mammal models (Parks et al. 2004; Parks and Tyack 2005; Parks et al. 2007).

North Atlantic right whales produce a variety of sounds, including moans, screams, gunshots, blows, upcalls, downcalls, and warbles that are often linked to specific behaviors (Matthews et al. 2001; Laurinolli et al. 2003; Vanderlaan et al. 2003; Parks et al. 2005; Parks and Tyack 2005). Sounds can be divided into three main categories: (1) blow sounds; (2) broadband impulsive sounds; and (3) tonal call types (Parks and Clark 2007). Blow sounds are those coinciding with an exhalation; it is not known whether these are intentional communication signals or just produced incidentally (Parks and Clark 2007). Broadband sounds include non-vocal slaps (when the whale strikes the surface of the water with parts of its body) and the “gunshot” sound; data suggests that the latter serves a communicative purpose (Parks and Clark 2007; Parks et al. 2012). Tonal calls can be divided into simple, low-frequency, stereo-typed calls and more complex, frequency-modulated, higher frequency calls (Parks and Clark 2007). Most of these sounds range in frequency from 0.02 to 15 kHz (dominant frequency range from 0.02 to less than 2 kHz; durations typically range from 0.01 to multiple seconds) with some sounds having multiple harmonics (Parks and Tyack 2005). Source levels for some of these sounds have been measured as ranging from 137 to 192 dB root-mean-square (rms) re: 1 μPa-m (decibels at the reference level of one micro Pascal at one meter) (Parks et al. 2005; Parks and Tyack 2005). In certain regions (i.e., northeast Atlantic), preliminary results indicate that right whales vocalize more from dusk to dawn than during the daytime (Leaper and Gillespie 2006; Mussoline et al. 2012; Parks et al. 2012). Vocalization rates of North Atlantic right whales are also highly variable, and individuals have been known to remain silent for hours (Gillespie and Leaper 2001). Baumgartner et al. (2005) noted that downsweep calls by North Atlantic right whales in the 16 to 160 Hz frequency band exhibited a diel pattern (fewer calls at night) that corresponded strongly to the diel vertical migration of zooplankton.

6.2. Hearing and Vocalization for Humpback Whales

While no measured data on hearing ability are available for humpback whales, Ketten (1997) hypothesized that mysticetes have acute infrasonic hearing. Houser et al. (2001) produced the first humpback whale audiogram (using a mathematical model), which was u-shaped and conformed to the typical mammalian presentation. The area of best hearing, or sensitivity, according to the model was observed between frequencies from 700 Hz to 10 kHz but the maximum range of hearing was identified between 200 Hz to 14 kHz. Au et al. (2006) noted that if the popular notion that animals generally hear the totality of the sounds they produce is applied to humpback whales, this suggests that its upper frequency limit of hearing is as high as 24 kHz.

Humpback whales are known to produce three classes of vocalizations: (1) “songs” in the late fall, winter, and spring by solitary males; (2) sounds made within groups on the wintering

(calving) grounds; and (3) social sounds made on the feeding grounds (Thomson and Richardson 1995). The best-known types of sounds produced by humpback whales are songs, which are thought to be breeding displays used only by adult males (Helweg et al. 1992). Singing is most common on breeding grounds during the winter and spring months but is occasionally heard outside breeding areas and out of season (Mattila et al. 1987; Gabriele et al. 2001; Gabriele and Frankel 2002; Clark and Clapham 2004). Humpback song is an elaborate series of patterned vocalizations which are hierarchical in nature (Payne and McVay 1971). There is geographical variation in humpback whale song, with different populations singing different songs and all members of a population using the same basic song. However, the song evolves over the course of a breeding season but remains nearly unchanged from the end of one season to the start of the next (Payne et al. 1983). Components of the song range from under 20 Hz to 4 kHz and occasionally 8 kHz, with source levels measured between 151 and 189 dB re 1 μPa-m and high-frequency harmonics extending beyond 24 kHz (Au et al. 2001; Au et al. 2006).

Social calls range in frequency from 50 Hz to over 10 kHz, with dominant frequencies below 3 kHz (Silber 1986). Female vocalizations appear to be simple; Simão and Moreira (2005) noted little complexity. "Feeding" calls, unlike song and social sounds, are highly stereotyped series of narrow-band trumpeting calls. They are 20 Hz to 2 kHz, less than 1 sec in duration, and have source levels of 162 to 192 dB re 1 μPa-m. The fundamental frequency of feeding calls is approximately 500 Hz (D'Vincent et al. 1985; Thompson et al. 1986).

6.3. Hearing and Vocalization for Atlantic Spotted Dolphins

A variety of sounds including whistles, echolocation clicks, squawks, barks, growls, and chirps have been recorded for the Atlantic spotted dolphin (Thomson and Richardson 1995). Whistles have dominant frequencies below 20 kHz (range: 7.1 to 14.5 kHz) but multiple harmonics extend above 100 kHz, while burst pulses consist of frequencies above 20 kHz (dominant frequency of approximately 40 kHz) (Lammers et al. 2003). Other sounds, such as squawks, barks, growls, and chirps, typically range in frequency from 100 Hz to 8 kHz (Thomson and Richardson 1995). Recently recorded echolocation clicks have two dominant frequency ranges at 40 to 50 kHz and 110 to 130 kHz, depending on source level (i.e., lower source levels typically correspond to lower frequencies and higher frequencies to higher source levels (Au and Herzing 2003).

Echolocation click source levels as high as 210 dB re 1 μPa-m peak-to-peak have been recorded (Au and Herzing 2003). Spotted dolphins in The Bahamas were frequently recorded during agonistic / aggressive interactions with bottlenose dolphins (and their own species) to produce squawks (200 Hz to 12 kHz broad band burst pulses; males and females), screams (5.8 to 9.4 kHz whistles; males only), barks (200 Hz to 20 kHz burst pulses; males only), and synchronized squawks (100 Hz - 15 kHz burst pulses; males only in a coordinated group) (Herzing 1996).

There have been no data collected on Atlantic spotted dolphin hearing abilities. However, odontocetes are generally adapted to hear high-frequencies (Ketten 1997) and it can be assumed that vocalization frequencies are generally within the hearing range of a species.

6.4. Hearing and Vocalization for Bottlenose Dolphins

Bottlenose dolphins can typically hear within a broad frequency range of 200 Hz to 160 kHz (Au 1993; Turl 1993), though with exposure during testing some dolphins might receive information as low as 50 Hz (Turl 1993). Electrophysiological experiments suggest the bottlenose dolphin brain has a dual analysis system: one specialized for ultrasonic clicks and another for lower-frequency sounds, such as whistles (Ridgway 2000). Scientists have reported a range of highest sensitivity between 25 and 70 kHz, with peaks in sensitivity at 25 and 50 kHz (Nachtigall et al. 2000). Recent research on the same individuals indicates auditory thresholds obtained by electrophysiological methods correlate well with those obtained in behavior studies, except at the some lower (10 kHz) and higher (80 and 100 kHz) frequencies (Finneran and Houser 2006).

Sounds emitted by bottlenose dolphins have been classified into two broad categories: pulsed sounds (including clicks and burst-pulses) and narrow-band continuous wave sounds (whistles), which usually are frequency modulated. Clicks and whistles have dominant frequency ranges of 110 to 130 kHz and source levels of 218 to 228 dB re 1 μPa-m (Au 1993) and 3.4 to 14.5 kHz and 125 to 173 dB re 1 μPa-m, respectively (Ketten 1998). Whistles are primarily associated with communication and can serve to identify specific individuals (i.e., signature whistles) (Caldwell and Caldwell 1965; Janik et al. 2006). Up to 52% of whistles produced by bottlenose dolphin groups with mother-calf pairs have been classified as signature whistles (Cook et al. 2004).

Sound production is also influenced by group type (single or multiple individuals), habitat, and behavior (Nowacek 2005). Bray calls (low-frequency vocalizations; majority of energy below 4 kHz), for example, are used when capturing fishes, specifically sea trout (*Salmo trutta*) and Atlantic salmon (*Salmo salar*), in some regions (i.e., Moray Firth, Scotland) (Janik 2000). Additionally, whistle production has been observed to increase while feeding (Acevedo-Gutiérrez and Stienessen 2004; Cook et al. 2004). Both whistles and clicks have been demonstrated to vary geographically in terms of overall vocal activity, group size, and specific context (e.g., feeding, milling, traveling, and socializing) (Jones and Sayigh 2002; Zaretsky et al. 2005; Baron 2006). For example, preliminary research indicates characteristics of whistles from populations in the northern Gulf of Mexico significantly differ (i.e., in frequency and duration) from those in the western north Atlantic (Zaretsky et al. 2005; Baron 2006).

6.5. Sound Exposure Criteria and Thresholds

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

Since 1997, NMFS has used generic sound exposure thresholds to determine when an activity in the ocean that produces sound might result in impacts to a marine mammal such that a take by harassment might occur (70 FR 1871). Current NMFS practice regarding exposure of marine

mammals to pile driving sounds is that cetaceans exposed to impulsive sounds ≥180 re 1 µPa rms are considered to have been taken by Level A (i.e., injurious) harassment. Level A injury thresholds have not been established for non-impulsive sounds such as vibratory pile driving, but the Navy has applied the threshold values for impulsive sounds to vibratory sound in this analysis.

Behavioral harassment (Level B) is considered to have occurred (and thus a "take" is counted) when marine mammals are exposed to underwater sounds below the injury threshold, but ≥ 160 dB re 1 µPa rms for impulsive sounds (e.g., impact pile driving) and 120 dB re 1 µPa rms for non-impulsive noise (e.g., vibratory pile driving).

6.6. Limitations of Existing Noise Criteria

To date, there is no research or data supporting a response by odontocetes to non-impulsive sounds from vibratory pile driving as low as the 120 dB re 1 µPa rms threshold. The application of the 120 dB rms re 1µPa threshold can be problematic because this threshold level can be at or below the ambient noise level of certain locations. For example, noise levels at some industrialized ports in Puget Sound, WA, have been measured at between 120 and 130 dB re 1µPa (Washington State Department of Transportation 2012). As a result, such analyses may be overly conservative, and the threshold level is subject to ongoing discussion due to these issues (74 FR 41684). NMFS is developing new science-based thresholds to improve and replace the current generic exposure level thresholds, but the criteria have not been finalized (79 FR 4672). The 120 dB re 1 µPa rms threshold level for non-impulsive noise originated from research conducted by Malme et al. (1984, 1988) for California gray whale response to non-impulsive industrial sounds such as drilling operations. Note: The 120 dB re 1 µPa rms *non-impulsive* sound threshold should not be confused with the 120 dB re 1 µPa rms *impulsive* sound criterion established for migrating bowhead whales in the Arctic as a result of research in the Beaufort Sea (Richardson et al. 1995; Miller et al. 1999).

6.7. Ambient Noise

The baseline noise level in the turning basin is referred to as the "ambient noise level". Ambient noise is comprised of sounds produced by a number of natural and anthropogenic sources. Natural noise sources can include wind, waves, precipitation, and biological sources such as shrimp, fish, and cetaceans. These sources produce sound in a wide variety of frequency ranges (Urick 1983; Richardson et al. 1995) and can vary over long (days to years) and short (seconds to hours) time scales. In shallow waters, precipitation may contribute up to 35 dB to the existing sound level, and increases in wind speed of 5 to 10 knots can cause a 5 dB increase in ambient ocean noise between 20 Hz and 100 kHz (Urick 1983). High noise levels may also occur in near shore areas during heavy surf, which may increase low frequency (200 Hz – 2 kHz) underwater noise levels by 20 dB or more within 200 yards of the surf zone (Wilson et al. 1985). At Mayport, vessel wakes in the St. Johns River may cause breaking waves on shore, contributing to the ambient acoustic environment.

Anthropogenic noise sources also contribute to ambient noise levels, particularly in ports and other high use areas in coastal regions. Normal port activities include vessel traffic (from large

ships, support vessels, and security boats), loading and maintenance operations, and other activities (sonar and echo-sounders from commercial and recreational vessels, construction, etc.) which all generate underwater sound (Urick 1983). Additionally, noise produced by mechanized equipment on wharves or adjacent shorelines may propagate underwater and contribute to underwater ambient noise levels.

The underwater acoustic environment in the Mayport turning basin is likely to be dominated by noise from day-to-day port and vessel activities. The basin is sheltered from most wave noise, but is a high-use area for naval ships, tugboats, and security vessels. When underway, these sources can create noise between 20 Hz and 16 kHz (Lesage et al. 1999), with broadband noise levels up to 180 dB re 1 µPa rms (Table 6-1) Normal port operations, including transits, docking, and maintenance by multiple tugboats and ships would continue. While there are no current measurements of ambient noise levels in the turning basin, the high levels of anthropogenic activity in the basin are likely to have elevated ambient noise levels within the basin above "quiet" habitats in which marine mammal reactions to 120 dB sounds were observed (Malme et al. 1984, 1988).

The existing sources of anthropogenic noise in the Mayport turning basin are generally non-impulsive (see Appendix B), intermittent sources such as vessel engines; this category also includes noise from vibratory pile driving. Impact pile driving noise differs from these sources in that it is impulsive, with a fast rise time and multiple short-duration (50 – 100 millisecond; Illingworth & Rodkin 2001) events. The use of impact driving during the proposed project is limited to instances when vibratory driving fails, and will be limited to a maximum of 20 strikes per day. Because of the very limited use of impact pile driving during the proposed action, the Navy expects no long-term change in the average ambient noise environment with respect to impulsive sounds as a result of impact pile driving.

TABLE 6-1. REPRESENTATIVE LEVELS OF NOISE FROM ANTHROPOGENIC SOURCES

Noise Source	Frequency Range (Hz)	Underwater Noise Level (dB re 1 µPa)
Small vessels[1]	250–6,000	151 dB rms at 1 m
Large vessels[2]	20 – 1,500	170 – 180 dB rms at 1 m
Tug docking barge[3]	200–1,000	149 dB rms at 100 m
Vibratory driving of 24-inch steel pipe pile[4]	50 – 1,500	159 dB rms at 10 m
Impact driving of 24-inch steel pipe pile[5]	50 – 1,500	186 dB rms at 10 m

m = meter ; Sources: [1]Lesage et al. 1999; [2]Richardson et al. 1995; [3]Blackwell and Greene 2002; [4]Illingworth & Rodkin 2012; [5]Washington Department of Transportation 2005

Airborne ambient noise in industrial areas such as the Mayport turning basin is comprised of sounds from trucks, cranes, compressors, generators, pumps, ship engines, and other equipment. While there are no current measurements of airborne ambient noise in the basin or wharf areas, expected noise levels range from a daytime minimum of 55 dBA to a maximum of 99 dBA,

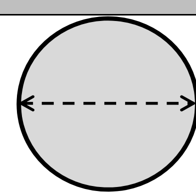
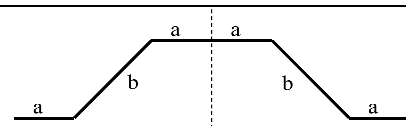
assuming that multiple sources will be operating simultaneously (Washington State Department of Transportation 2007).

6.8. Underwater Noise from Pile Driving

Noise levels produced by pile driving are influenced by factors including pile type, driving method, and the physical environment in which the activity takes place. A number of studies have examined sound pressure levels recorded from underwater pile driving projects in California and Washington, creating a large body of data for impact driving of steel pipe piles, concrete piles, and some timber piles. Data for vibratory pile driving is similarly concentrated on steel pipe piles of a range of diameters, and on 24-inch wide sheet piles (California Department of Transportation 2012, U.S. Navy 2013).

Because of the differences between the proposed action and available measured sound pressure levels, the Navy evaluated potential source levels for modeling of steel piles based on two methods. The first method examined measured sound pressure levels for single 24-inch wide sheet piles; the second was a comparison of the linear length of piles with the circumference of steel pipe piles for which source levels have been measured. Linear length was calculated as the sum of the lengths of all sides of each pile type (Table 6-2). Paired sheet pile linear lengths were comparable to the circumference of a 24-inch diameter pipe pile.

TABLE 6-2. COMPARISON OF PILE SIZES AND SHAPES FOR ESTIMATING SOURCE SOUND PRESSURE LEVELS

Pile Type	Shape and Dimensions
CIRCULAR STEEL PIPE PILE Diameter = 24 in. Circumference = Diameter*π = 75.4 in.	
SHEET PILE PAIR Linear length = 4*a+2*b =70.4 in. a = 6.81 in. b= 21.6 in. (total width = 55.12 in.)	

Measured sound pressure levels for 24 in. diameter steel sheet piles and 24 in. diameter steel pipe piles are available for both vibratory and impact driving methods. To determine the most appropriate sound pressure levels for this project, data from studies which met the following parameters were considered:

- Pile size and type: steel pipe piles (24 in. diameter) and/or steel sheet piles (24 in. wide)
- Installation method: vibratory and impact hammer

- Physical environment - water depth 15 ft. (4.5 m) or greater, sediment similar to sandy bottom in Mayport turning basin.

Tables 6-3 and 6-4 detail representative pile driving sound pressure levels measured from steel pipe piles and steel sheet piles. Comparison of measured sound pressure levels from the steel pipe piles and steel sheet piles revealed that levels from sheet pile driving were higher than those from pipe pile driving; the Navy has therefore used the more conservative sound pressure levels from steel sheet piles to model the proposed action. The selected sound pressure levels used for modeling steel piles in this application were 163 dB re 1 µPa rms for vibratory driving and 189 dB re 1µPa rms for impact driving. Sources are indicated by footnotes in the relevant tables.

TABLE 6-3. VIBRATORY INSTALLATION UNDERWATER SOUND PRESSURE LEVELS EXPECTED BASED ON SIMILAR IN-SITU MONITORED CONSTRUCTION ACTIVITIES

Project and Location	Pile Size and Type	Water Depth	Range to pile	RMS	Peak	Sediment
Portage Bay, WA[a]	24 inch steel pipe	3 – 7 m	10 m	157	170	Unknown
Berth 23 Port of Oakland, CA[b]	24 inch steel sheet pile	6.1 m	10 m	163[1]	177	Unknown
Berth 30 Port of Oakland, CA[b]	24 inch steel sheet pile	4.9 m	10 m	162	175	Unknown
Berth 35/37 Port of Oakland, CA[b]	24 inch steel sheet pile	6.1 m	10 m	163	177	Unknown
JEB Little Creek, Norfolk, VA[c]	24 inch steel sheet pile	< 4 m	11m	161	N/A	Sand/mud

Sound levels expressed as dB re 1 µPa rms and dB re 1 µPa peak for RMS and Peak SPL measurements, respectively. Average and Max values for Test Pile Program data are based on 10-second rms measurements over the 60 second driving time for the pile. 1- This data point was selected for use in acoustic modeling based on similarity to physical environment at NAVSTA Mayport and measurement location in mid-water column. Sources: a – Washington Department of Transportation 2010; b- California Department of Transportation 2012; c- U.S. Department of the Navy (2013); d– Washington Department of Transportation 2011

TABLE 6-4. IMPACT INSTALLATION UNDERWATER SOUND PRESSURE LEVELS EXPECTED BASED ON SIMILAR IN-SITU MONITORED CONSTRUCTION ACTIVITIES

<table>
<tr><th>Project and Location</th><th>Pile Size and Type</th><th>Water Depth</th><th>Range to pile</th><th>RMS</th><th>Peak</th><th>SEL</th><th>Sediment</th></tr>
<tr><td rowspan="6">Friday Harbor Ferry Terminal, WA[a]</td><td rowspan="6">24 inch steel pipe</td><td>12.8 m</td><td rowspan="6">10 m</td><td>170</td><td>183</td><td>180</td><td rowspan="3">Sandy silt/clay</td></tr>
<tr><td>13.4 m</td><td>186</td><td>205</td><td>179</td></tr>
<tr><td>14.3 m</td><td>186</td><td>204</td><td>179</td></tr>
<tr><td>10 m</td><td>194</td><td>210</td><td>185</td><td rowspan="3">Sandy silt/rock</td></tr>
<tr><td>10 m</td><td>195</td><td>215</td><td>187</td></tr>
<tr><td>10 m</td><td>193</td><td>212</td><td>184</td></tr>
<tr><td>Typical values, Caltrans compendium summary table[b]</td><td>24 inch steel pipe</td><td>15</td><td>NA</td><td>194</td><td>207</td><td>178</td><td>Unknown</td></tr>
<tr><td>Berth 23 Port of Oakland[b]</td><td>24 inch steel sheet pile</td><td>12 – 14 m</td><td>10 m</td><td>189[1]</td><td>205</td><td>179</td><td>Unknown</td></tr>
</table>

Sound levels expressed as dB re 1 µPa rms and dB re 1 µPa peak for RMS and Peak SPL measurements, respectively; 1- This data point was selected for use in acoustic modeling based on similarity to physical environment at NAVSTA Mayport and measurement location in mid-water column. Sources: [a]Washington State Department of Transportation 2005; [b]California Department of Transportation 2012

6.9. Underwater Sound Propagation

Pile driving can generate underwater noise that may result in disturbance to marine mammals within the project area. Modeling sound propagation is useful in evaluating noise levels to determine which marine mammals may be exposed at a given distance from the pile driving activity. The decrease in acoustic intensity as a sound wave propagates outward from a source is known as transmission loss (TL).

The formula for transmission loss is:

$$TL = B * log_{10}\left(\frac{R_1}{R_2}\right) + C * R_1, \text{ where}$$

B = logarithmic (predominantly spreading) loss

C = linear (scattering and absorption) loss

R_1 = range from source in meters

R_2 = range from driven pile to original measurement location (generally 10 m)

The amount of linear loss (C) is proportional to the frequency of a sound. Due to the low frequencies of sound generated by impact and vibratory pile driving, this factor was assumed to be zero for all calculations in this assessment and transmission loss was calculated using only logarithmic spreading. Therefore, using practical spreading (B=15), the revised formula for transmission loss is $TL = 15 \log_{10} (R_1/10)$.

6.10. Calculated Zones of Influence

The practical spreading loss model discussed above was used to calculate the propagation of pile driving sound in and around the Mayport turning basin. A total of 130 days of pile driving were modeled; 110 days of vibratory driving (73 days for Phase I, and 37 days for Phase II), plus 20 days of contingency impact driving distributed as needed across both phases. No sound mitigation methods (bubble curtains, cofferdams, etc.) are proposed and therefore no attenuation was included in the acoustic model.

For vibratory driving, the acoustic analysis used the assumption that a maximum of 27 sheet pile pairs would be driven each day, for a maximum daily length of approximately 124 ft..

For impact driving, modeling assumed a maximum of 20 strikes of the impact hammer per day, which is expected to take no more than five to ten minutes to complete.

TABLE 6-5. CALCULATED DISTANCES TO / AREAS ENCOMPASSED BY THE UNDERWATER MARINE MAMMAL NOISE THRESHOLDS FOR PILE DRIVING

Pile Type	Driving Method	Threshold (dB re 1µPa rms)	Distance (m)[1]	Area (km^2)
Steel sheet piles	vibratory	Level A (injury): 180	< 1	0
		Level B (behavior): 120	7,356	1.96
	impact (contingency only)	Level A (injury): 180	40	0.002
		Level B (behavior): 160	858	0.51

All sound levels expressed in dB re 1 µPa rms. dB = decibel; rms = root-mean-square; µPa = micro Pascal
Practical spreading loss (15 log, or 4.5 dB per doubling of distance) used for calculations.
[1]Sound pressure levels used for calculations are given in Table 6-3 and 6-4.

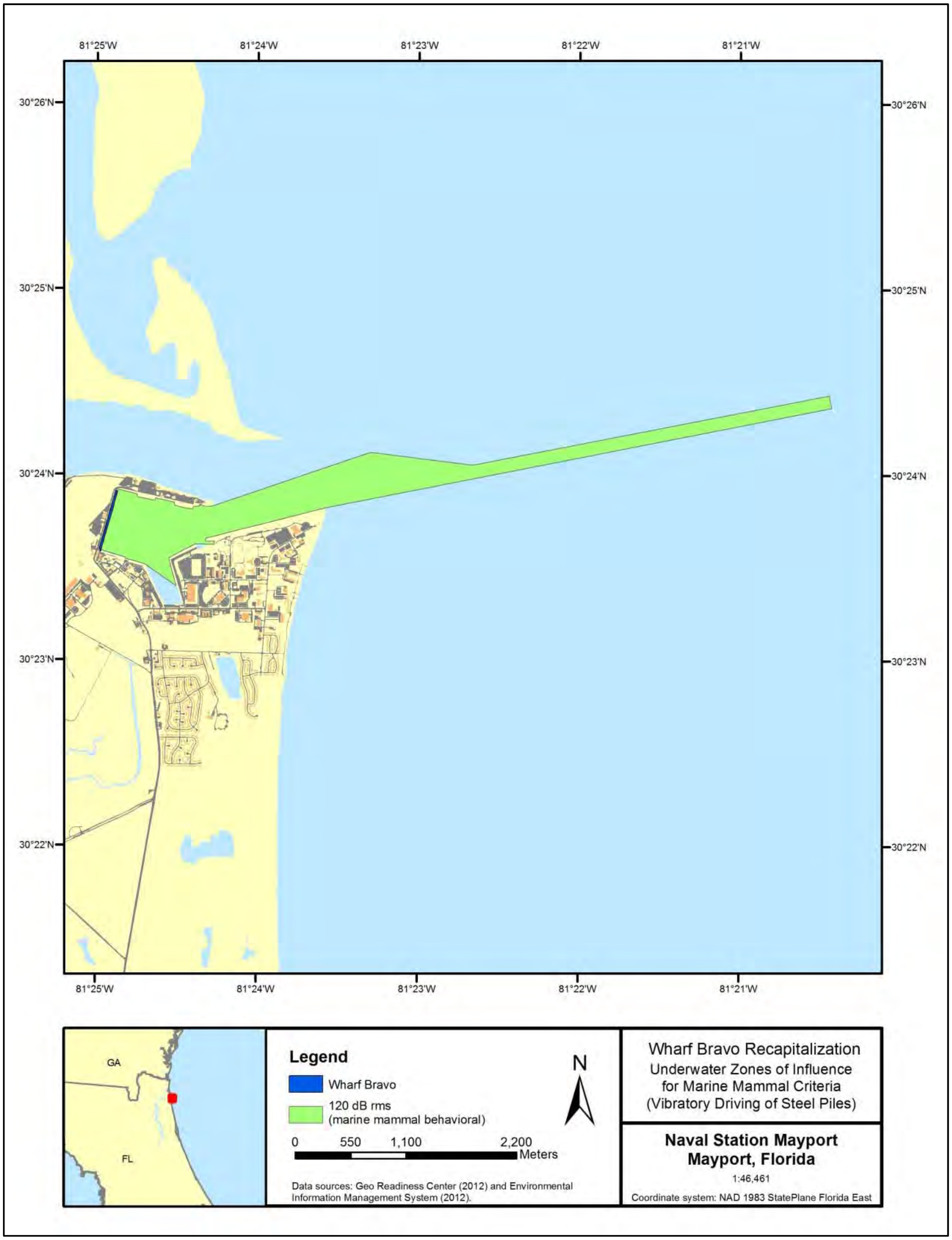
The calculations presented in Table 6-5 assume a field free of obstruction, which is unrealistic because the Mayport turning basin does not represent open water conditions (free field) and sounds will attenuate as they encounter land or other solid obstacles. As a result, the distances calculated may not actually be attained at the project area. The actual distances to the behavioral disturbance thresholds for impact and vibratory pile driving are likely to be shorter than those calculated due to the irregular contour of the waterfront and the maximum fetch (farthest

distance sound waves travel without obstruction [i.e. line of sight]) at the project area. Table 6-5 also depicts the actual areas encompassed by the marine mammal thresholds during the project.

Figures 6-1 through 6-2 depict the areas of each underwater sound threshold that are predicted to occur at the project area due to pile driving for marine mammals during each stage of the project. Note: injury zone for vibratory pile driving is not visible due to the size of the zone (> 1 m) and map scale.

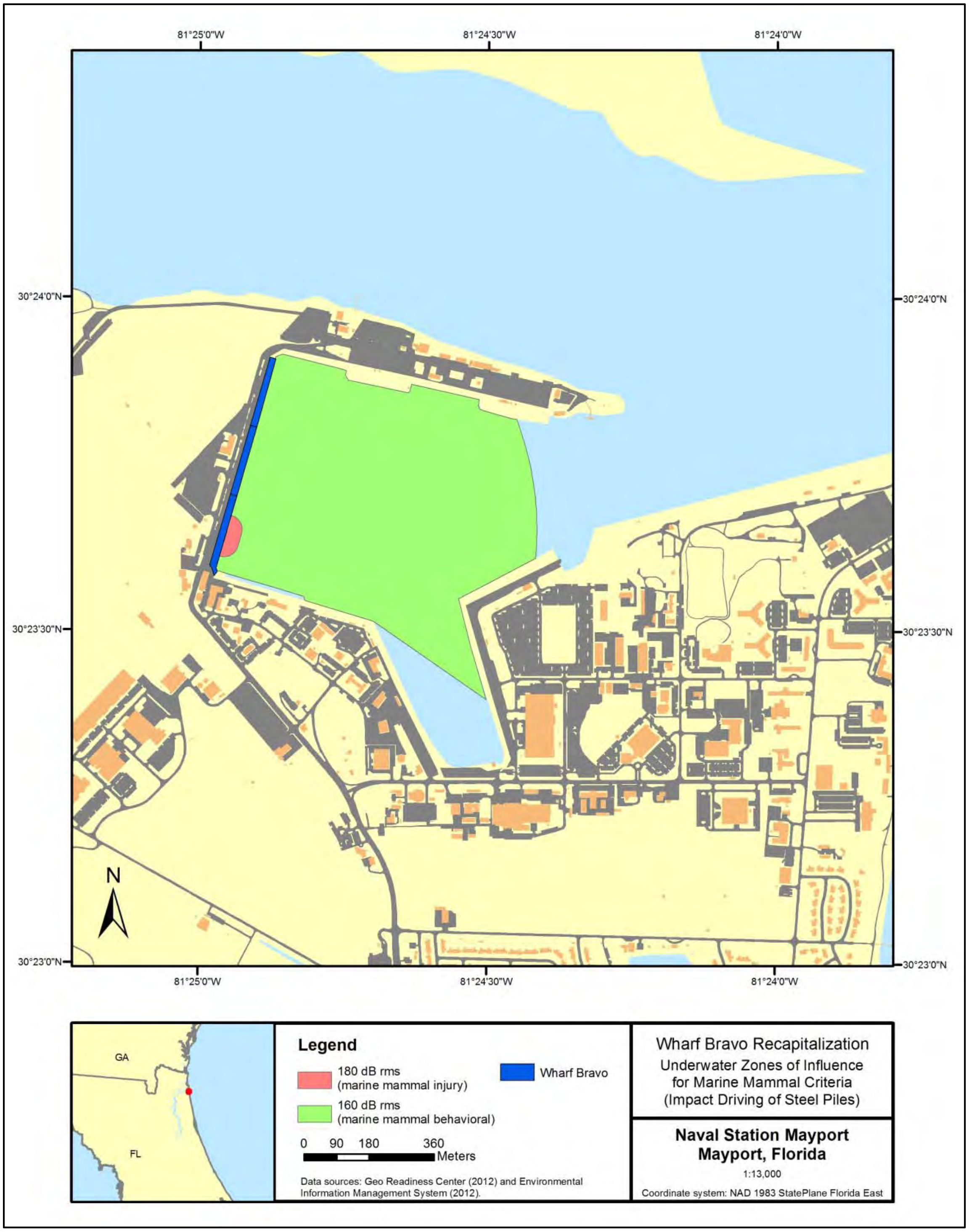
Marine mammal densities were multiplied by the size of the applicable zone of influence to estimate number of incidental takes per day. This number was rounded to the nearest whole number and multiplied by the estimated number of pile-driving days to calculate takes for the entire Project. (see Chapter 5).

FIGURE 6-1. INJURY AND BEHAVIORAL ZONES OF INFLUENCE FOR MARINE MAMMALS[1] - VIBRATORY DRIVING OF STEEL SHEET PILES



[1] Official criteria have not been established for West Indian manatees

FIGURE 6-2. INJURY AND BEHAVIORAL ZONES OF INFLUENCE FOR MARINE MAMMALS[2] - IMPACT DRIVING OF STEEL SHEET PILES (CONTINGENCY ONLY)



[2] Official criteria have not been established for West Indian manatees; marine mammal injury zone of influence illustrated represents a notional pile driving location

7. Impacts to Marine Mammal Species or Stocks

The anticipated impact of the activity upon the species or stock of marine mammals

The effects of pile driving noise on marine mammals depend on several factors, including:

- Type, depth, intensity, and duration of the pile driving sound,
- the species,
- size of the animal and its proximity to the source,
- depth of the water column,
- substrate of the habitat, and
- sound propagation properties of the environment.

Impacts to marine mammals from pile driving activities are expected to result primarily from acoustic pathways. As such, the degree of effect is intrinsically related to the received level and duration of the sound exposure, which are in turn influenced by the distance between the animal and the source. The farther away from the source, the less intense the exposure will be. The substrate and depth of the habitat affect the sound propagation properties of the environment. Shallow environments are typically more structurally complex, which leads to rapid sound attenuation. In addition, substrates that are soft (i.e., sand), such as those in the turning basin, will absorb and attenuate the sound more readily than hard substrates (rock) which may reflect the acoustic wave. Soft porous substrates will also likely require less time to drive the pile, and possibly less forceful equipment, which would ultimately decrease the intensity of the acoustic source to other locations

Potential behavioral disturbances are modeled to occur, but the type and severity of these disturbances are difficult to define due to individual differences in response and limited studies addressing the behavioral effects of sounds on marine mammals. The behavioral responses with greatest potential to occur during the proposed Project are habituation and temporary relocation (Ridgway et al. 1997; Finneran et al. 2003; Wartzok et al. 2003). The time required to drive each pile by vibratory methods would be less than sixty seconds, so the potential behavioral disturbances are anticipated to be discreet and brief.

7.1. Potential Physiological Responses

No Level A exposures are expected because of the mitigation measures outlined in Chapter 11 and the conservative modeling assumptions discussed in Chapter 5, but if they occurred, they would be the result of physiological responses to both the type and strength of the acoustic signature (Viada et al. 2008). The only real potential for Level A exposures would be as a result of impact pile driving, and that method would only be used as a contingency in cases when vibratory driving is insufficient (a similar project that has been completed at adjacent Wharf C-1 required impact pile driving on only seven piles, which required less than two days). Such potential exposures would be mitigated through monitoring, and are not expected to occur.

Physiological responses to impact/impulsive sound stimulation range from non-injurious vibration or compression of tissue to injurious tissue trauma, although mitigations would prevent such occurrences during this Project. The Navy is aware of how important such mitigations are and understands the risks of injury associated with impulsive sounds. Sound-related trauma can be lethal or sub lethal; lethal impacts are those resulting in immediate death or serious debilitation in or near an intense sound source (Ketten 1995). Ears are the most sensitive organ to pressure and are the organs most sensitive to injury (Ketten 2000). Sub lethal damage to the ear from a pressure wave can rupture the tympanum, fracture the ossicles, and damage the cochlea, cause hemorrhage, or cause leakage of cerebrospinal fluid into the middle ear (Ketten 1995). Sub lethal impacts also include hearing loss, which is caused by exposure to perceptible sounds. Moderate injury implies partial hearing loss. Permanent hearing loss (also called permanent threshold shift or PTS) can occur when the hair cells of the ear are damaged by a very loud event, as well as by prolonged exposure to noise. Instances of temporary threshold shifts and/or auditory fatigue are well documented in marine mammal literature as being one of the primary avenues of acoustic impact. Temporary loss of hearing sensitivity has been documented in controlled settings using captive marine mammals exposed to strong sound exposure levels at various frequencies (Ridgway et al. 1997; Kastak et al. 1999; Finneran et al. 2005). While injuries to other sensitive organs are possible, they are less likely since pile driving impacts are almost entirely acoustically mediated, versus explosive sounds which also include a shock wave resulting in damage.

7.2. Potential Behavioral Responses

The intent of the proposed project is to accomplish all pile driving using vibratory pile driving. Impact pile driving would only be used as a contingency in cases when vibratory driving is insufficient (a similar project that has been completed at adjacent Wharf C-1 required impact pile driving on only seven piles, which required less than two days). The time required to drive each pile by vibratory methods would be less than sixty seconds, so potential behavioral disturbances are anticipated to be discreet and brief.

Studies of marine mammal responses to vibratory pile driving are limited, but suggest the potential for behavioral disturbance can be negligible. Marine mammal monitoring at the Port of Anchorage marine terminal redevelopment project found no response by marine mammals swimming within the threshold distances to noise impacts from construction activities including pile driving (both impact hammer and vibratory driving) (Integrated Concepts & Research Corporation 2009). Background noise levels at this port are typically at 125 dB. Most marine mammals observed during the two lengthy construction seasons - beluga whales, harbor seals, harbor porpoises, and Steller sea lions - were observed in smaller numbers.

Responses to impulsive impact pile driving (if it were to be needed) are expected to be more acute than response to continuous vibratory driving. Controlled experiments with captive marine mammals showed pronounced behavioral reactions, including avoidance of loud sound sources (Ridgway et al. 1997; Finneran et al. 2003). Observed responses of wild marine mammals to loud impulsive sound sources (typically seismic guns or acoustic harassment devices) have been varied, but often consist of avoidance behavior or other behavioral changes suggesting discomfort (Morton and Symonds 2002; also see reviews in Gordon et al. 2004; Wartzok et al. 2003; and Nowacek et al. 2007).

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

A comprehensive review of acoustic and behavioral responses to noise exposure by Nowacek et al. (2007) concluded one of the most common responses is displacement. To assess the significance of displacements, it is necessary to know the areas to which the animals relocate, the quality of that habitat, and the duration of the displacement in the event they return to the pre-disturbance area. Short-term displacement may not be of great concern unless the disturbance happens repeatedly. Similarly, long-term displacement may not be of concern if adequate replacement habitat is available.

Marine mammals exposed to pile driving sound over the course of the Project would likely avoid affected areas if they experience noise-related discomfort. As described in the section above, individual responses to pile driving noise are expected to be variable. Some individuals may occupy the Project area during pile driving without apparent discomfort while others may be displaced with undetermined long-term effects. Avoidance of the affected area during pile driving operations would reduce or eliminate the likelihood of injury impacts, but would also reduce access to foraging areas, although whether or not foraging opportunities in the Project area are better than in areas outside the ZOI is not known. Noise-related disturbance may also inhibit some marine mammals from entering / exiting the turning basin. Given the duration of the project there is a potential for displacement of marine mammals from the affected area due to these behavioral disturbances during the in-water work period. However, the time required to drive each pile by vibratory methods would be less than sixty seconds, so potential behavioral disturbances are anticipated to be discreet and brief. Further, since pile driving will only occur during daylight hours, marine mammals transiting the activity area or foraging or resting in the project area at night will not be affected.

Habituation is a response that occurs when an animal's reaction to a stimulus wanes with repeated exposure, usually in the absence of unpleasant associated events (Wartzok et al. 2003). Animals are most likely to habituate to sounds that are predictable and unvarying. The opposite process is sensitization—when an unpleasant experience leads to subsequent responses, often in the form of avoidance, at a lower level of exposure. Behavioral state or differences in individual tolerance levels may affect the type of response as well. For example, animals that are resting may show greater behavioral change in response to disturbing noise levels than animals that are highly motivated to remain in an area for feeding (Richardson et al. 1995; National Research Council 2003; Wartzok et al. 2003). Indicators of disturbance may include sudden changes in the animal's behavior or avoidance of the affected area. A marine mammal may show signs that it is startled by the noise and/or it may swim away from the sound source and avoid the area. Increased surfacing time and temporary cessation of foraging in the project area could indicate disturbance or discomfort in marine mammals.

Effects of pile driving activities will be experienced by individual marine mammals, but will not cause population-level impacts or affect the continued survival of the species.

7.3. Conclusions Regarding Impacts to Species or Stocks

Individual marine mammals may be exposed to high sound pressure levels during pile removal and installation, which may result in Level B behavioral harassment. Any marine mammals exposed (harassed) may change their normal behavior patterns (i.e., swimming speed, foraging habits, etc.) or be temporarily displaced from the area of construction. Any exposures will likely have only a minor effect on individuals and no effect on their populations. The sound generated from vibratory pile driving is non-impulsive, which is not known to cause injury to marine mammals, and mitigations are in place to ensure injury does not occur. Each discreet vibratory pile driving action is also brief, requiring less than sixty seconds to completely drive a pile. Impact pile driving is anticipated to be seldom used, and only when vibratory driving is insufficient (a similar project that has been completed at adjacent Wharf C-1 required impact pile driving on only seven piles, which required less than two days) and mitigation is expected to prevent adverse physiological underwater impacts to marine mammals from impact pile driving. Nevertheless, potential behavioral disturbances are unavoidable. The expected level of unavoidable exposure (defined as acoustic harassment) is presented in Chapter 6. This level of effect is not anticipated to have any adverse impact to North Atlantic right whales', humpback whales', Atlantic spotted dolphins', or bottlenose dolphins' population recruitment, survival, or recovery (in the case of listed species).

8. Impact on Subsistence Use

The anticipated impact of the activity on the availability of the species or stock of marine mammals for subsistence uses.

Potential marine mammal disturbances resulting from the Project will be limited to populations for which there is no known historic or current subsistence use. Therefore, no impacts on the availability of species or stocks for subsistence use are considered.

9. Impacts to Marine Mammal Habitat and the Likelihood of Restoration

The anticipated impact of the activity upon the habitat of the marine mammal populations, and the likelihood of restoration of the affected habitat.

Activities associated with the Project are expected to result in removal of a small amount of low-quality habitat in the turning basin between the new and existing bulkheads, and disturb sediments, and benthic and forage fish communities, on a temporary, highly localized scale. The turning basin is dredged regularly to allow for deep draft naval ships' berthing; the last dredging took place during the spring of 2015. This, combined with the amount of vessel traffic in the relatively confined space of the turning basin and the transition to the federal navigation channel, has resulted in a determination the Bravo Wharf project area encompasses relatively low quality habitat for most marine species.

Pile installation and deployment of anchors and / or spuds from barges may result in temporary, small scale disturbance of benthic communities and marine vegetation in the immediate vicinity of the project. Benthic organisms may be disturbed, buried or crushed by anchors and / or spuds and removal of piles; this may result in a temporary degradation or loss of isolated foraging habitat for marine mammals. However, sediments and marine vegetation are expected to return to their prior conditions and cover within a short time of the conclusion of the in-water work.

The new surfaces associated with the piles and exposed concrete will likely result in establishment of fouling communities on Bravo Wharf itself, and may attract fish and benthic organisms resulting in very small scale shifts in prey distribution.

Overall, small-scale, temporary changes to habitat and community assemblages in the immediate project area are expected to occur, but natural sedimentation and succession / recruitment will likely return the project footprint to pre-construction conditions within a short amount of time after in-water work is completed.

10. Impacts to Marine Mammals from Loss or Modification of Habitat

The anticipated impact of the loss or modification of the habitat on the marine mammal populations involved.

The Project is not expected to have any habitat-related effects that could cause significant or long-term consequences for individual or populations of marine mammals because of the relatively small footprint and existing disturbed conditions. Further, all impacts will be temporary, with in-water pile driving work being completed in a maximum of 130 days. Information provided in Chapter 9 (Impacts on Marine Mammal Habitat and the Likelihood of Restoration) indicates there may be temporary impacts, but those impacts would be limited to the immediate area within the turning basin. Impacts will cease upon the completion of activities associated with the Project.

11. Means of Affecting the Least Practicable Adverse Impacts – Minimization Measures

The availability and feasibility (economic and technological) of equipment, methods, and manner of conducting such activity or other means of affecting the least practicable adverse impact upon the affected species or stocks, their habitat, and on their availability for subsistence uses, paying particular attention to rookeries, mating grounds, and areas of similar significance.

The Navy shall employ the measures listed in this section to avoid and minimize impacts to marine mammals and their habitats. Best Management Practices (BMPs) are intended to avoid and minimize potential environmental impacts. BMPs and minimization measures are included in the construction contract plans and specifications and must be agreed upon by the contractor prior to any construction activities. Upon signing the contract, it becomes a legal agreement between the contractor and the Navy. Failure to follow the prescribed BMPs and minimization measures is a contract violation.

General Construction Best Management Practices

1. All work shall adhere to performance requirements of the Clean Water Act, Section 404 permit and Section 401 Water Quality Certification. No in-water work shall begin until after issuance of regulatory authorizations.
2. The construction contractor is responsible for preparation of an Environmental Protection Plan. The plan shall be submitted and implemented prior to the commencement of any construction activities and is a binding component of the overall contract. The plan shall identify construction elements and recognize spill sources at the site. The plan shall outline BMPs, responsive actions in the event of a spill or release, and notification and reporting procedures. The plan shall also outline contractor management elements such as personnel responsibilities, project site security, site inspections, and training.
3. No petroleum products, lime, chemicals, or other toxic or harmful materials shall be allowed to enter surface waters.
4. Washwater resulting from washdown of equipment or work areas shall be contained for proper disposal, and shall not be discharged unless authorized.
5. Equipment that enters surface waters shall be maintained to prevent any visible sheen from petroleum products.
6. No oil, fuels, or chemicals shall be discharged to surface waters, or onto land where there is a potential for re-entry into surface waters shall occur. Fuel hoses, oil drums, oil or fuel transfer valves, fittings, etc. shall be checked regularly for leaks, and be maintained and stored properly to prevent spills.
7. No cleaning solvents or chemicals used for tools or equipment cleaning shall be discharged to ground or surface waters.
8. Construction materials shall not be stored where high tides, wave action, or upland runoff could cause materials to enter surface waters.

9. Barge operations shall be restricted to tidal elevations adequate to prevent grounding of a barge.

Pile Removal and Installation Best Management Practices

1. A containment boom surrounding the work area shall be used during creosote-treated pile removal to contain and collect any floating debris and sheen. The boom may be lined with oil-absorbing material to absorb released creosote.
2. Oil-absorbent materials shall be used in the event of a spill if any oil product is observed in the water.
3. All creosote-treated material and associated sediments shall be disposed of in a landfill that meets Florida environmental standards.
4. Removed piles and associated sediments (if any) shall be contained on a barge. If a barge is not utilized, piles and sediments may be stored in a containment area near the construction site.
5. Pilings that break or are already broken below the waterline may be removed by wrapping the piles with a cable or chain and pulling them directly from the sediment with a crane. If this is not possible, they shall be removed with a clamshell bucket. To minimize disturbance to bottom sediments and splintering of piling, the contractor shall use the minimum size bucket required to pull out piling based on pile depth and substrate. The clam shell bucket shall be emptied of piling and debris on a contained barge before it is lowered into the water. If the bucket contains only sediment, the bucket shall remain closed and be lowered to the mud line and opened to redeposit the sediment. In some cases (depending on access, location, etc.), piles may be cut below the mud line and the resulting hole backfilled with clean sediment.
6. Any floating debris generated during installation shall be retrieved. Any debris in a containment boom shall be removed by the end of the work day or when the boom is removed, whichever occurs first. Retrieved debris shall be disposed of at an upland disposal site.
7. Whenever activities that generate sawdust, drill tailings, or wood chips from treated timbers are conducted, tarps or other containment material shall be used to prevent debris from entering the water.
8. If excavation around piles to be replaced is necessary, hand tools or a siphon dredge shall be used to excavate around piles to be replaced.

Timing Restrictions

All in-water construction activities shall occur during daylight hours (one hour post sunrise to one hour prior to sunset[3]). Non in-water construction activities could occur between 6:00 AM and 10:00 PM during any time of the year.

[3] Sunrise and sunset are to be determined based on the National Oceanic and Atmospheric Administration data which can be found at http://www.srrb.noaa.gov/highlights/sunrise/sunrise.html.

Additional Minimization Measures for Marine Mammals

The following minimization measures shall be implemented during pile driving to avoid marine mammal exposure to Level A injurious noise levels generated from impact pile driving and to reduce to the lowest extent practicable exposure to Level B disturbance noise levels.

Coordination

The Navy shall conduct a pre-construction briefing with the contractor. During the briefing, all personnel working in the Project area shall watch the Navy's Marine Species Awareness Training video.

Acoustic Minimization Measures

Vibratory installation shall be used to the extent possible to drive steel piles to minimize higher sound pressure levels associated with impact pile driving.

Soft Start

The objective of a soft-start is to provide a warning and / or give animals in close proximity to pile driving a chance to leave the area prior to an impact driver operating at full capacity; thereby, exposing fewer animals to loud underwater and airborne sounds. A soft start procedure shall be used at the beginning of each day's in-water pile driving or if pile driving has ceased for more than 1 hour, for impact driving only.

The contractor shall provide an initial set of strikes from the impact hammer at reduced energy, followed by a 30-second waiting period, then two subsequent sets. (The reduced energy of an individual hammer cannot be quantified because they vary by individual drivers. Also, the number of strikes will vary at reduced energy because raising the hammer at less than full power and then releasing it results in the hammer "bouncing" as it strikes the pile resulting in multiple "strikes").

Standard Conditions

Conditions in this section include those that will be followed for the protection of all ESA-listed species, not only those being addressed in this application. The contractor will adhere to all requirements of the following:

- 2011 Standard Manatee Conditions for In-Water Work
- Sea Turtle and Smalltooth Sawfish Construction Conditions
- Southeast Regional Marine Mammal and Sea Turtle Viewing Guidelines

Sea Turtle Lighting Conditions

- Lighting on construction equipment shall be minimized through reduction, shielding, lowering, and appropriate placement to avoid excessive illumination of the nearby marine turtle nesting beach while still being consistent with human safety requirements.

- All permanent exterior lighting fixtures associated with the wharf redevelopment should be assessed by NAVSTA Mayport Environmental Department and designed according to the NAVSTA Mayport Light Management Plan to minimize light contribution to urban sky glow which could be visible from the marine turtle nesting beach.

Visual Monitoring and Shutdown Procedures

A separate Marine Species Monitoring Plan will be submitted to NMFS and USFWS; it includes all details for monitoring. Major components of the monitoring plan are summarized below.

Observers and Procedures

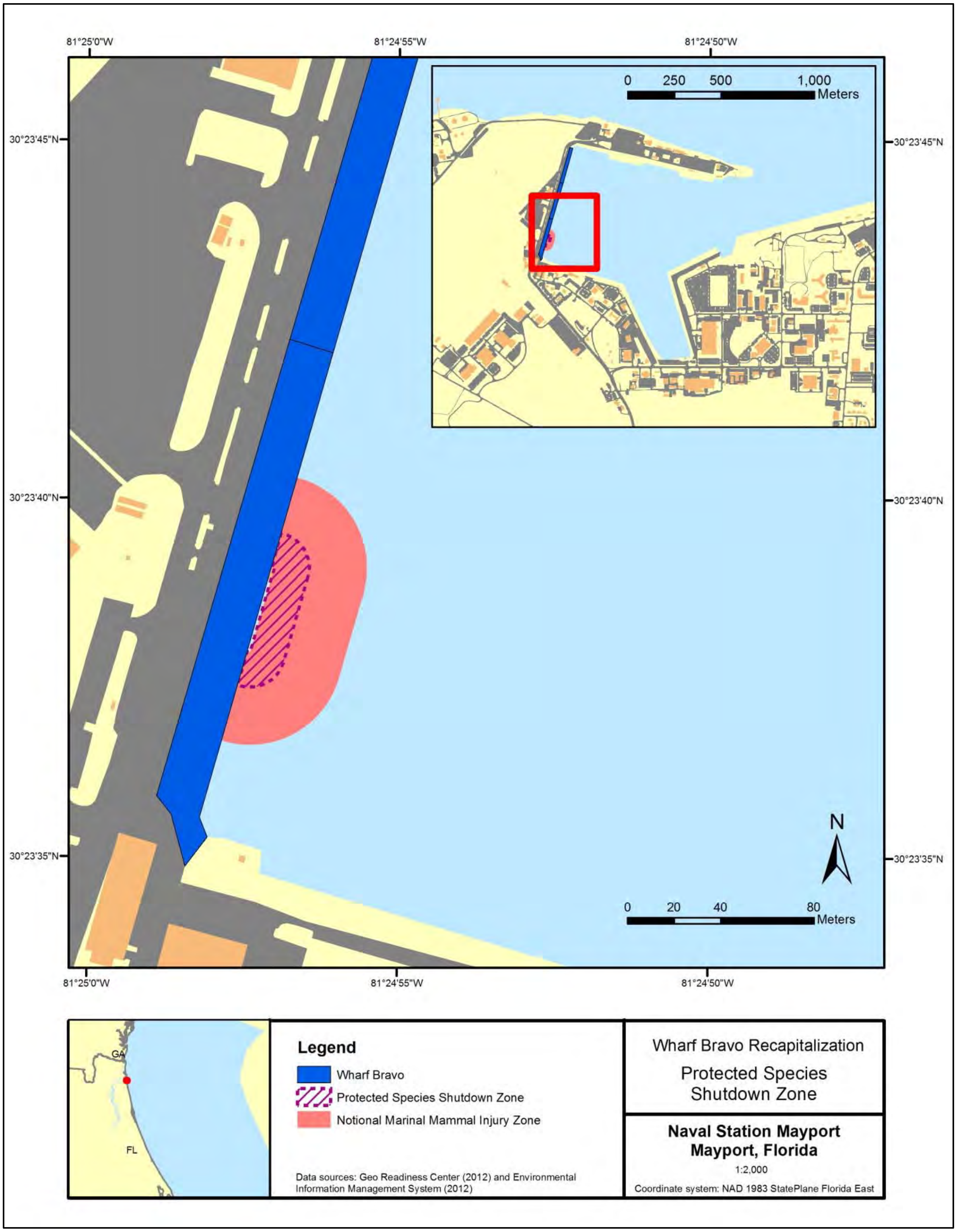
The Navy shall conduct a pre-construction briefing with the contractor. During the briefing, all contractor personnel working in the Project area will watch the Navy's Marine Species Awareness Training video. An informal guide will be included with the Monitoring Plan to aid in identifying species should they be observed in the vicinity of the Project.

Marine species observers ("observers") designated by the contractor will be placed at the best vantage point(s) practicable to monitor for protected species and implement shutdown/delay procedures when applicable by calling for the shutdown to equipment operators. The observers shall have no other construction related tasks while conducting monitoring.

Methods

The observer(s) will monitor the entire shutdown zone (Figure 11-1) before, during, and after pile driving and removal. The shutdown zone for contingency only impact pile driving was calculated based on acoustic modeling at a notional pile location on the wharf. The zone to be monitored is 40 m (132 ft.) in each direction from the pile being driven. However, the shutdown zone for the vast majority of in-water work (i.e. during vibratory pile driving) will be 15 m (50 ft.) from the pile being driven. The observer(s) will have full visibility of the shutdown zone regardless of the type of driving taking place, and will be able to immediately report a marine mammal observation and initiate shutdown procedures.

FIGURE 11-1. SHUTDOWN ZONES FOR VIBRATORY AND (CONTINGENCY ONLY) IMPACT PILE DRIVING



The observer(s) will be placed at the best vantage point practicable (e.g. from a small boat, construction barges, on shore, or any other suitable location) to monitor for marine species and implement shutdown/delay procedures when applicable by calling for the shutdown to the equipment operator(s). Elevated positions are preferable; it shall be the contractor's responsibility to ensure that appropriate safety measures are implemented to protect observers on elevated observation points. If a boat is used for monitoring, the boat will maintain minimum distances from all species (should they occur) as described in the Southeast Region Marine Mammal and Sea Turtle Viewing Guidelines.

During all observation periods, observers would use binoculars and the naked eye to search continuously for ESA-listed species (with the exception of fish, which are not likely to be visible from the surface). If the shutdown zone is obscured by fog or poor lighting conditions, pile driving will not be initiated until the entire shutdown zone is visible.

Pre-Activity Monitoring

The shutdown zone will be monitored for 15 minutes prior to in-water construction/demolition activities. If a protected species is observed in or approaching the shutdown zone, the activity shall be delayed until the animal(s) leaves the shutdown zone. Activity would resume only after the observer has determined, through re-sighting or by waiting approximately 15 minutes that the animal(s) has moved outside the shutdown zone. The observer(s) will notify the monitoring coordinator/construction foreman / point of contact (POC) when construction activities can commence.

Activity Monitoring

The shutdown zone will always be a minimum of 15 m (50 ft.) to prevent injury from physical interaction of protected species with construction equipment (Figure 11-1). For contingency impact pile driving, the larger 40 m (132 ft.) shutdown zone (indicated by red polygon in Figure 11-1 for a notional pile location) shall be implemented; the standard shutdown zone will continue to be applied for all other protected species.

If a protected species approaches or enters a shutdown zone during any in-water work, activity will be halted and delayed until either the animal has voluntarily left and been visually confirmed beyond the shutdown zone or 15 minutes have passed without re-detection of the animal. Note: protected fish species will not likely be visible to observers at the surface.

Bulkhead sheet pile installation shall be completed only after confirmation that no manatees or marine turtles will be trapped in the area to be filled between the existing and new bulkheads.

Post-Activity Monitoring

Monitoring of the shutdown zone will continue for 15 minutes following the completion of the activity.

Data Collection

The following information will be collected on sighting forms used by observers:

- Date and time that pile driving or removal begins or ends
- Construction activities occurring during each observation period
- Weather parameters identified in the acoustic monitoring (e.g., wind, temperature, percent cloud cover, and visibility)
- Tide and sea state

If a protected species approaches or enters the shutdown zone, the following information will be recorded once shutdown procedures have been implemented:

- Species, numbers, and if possible sex and age class of the species
- Behavior patterns observed, including bearing and direction of travel
- Location of the observer and distance from the animal(s) to the observer

If possible, photographs of the animal(s) will be taken and forwarded to the Naval Facilities Engineering Command Southeast Environmental point of contact.

Data collection forms shall be furnished to the Environmental point of contact within a mutually agreeable timeframe.

Interagency Notification

If the Navy encounters an injured, sick, or dead marine mammal, NMFS will be notified immediately. Such sightings will be called into the NMFS Stranding Coordinator for the Southeast:

Erin Fougeres, Ph.D.
Marine Mammal Stranding Program Administrator
NOAA Fisheries
Southeast Regional Office
263 13th Avenue South
St. Petersburg, FL 33701
e-mail: erin.fougeres@noaa.gov
office: 727-824-5323
fax: 727-824-5309

The Navy will provide NMFS with the species or description of the animal(s), the condition of the animal (including carcass condition if the animal is dead), location, the date and time of first discovery, observed behaviors (if alive), and photo or video (if available).

In preservation of biological materials from a dead animal, the finder (i.e. marine mammal observer) has the responsibility to ensure that evidence associated with the specimen is not unnecessarily disturbed. Observers should not handle dead animals.

Reporting

A draft report of any incidents of marine mammals entering the shutdown zone will be forwarded to NMFS / USFWS no later than 31 December 2017. A final report would be prepared and submitted to NMFS within 30 days following receipt of comments on the draft report from NMFS.

12. Minimization of Adverse Effects on Subsistence Use

Where the proposed activity would take place in or near a traditional Arctic subsistence hunting area and/or may affect the availability of a species or stock of marine mammal for Arctic subsistence uses, the applicant must submit either a plan of cooperation or information that identifies what measures have been taken and/or will be taken to minimize any adverse effects on the availability of marine mammals for subsistence uses. A plan must include the following:

(i) A statement that the applicant has notified and provided the affected subsistence community with a draft plan of cooperation;

(ii) A schedule for meeting with the affected subsistence communities to discuss proposed activities and to resolve potential conflicts regarding any aspects of either the operation or the plan of cooperation;

(iii) A description of what measures the applicant has taken an/or will take to ensure that proposed activities will not interfere with subsistence whaling or sealing; and

(iv) What plans the applicant has to continue to meet with the affected communities, both prior to and while conducting activity, to resolve conflicts and to notify the communities of any changes in the operation.

As detailed in Chapter 8, no impacts on the availability of species or stocks for subsistence use are considered. Therefore, no minimization efforts are applicable.

13. Monitoring and Reporting Measures

The suggested means of accomplishing the necessary monitoring and reporting that will result in increased knowledge of the species, the level of taking or impacts on populations of marine mammals that are expected to be present while conducting activities and suggested means of minimizing burdens by coordinating such reporting requirements with other schemes already applicable to persons conducting such activity. Monitoring plans should include a description of the survey techniques that would be used to determine the movement and activity of marine mammals near the activity site(s) including migration and other habitat uses, such as feeding.

A separate Marine Species Monitoring Plan is being submitted to NMFS. It includes all details for Project monitoring efforts.

14. Research

Suggested means of learning of, encouraging, and coordinating research opportunities, plans, and activities relating to reducing such incidental taking and evaluating its effects.

At this time the Navy does not anticipate any specific research conducted in conjunction with the Project.

The Navy strives to be a world leader in marine species research and has provided more than $100 million over the past five years to universities, research institutions, federal laboratories, private companies, and independent researchers around the world to increase the understanding of marine species physiology and behavior with several projects ongoing in Washington.

The Navy sponsors 70 percent of all U.S. research concerning the effects of human-generated sound on marine mammals and 50 percent of such research conducted worldwide. Major topics of Navy-supported research include the following:

- Gaining a better understanding of marine species distribution and important habitat areas
- Developing methods to detect and monitor marine species before and during training
- Understanding the effects of sound on marine mammals
- Developing tools to model and estimate potential effects of sound

The Navy has sponsored several workshops to evaluate the current state of knowledge and potential for future acoustic monitoring of marine mammals. The workshops brought together acoustic experts and marine biologists from the Navy and outside research organizations to present data and information on current acoustic monitoring research efforts and to evaluate the potential for incorporating similar technology and methods into Navy activities. The Navy supports research efforts on acoustic monitoring and will continue to investigate the feasibility of passive acoustics as a potential monitoring tool. Overall, the Navy will continue to research and contribute to university/external research to improve the state of the science regarding marine species biology and acoustic effects. These efforts include monitoring programs, data sharing with NMFS from research and development efforts, and future research as previously described.

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Appendix A

Standard Manatee Conditions for In-Water Work

STANDARD MANATEE CONDITIONS FOR IN-WATER WORK
2011

The permittee shall comply with the following conditions intended to protect manatees from direct project effects:

a. All personnel associated with the project shall be instructed about the presence of manatees and manatee speed zones, and the need to avoid collisions with and injury to manatees. The permittee shall advise all construction personnel that there are civil and criminal penalties for harming, harassing, or killing manatees which are protected under the Marine Mammal Protection Act, the Endangered Species Act, and the Florida Manatee Sanctuary Act.

b. All vessels associated with the construction project shall operate at "Idle Speed/No Wake" at all times while in the immediate area and while in water where the draft of the vessel provides less than a four-foot clearance from the bottom. All vessels will follow routes of deep water whenever possible.

c. Siltation or turbidity barriers shall be made of material in which manatees cannot become entangled, shall be properly secured, and shall be regularly monitored to avoid manatee entanglement or entrapment. Barriers must not impede manatee movement.

d. All on-site project personnel are responsible for observing water-related activities for the presence of manatee(s). All in-water operations, including vessels, must be shutdown if a manatee(s) comes within 50 feet of the operation. Activities will not resume until the manatee(s) has moved beyond the 50-foot radius of the project operation, or until 30 minutes elapses if the manatee(s) has not reappeared within 50 feet of the operation. Animals must not be herded away or harassed into leaving.

e. Any collision with or injury to a manatee shall be reported immediately to the Florida Fish and Wildlife Conservation Commission (FWC) Hotline at 1-888-404-3922. Collision and/or injury should also be reported to the U.S. Fish and Wildlife Service in Jacksonville (1-904-731-3336) for north Florida or in Vero Beach (1-772-562-3909) for south Florida, and emailed to FWC at ImperiledSpecies@myFWC.com.

f. Temporary signs concerning manatees shall be posted prior to and during all in-water project activities. All signs are to be removed by the permittee upon completion of the project. Temporary signs that have already been approved for this use by the FWC must be used. One sign which reads *Caution: Boaters* must be posted. A second sign measuring at least 8½ " by 11" explaining the requirements for "Idle Speed/No Wake" and the shut down of in-water operations must be posted in a location prominently visible to all personnel engaged in water-related activities. These signs can be viewed at http://www.myfwc.com/WILDLIFEHABITATS/manatee_sign_vendors.htm. Questions concerning these signs can be forwarded to the email address listed above.

CAUTION: MANATEE HABITAT

All project vessels

IDLE SPEED / NO WAKE

When a manatee is within 50 feet of work
all in-water activities must

SHUT DOWN

Report any collision with or injury to a manatee:

Wildlife Alert:

1-888-404-FWCC(3922)

cell *FWC or #FWC

Appendix B

Fundamentals of Acoustics

Bioacoustics, or the study of how sound affects living organisms, is a complex and interdisciplinary field that includes the physics of sound production and propagation, the source characteristics of sounds, and the perceptual capabilities of receivers. This appendix is intended to introduce the reader to the basics of sound measurements and sound propagation, as well as the hearing and vocal production abilities of species that may occur in the project area. The potential for noise from pile driving to cause auditory masking for marine mammals within the project area is also considered.

B.1 Fundamentals of Acoustics

Sound is an oscillation in pressure, particle displacement, or particle velocity, as well as the auditory sensation evoked by these oscillations, although not all sound waves evoke an auditory sensation (i.e., they are outside of an animal's hearing range) (ANSI S1.1-1994). Sound may be described in terms of both physical and subjective attributes. Physical attributes may be directly measured. Subjective (or sensory) attributes cannot be directly measured and require a listener to make a judgment about the sound. Physical attributes of a sound at a particular point are obtained by measuring pressure changes as sound waves pass. The following material provides a short description of some of the basic parameters of sound.

Sound can be characterized by several factors, including frequency, intensity, and pressure (Richardson et al. 1995). Sound frequency (measured in Hertz [Hz]) and intensity (amount of energy in a signal [Watts per meter^2]) are physical properties of the sound which are related to the subjective qualities of pitch and loudness (Kinsler et al. 1999). Sound intensity and sound pressure (measured in Pascals [Pa]) are also related; of the two, sound pressure is easier to measure directly, and is therefore more commonly used to evaluate the amount of disturbance to the medium caused by a sound ("amplitude").

Because of the wide range of pressures and intensities encountered during measurements of sound, a logarithmic scale known as the decibel is used to evaluate these properties; in acoustics, "level" indicates a sound measurement in decibels. The decibel [dB] scale expresses the logarithmic strength of a signal (pressure or intensity) relative to a reference value of the same units. This document reports sound levels with respect to sound pressure only. Each increase of 20 dB reflects a ten-fold increase in signal pressure, i.e., an increase of 20 dB means ten times the pressure, 40 dB means one hundred times the pressure, 60 dB means one thousand times the pressure, and so on.

The sound levels in this document are given as sound pressure levels [SPL]. For measurements of underwater sound, the standard reference pressure is 1 microPascal [μPa, or 10^{-6} Pascals], and is expressed as "dB re 1μPa". For airborne sounds, the reference value is 20 μPa, expressed as "dB re 20 μPa". Sound levels measured in air and water are not directly comparable, and it is important to note which reference value is associated with a given sound level.

Airborne sounds are commonly referenced to human hearing using a method which weights sound frequencies according to measures of human perception, de-emphasizing very low and very high frequencies which are not perceived well by humans. This is called A-weighting, and the decibel level measured is called the A-weighted sound level [dBA]. A similar method has been proposed for evaluating underwater sound levels with respect to marine mammal hearing. While preliminary weighting functions for marine mammal hearing have been developed

(Southall et al. 2007), they are not yet applied to sound exposure from pile driving activities. Therefore, underwater sound levels given in this document are not weighted and evaluate all frequencies equally.

Table D-1 summarizes common acoustic terminology. Two of the most common descriptors are the instantaneous peak SPL and the root-mean-square [rms] SPL. The peak SPL is the instantaneous maximum or minimum over- or underpressure observed during each sound event and is presented in dB re 1 µPa peak. The rms level is the square root of the energy divided by a defined time period, given as dB re 1 µPa rms.

Table B-1. Definitions of Acoustical Terms

Term	Definition
Decibel [dB]	A unit describing the amplitude of sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure or intensity of the sound measured to the appropriate standard reference value. This document uses only sound pressure measurements to calculate decibel levels. The reference pressure for water is 1 microPascal (µPa) and for air is 20 µPa (approximate threshold of human audibility).
Sound Pressure Level [SPL]	Sound pressure is the force per unit area, usually expressed in microPascals (or 20 micro Newtons per square meter), where 1 Pascal is the pressure resulting from a force of 1 Newton exerted over an area of 1 square meter. Sound pressure level is the quantity that is directly measured by a sound level meter, and is expressed in decibels referenced to the appropriate air or water standard.
Frequency, Hz	Frequency is expressed in terms of oscillations, or cycles, per second. Cycles per second are commonly referred to as Hertz (Hz). Typical human hearing ranges from 20 Hz to 20,000 Hz; hearing ranges in non-humans are widely variable and species specific.
Peak Sound Pressure (unweighted), dB re 1µPa peak	The maximum absolute value of the instantaneous sound pressure expressed as dB re 1µPa peak.
Root-Mean-Square [rms], dB re 1µPa	The rms level is the square root of the pressure divided by a defined time period, expressed in decibels. For impulsive sounds, the rms has been defined as the average of the squared pressures over the time that comprise that portion of waveform containing 90 percent of the sound energy for one impact pile driving impulse. For non-impulsive sounds, rms energy represents the average of the squared pressures over the measurement period and is not limited by the 90 percent energy criterion. Expressed as dB re 1µPa.
Sound Exposure Level [SEL], dB re 1µPa^2 sec	Sound exposure level is a measure of energy. Specifically, it is the dB level of the time integral of the squared-instantaneous sound pressure, normalized to a 1-second period. It can be an extremely useful metric for assessing cumulative exposure because it enables sounds of differing duration to be compared in terms of total energy.
Waveforms, µPa over time	A graphical plot illustrating the time history of positive and negative sound pressure of individual pile strikes shown as a plot of µPa over time (i.e., seconds).
Frequency Spectra, dB over frequency range	A graphical plot illustrating the frequency content over a given frequency range. Bandwidth is generally defined as linear (narrowband) or logarithmic (broadband) and is stated in frequency (Hz).
A-Weighted Sound Level, dBA	A frequency-weighted measure used for airborne sounds only. A-weighting de-emphasizes the low and high frequency components of a given sound in a manner similar to the frequency response of the human ear and correlates well with subjective human reactions to noise. A-weighted levels are referenced to 20 µPa unless otherwise noted.

Term	Definition
Ambient Noise Level	The background noise level, which is a composite of sounds from all sources near and far. The normal or existing level of environmental noise at a given location, given in dB referenced to the appropriate pressure standard.

Adapted and derived from URS Corporation (2007)

B.2 Sound vs. Noise

Sound may be purposely created to convey information, communicate, or obtain information about the environment. Examples of such sounds are sonar pings, marine mammal vocalizations/echolocations, tones used in hearing experiments, and small sonobuoy explosions used for submarine detection.

Noise is undesired sound (ANSI S1.1-1994). Whether a sound is noise depends on the receiver (i.e., the animal or system that detects the sound). For example, small explosives and sonar used to locate an enemy submarine produce *sound* that is useful to sailors engaged in anti-submarine warfare, but is likely to be considered undesirable *noise* by marine mammals. Sounds produced by naval aircraft and vessel propulsion are considered noise because they represent possible energy inefficiency and increased detectability, which are undesirable.

Noise also refers to all sound sources that may interfere with detection of a desired sound and the combination of all of the sounds at a particular location (ambient noise).

B.3 Description of Noise Sources

Ambient noise in the project area is a composite of sounds from natural sources, normal port activities, and temporary projects such as maintenance dredging or pile driving. Ambient noise in the Mayport turning basin is addressed in Chapter 5 of the IHA Application.

In-water construction activities associated with this project include vibratory and impact pile driving. The sounds produced by these activities fall into two sound types: impulsive (impact driving) and non-impulsive (vibratory driving). Distinguishing between these two general sound types is important because of each sound type may cause different types of physical effects, particularly with regard to hearing (Ward 1997).

Impulsive sounds (e.g., explosions, seismic airgun pulses, and impact pile driving) are referred to as pulsed sounds in Southall et al. (2007), and are brief, broadband, atonal transient sounds which can occur as isolated events or be repeated in some succession (Southall et al. 2007). Impulsive sounds are characterized by a relatively rapid rise from ambient pressure to a maximal pressure value followed by a decay period that may include a period of diminishing, oscillating maximal and minimal pressures (Southall et al. 2007). Impulsive sounds generally have a greater capacity to induce physical injury compared with sounds that lack these features (Southall et al. 2007).

Non-impulsive sounds (“non-pulsed” in Southall et al. 2007) can be tonal, broadband, or both. They lack the rapid rise time and can have longer durations than impulsive sounds. Non-impulsive sounds can be either intermittent or continuous sounds. Examples of non-impulsive sounds include vessels, aircraft, and machinery operations such as drilling, dredging, and vibratory pile driving (Southall et al. 2007).

In environments with non-porous boundaries (i.e. rock seafloor, rigid sides, etc.), reverberation may extend the duration of both impulsive and non-impulsive sounds.

B.4 Vocalization and Hearing of Marine Mammals

All marine mammals that have been studied can produce sounds and use sounds to forage, orient, detect and respond to predators, and facilitate social interactions (Richardson et al., 1995). Measurements of marine mammal sound production and hearing capabilities provide some basis for assessing whether exposure to a particular sound source may affect a marine mammal behaviorally or physiologically. Marine mammal hearing abilities are quantified using live animals either via behavioral audiometry or electrophysiology (see Schusterman 1981; Au 1993; Wartzok and Ketten 1999; Nachtigall et al. 2007). Behavioral audiograms, which are plots of animals' exhibited hearing threshold versus frequency, are obtained from captive, trained live animals using standard testing procedures with appropriate controls, and are considered to be a more accurate representation of a subject's hearing abilities. Behavioral audiograms of marine mammals are difficult to obtain because many species are too large, too rare, and too difficult to acquire and maintain for experiments in captivity. Consequently, our understanding of a species' hearing ability may be based on the behavioral audiogram of a single individual or small group of animals. In addition, captive animals may be exposed to local ambient sounds and other environmental factors that may impact their hearing abilities and may not accurately reflect the hearing abilities of free-swimming animals. For animals not available in captive or stranded settings (including large whales and rare species), estimates of hearing capabilities are made based on anatomical and physiological structures, the frequency range of the species' vocalizations, and extrapolations from related species.

Electrophysiological audiometry measures small electrical voltages produced by neural activity when the auditory system is stimulated by sound. The technique is relatively fast, does not require a conscious response, and is routinely used to assess the hearing of newborn humans. It has recently been adapted for use on non-humans, including marine mammals (Dolphin, 2000). For both methods of evaluating hearing ability, hearing response in relation to frequency is a generalized U-shaped curve or audiogram showing the frequency range of best sensitivity (lowest hearing threshold) and frequencies above and below with higher threshold values.

Direct measurement of hearing sensitivity exists for approximately 25 of the nearly 130 species of marine mammals. Table provides a summary of sound production and hearing capabilities for marine mammal species in the Project Area. For purposes of this analysis, marine mammals are arranged into the following functional hearing groups based on their generalized hearing sensitivities: high-frequency cetaceans, mid-frequency cetaceans, low-frequency cetaceans (mysticetes), phocid pinnipeds (true seals), otariid pinnipeds (sea lions and fur seals); of these, only mid- and low-frequency cetaceans occur in the Project Area.

Table B-2. Hearing and Vocalization Ranges for Marine Mammal Functional Hearing Groups and Species Potentially Occurring within the Project Area

Functional Hearing Group	Species	Sound Production		General Hearing Ability Frequency Range
		Frequency Range	Source Level (dB re 1 µPa @ 1 m)	
Mid-Frequency Cetaceans	Bottlenose dolphin	100 Hz to 100kHz	137 to 236	150 Hz to 160 kHz
Low-Frequency Cetaceans	North Atlantic right whale; humpback whale	10 Hz to 20 kHz	137 to 192	7 Hz to 22 kHz

Adapted and derived from Southall et al. (2007) and Richardson et al. (1995)
dB re 1 µPa @ 1 m: decibels (dB) referenced to (re) 1 micro (µ) Pascal (Pa) at 1 meter; Hz: Hertz; kHz: kilohertz

B.4.1 Auditory Masking

Natural and artificial sounds can disrupt behavior by auditory masking, or interfering with a marine mammal's ability to detect and interpret other relevant sounds, such as communication and echolocation signals (Wartzok et al. 2004). Masking occurs when both the signal and masking sound have similar frequencies and either overlap or occur very close to each other in time. A signal is very likely to be masked if the noise is within a certain "critical bandwidth" around the signal's frequency and its energy level is similar or higher (Holt 2009). Noise within the critical band of a marine mammal signal will show increased interference with detection of the signal as the level of the noise increases (Wartzok et al. 2004). In delphinid subjects, for example, relevant signals needed to be 17 to 20 dB louder than masking noise at frequencies below 1 kHz in order to be detected and 40 dB greater at approximately 100 kHz (Richardson et al. 1995). Noise at frequencies outside of a signal's critical bandwidth will have little to no effect on the detection of that signal (Wartzok et al. 2004).

Additional factors influencing masking are the temporal structure of the noise and the behavioral and environmental context in which the signal is produced. Continuous noise is more likely to mask signals than intermittent noise of the same amplitude; quiet "gaps" in the intermittent noise allow detection of signals which may not be detectable during continuous noise (Brumm and Slabbekoorn, 2005). The behavioral function of a vocalization (e.g. contact call, group cohesion vocalization, echolocation click, etc.) and the acoustic environment at the time of signaling may both influence call source level (Miksis-Olds and Tyack, 2009; Holt et al. 2011), which directly affects the chances that a signal will be masked (Nemeth and Brumm, 2010).

Noise from anthropogenic sources could cause masking of vocalizations which may rise to the level of behavioral harassment (as defined by the MMPA) if it disrupts communication, echolocation, or other hearing-dependent behaviors. Impact pile driving produces high-amplitude low-frequency noise (10 – 2,000 Hz), which is likely to be audible to all three marine mammal species considered, and is likely to overlap the vocalizations of low-frequency cetaceans (North Atlantic right and humpback whales; Table D-2). While the amplitude of impact pile driving noise may exceed marine mammal vocalization amplitudes within an unknown range of the driven pile, impact pile driving noise is unlikely to entirely mask social (non-echolocation)

signals due to the intermittent nature impact pile driving noise and the limited duration of impact pile driving associated with this project. Impact pile driving will be conducted only in the rare event that an obstruction is encountered during vibratory pile driving, and will be limited to a maximum of 20 strikes per day. We therefore estimate that the likelihood of noise from impact pile driving masking signals important to the behavior and survival of any of the three marine mammal species in the project area is negligible.

Vibratory pile driving produces frequencies from 10 Hz to 2 kHz, which would be within the range of audible sound and vocal production (see Table D-2) for all marine mammal species that may occur in the project area. Given the source levels (151 – 180 dB rms re 1 μPa at 10m) and frequency range (10 – 2,000 Hz) of vibratory pile driving noise (Illingworth & Rodkin 2012), we estimate that any masking event that could rise to Level B harassment under the MMPA would occur within the zones of behavioral harassment estimated for vibratory pile driving (see Chapter 5 in the IHA Application) (Parks et al. 2011). Therefore, potential masking effects are not considered separately in this IHA application.

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MARINE MAMMAL MONITORING PLAN
FOR BRAVO WHARF RECAPITALIZATION
AT NAVSTA MAYPORT, JACKSONVILLE, FLORIDA
NAVY REGION SOUTHEAST

Submitted to:

Office of Protected Resources,
National Marine Fisheries Service,
National Oceanographic and Atmospheric Administration

Prepared by:

Naval Facilities Engineering Command Southeast
and
Naval Facilities Engineering Command Atlantic

July 2015

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ACRONYMS AND ABBREVIATIONS

C-1	Charlie One (Wharf)
dB	decibel
EA	Environmental Assessment
ft.	foot / feet
IHA	Incidental Harassment Authorization
μPa	microPascal
m	meter
MMPA	Marine Mammal Protection Act
NAVSTA	Naval Station
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service
POC	point of contact
Project	Bravo Wharf Recapitalization Project
PTS	Permanent Threshold Shift
TTS	Temporary Threshold Shift
USFWS	U.S. Fish and Wildlife Service
ZOI	Zone of Influence

1.0 INTRODUCTION

1.1 Purpose of the Monitoring Plan

The purpose of this Monitoring Plan is to provide protocols for marine mammal monitoring during the proposed recapitalization of Bravo Wharf (berths B-1, B-2, and B-3) at Naval Station (NAVSTA) Mayport, Florida (Figures 1-1 and 1-2). Recapitalization includes demolishing and replacing the existing concrete pile cap, wharf deck, and utilities and installation of a new steel sheet pile bulkhead around the existing wharf. This plan was developed to support the National Marine Fisheries (NMFS) Incidental Harassment Authorization (IHA) Application (U.S. Department of the Navy 2015).

Marine mammal monitoring will be conducted before, during, and after pile driving activities within the zones detailed in Section 2.3, and will represent an important minimization measure to reduce the likelihood of potential injury to marine mammals.

1.2 Scope and Timing

The scope of this Monitoring Plan includes pile driving activities that are necessary for the Bravo Wharf recapitalization project (Project). Sea turtles and smalltooth sawfish (as practicable) will be included in monitoring efforts. However, for the purposes of this submittal to NMFS in support of compliance with the Marine Mammal Protection Act (MMPA), the scope of monitoring in this document is limited to marine mammals under NMFS' purview. Marine mammal monitoring would be integrated with other marine environmental monitoring if it is required as a result of the Navy's National Environmental Policy Act (NEPA) project review or as a condition of approval by other regulatory agencies.

This Monitoring Plan will be implemented when pile driving is taking place during the period of the requested IHA (July 1, 2016 to June 30, 2017) for the Project.

1.3 Management

The Monitoring Plan will be managed by Naval Facilities Engineering Command (NAVFAC) Southeast. Marine mammal monitoring will be carried out by private contractors supported by local technical staff from NAVFAC Southeast and NAVSTA Mayport. NAVFAC Southeast will also be responsible for preparation of the Monitoring Report for the IHA.

Figure 1-1. Regional Location – Naval Station Mayport, Mayport, Florida

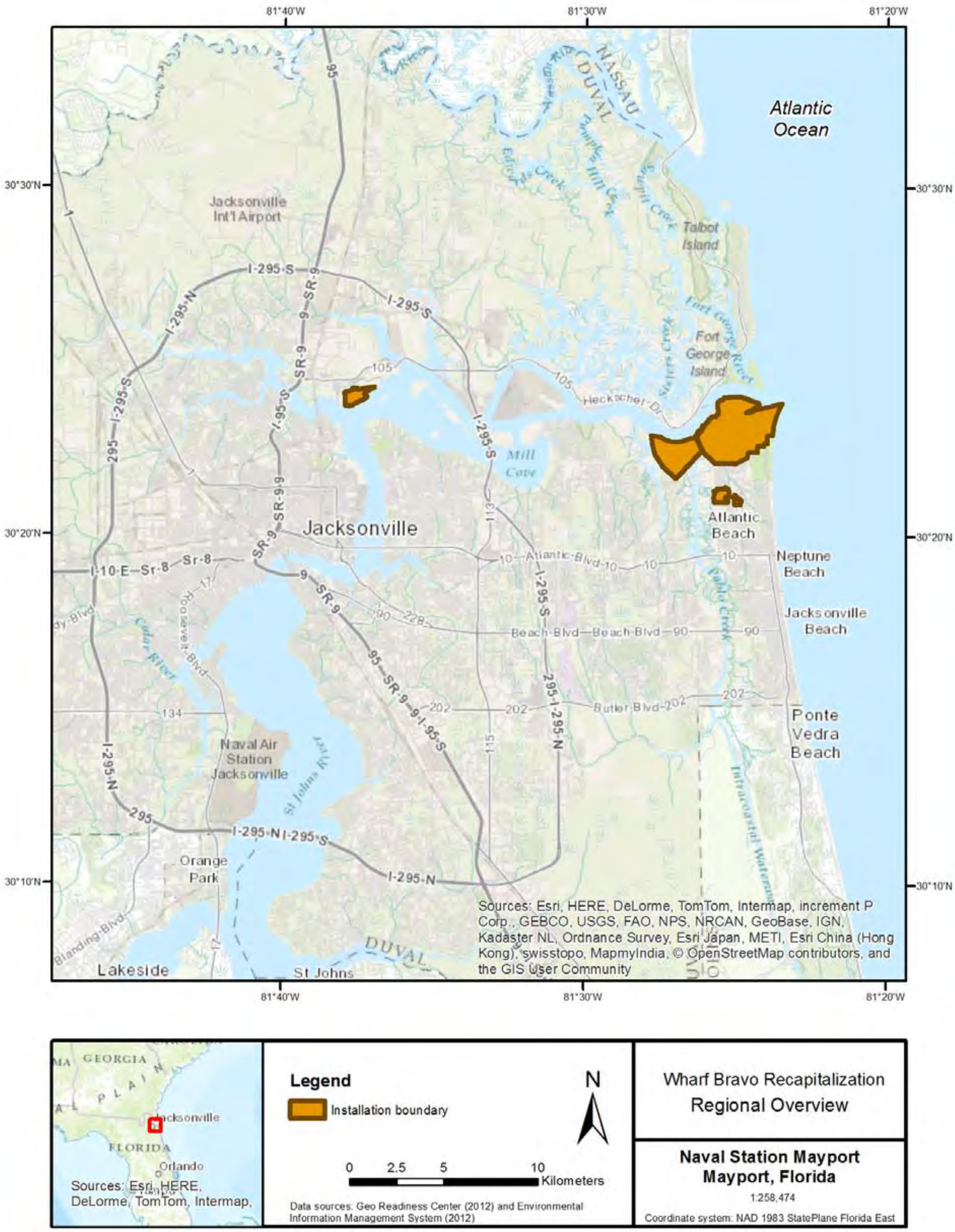
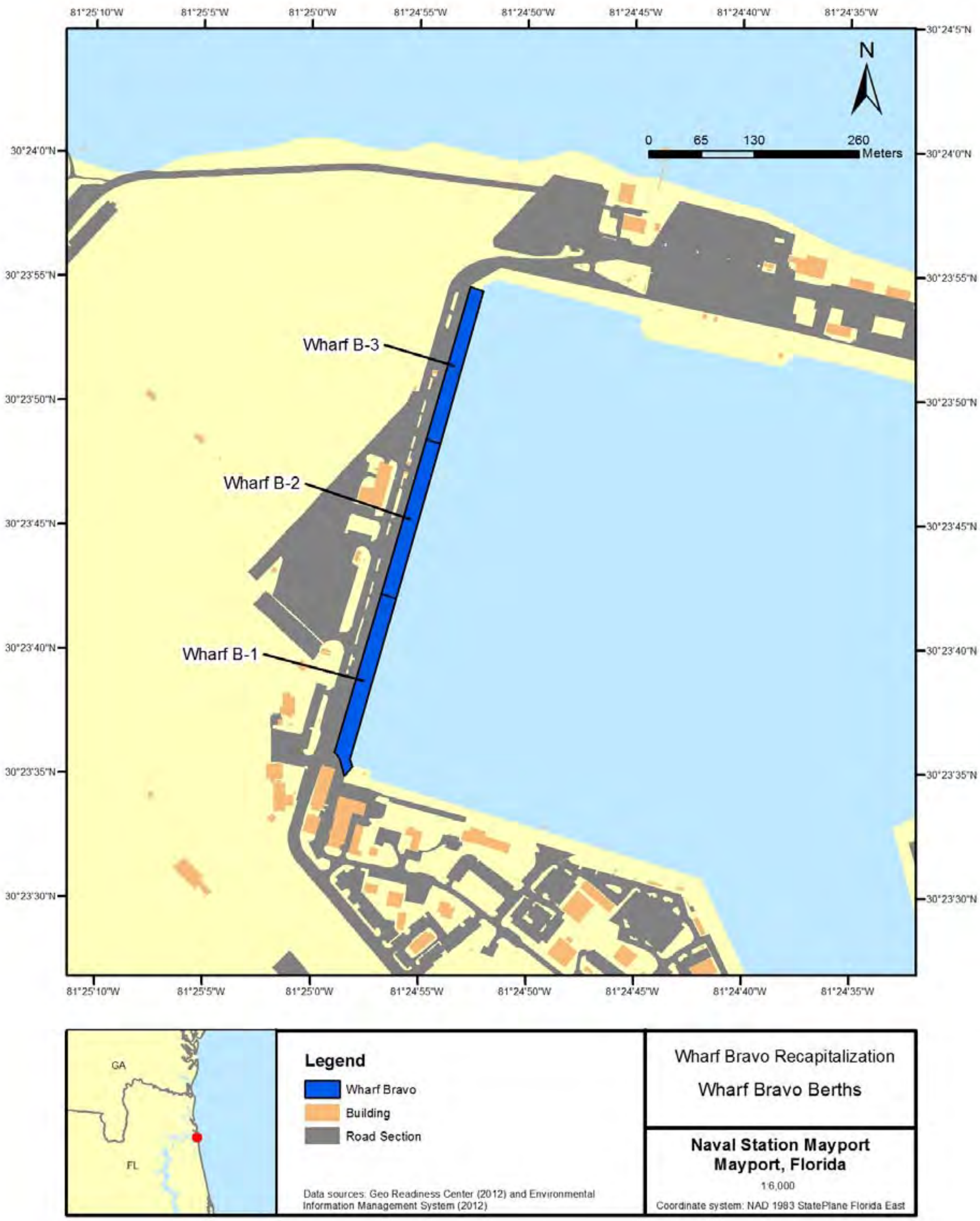


Figure 1-2. Bravo Wharf berths B-1, B-2, and B-3 – Naval Station Mayport, Mayport, Florida



2.0 BRAVO WHARF RECAPITALIZATION PROJECT

Refer to the Environmental Assessment (EA) (U.S. Department of the Navy 2015) and current IHA Application (U.S. Department of the Navy 2015) for a full description of the Project.

2.1 Project Area

The project area is along the Atlantic coast of northern Florida, and includes the NAVSTA Mayport turning basin out to the limit of the most distant of the acoustic thresholds for all protected species being addressed for the Project (Figure 2-1). The lesser acoustic threshold distances are displayed in Figure 2-2. Acoustic thresholds used in this monitoring report are based on criteria developed by NMFS[1] (70 FR 1871; 74 FR 41684).

2.2 Activities to be Monitored

Activities which would be subject to marine mammal monitoring include the following:

- Vibratory pile driving of steel sheet piles necessary to construct a new steel sheet pile wall outside the existing bulkhead. Approximately 880 steel sheet piles will be installed with a vibratory driver.
- Contingency-only impact installation of steel sheet piles. Impact driving will only be used if vibratory driving is inadequate or an obstruction that prevents vibratory installation of is encountered.

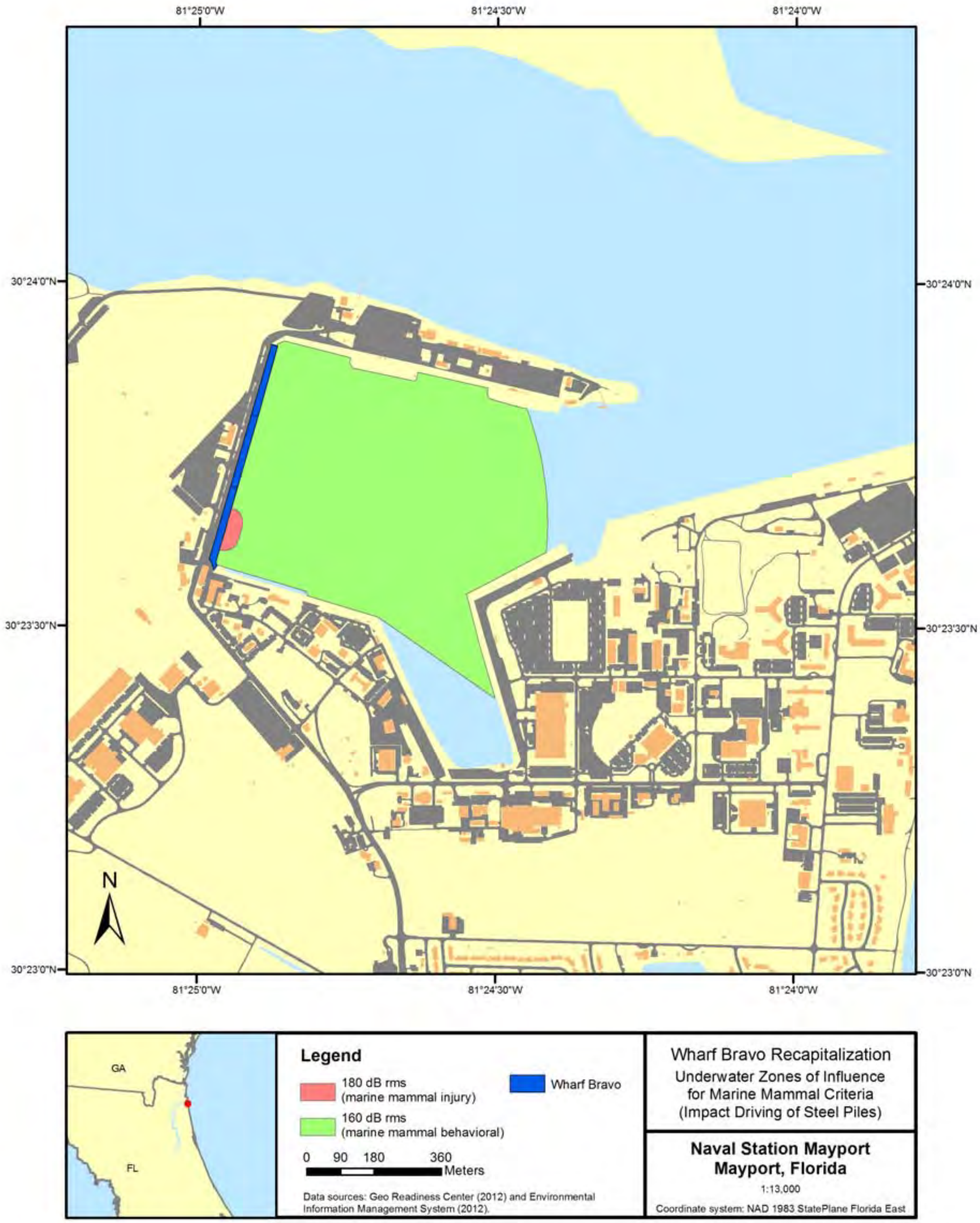
Marine mammal monitoring will be performed to ensure that in-water activities are stopped if animals occur within the zone of influence (ZOI) for potential injury or a standard 50 feet (ft.) buffer from pile driving activities (Figure 2-3). Monitoring methods are described in Section 3 of this document.

[1] New acoustic criteria covering permanent and temporary threshold shifts (PTS and TTS, respectively) were proposed by NMFS in December 2013. At the time of submittal, these criteria have not been finalized and no implementation guidance has been issued. They are therefore not addressed in this mitigation plan.

Figure 2-1. Injury and Behavioral Zones of Influence for Marine Mammals[2] – Vibratory Driving of Steel Sheet Piles

[2] Official criteria have not been established for West Indian manatees. The Navy's IHA application, Appendix C – Standards Manatee Conditions for In-Water Work, cover standards of practice promulgated by The U.S. Fish and Wildlife Service (USFWS) for manatees.

Figure 2-2. Injury and Behavioral Zones of Influence for Marine Mammals[3] – Impact Driving of Steel Sheet Piles (Contingency Only)



[3] Official criteria have not been established for West Indian manatees; marine mammal injury zone of influence illustrated represents a notional template location

Pile Installation

The acoustic analysis for vibratory pile driving used the assumption a maximum 27 sheet pile pairs would be driven each day. Each pile is anticipated to require no more than 60 seconds to drive by vibratory methods. Impact pile driving would only be used as a contingency in cases when vibratory driving is insufficient (a similar project that has been completed at adjacent Wharf C-1 required impact pile driving on only seven piles).

2.3 Monitoring and Shutdown Zones

Table 2-1 lists the monitoring and shutdown zones, and measures associated with the occurrence of a marine mammal in each zone. For all in-water construction and demolition activities, a minimum protective shutdown zone of 15 m (50 ft.) is proposed. Sound-generating activities with larger shutdown zones follow, based on the maximum modeled distance to the Level A (injury) threshold:

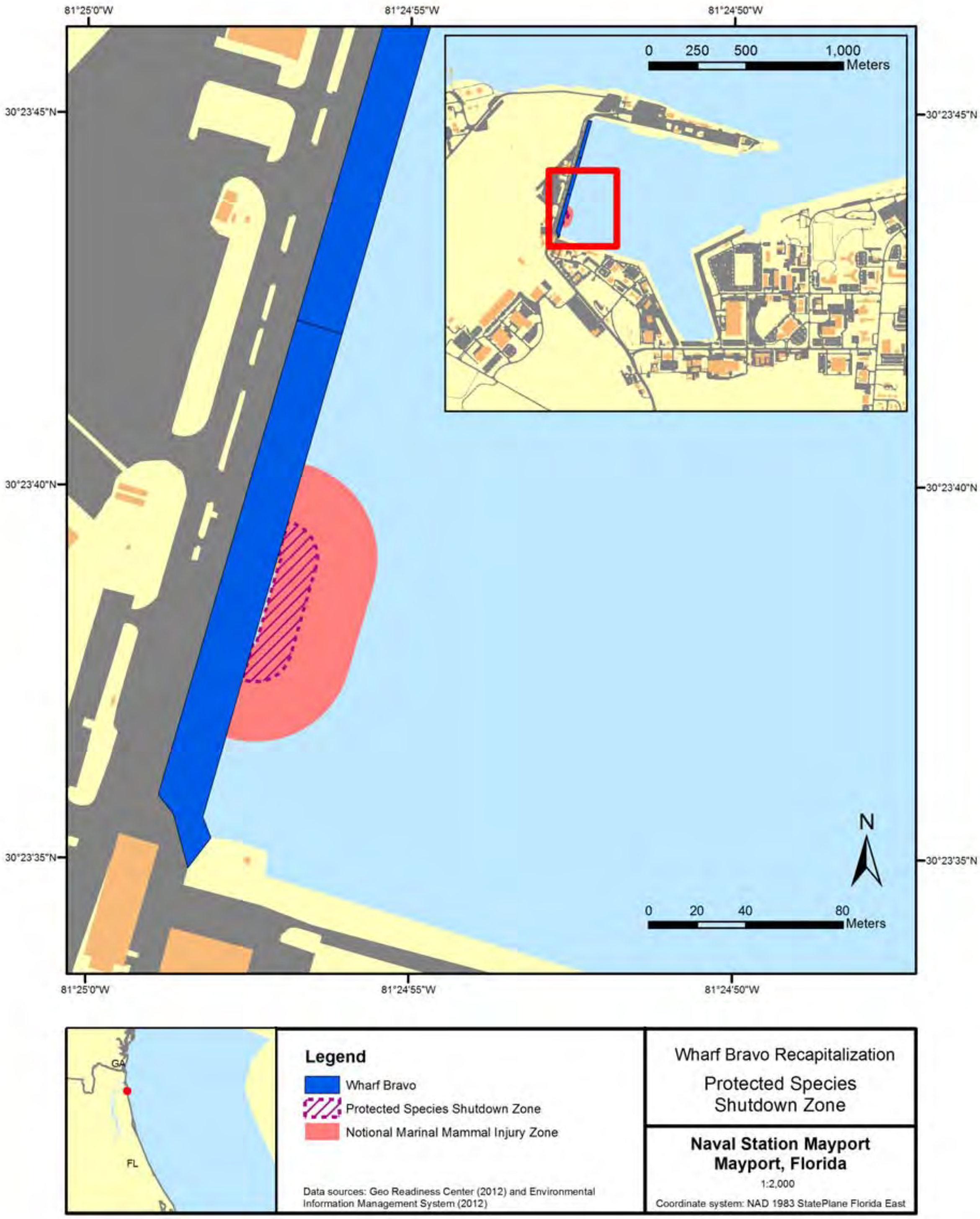
- During vibratory pile driving, the shutdown distance will initially be 15 m.
- If impact driving of steel piles is needed, the shutdown distance for cetaceans will be 40 m during the brief duration of such activities.

Table 2-1. Monitoring and Shutdown Zones

Type of Activity	Distance from Pile Being Driven and Active In-water Equipment (any direction in water)	Measure
All in-water work[1]	50 ft. (15 m)	Shut down all in-water work if a marine mammal, sea turtle, or smalltooth sawfish (surface) is observed in the zone
Impact driving of steel piles (contingency only)	130 ft. (40 m)	Shut down pile driving if a marine mammal is observed in the zone

[1] In-water work is defined as any activity where personnel or equipment are working in the water column. Vessel movement does not constitute in-water work.

Figure 2-3. Monitoring / Shutdown Zone



3.0 MARINE MAMMAL MONITORING

3.1 Observers and Procedures

The Navy shall conduct a pre-construction briefing with the contractor. During the briefing, all contractor personnel working in the Project area will watch the Navy's Marine Species Awareness Training presentation.

Marine mammal observers ("observers") designated by the contractor will be placed at the best vantage point(s) practicable to monitor for marine mammals and implement shutdown/delay procedures when applicable by calling for the shutdown to the hammer operator. The observers will have no other construction related tasks while conducting monitoring.

The contractor will adhere to all requirements of the following:

- U.S. Fish and Wildlife Services (USFWS) 2011 Standard Manatee Conditions for In-Water Work (Attachment 1)
- National Marine Fisheries Service 2006 Sea Turtle and Smalltooth Sawfish Construction Conditions (Attachment 2)
- National Marine Fisheries Services 2012 Southeast Region Marine Mammal and Sea Turtle Viewing Guidelines (Attachment 3)
- Requirements of IHA upon issuance by NMFS.

3.2 Methods

The observer(s) will monitor the shutdown zone before, during, and after pile driving and removal.

The observer(s) will be placed at the best vantage point practicable (e.g. from a small boat, construction barges, on shore, or any other suitable location) to monitor for marine mammals and implement shutdown/delay procedures when applicable by calling for the shutdown to the equipment operator(s). Elevated positions are preferable; it shall be the contractor's responsibility to ensure that appropriate safety measures are implemented to protect observers on elevated observation points. If a boat is used for monitoring, the boat will maintain minimum distances from species (should they occur) as described in National Marine Fisheries Services' 2012 Southeast Region Marine Mammal and Sea Turtle Viewing Guidelines (Attachment 3).

- During all observation periods, observers would use binoculars and the naked eye to search continuously for marine mammals;
- If the shutdown zone is obscured by fog or poor lighting conditions, pile driving will not be initiated until the entire shutdown zone is visible.
- The shutdown zone will be monitored for the presence of marine mammals before, during, and after any pile driving or removal activity.

Pre-Activity Monitoring:

The shutdown zone will be monitored for 15 minutes prior to in-water construction/demolition activities. If a marine mammal is present within or approaching the edge of the shutdown zone, the activity would be delayed until the animal(s) leave the shutdown zone. Activity would resume only after the observer has determined, through re-sighting or by waiting 15 minutes with no further sightings that the animal(s) has moved outside the shutdown zone. The observer will notify the monitoring coordinator/construction foreman / POC when construction activities can commence.

During Activity Monitoring:

The shutdown zone shall include all areas where the underwater sound pressure levels are anticipated to equal or exceed the Level A (injury) criteria for marine mammals (180 dB re 1 µPa isopleth for cetaceans). The shutdown zone will always be a minimum of 15 meters (m) (50 ft.) to prevent injury from physical interaction of marine mammals with construction equipment (Figure 2-3).

If a marine mammal, sea turtle, or smalltooth sawfish enters a shutdown zone during any in-water work, activity will be halted and delayed until either the animal has voluntarily left and been visually confirmed beyond the shutdown zone or 15 minutes have passed without re-detection of the animal.

Post-Activity Monitoring:

Monitoring of the shutdown zone will continue for 15 minutes following the completion of the activity.

3.3 Data Collection

The following information will be collected on sighting forms used by observers:

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

If a bottlenose dolphin or other cetacean enters the relevant ZOIs and/or a manatee, sea turtle, or smalltooth sawfish enters the shutdown zone, the following information will be recorded once shutdown procedures have been implemented:

- Species, numbers, and if possible sex and age class of marine mammals
- Behavior patterns observed, including bearing and direction of travel
- Location of the observer and distance from the animal(s) to the observer

If possible, photographs of the animal(s) will be taken and forwarded to the Naval Facilities Engineering Command Southeast Environmental point of contact.

Data collection forms shall be furnished to the Environmental point of contact within a mutually agreeable timeframe.

3.4 Equipment

The observer(s) shall be equipped with the following:

- binoculars (7 x 50 power or greater) to ensure sufficient visual acuity while investigating sightings
- portable radios or cellular phone(s) to rapidly communicate with the appropriate construction personnel to initiate shutdown of pile driving activity if required
- a digital camera for photographing any marine species sighted
- data collection forms
- Compass/GPS

3.5 Observer Monitoring Locations

In order to effectively monitor the shutdown zones, marine mammal observers will be positioned at the best practicable vantage point(s), taking into consideration the behavior of marine mammal species likely to enter the area, security, safety, and space limitations at the waterfront, in order to properly monitor these zones. Observers may be stationed in small vessels or on the wharf at a location that will provide adequate visual coverage for the marine mammal shutdown zone.

3.6 Interagency Notification

If the Navy encounters an injured, sick, or dead marine mammal, NMFS will be notified immediately. Such sightings will be called into the NMFS Stranding Coordinator for the Southeast:

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e-mail: erin.fougeres@noaa.gov
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fax: 727-824-5309

The Navy will provide NMFS with the species or description of the animal(s), the condition of the animal (including carcass condition if the animal is dead), location, the date and time of first discovery, observed behaviors (if alive), and photo or video (if available).

Care should be taken in handling dead specimens to preserve biological materials in the best possible state for later analysis of cause of death, if that occurs. In preservation of biological materials from a dead animal, the finder (i.e. marine mammal observer) has the responsibility to ensure that evidence associated with the specimen is not unnecessarily disturbed.

4.0 REPORTING

A draft report of any incidents of marine mammals entering the shutdown zone will be forwarded to NMFS / USFWS no later than 31 December 2017. This report will also include observed cetacean sightings in the larger ZOIs and other protected species in the shutdown zone. A final report would be prepared and submitted to NMFS within 30 days following receipt of comments on the draft report from NMFS.

5.0 REFERENCES

Hannigan, P. (2011). Pile Driving Equipment. 2011 PDCA Professor Pile Institute. Produced by GRL Engineers, Inc. Retrieved from http://www.piledrivers.org/pdpi-pat-hannigan.htm. Accessed on 04 November 2012

National Marine Fisheries Service. (2013). Incidental Harassment Authorization for Wharf C-2 Recapitalization Project at Mayport, FL. Issued 25 November 2013.

U.S. Department of the Navy (2015b). Environmental Assessment Bravo Wharf Recapitalization at Naval Station Mayport, Florida.

U.S. Department of the Navy. (2015). Request for an Incidental Harassment Authorization Under the Marine Mammal Protection Act for the Bravo Wharf Recapitalization Project, Navy Region Southeast. April 2015.

on respondents, including through the use of automated collection techniques or other forms of information technology.

Comments submitted in response to this notice will be summarized and/or included in the request for OMB approval of this information collection; they also will become a matter of public record.

Dated: December 1, 2015.

Sarah Brabson,

NOAA PRA Clearance Officer.

[FR Doc. 2015–30692 Filed 12–4–15; 8:45 am]

BILLING CODE 3510–22–P

DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

RIN 0648–XE271

Takes of Marine Mammals Incidental to Specified Activities; Taking Marine Mammals Incidental to the Bravo Wharf Recapitalization Project

AGENCY: National Marine Fisheries Service (NMFS), National Oceanic and Atmospheric Administration (NOAA), Commerce.

ACTION: Notice; proposed incidental harassment authorization; request for comments.

SUMMARY: NMFS has received a request from the U.S. Navy (Navy) for authorization to take marine mammals incidental to construction activities as part of a wharf recapitalization project. Pursuant to the Marine Mammal Protection Act (MMPA), NMFS is requesting public comment on its proposal to issue an incidental harassment authorization (IHA) to the Navy to incidentally take marine mammals, by Level B harassment only, during the specified activity.

DATES: Comments and information must be received no later than January 6, 2016.

ADDRESSES: Comments on this proposal should be addressed to Jolie Harrison, Chief, Permits and Conservation Division, Office of Protected Resources, National Marine Fisheries Service. Physical comments should be sent to 1315 East-West Highway, Silver Spring, MD 20910 and electronic comments should be sent to *ITP.mccue@noaa.gov.*

Instructions: NMFS is not responsible for comments sent by any other method, to any other address or individual, or received after the end of the comment period. Comments received electronically, including all attachments, must not exceed a 25-megabyte file size. Attachments to electronic comments will be accepted in Microsoft Word or Excel or Adobe PDF file formats only. All comments received are a part of the public record and will generally be posted to the Internet at *www.nmfs.noaa.gov/pr/permits/incidental/construction.htm* without change. All personal identifying information (*e.g.*, name, address) voluntarily submitted by the commenter may be publicly accessible. Do not submit confidential business information or otherwise sensitive or protected information.

FOR FURTHER INFORMATION CONTACT: Laura McCue, Office of Protected Resources, NMFS, (301) 427–8401.

SUPPLEMENTARY INFORMATION:

Availability

An electronic copy of the Navy's application and supporting documents, as well as a list of the references cited in this document, may be obtained by visiting the Internet at: *www.nmfs.noaa.gov/pr/permits/incidental/construction.htm.* In case of problems accessing these documents, please call the contact listed above.

National Environmental Policy Act

The Navy has prepared a draft Environmental Assessment (*Wharf Bravo Recapitalization at Naval Station Mayport, Jacksonville, FL*) in accordance with the National Environmental Policy Act (NEPA) and the regulations published by the Council on Environmental Quality. It is posted at the aforementioned site. NMFS will independently evaluate the EA and determine whether or not to adopt it. We may prepare a separate NEPA analysis and incorporate relevant portions of Navy's EA by reference. Information in the Navy's application, EA, and this notice collectively provide the environmental information related to proposed issuance of this IHA for public review and comment. We will review all comments submitted in response to this notice as we complete the NEPA process, including a decision of whether to sign a Finding of No Significant Impact (FONSI), prior to a final decision on the incidental take authorization request.

Background

Sections 101(a)(5)(A) and (D) of the MMPA (16 U.S.C. 1361 *et seq.*) direct the Secretary of Commerce to allow, upon request by U.S. citizens who engage in a specified activity (other than commercial fishing) within a specified area, the incidental, but not intentional, taking of small numbers of marine mammals, providing that certain findings are made and the necessary prescriptions are established.

The incidental taking of small numbers of marine mammals may be allowed only if NMFS (through authority delegated by the Secretary) finds that the total taking by the specified activity during the specified time period will (i) have a negligible impact on the species or stock(s) and (ii) not have an unmitigable adverse impact on the availability of the species or stock(s) for subsistence uses (where relevant). Further, the permissible methods of taking and requirements pertaining to the mitigation, monitoring and reporting of such taking must be set forth, either in specific regulations or in an authorization.

The allowance of such incidental taking under section 101(a)(5)(A), by harassment, serious injury, death, or a combination thereof, requires that regulations be established. Subsequently, a Letter of Authorization may be issued pursuant to the prescriptions established in such regulations, providing that the level of taking will be consistent with the findings made for the total taking allowable under the specific regulations. Under section 101(a)(5)(D), NMFS may authorize such incidental taking by harassment only, for periods of not more than one year, pursuant to requirements and conditions contained within an IHA. The establishment of prescriptions through either specific regulations or an authorization requires notice and opportunity for public comment.

NMFS has defined "negligible impact" in 50 CFR 216.103 as ". . . an impact resulting from the specified activity that cannot be reasonably expected to, and is not reasonably likely to, adversely affect the species or stock through effects on annual rates of recruitment or survival." Except with respect to certain activities not pertinent here, section 3(18) of the MMPA defines "harassment" as: ". . . any act of pursuit, torment, or annoyance which (i) has the potential to injure a marine mammal or marine mammal stock in the wild [Level A harassment]; or (ii) has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering [Level B harassment]."

Summary of Request

On July 21, 2015, we received a request from the Navy for authorization of the taking, by Level B harassment only, of marine mammals, incidental to pile driving in association with the

Bravo Wharf recapitalization project at Naval Station Mayport, Florida (NSM). That request was modified on November 4 and November 10, and a final version, which we deemed adequate and complete, was submitted on November 17. In-water work associated with the project is expected to be completed within the one-year timeframe of the proposed IHA (October 15, 2016 through September 30, 2017).

The use of both vibratory and impact pile driving is expected to produce underwater sound at levels that have the potential to result in behavioral harassment of marine mammals. One species of marine mammal has the potential to be affected by the specified activities: bottlenose dolphin (*Tursiops truncatus truncatus*). This species may occur year-round in the action area.

Similar wharf construction and pile driving activities in Naval Station Mayport have been authorized by NMFS in the past. The first authorization was effective between September 1, 2014 through August 31, 2015, and the second authorization, which is currently ongoing, is effective from September 8, 2015 through September 7, 2016.

Description of the Specified Activity

Overview

Bravo Wharf is a medium draft, general purpose berthing wharf that was constructed in 1970 and lies at the western edge of the NSM turning basin. Bravo Wharf is approximately 2,000 ft long, 125 ft wide, and has a berthing depth of 50 ft mean lower low water. The wharf is one of two primary deep draft berths at the basin and is capable of berthing ships up to and including large amphibious ships; it is one of three primary ordnance handling berths at the basin. The wharf is a diaphragm steel sheet pile cell structure with a concrete apron, partial concrete encasement of the piling and asphalt paved deck. The wharf is currently in poor condition due to advanced deterioration of the steel sheeting and lack of corrosion protection. This structural deterioration has resulted in the institution of load restrictions within 60 ft of the wharf face. The purpose of this project is to complete necessary repairs to Bravo Wharf. Please refer to the Navy's application for a schematic of the project plan.

Dates and Duration

The total project is expected to require a maximum of 130 days of in-water pile driving. The project may require up to 24 months for completion; in-water activities are limited to a maximum of 130 days, separated into two phases. If in-water work will extend beyond the effective dates of the IHA, a second IHA application will be submitted by the Navy. There will be a maximum of 110 days for vibratory pile driving (seventy three days in phase I and thirty seven days in phase II), and a contingent 20 days of impact pile driving. The specified activities are expected to occur between October 1, 2016 and September 30, 2017.

Specific Geographic Region

NSM is located in northeastern Florida, at the mouth of the St. Johns River and adjacent to the Atlantic Ocean (see Figures 2–1 and 2–2 of the Navy's application). The St. Johns River is the longest river in Florida, with the final 35 mi flowing through the city of Jacksonville. This portion of the river is significant for commercial shipping and military use. At the mouth of the river, near the action area, the Atlantic Ocean is the dominant influence and typical salinities are above 30 ppm. Outside the river mouth, in nearshore waters, moderate oceanic currents tend to flow southward parallel to the coast. Sea surface temperatures range from around 16 °C in winter to 28 °C in summer.

The specific action area consists of the NSM turning basin, an area of approximately 2,000 by 3,000 ft containing ship berthing facilities at sixteen locations along wharves around the basin perimeter. The basin was constructed during the early 1940s by dredging the eastern part of Ribault Bay (at the mouth of the St. Johns River), with dredge material from the basin used to fill parts of the bay and other low-lying areas in order to elevate the land surface. The basin is currently maintained through regular dredging at a depth of 50 ft, with depths at the berths ranging from 30–50 ft. The turning basin, connected to the St. Johns River by a 500-ft-wide entrance channel, will largely contain sound produced by project activities, with the exception of sound propagating east into nearshore Atlantic waters through the entrance channel (see Figure 2–2 of the Navy's application). Bravo Wharf is located in the western corner of the Mayport turning basin.

Detailed Description of Activities

In order to rehabilitate Bravo Wharf, the Navy proposes to install a new steel sheet pile bulkhead at Bravo Wharf. The project consists of installing a total of approximately 880 single sheet piles (Phase I—berths B–2 and B–3: 590; Phase II—berth B–1: 290). The wall will be anchored at the top and fill consisting of clean gravel and flowable concrete fill will be placed behind the wall. A concrete cap will be formed along the top and outside face of the wall to tie the entire structure together and provide a berthing surface for vessels. The new bulkhead will be designed for a fifty-year service life.

All piles would be driven by vibratory hammer, although impact pile driving may be used as a contingency in cases when vibratory driving is not sufficient to reach the necessary depth. In the unlikely event that impact driving is required, either impact or vibratory driving could occur on a given day, but concurrent use of vibratory and impact drivers would not occur. The Navy estimates that a total of 130 in-water work days may be required to complete pile driving activity, which includes twenty days for contingency impact driving, if necessary.

Description of Marine Mammals in the Area of the Specified Activity

There are four marine mammal species which may inhabit or transit through the waters nearby NSM at the mouth of the St. Johns River and in nearby nearshore Atlantic waters. These include the bottlenose dolphin, Atlantic spotted dolphin (*Stenella frontalis*), North Atlantic right whale (*Eubalaena glacialis*), and humpback whale (*Megaptera novaeangliae*). Multiple additional cetacean species occur in South Atlantic waters but would not be expected to occur in shallow nearshore waters of the action area. Table 1 lists the marine mammal species with expected potential for occurrence in the vicinity of NSM during the project timeframe and summarizes key information regarding stock status and abundance. Taxonomically, we follow Committee on Taxonomy (2014). Please see NMFS' Stock Assessment Reports (SAR), available at *www.nmfs.noaa.gov/pr/sars*, for more detailed accounts of these stocks' status and abundance. Please also refer to NMFS' Web site (*www.nmfs.noaa.gov/pr/species/mammals*) for generalized species accounts and to the Navy's Marine Resource Assessment for the Charleston/Jacksonville Operating Area, which documents and describes the marine resources that occur in Navy operating areas of the Southeast (DoN, 2008). The document is publicly available at *www.navfac.navy.mil/products_and_services/ev/products_and_services/marine_resources/marine_resource_assessments.html* (accessed November 2, 2015).

In the species accounts provided here, we offer a brief introduction to the species and relevant stock as well as available information regarding population trends and threats, and

describe any information regarding local occurrence. Multiple stocks of bottlenose dolphins may be present in the action area, either seasonally or year-round, and are described further below. We first address the three other species that may occur in the action area.

TABLE 1—MARINE MAMMALS POTENTIALLY PRESENT IN THE VICINITY OF NSM

Species	Stock	ESA/MMPA status; strategic (Y/N) [1]	Stock abundance (CV, N_{min}, most recent abundance survey) [2]	PBR [3]	Annual M/SI [4]	Relative occurrence; season of occurrence
Order Cetartiodactyla—Cetacea—Superfamily Mysticeti (baleen whales)						
Family Balaenidae						
North Atlantic right whale.	Western North Atlantic [5]	E/D; Y	476 (0; 476; 2013)	1	4.3	Rare inshore, regular near/offshore; Nov–Apr.
Humpback whale	Gulf of Maine	E/D; Y	823 (0; 823; 2008)	2.7	7.6	Rare; Fall–Spring.
Superfamily Odontoceti (toothed whales, dolphins, and porpoises)						
Family Delphinidae						
Atlantic spotted dolphin	Western North Atlantic	-; N	44,715 (0.43; 31,610; 2011).	316	0	Rare; year-round.
Common bottlenose dolphin.	Western North Atlantic Offshore.	-; N	77,532 (0.4; 56,053; 2011).	561	43.9	Rare; year-round.
	Western North Atlantic Coastal, Southern Migratory.	-/D; Y	9,173 (0.46; 6,326; 2010–11).	63	0–12	Possibly common; [8] Jan–Mar.
	Western North Atlantic Coastal, Northern Florida.	-/D; Y	1,219 (0.67; 730; 2010–11).	7	0.4	Possibly common; [8] year-round.
	Jacksonville Estuarine System [6].	-; Y	412 [7] (0.06; unk; 1994–97).	undet.	1.2	Possibly common; [8] year-round.

[1] ESA status: Endangered (E), Threatened (T)/MMPA status: Depleted (D). A dash (-) indicates that the species is not listed under the ESA or designated as depleted under the MMPA. Under the MMPA, a strategic stock is one for which the level of direct human-caused mortality exceeds PBR (see footnote 3) or which is determined to be declining and likely to be listed under the ESA within the foreseeable future. Any species or stock listed under the ESA is automatically designated under the MMPA as depleted and as a strategic stock.

[2] CV is coefficient of variation; N_{min} is the minimum estimate of stock abundance. In some cases, CV is not applicable. For certain stocks, abundance estimates are actual counts of animals and there is no associated CV. The most recent abundance survey that is reflected in the abundance estimate is presented; there may be more recent surveys that have not yet been incorporated into the estimate.

[3] Potential biological removal, defined by the MMPA as the maximum number of animals, not including natural mortalities, that may be removed from a marine mammal stock while allowing that stock to reach or maintain its optimum sustainable population size (OSP).

[4] These values, found in NMFS' SARs, represent annual levels of human-caused mortality plus serious injury from all sources combined (*e.g.*, commercial fisheries, subsistence hunting, ship strike). Annual M/SI often cannot be determined precisely and is in some cases presented as a minimum value. All values presented here are from the draft 2015 SARs (*www.nmfs.noaa.gov/pr/sars/draft.htm*).

[5] Abundance estimates (and resulting PBR values) for these stocks are new values presented in the draft 2015 SARs. This information was made available for public comment and is currently under review and therefore may be revised prior to finalizing the 2015 SARs. However, we consider this information to be the best available for use in this document.

[6] Abundance estimates for these stocks are greater than eight years old and are therefore not considered current. PBR is considered undetermined for these stocks, as there is no current minimum abundance estimate for use in calculation. We nevertheless present the most recent abundance estimates and PBR values, as these represent the best available information for use in this document.

[7] This abundance estimate is considered an overestimate because it includes non- and seasonally-resident animals.

[8] Bottlenose dolphins in general are common in the project area, but it is not possible to readily identify them to stock. Therefore, these three stocks are listed as possibly common as we have no information about which stock commonly only occurs.

Northern Right whales occur in sub-polar to temperate waters in all major ocean basins in the world with a clear migratory pattern, occurring in high latitudes in summer (feeding) and lower latitudes in winter (breeding). North Atlantic right whales exhibit extensive migratory patterns, traveling along the eastern seaboard from calving grounds off Georgia and northern Florida to northern feeding areas off of the northeast U.S. and Canada in March/April and returning in November/December. Migrations are typically within 30 nmi of the coastline and in waters less than 50 m deep. Although this migratory pattern is well known, winter distribution for most of the population—the non-calving portion—is poorly known, as many whales are not observed on the calving grounds. It is unknown where these animals spend the winter, although they may occur further offshore or may remain on foraging grounds during winter (Morano *et al.*, 2012). During the winter calving period, right whales occur regularly in offshore waters of northeastern Florida. Critical habitat for right whales in the southeast (as identified under the ESA) is designated to protect calving grounds, and encompasses waters from the coast out to 15 nmi offshore from Mayport. More rarely, right whales have been observed entering the mouth of the St. Johns River for brief periods of time (Schweitzer and Zoodsma, 2011). Right whales are not present in the region outside of the winter calving season.

Humpback whales are a cosmopolitan species that migrate seasonally between warm-water (tropical or sub-tropical) breeding and calving areas in winter months and cool-water (temperate to sub-Arctic/Antarctic) feeding areas in summer months (Gendron and Urban, 1993). They tend to occupy shallow, coastal waters, although migrations are

undertaken through deep, pelagic waters. In the North Atlantic, humpback whales are known to aggregate in six summer feeding areas representing relatively discrete subpopulations (Clapham and Mayo, 1987), which share common wintering grounds in the Caribbean (and to a lesser extent off of West Africa) (Winn *et al.*, 1975; Mattila *et al.*, 1994; Palsbøll *et al.*, 1997; Smith *et al.*, 1999; Stevick *et al.*, 2003; Cerchio *et al.*, 2010). These populations or aggregations range from the Gulf of Maine in the west to Norway in the east, and the migratory range includes the east coast of the U.S. and Canada. The only managed stock in U.S. waters is the Gulf of Maine feeding aggregation, although other stocks occur in Canadian waters (*e.g.*, Gulf of St. Lawrence feeding aggregation), and it is possible that whales from other stocks could occur in U.S. waters. Significant numbers of whales do remain in mid- to high-latitude waters during the winter months (Clapham *et al.*, 1993; Swingle *et al.*, 1993), and there have been a number of humpback sightings in coastal waters of the southeastern U.S. during the winter (Wiley *et al.*, 1995; Laerm *et al.*, 1997; Waring *et al.*, 2014). According to Waring *et al.* (2014), it is unclear whether the increased numbers of sightings represent a distributional change, or are simply due to an increase in sighting effort and/or whale abundance. These factors aside, the humpback whale remains relatively rare in U.S. coastal waters south of the mid-Atlantic region, and is considered rare to extralimital in the action area. Any occurrences in the region would be expected in fall, winter, and spring during migration, as whales are unlikely to occur so far south during the summer feeding season.

Neither the humpback whale nor the right whale would occur within the turning basin, and only the right whale has been observed to occur as far inshore as the mouth of the St. Johns River. Therefore, the potential for interaction with these species is unlikely. When considering frequency of occurrence, size of ensonified area (less than one square kilometer during both vibratory (approximately 0.61 km^2) and impact driving (0.51 km^2)), and duration (seventy three days in phase I, and thirty seven days in phase II), we consider the possibility for harassment of humpback and right whales to be discountable. Therefore, the humpback whale and right whale are excluded from further analysis and are not discussed further in this document.

Atlantic spotted dolphins are distributed in tropical and warm temperate waters of the western North Atlantic predominantly over the continental shelf and upper slope, from southern New England through the Gulf of Mexico (Leatherwood *et al.*, 1976). Spotted dolphins in the Atlantic Ocean and Gulf of Mexico are managed as separate stocks. The Atlantic spotted dolphin occurs in two forms which may be distinct sub-species (Perrin *et al.*, 1987; Rice, 1998); a larger, more heavily spotted form inhabits the continental shelf inside or near the 200-m isobath and is the only form that would be expected to occur in the action area. Although typically observed in deeper waters, spotted dolphins of the western North Atlantic stock do occur regularly in nearshore waters south of the Chesapeake Bay (Mullin and Fulling, 2003). Specific data regarding seasonal occurrence in the region of activity is lacking, but higher numbers of individuals have been reported to occur in nearshore waters of the Gulf of Mexico from November to May, suggesting seasonal migration patterns (Griffin and Griffin, 2003).

From recent observation reports from the Navy from previous construction activity at Naval Station Mayport, no spotted dolphins were observed. Similarly, dolphin research studies that have been conducted in the area also reported zero observed spotted dolphins in the project area (Gibson, pers. comm.). We consider the likelihood of Atlantic spotted dolphins being impacted by the construction activities to be discountable based on this information, combined with the zero estimated exposures (density: 0.005240/km^2). Therefore, spotted dolphins are also excluded from further analysis and are not discussed further in this document.

The following summarizes the population status and abundance of the remaining species.

Bottlenose Dolphin

Bottlenose dolphins are found worldwide in tropical to temperate waters and can be found in all depths from estuarine inshore to deep offshore waters. Temperature appears to limit the range of the species, either directly, or indirectly, for example, through distribution of prey. Off North American coasts, common bottlenose dolphins are found where surface water temperatures range from about 10 °C to 32 °C. In many regions, including the southeastern U.S., separate coastal and offshore populations are known. There is significant genetic, morphological, and hematological differentiation evident between the two ecotypes (*e.g.*, Walker, 1981; Duffield *et al.*, 1983; Duffield, 1987; Hoelzel *et al.*, 1998), which correspond to shallow, warm water and deep, cold water. Both ecotypes have been shown to inhabit the western North Atlantic (Hersh and Duffield, 1990; Mead and Potter, 1995), where the deep-water ecotype tends to be larger and darker. In addition, several lines of evidence, including photo-identification and genetic studies, support a distinction between dolphins inhabiting coastal waters near the shore and those present in the inshore waters of bays, sounds and estuaries. This complex differentiation of bottlenose dolphin populations is observed throughout the Atlantic and Gulf of Mexico coasts where bottlenose dolphins are found, although estuarine populations have not been fully defined.

In the Mayport area, four stocks of bottlenose dolphins are currently managed, none of which are protected under the ESA. Of the four stocks—offshore, southern migratory coastal, northern Florida coastal, and Jacksonville estuarine system—only the latter three are likely to occur in the action area. Bottlenose dolphins typically occur in groups of 2–15 individuals (Shane *et al.*, 1986; Kerr *et al.*, 2005). Although significantly larger groups have also been reported, smaller groups are typical of shallow, confined waters. In addition, such waters typically support some degree of regional site fidelity and limited movement patterns (Shane *et al.*, 1986; Wells *et al.*, 1987). Observations made during marine mammal surveys conducted during 2012–2013 in the Mayport turning basin show bottlenose dolphins typically occurring individually or in pairs, or less frequently in larger groups. The maximum observed group size during these surveys is six, while the mode is one. Navy observations indicate that bottlenose dolphins rarely linger in a particular area in the turning basin, but rather appear to move purposefully through the basin and then leave, which likely reflects a lack of biological importance for these dolphins in the basin. Based on currently available information, it is not possible to determine the stock to which the dolphins occurring in the action area may belong. These stocks are described in greater detail below.

Western North Atlantic Offshore—This stock, consisting of the deep-water ecotype or offshore form of bottlenose dolphin in the western North Atlantic, is distributed primarily along the outer continental shelf and continental slope, but has been documented to occur relatively close to shore (Waring *et al.*, 2014). The separation between offshore and coastal morphotypes varies

depending on location and season, with the ranges overlapping to some degree south of Cape Hatteras. Based on genetic analysis, Torres *et al.* (2003) found a distributional break at 34 km from shore, with the offshore form found exclusively seaward of 34 km and in waters deeper than 34 m. Within 7.5 km of shore, all animals were of the coastal morphotype. More recently, coastwide, systematic biopsy collection surveys were conducted during the summer and winter to evaluate the degree of spatial overlap between the two morphotypes. South of Cape Hatteras, spatial overlap was found although the probability of a sampled group being from the offshore morphotype increased with increasing depth, and the closest distance for offshore animals was 7.3 km from shore, in water depths of 13 m just south of Cape Lookout (Garrison *et al.*, 2003). The maximum radial distance for the largest ZOI is approximately 1.2 km (Table 3); therefore, it is unlikely that any individuals of the offshore morphotype would be affected by project activities. In terms of water depth, the affected area is generally in the range of the shallower depth reported for offshore dolphins by Garrison *et al.* (2003), but is far shallower than the depths reported by Torres *et al.* (2003). South of Cape Lookout, the zone of spatial overlap between offshore and coastal ecotypes is generally considered to occur in water depths between 20–100 m (Waring *et al.*, 2014), which is generally deeper than waters in the action area. This stock is thus excluded from further analysis.

Western North Atlantic Coastal, Southern Migratory—The coastal morphotype of bottlenose dolphin is continuously distributed from the Gulf of Mexico to the Atlantic and north approximately to Long Island (Waring *et al.*, 2014). On the Atlantic coast, Scott *et al.* (1988) hypothesized a single coastal stock, citing stranding patterns during a high mortality event in 1987–88 and observed density patterns. More recent studies demonstrate that there is instead a complex mosaic of stocks (Zolman, 2002; McLellan *et al.*, 2002; Rosel *et al.*, 2009). The coastal morphotype was managed by NMFS as a single stock until 2009, when it was split into five separate stocks, including northern and southern migratory stocks. The original, single stock of coastal dolphins recognized from 1995–2001 was listed as depleted under the MMPA as a result of a 1987–88 mortality event. That designation was retained when the single stock was split into multiple coastal stocks. Therefore, all coastal stocks of bottlenose dolphins are listed as depleted under the MMPA, and are also considered strategic stocks.

According to the Scott *et al.* (1988) hypothesis, a single stock was thought to migrate seasonally between New Jersey (summer) and central Florida (winter). Instead, it was more recently determined that a mix of resident and migratory stocks exists, with the migratory movements and spatial distribution of the southern migratory stock the most poorly understood of these. Stable isotope analysis and telemetry studies provide evidence for seasonal movements of dolphins between North Carolina and northern Florida (Knoff, 2004; Waring *et al.*, 2014), and genetic analyses and tagging studies support differentiation of northern and southern migratory stocks (Rosel *et al.*, 2009; Waring *et al.*, 2014). Although there is significant uncertainty regarding the southern migratory stock's spatial movements, telemetry data indicates that the stock occupies waters of southern North Carolina (south of Cape Lookout) during the fall (October–December). In winter months (January–March), the stock moves as far south as northern Florida where it overlaps spatially with the northern Florida coastal and Jacksonville estuarine system stocks. In spring (April–June), the stock returns north to waters of North Carolina, and is presumed to remain north of Cape Lookout during the summer months. Therefore, the potential exists for harassment of southern migratory dolphins, most likely during the winter only.

Bottlenose dolphins are ubiquitous in coastal waters from the mid-Atlantic through the Gulf of Mexico, and therefore interact with multiple coastal fisheries, including gillnet, trawl, and trap/pot fisheries. Stock-specific total fishery-related mortality and serious injury cannot be directly estimated because of the spatial overlap among stocks of bottlenose dolphins, as well as because of unobserved fisheries. The primary known source of fishery mortality for the southern migratory stock is the mid-Atlantic gillnet fishery (Waring *et al.*, 2014). Between 2004 and 2008, 588 bottlenose dolphins stranded along the Atlantic coast between Florida and Maryland that could potentially be assigned to the southern migratory stock, although the assignment of animals to a particular stock is impossible in some seasons and regions due to spatial overlap amongst stocks (Waring *et al.*, 2014). Many of these animals exhibited some evidence of human interaction, such as line/net marks, gunshot wounds, or vessel strike. In addition, nearshore and estuarine habitats occupied by the coastal morphotype are adjacent to areas of high human population and some are highly industrialized. It should also be noted that stranding data underestimate the extent of fishery-related mortality and serious injury because not all of the marine mammals that die or are seriously injured in fishery interactions are discovered, reported or investigated, nor will all of those that are found necessarily show signs of entanglement or other fishery interaction. The level of technical expertise among stranding network personnel varies widely as does the ability to recognize signs of fishery interactions. Finally, multiple resident populations of bottlenose dolphins have been shown to have high concentrations of organic pollutants (*e.g.*, Kuehl *et al.*, 1991) and, despite little study of contaminant loads in migrating coastal dolphins, exposure to environmental pollutants and subsequent effects on population health is an area of concern and active research.

Western North Atlantic Coastal, Northern Florida—Please see above for description of the differences between coastal and offshore ecotypes and the delineation of coastal dolphins into management stocks. The northern Florida coastal stock is one of five stocks of coastal dolphins and one of three known resident stocks (other resident stocks include South Carolina/Georgia and central Florida dolphins). The spatial extent of these stocks, their potential seasonal movements, and their relationships with estuarine stocks are poorly understood. During summer months, when the migratory stocks are known to be in North Carolina waters and further north, bottlenose dolphins are still seen in coastal waters of South Carolina, Georgia and Florida, indicating the presence of additional stocks of coastal animals. Speakman *et al.* (2006) documented dolphins in coastal waters off Charleston, South Carolina, that are not known resident members of the estuarine stock, and genetic analyses indicate significant differences between coastal dolphins from northern Florida, Georgia and central South Carolina (NMFS, 2001; Rosel *et al.*, 2009). The northern Florida stock is thought to be present from approximately the Georgia-Florida border south to 29.4° N. (Waring *et al.*, 2014).

The northern Florida coastal stock ventures into the St. Johns River in large numbers, but rarely moves past Naval Station Mayport. The mouth of the St. Johns River may serve as a foraging area for this stock and the Jacksonville estuarine stock (Gibson, pers. comm).

The northern Florida coastal stock is susceptible to interactions with similar fisheries as those described above for the southern migratory stock, including gillnet, trawl, and trap/pot fisheries. From 2004–08, 78 stranded dolphins were recovered in northern Florida waters, although it was not possible to determine whether there was evidence of human interaction for the majority of these (Waring *et al.*, 2014). The same concerns discussed above regarding underestimation of mortality hold for this stock and, as for southern migratory dolphins, pollutant loading is a concern.

Jacksonville Estuarine System—Please see above for description of the differences between coastal and offshore ecotypes and the delineation of coastal dolphins into management stocks primarily inhabiting nearshore waters. The coastal morphotype of bottlenose dolphin is also resident to certain inshore estuarine waters (Caldwell, 2001; Gubbins, 2002; Zolman, 2002; Gubbins *et al.*, 2003). Multiple lines of evidence support demographic separation between coastal dolphins found in nearshore waters and those in estuarine waters, as well as between dolphins residing within estuaries along the Atlantic and Gulf coasts (*e.g.*, Wells *et al.*, 1987; Scott *et al.*, 1990; Wells *et al.*, 1996; Cortese, 2000; Zolman, 2002; Speakman, *et al.* 2006; Stolen *et al.*, 2007; Balmer *et al.*, 2008; Mazzoil *et al.*, 2008). In particular, a study conducted near Jacksonville demonstrated significant genetic differences between coastal and estuarine dolphins (Caldwell, 2001; Rosel *et al.*, 2009). Despite evidence for genetic differentiation between estuarine and nearshore populations, the degree of spatial overlap between these populations remains unclear. Photo-identification studies within estuaries demonstrate seasonal immigration and emigration and the presence of transient animals (*e.g.*, Speakman *et al.*, 2006). In addition, the degree of movement of resident estuarine animals into coastal waters on seasonal or shorter time scales is poorly understood (Waring *et al.*, 2014).

The Jacksonville estuarine system (JES) stock has been defined as separate primarily by the results of photo-identification and genetic studies. The stock range is considered to be bounded in the north by the Georgia-Florida border at Cumberland Sound, extending south to approximately Jacksonville Beach, Florida. This encompasses an area defined during a photo-identification study of bottlenose dolphin residency patterns in the area (Caldwell, 2001), and the borders are subject to change upon further study of dolphin residency patterns in estuarine waters of southern Georgia and northern/central Florida. The habitat is comprised of several large brackish rivers, including the St. Johns River, as well as tidal marshes and shallow riverine systems. Three behaviorally different communities were identified during Caldwell's (2001) study: The estuarine waters north (Northern) and south (Southern) of the St. Johns River and the coastal area, all of which differed in density, habitat fidelity and social affiliation patterns. The coastal dolphins are believed to be members of a coastal stock, however (Waring *et al.*, 2014). Although Northern and Southern members of the JES stock show strong site fidelity, members of both groups have been observed outside their preferred areas. Dolphins residing within estuaries south of Jacksonville Beach down to the northern boundary of the Indian River Lagoon Estuarine System (IRLES) stock are currently not included in any stock, as there are insufficient data to determine whether animals in this area exhibit affiliation to the JES stock, the IRLES stock, or are simply transient animals associated with coastal stocks. Further research is needed to establish affinities of dolphins in the area between the ranges, as currently understood, of the JES and IRLES stocks.

The JES stock is susceptible to similar fisheries interactions as those described above for coastal stocks, although only trap/pot fisheries are likely to occur in estuarine waters frequented by the stock. Only one dolphin carcass bearing evidence of fisheries interaction was recovered during 2003–07 in the JES area, and an additional sixteen stranded dolphins were recovered during this time, but no determinations regarding human interactions could be made for the majority (Waring *et al.*, 2014). Nineteen bottlenose dolphins died in the St. Johns River (SJR), Florida between May 24 and November 7, 2010, all of which came from the JES stock. The cause of these deaths was undetermined. The same concerns discussed above regarding underestimation of mortality hold for this stock and, as for stocks discussed above, pollutant loading is a concern. Although no contaminant analyses have yet been conducted in this area, the JES stock inhabits areas with significant drainage from industrial and urban sources, and as such is exposed to contaminants in runoff from these. In other estuarine areas where such analyses have been conducted, exposure to anthropogenic contaminants has been found to likely have an effect (Hansen *et al.* 2004; Schwacke *et al.*, 2004; Reif *et al.*, 2008).

The original, single stock of coastal dolphins recognized from 1995–2001 was listed as depleted under the MMPA as a result of a 1987–88 mortality event. That designation was retained when the single stock was split into multiple coastal stocks. However, Scott *et al.* (1988) suggested that dolphins residing in the bays, sounds and estuaries adjacent to these coastal waters were not affected by the mortality event and these animals were explicitly excluded from the depleted listing (Waring *et al.*, 2014). Gubbins *et al.* (2003), using data from Caldwell (2001), estimated the stock size to be 412 (CV = 0.06). However, NMFS considers abundance unknown because this estimate likely includes an unknown number of non-resident and seasonally-resident dolphins. It nevertheless represents the best available information regarding stock size. Because the stock size is likely small, and relatively few mortalities and serious injuries would exceed PBR, the stock is considered to be a strategic stock (Waring *et al.*, 2014).

An unusual mortality event (UME) occurred between 2013 and 2015 spanning the Atlantic coast, which impacted all stocks of bottlenose dolphins in the area. Over 1,800 dolphins stranded in this time period. The preliminary conclusion of the cause of this UME was morbillivirus. The bottlenose dolphin stocks in this area (SJR and coastal areas) may be considered vulnerable to impacts from future activities due to this recent event.

Potential Effects of the Specified Activity on Marine Mammals and Their Habitat

This section includes a summary and discussion of the ways that components of the specified activity (*e.g.*, sound produced by pile driving) may impact marine mammals and their habitat. The Estimated Take by Incidental Harassment section later in this document will include a quantitative analysis of the number of individuals that are expected to be taken by this activity. The Negligible Impact Analysis section will include an analysis of how this specific activity will impact marine mammals and will consider the content of this section, the Estimated Take by Incidental Harassment section and the Proposed Mitigation section to draw conclusions regarding the likely impacts of this activity on the reproductive success or survivorship of individuals and from that on the affected marine mammal populations or stocks. In the following discussion, we provide general background information on

sound and marine mammal hearing before considering potential effects to marine mammals from sound produced by vibratory and impact pile driving.

Description of Sound Sources

Sound travels in waves, the basic components of which are frequency, wavelength, velocity, and amplitude. Frequency is the number of pressure waves that pass by a reference point per unit of time and is measured in hertz (Hz) or cycles per second. Wavelength is the distance between two peaks of a sound wave; lower frequency sounds have longer wavelengths than higher frequency sounds and attenuate (decrease) more rapidly in shallower water. Amplitude is the height of the sound pressure wave or the 'loudness' of a sound and is typically measured using the decibel (dB) scale. A dB is the ratio between a measured pressure (with sound) and a reference pressure (sound at a constant pressure, established by scientific standards). It is a logarithmic unit that accounts for large variations in amplitude; therefore, relatively small changes in dB ratings correspond to large changes in sound pressure. When referring to sound pressure levels (SPLs; the sound force per unit area), sound is referenced in the context of underwater sound pressure to 1 microPascal (μPa). One pascal is the pressure resulting from a force of one newton exerted over an area of one square meter. The source level (SL) represents the sound level at a distance of 1 m from the source (referenced to 1 μPa). The received level is the sound level at the listener's position. Note that all underwater sound levels in this document are referenced to a pressure of 1 μPa and all airborne sound levels in this document are referenced to a pressure of 20 μPa.

Root mean square (rms) is the quadratic mean sound pressure over the duration of an impulse. Rms is calculated by squaring all of the sound amplitudes, averaging the squares, and then taking the square root of the average (Urick, 1983). Rms accounts for both positive and negative values; squaring the pressures makes all values positive so that they may be accounted for in the summation of pressure levels (Hastings and Popper, 2005). This measurement is often used in the context of discussing behavioral effects, in part because behavioral effects, which often result from auditory cues, may be better expressed through averaged units than by peak pressures.

When underwater objects vibrate or activity occurs, sound-pressure waves are created. These waves alternately compress and decompress the water as the sound wave travels. Underwater sound waves radiate in all directions away from the source (similar to ripples on the surface of a pond), except in cases where the source is directional. The compressions and decompressions associated with sound waves are detected as changes in pressure by aquatic life and man-made sound receptors such as hydrophones.

Even in the absence of sound from the specified activity, the underwater environment is typically loud due to ambient sound. Ambient sound is defined as environmental background sound levels lacking a single source or point (Richardson *et al.*, 1995), and the sound level of a region is defined by the total acoustical energy being generated by known and unknown sources. These sources may include physical (*e.g.*, waves, earthquakes, ice, atmospheric sound), biological (*e.g.*, sounds produced by marine mammals, fish, and invertebrates), and anthropogenic sound (*e.g.*, vessels, dredging, aircraft, construction). A number of sources contribute to ambient sound, including the following (Richardson *et al.*, 1995):

• Wind and waves: The complex interactions between wind and water surface, including processes such as breaking waves and wave-induced bubble oscillations and cavitation, are a main source of naturally occurring ambient noise for frequencies between 200 Hz and 50 kHz (Mitson, 1995). In general, ambient sound levels tend to increase with increasing wind speed and wave height. Surf noise becomes important near shore, with measurements collected at a distance of 8.5 km from shore showing an increase of 10 dB in the 100 to 700 Hz band during heavy surf conditions.

• Precipitation: Sound from rain and hail impacting the water surface can become an important component of total noise at frequencies above 500 Hz, and possibly down to 100 Hz during quiet times.

• Biological: Marine mammals can contribute significantly to ambient noise levels, as can some fish and shrimp. The frequency band for biological contributions is from approximately 12 Hz to over 100 kHz.

• Anthropogenic: Sources of ambient noise related to human activity include transportation (surface vessels and aircraft), dredging and construction, oil and gas drilling and production, seismic surveys, sonar, explosions, and ocean acoustic studies. Shipping noise typically dominates the total ambient noise for frequencies between 20 and 300 Hz. In general, the frequencies of anthropogenic sounds are below 1 kHz and, if higher frequency sound levels are created, they attenuate rapidly (Richardson *et al.*, 1995). Sound from identifiable anthropogenic sources other than the activity of interest (*e.g.*, a passing vessel) is sometimes termed background sound, as opposed to ambient sound.

The sum of the various natural and anthropogenic sound sources at any given location and time—which comprise "ambient" or "background" sound—depends not only on the source levels (as determined by current weather conditions and levels of biological and shipping activity) but also on the ability of sound to propagate through the environment. In turn, sound propagation is dependent on the spatially and temporally varying properties of the water column and sea floor, and is frequency-dependent. As a result of the dependence on a large number of varying factors, ambient sound levels can be expected to vary widely over both coarse and fine spatial and temporal scales. Sound levels at a given frequency and location can vary by 10–20 dB from day to day (Richardson *et al.*, 1995). The result is that, depending on the source type and its intensity, sound from the specified activity may be a negligible addition to the local environment or could form a distinctive signal that may affect marine mammals.

The underwater acoustic environment in the Mayport turning basin is likely to be dominated by noise from day-to-day port and vessel activities. The basin is sheltered from most wave noise, but is a high-use area for naval ships, tugboats, and security vessels. When underway, these sources can create noise between 20 Hz and 16 kHz (Lesage *et al.*, 1999), with broadband noise levels up to 180 dB. While there are no current measurements of ambient noise levels in the turning basin, it is likely that levels within the basin periodically exceed the 120 dB threshold and, therefore, that the high levels of anthropogenic activity in the basin create an environment far different from quieter habitats where behavioral reactions to sounds around the 120 dB threshold have been observed (*e.g.*, Malme *et al.*, 1984, 1988).

In-water construction activities associated with the project would include impact pile driving and vibratory pile driving. The sounds produced by these activities fall into one of two general sound types: Pulsed and non-pulsed (defined in the following). The distinction between these two sound types is important because they have differing potential to cause physical effects, particularly with regard to hearing (*e.g.*, Ward, 1997 in Southall *et al.*, 2007). Please see

Southall *et al.*, (2007) for an in-depth discussion of these concepts.

Pulsed sound sources (*e.g.*, explosions, gunshots, sonic booms, impact pile driving) produce signals that are brief (typically considered to be less than one second), broadband, atonal transients (ANSI, 1986; Harris, 1998; NIOSH, 1998; ISO, 2003; ANSI, 2005) and occur either as isolated events or repeated in some succession. Pulsed sounds are all characterized by a relatively rapid rise from ambient pressure to a maximal pressure value followed by a rapid decay period that may include a period of diminishing, oscillating maximal and minimal pressures, and generally have an increased capacity to induce physical injury as compared with sounds that lack these features.

Non-pulsed sounds can be tonal, narrowband, or broadband, brief or prolonged, and may be either continuous or non-continuous (ANSI, 1995; NIOSH, 1998). Some of these non-pulsed sounds can be transient signals of short duration but without the essential properties of pulses (*e.g.*, rapid rise time). Examples of non-pulsed sounds include those produced by vessels, aircraft, machinery operations such as drilling or dredging, vibratory pile driving, and active sonar systems (such as those used by the U.S. Navy). The duration of such sounds, as received at a distance, can be greatly extended in a highly reverberant environment.

Impact hammers operate by repeatedly dropping a heavy piston onto a pile to drive the pile into the substrate. Sound generated by impact hammers is characterized by rapid rise times and high peak levels, a potentially injurious combination (Hastings and Popper, 2005). Vibratory hammers install piles by vibrating them and allowing the weight of the hammer to push them into the sediment. Vibratory hammers produce significantly less sound than impact hammers. Peak SPLs may be 180 dB or greater, but are generally 10 to 20 dB lower than SPLs generated during impact pile driving of the same-sized pile (Oestman *et al.*, 2009). Rise time is slower, reducing the probability and severity of injury, and sound energy is distributed over a greater amount of time (Nedwell and Edwards, 2002; Carlson *et al.*, 2005).

Marine Mammal Hearing

Hearing is the most important sensory modality for marine mammals, and exposure to sound can have deleterious effects. To appropriately assess these potential effects, it is necessary to understand the frequency ranges marine mammals are able to hear. Current data indicate that not all marine mammal species have equal hearing capabilities (*e.g.*, Richardson *et al.*, 1995; Wartzok and Ketten, 1999; Au and Hastings, 2008). To reflect this, Southall *et al.* (2007) recommended that marine mammals be divided into functional hearing groups based on measured or estimated hearing ranges on the basis of available behavioral data, audiograms derived using auditory evoked potential techniques, anatomical modeling, and other data. The lower and/or upper frequencies for some of these functional hearing groups have been modified from those designated by Southall *et al.* (2007). The functional groups and the associated frequencies are indicated below (note that these frequency ranges do not necessarily correspond to the range of best hearing, which varies by species):

- Low-frequency cetaceans (mysticetes): Functional hearing is estimated to occur between approximately 7 Hz and 25 kHz (extended from 22 kHz; Watkins, 1986; Au *et al.*, 2006; Lucifredi and Stein, 2007; Ketten and Mountain, 2009; Tubelli *et al.*, 2012);
- Mid-frequency cetaceans (larger toothed whales, beaked whales, and most delphinids): Functional hearing is estimated to occur between approximately 150 Hz and 160 kHz;
- High-frequency cetaceans (porpoises, river dolphins, and members of the genera *Kogia* and *Cephalorhynchus;* now considered to include two members of the genus *Lagenorhynchus* on the basis of recent echolocation data and genetic data [May-Collado and Agnarsson, 2006; Kyhn *et al.* 2009, 2010; Tougaard *et al.* 2010]): Functional hearing is estimated to occur between approximately 200 Hz and 180 kHz; and
- Pinnipeds in water: Functional hearing is estimated to occur between approximately 75 Hz to 100 kHz for Phocidae (true seals) and between 100 Hz and 40 kHz for Otariidae (eared seals), with the greatest sensitivity between approximately 700 Hz and 20 kHz. The pinniped functional hearing group was modified from Southall *et al.* (2007) on the basis of data indicating that phocid species have consistently demonstrated an extended frequency range of hearing compared to otariids, especially in the higher frequency range (Hemilä *et al.*, 2006; Kastelein *et al.*, 2009; Reichmuth *et al.*, 2013).

One cetacean species is expected to potentially be affected by the specified activity. Bottlenose dolphins are classified as mid-frequency cetaceans.

Acoustic Effects, Underwater

Potential Effects of Pile Driving Sound—The effects of sounds from pile driving might result in one or more of the following: Temporary or permanent hearing impairment, non-auditory physical or physiological effects, behavioral disturbance, and masking (Richardson *et al.*, 1995; Gordon *et al.*, 2003; Nowacek *et al.*, 2007; Southall *et al.*, 2007). The effects of pile driving on marine mammals are dependent on several factors, including the size, type, and depth of the animal; the depth, intensity, and duration of the pile driving sound; the depth of the water column; the substrate of the habitat; the standoff distance between the pile and the animal; and the sound propagation properties of the environment. Impacts to marine mammals from pile driving activities are expected to result primarily from acoustic pathways. As such, the degree of effect is intrinsically related to the received level and duration of the sound exposure, which are in turn influenced by the distance between the animal and the source. The further away from the source, the less intense the exposure should be. The substrate and depth of the habitat affect the sound propagation properties of the environment. Shallow environments are typically more structurally complex, which leads to rapid sound attenuation. In addition, substrates that are soft (*e.g.*, sand) would absorb or attenuate the sound more readily than hard substrates (*e.g.*, rock) which may reflect the acoustic wave. Soft porous substrates would also likely require less time to drive the pile, and possibly less forceful equipment, which would ultimately decrease the intensity of the acoustic source.

In the absence of mitigation, impacts to marine species would be expected to result from physiological and behavioral responses to both the type and strength of the acoustic signature (Viada *et al.*, 2008). The type and severity of behavioral impacts are more difficult to define due to limited studies addressing the behavioral effects of impulsive sounds on marine mammals. Potential effects from impulsive sound sources can range in severity from effects such as behavioral disturbance or tactile perception to physical discomfort, slight injury of the internal organs and the auditory system, or mortality (Yelverton *et al.*, 1973).

Hearing Impairment and Other Physical Effects—Marine mammals exposed to high intensity sound repeatedly or for prolonged periods can experience hearing threshold shift (TS), which is the loss of hearing sensitivity

at certain frequency ranges (Kastak *et al.*, 1999; Schlundt *et al.*, 2000; Finneran *et al.*, 2002, 2005). TS can be permanent (PTS), in which case the loss of hearing sensitivity is not recoverable, or temporary (TTS), in which case the animal's hearing threshold would recover over time (Southall *et al.*, 2007). Marine mammals depend on acoustic cues for vital biological functions, (*e.g.*, orientation, communication, finding prey, avoiding predators); thus, TTS may result in reduced fitness in survival and reproduction. However, this depends on the frequency and duration of TTS, as well as the biological context in which it occurs. TTS of limited duration, occurring in a frequency range that does not coincide with that used for recognition of important acoustic cues, would have little to no effect on an animal's fitness. Repeated sound exposure that leads to TTS could cause PTS. PTS constitutes injury (direct auditory tissue effects), but TTS does not (Southall *et al.*, 2007). The following subsections discuss in somewhat more detail the possibilities of TTS, PTS, and non-auditory physical effects.

Temporary Threshold Shift—TTS is the mildest form of hearing impairment that can occur during exposure to a strong sound (Kryter, 1985). While experiencing TTS, the hearing threshold rises, and a sound must be stronger in order to be heard. In terrestrial mammals, TTS can last from minutes or hours to days (in cases of strong TTS). For sound exposures at or somewhat above the TTS threshold, hearing sensitivity in both terrestrial and marine mammals recovers rapidly after exposure to the sound ends. Few data on sound levels and durations necessary to elicit mild TTS have been obtained for marine mammals, and none of the published data concern TTS elicited by exposure to multiple pulses of sound. Available data on TTS in marine mammals are summarized in Southall *et al.* (2007).

Given the available data, the received level of a single pulse (with no frequency weighting) might need to be approximately 186 dB re 1 μPa^2-s (*i.e.*, 186 dB sound exposure level [SEL] or approximately 221–226 dB p-p [peak]) in order to produce brief, mild TTS. Exposure to several strong pulses that each have received levels near 190 dB rms (175–180 dB SEL) might result in cumulative exposure of approximately 186 dB SEL and thus slight TTS in a small odontocete, assuming the TTS threshold is (to a first approximation) a function of the total received pulse energy.

The above TTS information for odontocetes is derived from studies on the bottlenose dolphin and beluga whale (*Delphinapterus leucas*). There is no published TTS information for other species of cetaceans. However, preliminary evidence from a harbor porpoise exposed to pulsed sound suggests that its TTS threshold may have been lower (Lucke *et al.*, 2009). As summarized above, data that are now available imply that TTS is unlikely to occur unless odontocetes are exposed to pile driving pulses stronger than 180 dB re 1 µPa rms.

Permanent Threshold Shift—When PTS occurs, there is physical damage to the sound receptors in the ear. In severe cases, there can be total or partial deafness, while in other cases the animal has an impaired ability to hear sounds in specific frequency ranges (Kryter, 1985). There is no specific evidence that exposure to pulses of sound can cause PTS in any marine mammal. However, given the possibility that mammals close to a sound source might incur TTS, there has been further speculation about the possibility that some individuals might incur PTS. Single or occasional occurrences of mild TTS are not indicative of permanent auditory damage, but repeated or (in some cases) single exposures to a level well above that causing TTS onset might elicit PTS.

Relationships between TTS and PTS thresholds have not been studied in marine mammals but are assumed to be similar to those in humans and other terrestrial mammals. PTS might occur at a received sound level at least several decibels above that inducing mild TTS if the animal were exposed to strong sound pulses with rapid rise time. Based on data from terrestrial mammals, a precautionary assumption is that the PTS threshold for impulse sounds (such as pile driving pulses as received close to the source) is at least 6 dB higher than the TTS threshold on a peak-pressure basis and probably greater than 6 dB (Southall *et al.*, 2007). On an SEL basis, Southall *et al.* (2007) estimated that received levels would need to exceed the TTS threshold by at least 15 dB for there to be risk of PTS. Thus, for cetaceans, Southall *et al.* (2007) estimate that the PTS threshold might be an M-weighted SEL (for the sequence of received pulses) of approximately 198 dB re 1 μPa^2-s (15 dB higher than the TTS threshold for an impulse). Given the higher level of sound necessary to cause PTS as compared with TTS, it is considerably less likely that PTS could occur.

Measured source levels from impact pile driving can be as high as 214 dB rms. Although no marine mammals have been shown to experience TTS or PTS as a result of being exposed to pile driving activities, captive bottlenose dolphins and beluga whales exhibited changes in behavior when exposed to strong pulsed sounds (Finneran *et al.*, 2000, 2002, 2005). The animals tolerated high received levels of sound before exhibiting aversive behaviors. Experiments on a beluga whale showed that exposure to a single watergun impulse at a received level of 207 kPa (30 psi) p-p, which is equivalent to 228 dB p-p, resulted in a 7 and 6 dB TTS in the beluga whale at 0.4 and 30 kHz, respectively. Thresholds returned to within 2 dB of the pre-exposure level within four minutes of the exposure (Finneran *et al.*, 2002). Although the source level of pile driving from one hammer strike is expected to be much lower than the single watergun impulse cited here, animals being exposed for a prolonged period to repeated hammer strikes could receive more sound exposure in terms of SEL than from the single watergun impulse (estimated at 188 dB re 1 μPa^2-s) in the aforementioned experiment (Finneran *et al.*, 2002). However, in order for marine mammals to experience TTS or PTS, the animals have to be close enough to be exposed to high intensity sound levels for a prolonged period of time. Based on the best scientific information available, these SPLs are far below the thresholds that could cause TTS or the onset of PTS.

Non-auditory Physiological Effects—Non-auditory physiological effects or injuries that theoretically might occur in marine mammals exposed to strong underwater sound include stress, neurological effects, bubble formation, resonance effects, and other types of organ or tissue damage (Cox *et al.*, 2006; Southall *et al.*, 2007). Studies examining such effects are limited. In general, little is known about the potential for pile driving to cause auditory impairment or other physical effects in marine mammals. Available data suggest that such effects, if they occur at all, would presumably be limited to short distances from the sound source and to activities that extend over a prolonged period. The available data do not allow identification of a specific exposure level above which non-auditory effects can be expected (Southall *et al.*, 2007) or any meaningful quantitative predictions of the numbers (if any) of marine mammals that might be affected in those ways. Marine mammals that show behavioral avoidance of pile driving, including some odontocetes and some pinnipeds, are especially unlikely to incur auditory impairment or non-auditory physical effects.

Disturbance Reactions

Disturbance includes a variety of effects, including subtle changes in behavior, more conspicuous changes in activities, and displacement. Behavioral responses to sound are highly variable and context-specific and reactions, if any, depend on species, state of maturity, experience, current activity, reproductive state, auditory sensitivity, time of day, and many other factors (Richardson *et al.*, 1995; Wartzok *et al.*, 2003; Southall *et al.*, 2007).

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

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

With both types of pile driving, it is likely that the onset of pile driving could result in temporary, short term changes in an animal's typical behavior and/or avoidance of the affected area. These behavioral changes may include (Richardson *et al.*, 1995): Changing durations of surfacing and dives, number of blows per surfacing, or moving direction and/or speed; reduced/increased vocal activities; changing/cessation of certain behavioral activities (such as socializing or feeding); visible startle response or aggressive behavior (such as tail/fluke slapping or jaw clapping); avoidance of areas where sound sources are located; and/or flight responses (*e.g.*, pinnipeds flushing into water from haul-outs or rookeries). Pinnipeds may increase their haul-out time, possibly to avoid in-water disturbance (Thorson and Reyff, 2006).

The biological significance of many of these behavioral disturbances is difficult to predict, especially if the detected disturbances appear minor. However, the consequences of behavioral modification could be expected to be biologically significant if the change affects growth, survival, or reproduction. Significant behavioral modifications that could potentially lead to effects on growth, survival, or reproduction include:

• Drastic changes in diving/surfacing patterns (such as those thought to cause beaked whale stranding due to exposure to military mid-frequency tactical sonar);

• Habitat abandonment due to loss of desirable acoustic environment; and

• Cessation of feeding or social interaction.

The onset of behavioral disturbance from anthropogenic sound depends on both external factors (characteristics of sound sources and their paths) and the specific characteristics of the receiving animals (hearing, motivation, experience, demography) and is difficult to predict (Southall *et al.*, 2007).

Auditory Masking

Natural and artificial sounds can disrupt behavior by masking, or interfering with, a marine mammal's ability to hear other sounds. Masking occurs when the receipt of a sound is interfered with by another coincident sound at similar frequencies and at similar or higher levels. Chronic exposure to excessive, though not high-intensity, sound could cause masking at particular frequencies for marine mammals, which utilize sound for vital biological functions. Masking can interfere with detection of acoustic signals such as communication calls, echolocation sounds, and environmental sounds important to marine mammals. Therefore, under certain circumstances, marine mammals whose acoustical sensors or environment are being severely masked could also be impaired from maximizing their performance fitness in survival and reproduction. If the coincident (masking) sound were man-made, it could be potentially harassing if it disrupted hearing-related behavior. It is important to distinguish TTS and PTS, which persist after the sound exposure, from masking, which occurs during the sound exposure. Because masking (without resulting in TS) is not associated with abnormal physiological function, it is not considered a physiological effect, but rather a potential behavioral effect.

The frequency range of the potentially masking sound is important in determining any potential behavioral impacts. Because sound generated from in-water pile driving is mostly concentrated at low frequency ranges, it may have less effect on high frequency echolocation sounds made by porpoises. However, lower frequency man-made sounds are more likely to affect detection of communication calls and other potentially important natural sounds such as surf and prey sound. It may also affect communication signals when they occur near the sound band and thus reduce the communication space of animals (*e.g.*, Clark *et al.*, 2009) and cause increased stress levels (*e.g.*, Foote *et al.*, 2004; Holt *et al.*, 2009).

Masking has the potential to impact species at the population or community levels as well as at individual levels. Masking affects both senders and receivers of the signals and can potentially have long-term chronic effects on marine mammal species and populations. Recent research suggests that low frequency ambient sound levels have increased by as much as 20 dB (more than three times in terms of SPL) in the world's ocean from pre-industrial periods, and that most of these increases are from distant shipping (Hildebrand, 2009). All anthropogenic sound sources, such as those from vessel traffic, pile driving, and dredging activities, contribute to the elevated ambient sound levels, thus intensifying masking.

The most intense underwater sounds in the proposed action are those produced by impact pile driving. Given that the energy distribution of pile driving covers a broad frequency spectrum, sound from these sources would likely be within the audible range of marine mammals present in the project area. Impact pile driving activity is relatively short-term, with rapid pulses occurring for approximately fifteen minutes per pile. The probability for impact pile driving resulting from this proposed action masking acoustic signals important to the behavior and survival of marine mammal species is likely to be negligible. Vibratory pile driving is also relatively short-term, with rapid oscillations occurring for approximately one and a half hours per pile. It is possible that vibratory pile driving resulting from this proposed action may mask acoustic signals important to the behavior and survival of marine mammal species, but the

short-term duration and limited affected area would result in insignificant impacts from masking. Any masking event that could possibly rise to Level B harassment under the MMPA would occur concurrently within the zones of behavioral harassment already estimated for vibratory and impact pile driving, and which have already been taken into account in the exposure analysis.

Anticipated Effects on Habitat

The proposed activities at NSM would not result in permanent impacts to habitats used directly by marine mammals, but may have potential short-term impacts to food sources such as forage fish and may affect acoustic habitat (see masking discussion above). There are no known foraging hotspots or other ocean bottom structure of significant biological importance to marine mammals present in the marine waters of the project area; however the surrounding areas may be foraging habitat for the dolphins. Therefore, the main impact issue associated with the proposed activity would be temporarily elevated sound levels and the associated direct effects on marine mammals, as discussed previously in this document. The most likely impact to marine mammal habitat occurs from pile driving effects on likely marine mammal prey (*i.e.,* fish) within NSM and minor impacts to the immediate substrate during installation and removal of piles during the wharf construction project.

Pile Driving Effects on Potential Prey (Fish)

Construction activities may produce both pulsed (*i.e.,* impact pile driving) and continuous (*i.e.,* vibratory pile driving) sounds. Fish react to sounds which are especially strong and/or intermittent low-frequency sounds. Short duration, sharp sounds can cause overt or subtle changes in fish behavior and local distribution. Hastings and Popper (2005) identified several studies that suggest fish may relocate to avoid certain areas of sound energy. Additional studies have documented effects of pile driving (or other types of sounds) on fish, although several are based on studies in support of large, multiyear bridge construction projects (*e.g.,* Scholik and Yan, 2001, 2002; Popper and Hastings, 2009). Sound pulses at received levels of 160 dB re 1 µPa may cause subtle changes in fish behavior. SPLs of 180 dB may cause noticeable changes in behavior (Pearson *et al.,* 1992; Skalski *et al.,* 1992). SPLs of sufficient strength have been known to cause injury to fish and fish mortality. The most likely impact to fish from pile driving activities at the project area would be temporary behavioral avoidance of the area. The duration of fish avoidance of this area after pile driving stops is unknown, but a rapid return to normal recruitment, distribution and behavior is anticipated. In general, impacts to marine mammal prey species are expected to be minor and temporary due to the short timeframe for the project.

Pile Driving Effects on Potential Foraging Habitat

The area likely impacted by the project is relatively small compared to the available habitat in nearshore and estuarine waters in the region. Avoidance by potential prey (*i.e.,* fish) of the immediate area due to the temporary loss of this foraging habitat is also possible. The duration of fish avoidance of this area after pile driving stops is unknown, but a rapid return to normal recruitment, distribution and behavior is anticipated. Any behavioral avoidance by fish of the disturbed area would still leave significantly large areas of fish and marine mammal foraging habitat in the nearby vicinity.

In summary, given the short daily duration of sound associated with individual pile driving events and the relatively small areas being affected, pile driving activities associated with the proposed action are not likely to have a permanent, adverse effect on any fish habitat, or populations of fish species. Therefore, pile driving is not likely to have a permanent, adverse effect on marine mammal foraging habitat at the project area. The Mayport turning basin itself is a man-made basin with significant levels of industrial activity and regular dredging, and is unlikely to harbor significant amounts of forage fish. Thus, any impacts to marine mammal habitat are not expected to cause significant or long-term consequences for individual marine mammals or their populations.

Proposed Mitigation

In order to issue an IHA under section 101(a)(5)(D) of the MMPA, NMFS must set forth the permissible methods of taking pursuant to such activity, and other means of effecting the least practicable impact on such species or stock and its habitat, paying particular attention to rookeries, mating grounds, and areas of similar significance, and on the availability of such species or stock for taking for certain subsistence uses.

Measurements from similar pile driving events were coupled with practical spreading loss to estimate zones of influence (ZOI; see Estimated Take by Incidental Harassment); these values were used to develop mitigation measures for pile driving activities at NSM. The ZOIs effectively represent the mitigation zone that would be established around each pile to prevent Level A harassment to marine mammals, while providing estimates of the areas within which Level B harassment might occur. In addition to the specific measures described later in this section, the Navy would conduct briefings between construction supervisors and crews, marine mammal monitoring team, and Navy staff prior to the start of all pile driving activity, and when new personnel join the work, in order to explain responsibilities, communication procedures, marine mammal monitoring protocol, and operational procedures.

Monitoring and Shutdown for Pile Driving

The following measures would apply to the Navy's mitigation through shutdown and disturbance zones:

Shutdown Zone—For all pile driving activities, the Navy will establish a shutdown zone intended to contain the area in which SPLs equal or exceed the 190 dB rms acoustic injury criteria. The purpose of a shutdown zone is to define an area within which shutdown of activity would occur upon sighting of a marine mammal (or in anticipation of an animal entering the defined area), thus preventing injury of marine mammals (as described previously under Potential Effects of the Specified Activity on Marine Mammals, serious injury or death are unlikely outcomes even in the absence of mitigation measures). Modeled radial distances for shutdown zones are shown in Table 3. However, a minimum shutdown zone of 15 m (which is larger than the maximum predicted injury zone) will be established during all pile driving activities, regardless of the estimated zone. Vibratory pile driving activities are not predicted to produce sound exceeding the 190-dB Level A harassment threshold, but these precautionary measures are intended to prevent the already unlikely possibility of physical interaction with construction equipment and to further reduce any possibility of acoustic injury. For impact driving of steel piles, if necessary, the radial distance of the shutdown would be established at 40 m.

Disturbance Zone—Disturbance zones are the areas in which SPLs equal or exceed 160 and 120 dB rms (for impulse and continuous sound, respectively). Disturbance zones provide utility for monitoring conducted for mitigation purposes (*i.e.,* shutdown zone monitoring) by establishing monitoring

protocols for areas adjacent to the shutdown zones. Monitoring of disturbance zones enables observers to be aware of and communicate the presence of marine mammals in the project area but outside the shutdown zone and thus prepare for potential shutdowns of activity. However, the primary purpose of disturbance zone monitoring is for documenting incidents of Level B harassment; disturbance zone monitoring is discussed in greater detail later (see Proposed Monitoring and Reporting). Nominal radial distances for disturbance zones are shown in Table 3. Given the size of the disturbance zone for vibratory pile driving, it is impossible to guarantee that all animals would be observed or to make comprehensive observations of fine-scale behavioral reactions to sound, and only a portion of the zone (*e.g.*, what may be reasonably observed by visual observers stationed within the turning basin) would be observed.

In order to document observed incidents of harassment, monitors record all marine mammal observations, regardless of location. The observer's location, as well as the location of the pile being driven, is known from a GPS. The location of the animal is estimated as a distance from the observer, which is then compared to the location from the pile. It may then be estimated whether the animal was exposed to sound levels constituting incidental harassment on the basis of predicted distances to relevant thresholds in post-processing of observational and acoustic data, and a precise accounting of observed incidences of harassment created. This information may then be used to extrapolate observed takes to reach an approximate understanding of actual total takes.

Monitoring Protocols—Monitoring would be conducted before, during, and after pile driving activities. In addition, observers shall record all incidents of marine mammal occurrence, regardless of distance from activity, and shall document any behavioral reactions in concert with distance from piles being driven. Observations made outside the shutdown zone will not result in shutdown; that pile segment would be completed without cessation, unless the animal approaches or enters the shutdown zone, at which point all pile driving activities would be halted. Monitoring will take place from fifteen minutes prior to initiation through thirty minutes post-completion of pile driving activities. Pile driving activities include the time to install or remove a single pile or series of piles, as long as the time elapsed between uses of the pile driving equipment is no more than thirty minutes. Please see the Monitoring Plan (*www.nmfs.noaa.gov/pr/permits/incidental/construction.htm*), developed by the Navy in agreement with NMFS, for full details of the monitoring protocols.

The following additional measures apply to visual monitoring:

(1) Monitoring will be conducted by qualified observers, who will be placed at the best vantage point(s) practicable to monitor for marine mammals and implement shutdown/delay procedures when applicable by calling for the shutdown to the hammer operator. Qualified observers are typically trained biologists, with the following minimum qualifications:

- Visual acuity in both eyes (correction is permissible) sufficient for discernment of moving targets at the water's surface with ability to estimate target size and distance; use of binoculars may be necessary to correctly identify the target;
- Experience and ability to conduct field observations and collect data according to assigned protocols (this may include academic experience);
- Experience or training in the field identification of marine mammals, including the identification of behaviors;
- Sufficient training, orientation, or experience with the construction operation to provide for personal safety during observations;
- Writing skills sufficient to prepare a report of observations including but not limited to the number and species of marine mammals observed; dates and times when in-water construction activities were conducted; dates and times when in-water construction activities were suspended to avoid potential incidental injury from construction sound of marine mammals observed within a defined shutdown zone; and marine mammal behavior; and
- Ability to communicate orally, by radio or in person, with project personnel to provide real-time information on marine mammals observed in the area as necessary.

(2) Prior to the start of pile driving activity, the shutdown zone will be monitored for fifteen minutes to ensure that it is clear of marine mammals. Pile driving will only commence once observers have declared the shutdown zone clear of marine mammals; animals will be allowed to remain in the shutdown zone (*i.e.*, must leave of their own volition) and their behavior will be monitored and documented. The shutdown zone may only be declared clear, and pile driving started, when the entire shutdown zone is visible (*i.e.*, when not obscured by dark, rain, fog, *etc.*). In addition, if such conditions should arise during impact pile driving that is already underway, the activity would be halted.

(3) If a marine mammal approaches or enters the shutdown zone during the course of pile driving operations, activity will be halted and delayed until either the animal has voluntarily left and been visually confirmed beyond the shutdown zone or fifteen minutes have passed without re-detection of the animal. Monitoring will be conducted throughout the time required to drive a pile.

Soft Start

The use of a soft start procedure is believed to provide additional protection to marine mammals by warning or providing a chance to leave the area prior to the hammer operating at full capacity, and typically involves a requirement to initiate sound from the hammer at reduced energy followed by a waiting period. This procedure is repeated two additional times. It is difficult to specify the reduction in energy for any given hammer because of variation across drivers and, for impact hammers, the actual number of strikes at reduced energy will vary because operating the hammer at less than full power results in "bouncing" of the hammer as it strikes the pile, resulting in multiple "strikes." For impact driving, we require an initial set of three strikes from the impact hammer at reduced energy, followed by a thirty-second waiting period, then two subsequent three strike sets. Soft start will be required at the beginning of each day's impact pile driving work and at any time following a cessation of impact pile driving of thirty minutes or longer.

We have carefully evaluated the Navy's proposed mitigation measures and considered their effectiveness in past implementation to preliminarily determine whether they are likely to effect the least practicable impact on the affected marine mammal species and stocks and their habitat. Our evaluation of potential measures included consideration of the following factors in relation to one another: (1) The manner in which, and the degree to which, the successful implementation of the measure is expected to minimize adverse impacts to marine mammals, (2) the proven or likely efficacy of the specific measure to minimize adverse impacts as planned; and (3) the practicability of the measure for applicant implementation.

Any mitigation measure(s) we prescribe should be able to accomplish, have a reasonable likelihood of

accomplishing (based on current science), or contribute to the accomplishment of one or more of the general goals listed below:

(1) Avoidance or minimization of injury or death of marine mammals wherever possible (goals 2, 3, and 4 may contribute to this goal).

(2) A reduction in the number (total number or number at biologically important time or location) of individual marine mammals exposed to stimuli expected to result in incidental take (this goal may contribute to 1, above, or to reducing takes by behavioral harassment only).

(3) A reduction in the number (total number or number at biologically important time or location) of times any individual marine mammal would be exposed to stimuli expected to result in incidental take (this goal may contribute to 1, above, or to reducing takes by behavioral harassment only).

(4) A reduction in the intensity of exposure to stimuli expected to result in incidental take (this goal may contribute to 1, above, or to reducing the severity of behavioral harassment only).

(5) Avoidance or minimization of adverse effects to marine mammal habitat, paying particular attention to the prey base, blockage or limitation of passage to or from biologically important areas, permanent destruction of habitat, or temporary disturbance of habitat during a biologically important time.

(6) For monitoring directly related to mitigation, an increase in the probability of detecting marine mammals, thus allowing for more effective implementation of the mitigation.

Based on our evaluation of the Navy's proposed measures, as well as any other potential measures that may be relevant to the specified activity, we have preliminarily determined that the proposed mitigation measures provide the means of effecting the least practicable impact on marine mammal species or stocks and their habitat, paying particular attention to rookeries, mating grounds, and areas of similar significance.

Proposed Monitoring and Reporting

In order to issue an IHA for an activity, section 101(a)(5)(D) of the MMPA states that NMFS must set forth "requirements pertaining to the monitoring and reporting of such taking." The MMPA implementing regulations at 50 CFR 216.104(a)(13) indicate that requests for incidental take authorizations must include the suggested means of accomplishing the necessary monitoring and reporting that will result in increased knowledge of the species and of the level of taking or impacts on populations of marine mammals that are expected to be present in the proposed action area.

Any monitoring requirement we prescribe should improve our understanding of one or more of the following:

- Occurrence of marine mammal species in action area (*e.g.,* presence, abundance, distribution, density).
- Nature, scope, or context of likely marine mammal exposure to potential stressors/impacts (individual or cumulative, acute or chronic), through better understanding of: (1) Action or environment (*e.g.,* source characterization, propagation, ambient noise); (2) Affected species (*e.g.,* life history, dive patterns); (3) Co-occurrence of marine mammal species with the action; or (4) Biological or behavioral context of exposure (*e.g.,* age, calving or feeding areas).
- Individual responses to acute stressors, or impacts of chronic exposures (behavioral or physiological).
- How anticipated responses to stressors impact either: (1) Long-term fitness and survival of an individual; or (2) Population, species, or stock.
- Effects on marine mammal habitat and resultant impacts to marine mammals.
- Mitigation and monitoring effectiveness.

The Navy's proposed monitoring and reporting is also described in their Marine Mammal Monitoring Plan, on the Internet at *www.nmfs.noaa.gov/pr/permits/incidental/construction.htm.*

Visual Marine Mammal Observations

The Navy will collect sighting data and behavioral responses to construction for marine mammal species observed in the region of activity during the period of activity. All observers (MMOs) will be trained in marine mammal identification and behaviors and are required to have no other construction-related tasks while conducting monitoring. The Navy will monitor the shutdown zone and disturbance zone before, during, and after pile driving, with observers located at the best practicable vantage points. Based on our requirements, the Navy would implement the following procedures for pile driving:

- MMOs would be located at the best vantage point(s) in order to properly see the entire shutdown zone and as much of the disturbance zone as possible.
- During all observation periods, observers will use binoculars and the naked eye to search continuously for marine mammals.
- If the shutdown zones are obscured by fog or poor lighting conditions, pile driving at that location will not be initiated until that zone is visible. Should such conditions arise while impact driving is underway, the activity would be halted.
- The shutdown and disturbance zones around the pile will be monitored for the presence of marine mammals before, during, and after any pile driving or removal activity.

Individuals implementing the monitoring protocol will assess its effectiveness using an adaptive approach. The monitoring biologists will use their best professional judgment throughout implementation and seek improvements to these methods when deemed appropriate. Any modifications to protocol will be coordinated between NMFS and the Navy.

Data Collection

We require that observers use approved data forms. Among other pieces of information, the Navy will record detailed information about any implementation of shutdowns, including the distance of animals to the pile and description of specific actions that ensued and resulting behavior of the animal, if any. In addition, the Navy will attempt to distinguish between the number of individual animals taken and the number of incidences of take. We require that, at a minimum, the following information be collected on the sighting forms:

- Date and time that monitored activity begins or ends;
- Construction activities occurring during each observation period;
- Weather parameters (*e.g.,* percent cover, visibility);
- Water conditions (*e.g.,* sea state, tide state);
- Species, numbers, and, if possible, sex and age class of marine mammals;
- Description of any observable marine mammal behavior patterns, including bearing and direction of travel, and if possible, the correlation to SPLs;
- Distance from pile driving activities to marine mammals and distance from the marine mammals to the observation point;
- Description of implementation of mitigation measures (*e.g.,* shutdown or delay);
- Locations of all marine mammal observations; and
- Other human activity in the area.

Reporting

A draft report would be submitted to NMFS within 90 days of the completion

of marine mammal monitoring, or sixty days prior to the requested date of issuance of any future IHA for projects at the same location, whichever comes first. The report will include marine mammal observations pre-activity, during-activity, and post-activity during pile driving days, and will also provide descriptions of any behavioral responses to construction activities by marine mammals and a complete description of all mitigation shutdowns and the results of those actions and an extrapolated total take estimate based on the number of marine mammals observed during the course of construction. A final report must be submitted within thirty days following resolution of comments on the draft report.

Estimated Take by Incidental Harassment

Except with respect to certain activities not pertinent here, section 3(18) of the MMPA defines "harassment" as: ". . . any act of pursuit, torment, or annoyance which (i) has the potential to injure a marine mammal or marine mammal stock in the wild [Level A harassment]; or (ii) has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering [Level B harassment]."

All anticipated takes would be by Level B harassment resulting from vibratory and impact pile driving and involving temporary changes in behavior. The proposed mitigation and monitoring measures are expected to minimize the possibility of injurious or lethal takes such that take by Level A harassment, serious injury, or mortality is considered discountable. However, it is unlikely that injurious or lethal takes would occur even in the absence of the planned mitigation and monitoring measures.

If a marine mammal responds to a stimulus by changing its behavior (*e.g.*, through relatively minor changes in locomotion direction/speed or vocalization behavior), the response may or may not constitute taking at the individual level, and is unlikely to affect the stock or the species as a whole. However, if a sound source displaces marine mammals from an important feeding or breeding area for a prolonged period, impacts on animals or on the stock or species could potentially be significant (*e.g.*, Lusseau and Bejder, 2007; Weilgart, 2007). Given the many uncertainties in predicting the quantity and types of impacts of sound on marine mammals, it is common practice to estimate how many animals are likely to be present within a particular distance of a given activity, or exposed to a particular level of sound. In practice, depending on the amount of information available to characterize daily and seasonal movement and distribution of affected marine mammals, it can be difficult to distinguish between the number of individuals harassed and the instances of harassment and, when duration of the activity is considered, it can result in a take estimate that overestimates the number of individuals harassed. In particular, for stationary activities, it is more likely that some smaller number of individuals may accrue a number of incidences of harassment per individual than for each incidence to accrue to a new individual, especially if those individuals display some degree of residency or site fidelity and the impetus to use the site (*e.g.*, because of foraging opportunities) is stronger than the deterrence presented by the harassing activity.

The turning basin is not considered important habitat for marine mammals, as it is a man-made, semi-enclosed basin with frequent industrial activity and regular maintenance dredging. The surrounding waters may be an important foraging habitat for the dolphins; however the small area of ensonification does not extend outside of the turning basin and into this foraging habitat (see Figure 6–1 in the Navy's application). Therefore, behavioral disturbances that could result from anthropogenic sound associated with these activities are expected to affect only a relatively small number of individual marine mammals that may venture near the turning basin, although those effects could be recurring over the life of the project if the same individuals remain in the project vicinity. The Navy has requested authorization for the incidental taking of small numbers of bottlenose dolphins in the Mayport turning basin that may result from pile driving during construction activities associated with the project described previously in this document.

In order to estimate the potential incidents of take that may occur incidental to the specified activity, we must first estimate the extent of the sound field that may be produced by the activity and then consider in combination with information about marine mammal density or abundance in the project area. We first provide information on applicable sound thresholds for determining effects to marine mammals before describing the information used in estimating the sound fields, the available marine mammal density or abundance information, and the method of estimating potential incidents of take.

Sound Thresholds

We use generic sound exposure thresholds to determine when an activity that produces sound might result in impacts to a marine mammal such that a take by harassment might occur. To date, no studies have been conducted that explicitly examine impacts to marine mammals from pile driving sounds or from which empirical sound thresholds have been established. These thresholds (Table 2) are used to estimate when harassment may occur (*i.e.*, when an animal is exposed to levels equal to or exceeding the relevant criterion) in specific contexts; however, useful contextual information that may inform our assessment of effects is typically lacking and we consider these thresholds as step functions. NMFS is working to revise these acoustic guidelines; for more information on that process, please visit *www.nmfs.noaa.gov/pr/acoustics/guidelines.htm*.

TABLE 2—CURRENT ACOUSTIC EXPOSURE CRITERIA

Criterion	Definition	Threshold
Level A harassment (underwater) ...	Injury (PTS—any level above that which is known to cause TTS).	180 dB (cetaceans)/190 dB (pinnipeds) (rms).
Level B harassment (underwater) ...	Behavioral disruption	160 dB (impulsive source)/120 dB (continuous source) (rms).
Level B harassment (airborne)	Behavioral disruption	90 dB (harbor seals)/100 dB (other pinnipeds) (unweighted).

Distance to Sound Thresholds

Underwater Sound Propagation Formula—Pile driving generates underwater noise that can potentially result in disturbance to marine mammals in the project area. Transmission loss (TL) is the decrease in acoustic intensity as an acoustic pressure wave propagates out from a source. TL parameters vary with frequency, temperature, sea conditions, current, source and receiver depth, water depth, water chemistry, and bottom composition and topography. The general formula for underwater TL is:

$$TL = B * \log_{10}(R_1/R_2),$$

Where:

R_1 = the distance of the modeled SPL from the driven pile, and

R_2 = the distance from the driven pile of the initial measurement.

This formula neglects loss due to scattering and absorption, which is assumed to be zero here. The degree to which underwater sound propagates away from a sound source is dependent on a variety of factors, most notably the water bathymetry and presence or absence of reflective or absorptive conditions including in-water structures and sediments. Spherical spreading occurs in a perfectly unobstructed (free-field) environment not limited by depth or water surface, resulting in a 6 dB reduction in sound level for each doubling of distance from the source (20*log[range]). Cylindrical spreading occurs in an environment in which sound propagation is bounded by the water surface and sea bottom, resulting in a reduction of 3 dB in sound level for each doubling of distance from the source (10*log[range]). A practical spreading value of fifteen is often used under conditions, such as at the NSM turning basin, where water increases with depth as the receiver moves away from the shoreline, resulting in an expected propagation environment that would lie between spherical and cylindrical spreading loss conditions. Practical spreading loss (4.5 dB reduction in sound level for each doubling of distance) is assumed here.

Underwater Sound—The intensity of pile driving sounds is greatly influenced by factors such as the type of piles, hammers, and the physical environment in which the activity takes place. A number of studies, primarily on the west coast, have measured sound produced during underwater pile driving projects. However, these data are largely for impact driving of steel pipe piles and concrete piles as well as vibratory driving of steel pipe piles. Vibratory driving of steel sheet piles was monitored during the first year of construction at the nearby Wharf C–2 at Naval Station Mayport during 2015. Measurements were conducted from a small boat in the turning basin and from the construction barge itself. Details are available in DoN (2015). Source levels averaged 151 dB re 1 µPa rms (DoN, 2015). No impact driving was measured at this location; therefore, proxy levels for impact driving have been calculated from other available source levels.

In order to determine reasonable SPLs and their associated effects on marine mammals that are likely to result from impact pile driving at NSM, we considered existing measurements from similar physical environments (sandy sediments and water depths greater than 15 ft) for impact and vibratory driving of 24-in steel pipe piles and for steel sheet piles. These studies, largely conducted by the Washington State Department of Transportation and the California Department of Transportation, show typical values around 160 dB for vibratory driving of 24-in pipe piles and sheet piles, and around 185–195 dB for impact driving of similar pipe piles (all measured at 10 m; *e.g.*, Laughlin, 2005a, 2005b; Illingworth and Rodkin, 2010, 2012, 2013; CalTrans, 2012). For impact driving of sheet piles a proxy source value of 189 dB (CalTrans, 2012) was selected for use in acoustic modeling based on similarity to the physical environment at NSM and because of the measurement location in mid-water column. All calculated distances to and the total area encompassed by the marine mammal sound thresholds are provided in Table 3.

TABLE 3—DISTANCES TO RELEVANT UNDERWATER SOUND THRESHOLDS AND AREAS OF ENSONIFICATION

Pile type	Method	Threshold	Distance (m) [1]	Area (sq km^2)
Steel sheet piles	Vibratory	Level A harassment (180 dB)	0	0
		Level B harassment (120 dB)	1,166	0.614439
	Impact	Level A harassment (180 dB)	40	0.002
		Level B harassment (160 dB)	858	0.51

[1] Areas presented take into account attenuation and/or shadowing by land. Calculated distances to relevant thresholds cannot be reached in most directions form source piles. Please see Figures 6–1 and 6–2 in the Navy's application.

The Mayport turning basin does not represent open water, or free field, conditions. Therefore, sounds would attenuate as per the confines of the basin, and may only reach the full estimated distances to the harassment thresholds via the narrow, east-facing entrance channel. Distances shown in Table 3 are estimated for free-field conditions, but areas are calculated per the actual conditions of the action area. See Figures 6–1 and 6–2 of the Navy's application for a depiction of areas in which each underwater sound threshold is predicted to occur at the project area due to pile driving.

Marine Mammal Densities

For all species, the best scientific information available was considered for use in the marine mammal take assessment calculations. Density for bottlenose dolphins is derived from site-specific surveys conducted by the Navy (see Appendix C of the Navy's application for more information); it is not currently possible to identify observed individuals to stock. This survey effort consists of 24 half-day observation periods covering mornings and afternoons during four seasons (December 10–13, 2012, March 4–7, 2013, June 3–6, 2013, and September 9–12, 2013). During each observation period, two observers (a primary observer at an elevated observation point and a secondary observer at ground level) monitored for the presence of marine mammals in the turning basin (0.712 km^2) and an additional grid east of the basin entrance. Observers tracked marine mammal movements and behavior within the observation area, with observations recorded for five-minute intervals every half-hour. Morning sessions typically ran from 7:00–11:30 and afternoon sessions from 1:00 to 5:30.

Most observations of bottlenose dolphins were of individuals or pairs, although larger groups were

occasionally observed (median number of dolphins observed ranged from 1–3.5 across seasons). Densities were calculated using observational data from the primary observer supplemented with data from the secondary observer for grids not visible by the primary observer. Season-specific density was then adjusted by applying a correction factor for observer error (*i.e.*, perception bias). The seasonal densities range from 1.98603 (winter) to 4.15366 (summer) dolphins/km². We conservatively use the largest density value to assess take, as the Navy does not have specific information about when in-water work may occur during the proposed period of validity.

Description of Take Calculation

The following assumptions are made when estimating potential incidents of take:

• All marine mammal individuals potentially available are assumed to be present within the relevant area, and thus incidentally taken;

• An individual can only be taken once during a 24-h period; and,

• There will be 110 total days of vibratory driving (seventy three days in phase I and thirty seven days in phase II) and twenty days of impact pile driving.

• Exposures to sound levels at or above the relevant thresholds equate to take, as defined by the MMPA.

The estimation of marine mammal takes typically uses the following calculation:

Exposure estimate = (n * ZOI) * days of total activity

Where:

n = density estimate used for each species/season

ZOI = sound threshold ZOI area; the area encompassed by all locations where the SPLs equal or exceed the threshold being evaluated

n * ZOI produces an estimate of the abundance of animals that could be present in the area for exposure, and is rounded to the nearest whole number before multiplying by days of total activity.

The ZOI impact area is estimated using the relevant distances in Table 3, taking into consideration the possible affected area with attenuation due to the constraints of the basin. Because the basin restricts sound from propagating outward, with the exception of the east-facing entrance channel, the radial distances to thresholds are not generally reached.

There are a number of reasons why estimates of potential incidents of take may be conservative, assuming that available density or abundance estimates and estimated ZOI areas are accurate. We assume, in the absence of information supporting a more refined conclusion, that the output of the calculation represents the number of individuals that may be taken by the specified activity. In fact, in the context of stationary activities such as pile driving and in areas where resident animals may be present, this number more realistically represents the number of incidents of take that may accrue to a smaller number of individuals. While pile driving can occur any day throughout the in-water work window, and the analysis is conducted on a per day basis, only a fraction of that time (typically a matter of hours on any given day) is actually spent pile driving. The potential effectiveness of mitigation measures in reducing the number of takes is typically not quantified in the take estimation process. For these reasons, these take estimates may be conservative.

The quantitative exercise described above indicates that no incidents of Level A harassment would be expected, independent of the implementation of required mitigation measures. See Table 4 for total estimated incidents of take.

TABLE 4—CALCULATIONS FOR INCIDENTAL TAKE ESTIMATION

Species	n (animals/km²)	Activity	n * ZOI [1]	Proposed authorized takes [2]
Phase I (73 days)				
Bottlenose dolphin [3]	4.15366	Vibratory driving	3	219
Phase II (37 days)				
Bottlenose dolphin [3]	4.15366	Vibratory driving	3	111
Contingency impact driving (20 days)				
Bottlenose dolphin [3]	4.15366	Impact driving	1	40
Total exposures				370

[1] See Table 3 for relevant ZOIs. The product of this calculation is rounded to the nearest whole number.
[2] The product of n * ZOI is multiplied by the total number of activity-specific days to estimate the number of takes.
[3] It is impossible to estimate from available information which stock these takes may accrue to.

Analyses and Preliminary Determinations

Negligible Impact Analysis

NMFS has defined "negligible impact" in 50 CFR 216.103 as ". . . an impact resulting from the specified activity that cannot be reasonably expected to, and is not reasonably likely to, adversely affect the species or stock through effects on annual rates of recruitment or survival." A negligible impact finding is based on the lack of likely adverse effects on annual rates of recruitment or survival (*i.e.*, population-level effects). An estimate of the number of Level B harassment takes alone is not enough information on which to base an impact determination. In addition to considering estimates of the number of marine mammals that might be "taken" through behavioral harassment, we consider other factors, such as the likely nature of any responses (*e.g.*, intensity, duration), the context of any responses (*e.g.*, critical reproductive time or location, migration), as well as the number and nature of estimated Level A harassment takes, the number of estimated mortalities, and effects on habitat.

Pile driving activities associated with the wharf construction project, as outlined previously, have the potential to disturb or displace marine mammals. Specifically, the specified activities may result in take, in the form of Level B harassment (behavioral disturbance) only, from underwater sounds generated

from pile driving. Potential takes could occur if individuals of these species are present in the ensonified zone when pile driving is happening.

No injury, serious injury, or mortality is anticipated given the nature of the activities and measures designed to minimize the possibility of injury to marine mammals. The potential for these outcomes is minimized through the construction method and the implementation of the planned mitigation measures. Specifically, vibratory hammers will be the primary method of installation (impact driving is included only as a contingency and is not expected to be required), and this activity does not have the potential to cause injury to marine mammals due to the relatively low source levels produced (less than 180 dB) and the lack of potentially injurious source characteristics. Impact pile driving produces short, sharp pulses with higher peak levels and much sharper rise time to reach those peaks. If impact driving is necessary, implementation of soft start and shutdown zones significantly reduces any possibility of injury. Given sufficient "notice" through use of soft start (for impact driving), marine mammals are expected to move away from a sound source that is annoying prior to it becoming potentially injurious. Environmental conditions in the confined and protected Mayport turning basin mean that marine mammal detection ability by trained observers is high, enabling a high rate of success in implementation of shutdowns to avoid injury.

Effects on individuals that are taken by Level B harassment, on the basis of reports in the literature as well as monitoring from other similar activities, will likely be limited to reactions such as increased swimming speeds, increased surfacing time, or decreased foraging (if such activity were occurring) (*e.g.*, Thorson and Reyff, 2006; HDR, Inc., 2012). Most likely, individuals will simply move away from the sound source and be temporarily displaced from the areas of pile driving, although even this reaction has been observed primarily only in association with impact pile driving. The pile driving activities analyzed here are similar to, or less impactful than, numerous other construction activities conducted in San Francisco Bay and in the Puget Sound region, which have taken place with no reported injuries or mortality to marine mammals, and no known long-term adverse consequences from behavioral harassment. These activities are also nearly identical to the pile driving activities that took place at Wharf C–2 at NSM, which also reported zero injuries or mortality to marine mammals and no known long-term adverse consequences from behavioral harassment. Repeated exposures of individuals to levels of sound that may cause Level B harassment are unlikely to result in hearing impairment or to significantly disrupt foraging behavior. Thus, even repeated Level B harassment of some small subset of the overall stock is unlikely to result in any significant realized decrease in viability for the affected individuals, and thus would not result in any adverse impact to the stock as a whole. Level B harassment will be reduced to the level of least practicable impact through use of mitigation measures described herein and, if sound produced by project activities is sufficiently disturbing, animals are likely to simply avoid the turning basin while the activity is occurring.

In summary, this negligible impact analysis is founded on the following factors: (1) The possibility of injury, serious injury, or mortality may reasonably be considered discountable; (2) the anticipated incidents of Level B harassment consist of, at worst, temporary modifications in behavior; (3) the absence of any significant habitat within the project area, including known areas or features of special significance for foraging or reproduction; (4) the presumed efficacy of the proposed mitigation measures in reducing the effects of the specified activity to the level of least practicable impact. In addition, these stocks are not listed under the ESA, although coastal bottlenose dolphins are designated as depleted under the MMPA. In combination, we believe that these factors, as well as the available body of evidence from other similar activities, demonstrate that the potential effects of the specified activity will have only short-term effects on individuals. The specified activity is not expected to impact rates of recruitment or survival and will therefore not result in population-level impacts.

Based on the analysis contained herein of the likely effects of the specified activity on marine mammals and their habitat, and taking into consideration the implementation of the proposed monitoring and mitigation measures, we preliminarily find that the total marine mammal take from the Navy's wharf construction activities will have a negligible impact on the affected marine mammal species or stocks.

Small Numbers Analysis

As described previously, of the 370 incidents of behavioral harassment predicted to occur for bottlenose dolphin, we have no information allowing us to parse those predicted incidents amongst the three stocks of bottlenose dolphin that may occur in the project area. Therefore, we assessed the total number of predicted incidents of take against the best abundance estimate for each stock, as though the total would occur for the stock in question. For one of the bottlenose dolphin stocks, the total predicted number of incidents of take authorized would be considered small—approximately four percent for the southern migratory stock– even if each estimated taking occurred to a new individual. This is an extremely unlikely scenario as, for bottlenose dolphins in estuarine and nearshore waters, there is likely to be some overlap in individuals present day-to-day.

The total number of authorized takes proposed for bottlenose dolphins, if assumed to accrue solely to new individuals of the JES or northern Florida coastal stocks, is higher relative to the total stock abundance, which is currently considered unknown for the JES stock and is 1,219 for the northern Florida coastal stock. However, these numbers represent the estimated incidents of take, not the number of individuals taken. That is, it is highly likely that a relatively small subset of these bottlenose dolphins would be harassed by project activities.

JES bottlenose dolphins range from Cumberland Sound at the Georgia-Florida border south to approximately Palm Coast, Florida, an area spanning over 120 linear km of coastline and including habitat consisting of complex inshore and estuarine waterways. JES dolphins, divided by Caldwell (2001) into Northern and Southern groups, show strong site fidelity and, although members of both groups have been observed outside their preferred areas, it is likely that the majority of JES dolphins would not occur within waters ensonified by project activities.

In the western North Atlantic, the Northern Florida Coastal Stock is present in coastal Atlantic waters from the Georgia/Florida border south to 29.4° N. (Waring *et al.*, 2014), a span of more than 90 miles. There is no obvious boundary defining the offshore extent of this stock. They occur in waters less than 20 m deep; however, they may also occur in lower densities over the continental shelf (waters between 20 m and 100 m depth) and overlap spatially with the offshore morphotype (Waring *et al.*, 2014).

In summary, JES dolphins are known to form two groups and exhibit strong site fidelity (*i.e.*, individuals do not

generally range throughout the recognized overall JES stock range); and neither stock is expected to occur at all in a significant portion of the larger ZOI, which is almost entirely confined within NSM. Given that the specified activity will be stationary within an enclosed basin not recognized as an area of any special significance that would serve to attract or aggregate dolphins, we therefore believe that the estimated numbers of takes, were they to occur, likely represent repeated exposures of a much smaller number of bottlenose dolphins and that these estimated incidents of take represent small numbers of bottlenose dolphins.

Based on the analysis contained herein of the likely effects of the specified activity on marine mammals and their habitat, and taking into consideration the implementation of the mitigation and monitoring measures, we preliminarily find that small numbers of marine mammals will be taken relative to the populations of the affected species or stocks.

Impact on Availability of Affected Species for Taking for Subsistence Uses

There are no relevant subsistence uses of marine mammals implicated by this action. Therefore, we have determined that the total taking of affected species or stocks would not have an unmitigable adverse impact on the availability of such species or stocks for taking for subsistence purposes.

Endangered Species Act (ESA)

No marine mammal species listed under the ESA are expected to be affected by these activities. Therefore, we have determined that section 7 consultation under the ESA is not required.

National Environmental Policy Act (NEPA)

The Navy has prepared a Draft Environmental Assessment (EA; Environmental Assessment for the Wharf Bravo Recapitalization at Naval Station Mayport, Jacksonville, FL) in accordance with NEPA and the regulations published by the Council on Environmental Quality. We have posted it on the NMFS Web site (see SUPPLEMENTARY INFORMATION) concurrently with the publication of this proposed IHA. NMFS will independently evaluate the EA and determine whether or not to adopt it. We may prepare a separate NEPA analysis and incorporate relevant portions of the Navy's EA by reference. Information in the Navy's application, EA, and this notice collectively provide the environmental information related to proposed issuance of the IHA for public review and comment. We will review all comments submitted in response to this notice as we complete the NEPA process, including a decision of whether to sign a Finding of No Significant Impact (FONSI), prior to a final decision on the IHA request. The 2015 NEPA documents are available for review at *www.nmfs.noaa.gov/pr/permits/incidental/construction.htm*.

Proposed Authorization

As a result of these preliminary determinations, we propose to authorize the take of marine mammals incidental to the Navy's Bravo wharf recapitalization project, provided the previously mentioned mitigation, monitoring, and reporting requirements are incorporated. Specific language from the proposed IHA is provided next.

This section contains a draft of the IHA. The wording contained in this section is proposed for inclusion in the IHA (if issued).

1. This Incidental Harassment Authorization (IHA) is valid for one year from the date of issuance.

2. This IHA is valid only for pile driving activities associated with the Bravo Wharf Recapitalization Project at Naval Station Mayport, Florida.

3. General Conditions

(a) A copy of this IHA must be in the possession of the Navy, its designees, and work crew personnel operating under the authority of this IHA.

(b) The species authorized for taking is the bottlenose dolphin (*Tursiops truncatus*).

(c) The taking, by Level B harassment only, is limited to the species listed in condition 3(b). See Table 1 for numbers of take authorized.

TABLE 1—AUTHORIZED TAKE NUMBERS

Species	Authorized take		
	Phase I	Phase II	Contingency impact driving
Bottlenose dolphin	219	111	40

(d) The taking by injury (Level A harassment), serious injury, or death of the species listed in condition 3(b) of the Authorization or any taking of any other species of marine mammal is prohibited and may result in the modification, suspension, or revocation of this IHA.

(e) The Navy shall conduct briefings between construction supervisors and crews, marine mammal monitoring team, and Navy staff prior to the start of all pile driving activity, and when new personnel join the work, in order to explain responsibilities, communication procedures, marine mammal monitoring protocol, and operational procedures.

4. Mitigation Measures

The holder of this Authorization is required to implement the following mitigation measures:

(a) For all pile driving, the Navy shall implement a minimum shutdown zone of 15 m radius around the pile. If a marine mammal comes within or approaches the shutdown zone, such operations shall cease. For impact driving of steel piles, the minimum shutdown zone shall be of 40 m radius.

(b) The Navy shall establish monitoring locations as described below. Please also refer to the Marine Mammal Monitoring Plan (see *www.nmfs.noaa.gov/pr/permits/incidental/construction.htm)*.

i. For all pile driving activities, a minimum of two observers shall be deployed, with one positioned to achieve optimal monitoring of the shutdown zone and the second positioned to achieve optimal monitoring of surrounding waters of the turning basin, the entrance to that basin, and portions of the Atlantic Ocean. If practicable, the second observer should be deployed to an elevated position, preferably opposite Bravo Wharf and with clear sight lines to the wharf and out the entrance channel.

ii. These observers shall record all observations of marine mammals, regardless of distance from the pile being driven, as well as behavior and potential behavioral reactions of the animals. Observations within the turning basin shall be distinguished from those in the entrance channel and nearshore waters of the Atlantic Ocean.

iii. All observers shall be equipped for communication of marine mammal observations amongst themselves and to other relevant personnel (*e.g.*, those necessary to effect activity delay or shutdown).

(c) Monitoring shall take place from fifteen minutes prior to initiation of pile driving activity through thirty minutes post-completion of pile driving activity. Pre-activity monitoring shall be conducted for fifteen minutes to ensure that the shutdown zone is clear of marine mammals, and pile driving may commence when observers have declared the shutdown zone clear of marine mammals. In the event of a delay or shutdown of activity resulting from marine mammals in the shutdown zone, animals shall be allowed to remain in the shutdown zone (*i.e.*, must leave of their own volition) and their behavior shall be monitored and documented. Monitoring shall occur throughout the time required to drive a pile. The shutdown zone must be determined to be clear during periods of good visibility (*i.e.*, the entire shutdown zone and surrounding waters must be visible to the naked eye).

(d) If a marine mammal approaches or enters the shutdown zone, all pile driving activities at that location shall be halted. If pile driving is halted or delayed due to the presence of a marine mammal, the activity may not commence or resume until either the animal has voluntarily left and been visually confirmed beyond the shutdown zone or fifteen minutes have passed without re-detection of the animal.

(e) Monitoring shall be conducted by qualified observers, as described in the Monitoring Plan. Trained observers shall be placed from the best vantage point(s) practicable to monitor for marine mammals and implement shutdown or delay procedures when applicable through communication with the equipment operator. Observer training must be provided prior to project start and in accordance with the monitoring plan, and shall include instruction on species identification (sufficient to distinguish the species listed in 3(b)), description and categorization of observed behaviors and interpretation of behaviors that may be construed as being reactions to the specified activity, proper completion of data forms, and other basic components of biological monitoring, including tracking of observed animals or groups of animals such that repeat sound exposures may be attributed to individuals (to the extent possible).

(f) The Navy shall use soft start techniques recommended by NMFS for impact pile driving. Soft start requires contractors to provide an initial set of strikes at reduced energy, followed by a thirty-second waiting period, then two subsequent reduced energy strike sets. Soft start shall be implemented at the start of each day's impact pile driving and at any time following cessation of impact pile driving for a period of thirty minutes or longer.

(g) Pile driving shall only be conducted during daylight hours.

5. Monitoring

The holder of this Authorization is required to conduct marine mammal monitoring during pile driving activity. Marine mammal monitoring and reporting shall be conducted in accordance with the Monitoring Plan.

(a) The Navy shall collect sighting data and behavioral responses to pile driving for marine mammal species observed in the region of activity during the period of activity. All observers shall be trained in marine mammal identification and behaviors, and shall have no other construction-related tasks while conducting monitoring.

(b) For all marine mammal monitoring, the information shall be recorded as described in the Monitoring Plan.

6. Reporting

The holder of this Authorization is required to:

(a) Submit a draft report on all monitoring conducted under the IHA within ninety days of the completion of marine mammal monitoring, or sixty days prior to the issuance of any subsequent IHA for projects at NSM, whichever comes first. A final report shall be prepared and submitted within thirty days following resolution of comments on the draft report from NMFS. This report must contain the informational elements described in the Monitoring Plan, at minimum (see *www.nmfs.noaa.gov/pr/permits/incidental/construction.htm*), and shall also include:

i. Detailed information about any implementation of shutdowns, including the distance of animals to the pile and description of specific actions that ensued and resulting behavior of the animal, if any.

ii. Description of attempts to distinguish between the number of individual animals taken and the number of incidents of take, such as ability to track groups or individuals.

iii. An estimated total take estimate extrapolated from the number of marine mammals observed during the course of construction activities, if necessary.

(b) Reporting injured or dead marine mammals:

i. In the unanticipated event that the specified activity clearly causes the take of a marine mammal in a manner prohibited by this IHA, such as an injury (Level A harassment), serious injury, or mortality, Navy shall immediately cease the specified activities and report the incident to the Office of Protected Resources, NMFS, and the Southeast Regional Stranding Coordinator, NMFS. The report must include the following information:

A. Time and date of the incident;

B. Description of the incident;

C. Environmental conditions (*e.g.*, wind speed and direction, Beaufort sea state, cloud cover, and visibility);

D. Description of all marine mammal observations in the 24 hours preceding the incident;

E. Species identification or description of the animal(s) involved;

F. Fate of the animal(s); and

G. Photographs or video footage of the animal(s).

Activities shall not resume until NMFS is able to review the circumstances of the prohibited take. NMFS will work with Navy to determine what measures are necessary to minimize the likelihood of further prohibited take and ensure MMPA compliance. Navy may not resume their activities until notified by NMFS.

ii. In the event that Navy discovers an injured or dead marine mammal, and the lead observer determines that the cause of the injury or death is unknown and the death is relatively recent (*e.g.*, in less than a moderate state of decomposition), Navy shall immediately report the incident to the Office of Protected Resources, NMFS, and the Southeast Regional Stranding Coordinator, NMFS.

The report must include the same information identified in 6(b)(i) of this IHA. Activities may continue while NMFS reviews the circumstances of the incident. NMFS will work with Navy to determine whether additional mitigation measures or modifications to the activities are appropriate.

iii. In the event that Navy discovers an injured or dead marine mammal, and the lead observer determines that the injury or death is not associated with or related to the activities authorized in the IHA (*e.g.*, previously wounded animal, carcass with moderate to advanced decomposition, scavenger damage), Navy shall report the incident to the Office of Protected Resources, NMFS, and the Southeast Regional Stranding Coordinator, NMFS, within 24 hours of the discovery. Navy shall provide photographs or video footage or other documentation of the stranded animal sighting to NMFS.

7. This Authorization may be modified, suspended or withdrawn if the holder fails to abide by the conditions prescribed herein, or if NMFS determines the authorized taking is having more than a negligible impact on the species or stock of affected marine mammals.

Request for Public Comments

We request comment on our analyses, the draft authorization, and any other aspect of this Notice of Proposed IHAs for Navy's wharf construction activities. Please include with your comments any supporting data or literature citations to help inform our final decision on Navy's request for an MMPA authorization.

Dated: December 2, 2015.

Perry F. Gayaldo,

Deputy Director, Office of Protected Resources, National Marine Fisheries Service.

[FR Doc. 2015–30745 Filed 12–4–15; 8:45 am]

BILLING CODE 3510–22–P

DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

RIN 0648–XE341

Taking and Importing Marine Mammals; Taking Marine Mammals Incidental to Fisheries Research

AGENCY: National Marine Fisheries Service (NMFS), National Oceanic and Atmospheric Administration (NOAA), Commerce.

ACTION: Notice; receipt of application for Letters of Authorization; request for comments and information.

SUMMARY: NMFS' Office of Protected Resources has received a request from the NMFS Pacific Islands Fisheries Science Center (PIFSC) for authorization to take small numbers of marine mammals incidental to conducting fisheries research, over the course of five years from the date of issuance. Pursuant to regulations implementing the Marine Mammal Protection Act (MMPA), NMFS is announcing receipt of the PIFSC's request for the development and implementation of regulations governing the incidental taking of marine mammals. NMFS invites the public to provide information, suggestions, and comments on the PIFSC's application and request.

DATES: Comments and information must be received no later than January 6, 2016.

ADDRESSES: Comments on the applications should be addressed to Jolie Harrison, Chief, Permits and Conservation Division, Office of Protected Resources, National Marine Fisheries Service. Physical comments should be sent to 1315 East-West Highway, Silver Spring, MD 20910 and electronic comments should be sent to *ITP.Laws@noaa.gov*.

Instructions: NMFS is not responsible for comments sent by any other method, to any other address or individual, or received after the end of the comment period. Comments received electronically, including all attachments, must not exceed a 25-megabyte file size. Attachments to electronic comments will be accepted in Microsoft Word or Excel or Adobe PDF file formats only. All comments received are a part of the public record and will generally be posted to the Internet at *www.nmfs.noaa.gov/pr/permits/incidental/research.htm* without change. All personal identifying information (*e.g.*, name, address) voluntarily submitted by the commenter may be publicly accessible. Do not submit confidential business information or otherwise sensitive or protected information.

FOR FURTHER INFORMATION CONTACT: Ben Laws, Office of Protected Resources, NMFS, (301) 427–8401.

SUPPLEMENTARY INFORMATION:

Availability

An electronic copy of the PIFSC's application may be obtained by visiting the Internet at: *www.nmfs.noaa.gov/pr/permits/incidental/research.htm*. The PIFSC is concurrently releasing a draft Environmental Assessment, prepared pursuant to requirements of the National Environmental Policy Act, for the conduct of their fisheries research. A copy of the draft EA, which would also support our proposed rulemaking under the MMPA, is available at the same Web site.

Background

Section 101(a)(5)(A) of the MMPA (16 U.S.C. 1361 *et seq.*) directs the Secretary of Commerce (Secretary) to allow, upon request, the incidental, but not intentional, taking of small numbers of marine mammals by U.S. citizens who engage in a specified activity (other than commercial fishing) if certain findings are made and regulations are issued.

Incidental taking shall be allowed if NMFS finds that the taking will have a negligible impact on the species or stock(s) affected and will not have an unmitigable adverse impact on the availability of the species or stock(s) for taking for subsistence uses, and if the permissible methods of taking and requirements pertaining to the mitigation, monitoring and reporting of such taking are set forth.

NMFS has defined "negligible impact" in 50 CFR 216.103 as "an impact resulting from the specified activity that cannot be reasonably expected to, and is not reasonably likely to, adversely affect the species or stock through effects on annual rates of recruitment or survival."

Except with respect to certain activities not pertinent here, the MMPA defines "harassment" as: "any act of pursuit, torment, or annoyance which (i) has the potential to injure a marine mammal or marine mammal stock in the wild [Level A harassment]; or (ii) has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering [Level B harassment]."

Summary of Request

On November 30, 2015, NMFS received an adequate and complete application from the PIFSC requesting authorization for take of marine mammals incidental to fisheries research conducted by the PIFSC. The requested regulations would be valid for five years from the date of issuance. The PIFSC plans to conduct fisheries research surveys in multiple geographic regions within the Pacific Ocean, including Hawaii, Samoa, the Marianas, and the western and central Pacific broadly (including the Pacific Remote Island Area). It is possible that marine mammals may interact with fishing gear (*e.g.*, trawls nets, longlines) used in PIFSC's fisheries research projects, resulting in injury, serious injury, or mortality. In addition, the PIFSC operates active acoustic devices that have the potential to disturb marine mammals. Because the specified activities have the potential to take marine mammals present within these action areas, the PIFSC requests authorization to take multiple species of marine mammal that may occur in these areas.

Specified Activities

The Federal Government has a responsibility to conserve and protect living marine resources in U.S. federal waters and has also entered into a number of international agreements and treaties related to the management of living marine resources in international waters outside the United States. NOAA has the primary responsibility for managing marine fin and shellfish species and their habitats, with that

APPENDIX E
Marine Mammal Monitoring Plan

MARINE MAMMAL MONITORING PLAN FOR BRAVO WHARF RECAPITALIZATION AT NAVSTA MAYPORT, JACKSONVILLE, FLORIDA NAVY REGION SOUTHEAST

Submitted to:

Office of Protected Resources,
National Marine Fisheries Service,
National Oceanographic and Atmospheric Administration

Prepared by:

Naval Facilities Engineering Command Southeast
and
Naval Facilities Engineering Command Atlantic

June 2015

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ACRONYMS AND ABBREVIATIONS

C-1	Charlie One (Wharf)
dB	decibel
EA	Environmental Assessment
ft.	foot / feet
IHA	Incidental Harassment Authorization
μPa	microPascal
m	meter
MMPA	Marine Mammal Protection Act
NAVSTA	Naval Station
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service
POC	point of contact
Project	Bravo Wharf Recapitalization Project
PTS	Permanent Threshold Shift
TTS	Temporary Threshold Shift
USFWS	U.S. Fish and Wildlife Service
ZOI	Zone of Influence

1.0 INTRODUCTION

1.1 Purpose of the Monitoring Plan

The purpose of this Monitoring Plan is to provide protocols for marine mammal monitoring during the proposed recapitalization of Bravo Wharf (berths B-1, B-2, and B-3) at Naval Station (NAVSTA) Mayport, Florida (Figures 1-1 and 1-2). Recapitalization includes demolishing and replacing the existing concrete pile cap, wharf deck, and utilities and installation of a new steel sheet pile bulkhead around the existing wharf. This plan was developed to support the National Marine Fisheries (NMFS) Incidental Harassment Authorization (IHA) Application (U.S. Department of the Navy 2015).

Marine mammal monitoring will be conducted before, during, and after pile driving activities within the zones detailed in Section 2.3, and will represent an important minimization measure to reduce the likelihood of potential injury to marine mammals.

1.2 Scope and Timing

The scope of this Monitoring Plan includes pile driving activities that are necessary for the Bravo Wharf recapitalization project (Project). Sea turtles and smalltooth sawfish (as practicable) will be included in monitoring efforts. However, for the purposes of this submittal to NMFS in support of compliance with the Marine Mammal Protection Act (MMPA), the scope of monitoring in this document is limited to marine mammals under NMFS' purview. Marine mammal monitoring would be integrated with other marine environmental monitoring if it is required as a result of the Navy's National Environmental Policy Act (NEPA) project review or as a condition of approval by other regulatory agencies.

This Monitoring Plan will be implemented when pile driving is taking place during the period of the requested IHA (1 October 2016 to 30 September 2017) for the Project.

1.3 Management

The Monitoring Plan will be managed by Naval Facilities Engineering Command (NAVFAC) Southeast. Marine mammal monitoring will be carried out by private contractors supported by local technical staff from NAVFAC Southeast and NAVSTA Mayport. NAVFAC Southeast will also be responsible for preparation of the Monitoring Report for the IHA.

Figure 1-1. Regional Location – Naval Station Mayport, Mayport, Florida

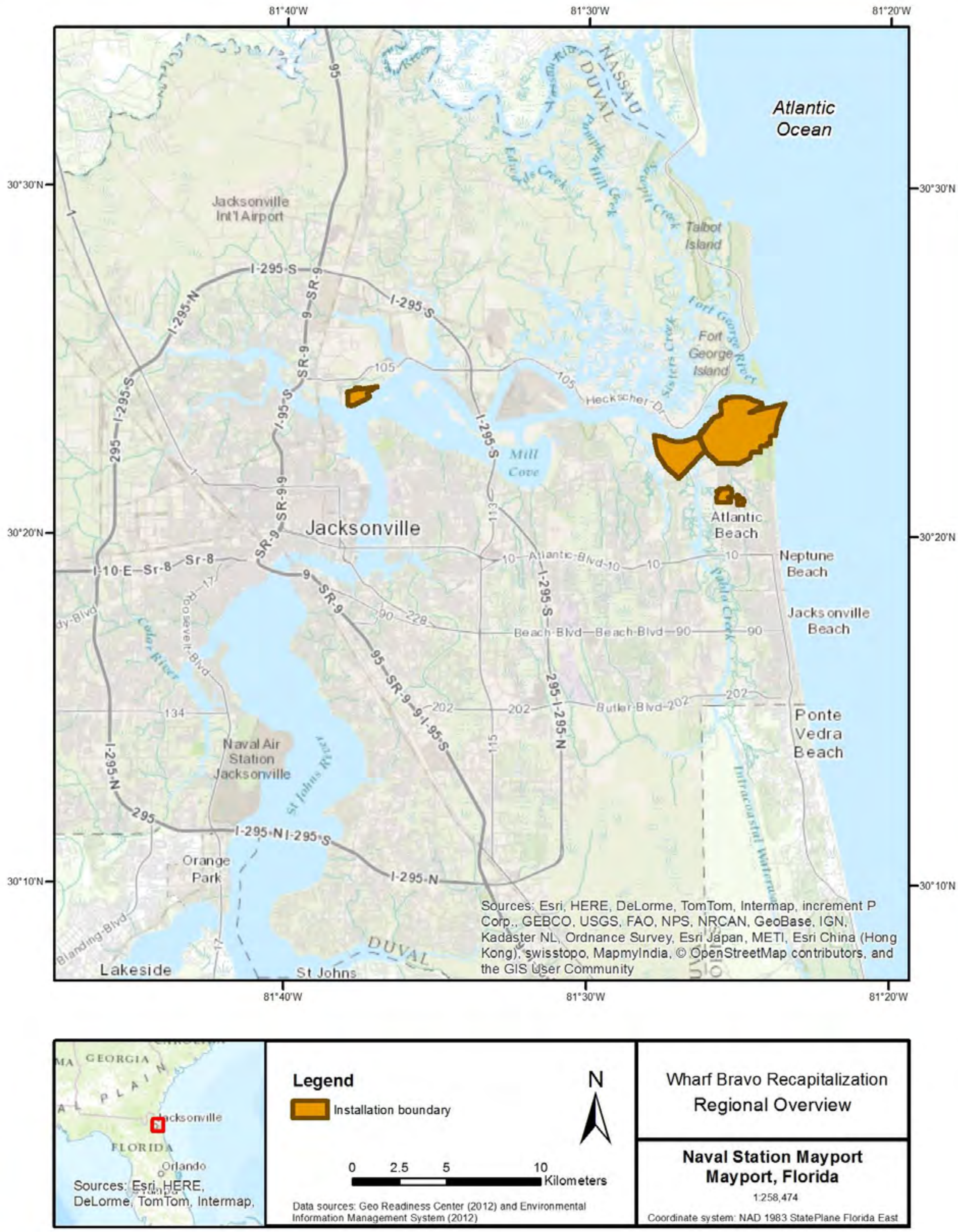
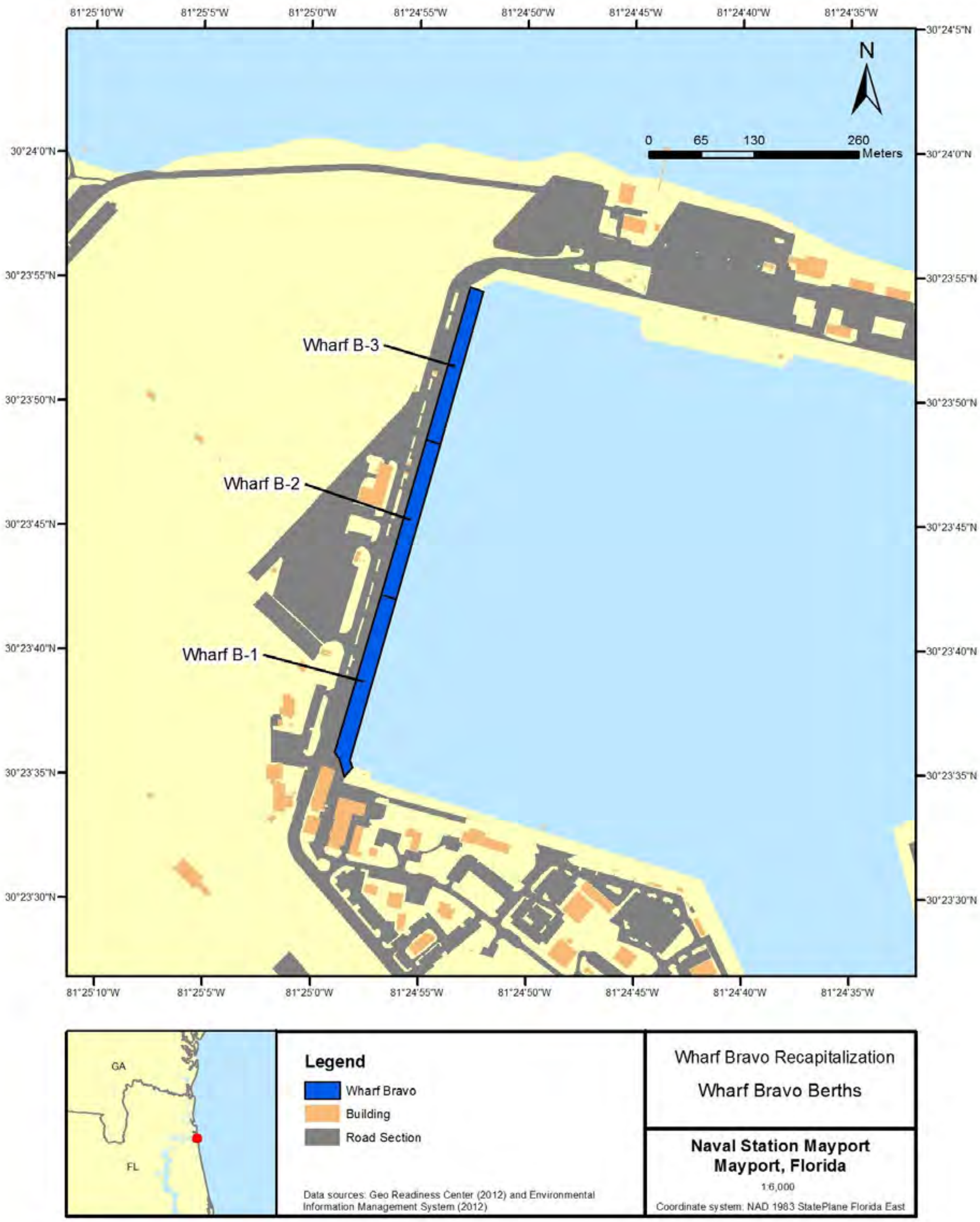


Figure 1-2. Bravo Wharf berths B-1, B-2, and B-3 – Naval Station Mayport, Mayport, Florida



2.0 BRAVO WHARF RECAPITALIZATION PROJECT

Refer to the Environmental Assessment (EA) (U.S. Department of the Navy 2015) and current IHA Application (U.S. Department of the Navy 2015) for a full description of the Project.

2.1 Project Area

The project area is along the Atlantic coast of northern Florida, and includes the NAVSTA Mayport turning basin out to the limit of the most distant of the acoustic thresholds for all protected species being addressed for the Project (Figure 2-1). The lesser acoustic threshold distances are displayed in Figure 2-2. Acoustic thresholds used in this monitoring report are based on criteria developed by NMFS[1] (70 FR 1871; 74 FR 41684).

2.2 Activities to be Monitored

Activities which would be subject to marine mammal monitoring include the following:

- Vibratory pile driving of steel sheet piles necessary to construct a new steel sheet pile wall outside the existing bulkhead. Approximately 880 steel sheet piles will be installed with a vibratory driver.
- Contingency-only impact installation of steel sheet piles. Impact driving will only be used if vibratory driving is inadequate or an obstruction that prevents vibratory installation of is encountered.

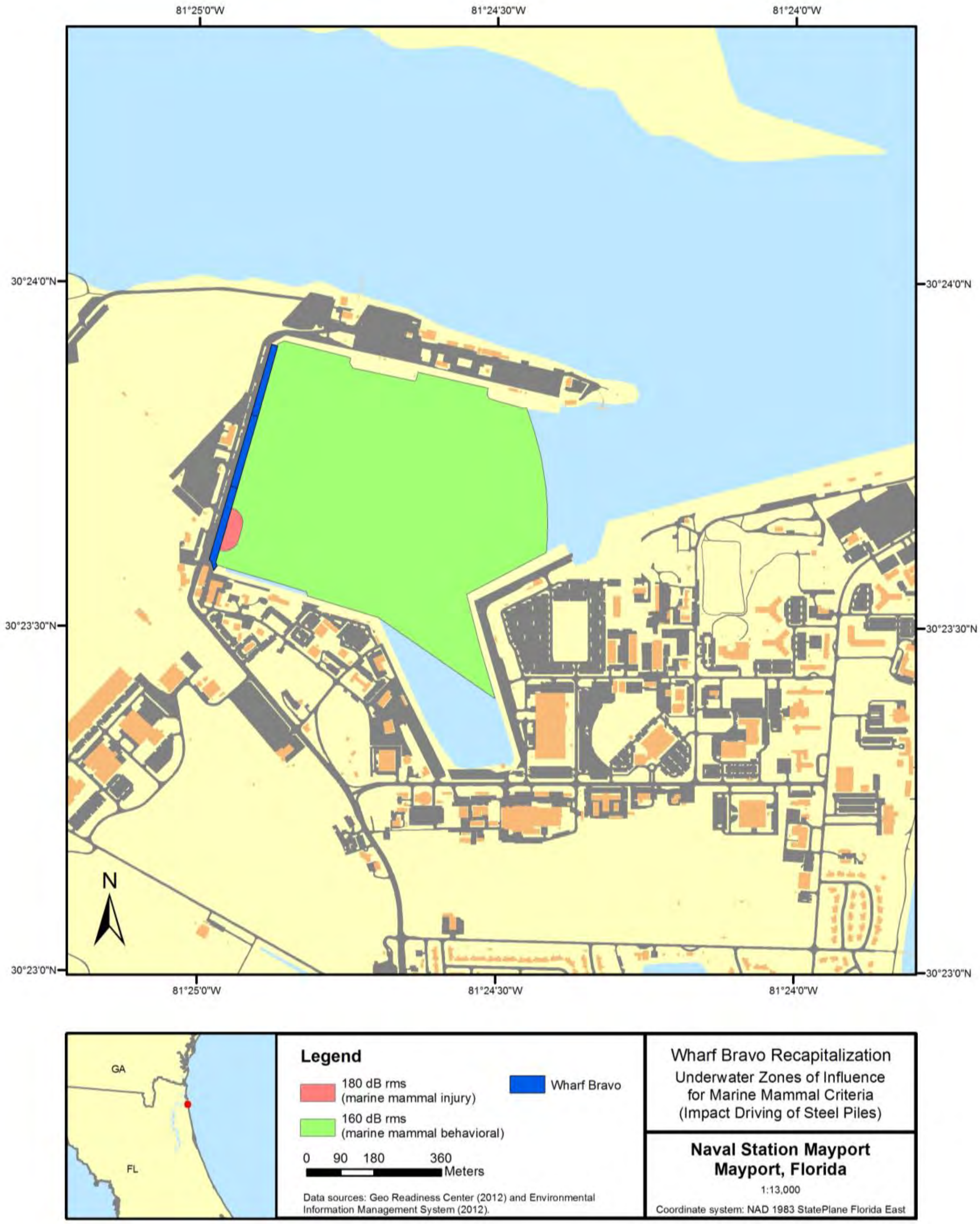
Marine mammal monitoring will be performed to ensure that in-water activities are stopped if animals occur within the zone of influence (ZOI) for potential injury or a standard 50 feet (ft.) buffer from pile driving activities (Figure 2-3). Monitoring methods are described in Section 3 of this document.

[1] New acoustic criteria covering permanent and temporary threshold shifts (PTS and TTS, respectively) were proposed by NMFS in December 2013. At the time of submittal, these criteria have not been finalized and no implementation guidance has been issued. They are therefore not addressed in this mitigation plan.

Figure 2-1. Injury and Behavioral Zones of Influence for Marine Mammals[2] – Vibratory Driving of Steel Sheet Piles

[2] Official criteria have not been established for West Indian manatees. The Navy's IHA application, Appendix C – Standards Manatee Conditions for In-Water Work, cover standards of practice promulgated by The U.S. Fish and Wildlife Service (USFWS) for manatees.

Figure 2-2. Injury and Behavioral Zones of Influence for Marine Mammals[3] – Impact Driving of Steel Sheet Piles (Contingency Only)



[3] Official criteria have not been established for West Indian manatees; marine mammal injury zone of influence illustrated represents a notional template location

Pile Installation

The acoustic analysis for vibratory pile driving used the assumption a maximum 27 sheet pile pairs would be driven each day. Each pile is anticipated to require no more than 60 seconds to drive by vibratory methods. Impact pile driving would only be used as a contingency in cases when vibratory driving is insufficient (a similar project that has been completed at adjacent Wharf C-1 required impact pile driving on only seven piles).

2.3 Monitoring and Shutdown Zones

Table 2-1 lists the monitoring and shutdown zones, and measures associated with the occurrence of a marine mammal in each zone. For all in-water construction and demolition activities, a minimum protective shutdown zone of 15 m (50 ft.) is proposed. Sound-generating activities with larger shutdown zones follow, based on the maximum modeled distance to the Level A (injury) threshold:

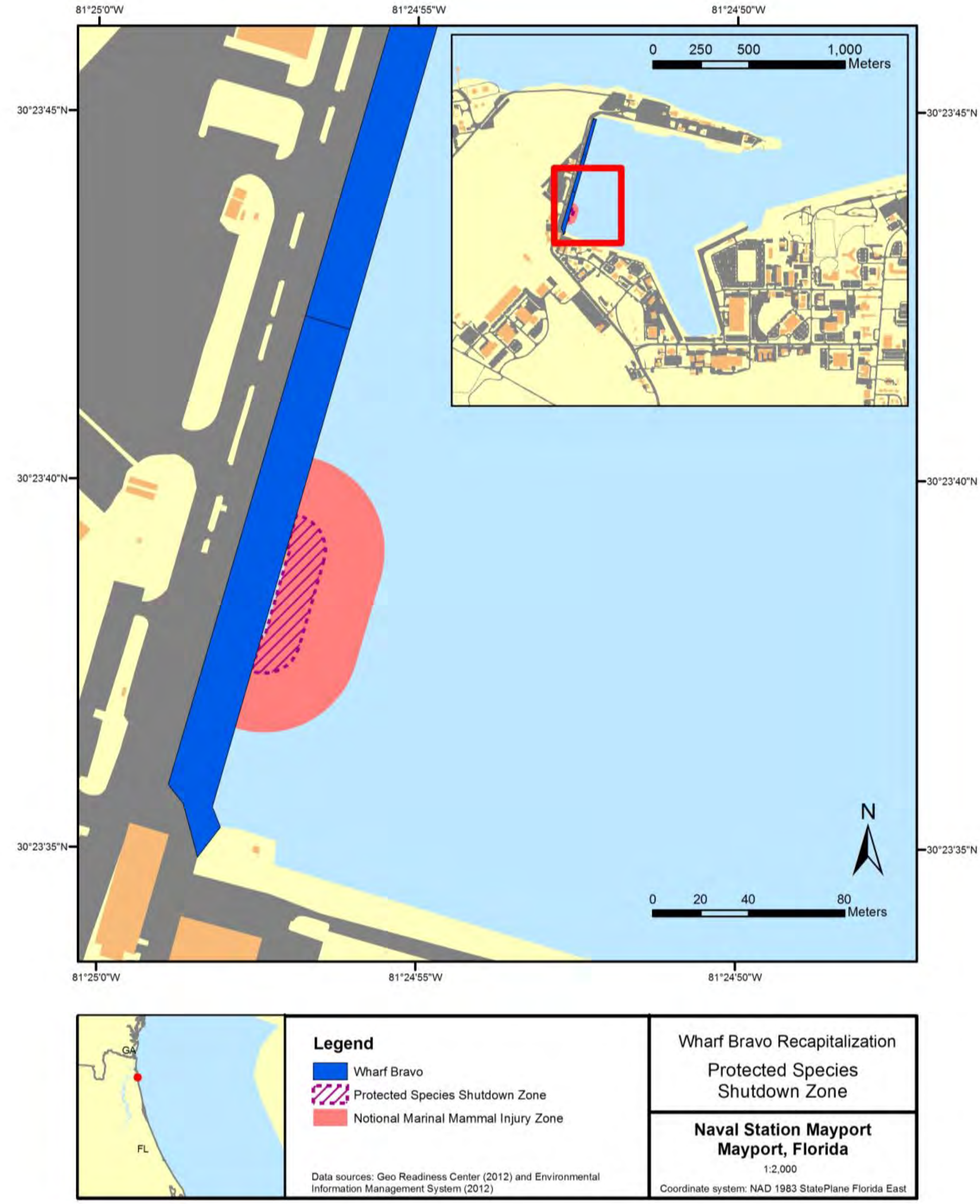
- During vibratory pile driving, the shutdown distance will initially be 15 m.
- If impact driving of steel piles is needed, the shutdown distance for cetaceans will be 40 m during the brief duration of such activities.

Table 2-1. Monitoring and Shutdown Zones

Type of Activity	Distance from Pile Being Driven and Active In-water Equipment (any direction in water)	Measure
All in-water work[1]	50 ft. (15 m)	Shut down all in-water work if a marine mammal, sea turtle, or smalltooth sawfish (surface) is observed in the zone
Impact driving of steel piles (contingency only)	130 ft. (40 m)	Shut down pile driving if a marine mammal is observed in the zone

[1] In-water work is defined as any activity where personnel or equipment are working in the water column. Vessel movement does not constitute in-water work.

Figure 2-3. Monitoring / Shutdown Zone



3.0 MARINE MAMMAL MONITORING

3.1 Observers and Procedures

The Navy shall conduct a pre-construction briefing with the contractor. During the briefing, all contractor personnel working in the Project area will watch the Navy's Marine Species Awareness Training presentation.

Marine mammal observers ("observers") designated by the contractor will be placed at the best vantage point(s) practicable to monitor for marine mammals and implement shutdown/delay procedures when applicable by calling for the shutdown to the hammer operator. The observers will have no other construction related tasks while conducting monitoring.

The contractor will adhere to all requirements of the following:

- U.S. Fish and Wildlife Services (USFWS) 2011 Standard Manatee Conditions for In-Water Work (Attachment 1)
- National Marine Fisheries Service 2006 Sea Turtle and Smalltooth Sawfish Construction Conditions (Attachment 2)
- National Marine Fisheries Services 2012 Southeast Region Marine Mammal and Sea Turtle Viewing Guidelines (Attachment 3)
- Requirements of IHA upon issuance by NMFS.

3.2 Methods

The observer(s) will monitor the shutdown zone before, during, and after pile driving and removal.

The observer(s) will be placed at the best vantage point practicable (e.g. from a small boat, construction barges, on shore, or any other suitable location) to monitor for marine mammals and implement shutdown/delay procedures when applicable by calling for the shutdown to the equipment operator(s). Elevated positions are preferable; it shall be the contractor's responsibility to ensure that appropriate safety measures are implemented to protect observers on elevated observation points. If a boat is used for monitoring, the boat will maintain minimum distances from species (should they occur) as described in National Marine Fisheries Services' 2012 Southeast Region Marine Mammal and Sea Turtle Viewing Guidelines (Attachment 3).

- During all observation periods, observers would use binoculars and the naked eye to search continuously for marine mammals;
- If the shutdown zone is obscured by fog or poor lighting conditions, pile driving will not be initiated until the entire shutdown zone is visible.
- The shutdown zone will be monitored for the presence of marine mammals before, during, and after any pile driving or removal activity.

Pre-Activity Monitoring:

The shutdown zone will be monitored for 15 minutes prior to in-water construction/demolition activities. If a marine mammal is present within or approaching the edge of the shutdown zone, the activity would be delayed until the animal(s) leave the shutdown zone. Activity would resume only after the observer has determined, through re-sighting or by waiting 15 minutes with no further sightings that the animal(s) has moved outside the shutdown zone. The observer will notify the monitoring coordinator/construction foreman / POC when construction activities can commence.

During Activity Monitoring:

The shutdown zone shall include all areas where the underwater sound pressure levels are anticipated to equal or exceed the Level A (injury) criteria for marine mammals (180 dB re 1 μPa isopleth for cetaceans). The shutdown zone will always be a minimum of 15 meters (m) (50 ft.) to prevent injury from physical interaction of marine mammals with construction equipment (Figure 2-3).

If a marine mammal, sea turtle, or smalltooth sawfish enters a shutdown zone during any in-water work, activity will be halted and delayed until either the animal has voluntarily left and been visually confirmed beyond the shutdown zone or 15 minutes have passed without re-detection of the animal.

Post-Activity Monitoring:

Monitoring of the shutdown zone will continue for 15 minutes following the completion of the activity.

3.3 Data Collection

The following information will be collected on sighting forms used by observers:

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

If a bottlenose dolphin or other cetacean enters the relevant ZOIs and/or a manatee, sea turtle, or smalltooth sawfish enters the shutdown zone, the following information will be recorded once shutdown procedures have been implemented:

- Species, numbers, and if possible sex and age class of marine mammals
- Behavior patterns observed, including bearing and direction of travel
- Location of the observer and distance from the animal(s) to the observer

If possible, photographs of the animal(s) will be taken and forwarded to the Naval Facilities Engineering Command Southeast Environmental point of contact.

Data collection forms shall be furnished to the Environmental point of contact within a mutually agreeable timeframe.

3.4 Equipment

The observer(s) shall be equipped with the following:

- binoculars (7 x 50 power or greater) to ensure sufficient visual acuity while investigating sightings
- portable radios or cellular phone(s) to rapidly communicate with the appropriate construction personnel to initiate shutdown of pile driving activity if required
- a digital camera for photographing any marine species sighted
- data collection forms
- Compass/GPS

3.5 Observer Monitoring Locations

In order to effectively monitor the shutdown zones, marine mammal observers will be positioned at the best practicable vantage point(s), taking into consideration the behavior of marine mammal species likely to enter the area, security, safety, and space limitations at the waterfront, in order to properly monitor these zones. Observers may be stationed in small vessels or on the wharf at a location that will provide adequate visual coverage for the marine mammal shutdown zone.

3.6 Interagency Notification

If the Navy encounters an injured, sick, or dead marine mammal, NMFS will be notified immediately. Such sightings will be called into the NMFS Stranding Coordinator for the Southeast:

Erin Fougeres, Ph.D.
Marine Mammal Stranding Program Administrator
NOAA Fisheries
Southeast Regional Office
263 13th Avenue South
St. Petersburg, FL 33701
e-mail: erin.fougeres@noaa.gov
office: 727-824-5323
fax: 727-824-5309

The Navy will provide NMFS with the species or description of the animal(s), the condition of the animal (including carcass condition if the animal is dead), location, the date and time of first discovery, observed behaviors (if alive), and photo or video (if available).

Care should be taken in handling dead specimens to preserve biological materials in the best possible state for later analysis of cause of death, if that occurs. In preservation of biological materials from a dead animal, the finder (i.e. marine mammal observer) has the responsibility to ensure that evidence associated with the specimen is not unnecessarily disturbed.

4.0 REPORTING

A draft report of any incidents of marine mammals entering the shutdown zone will be forwarded to NMFS / USFWS no later than 31 December 2017. This report will also include observed cetacean sightings in the larger ZOIs and other protected species in the shutdown zone. A final report would be prepared and submitted to NMFS within 30 days following receipt of comments on the draft report from NMFS.

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APPENDIX F
Fundamentals of Acoustics

Fundamentals of Acoustics

Bioacoustics, or the study of how sound affects living organisms, is a complex and interdisciplinary field that includes the physics of sound production and propagation, the source characteristics of sounds, and the perceptual capabilities of receivers. This appendix is intended to introduce the reader to the basics of sound measurements and sound propagation, as well as the hearing and vocal production abilities of species that may occur in the project area. The potential for noise from pile driving to cause auditory masking for marine mammals within the project area is also considered.

B.1 Fundamentals of Acoustics

Sound is an oscillation in pressure, particle displacement, or particle velocity, as well as the auditory sensation evoked by these oscillations, although not all sound waves evoke an auditory sensation (i.e., they are outside of an animal's hearing range) (ANSI S1.1-1994). Sound may be described in terms of both physical and subjective attributes. Physical attributes may be directly measured. Subjective (or sensory) attributes cannot be directly measured and require a listener to make a judgment about the sound. Physical attributes of a sound at a particular point are obtained by measuring pressure changes as sound waves pass. The following material provides a short description of some of the basic parameters of sound.

Sound can be characterized by several factors, including frequency, intensity, and pressure (Richardson et al. 1995). Sound frequency (measured in Hertz [Hz]) and intensity (amount of energy in a signal [Watts per meter^2]) are physical properties of the sound which are related to the subjective qualities of pitch and loudness (Kinsler et al. 1999). Sound intensity and sound pressure (measured in Pascals [Pa]) are also related; of the two, sound pressure is easier to measure directly, and is therefore more commonly used to evaluate the amount of disturbance to the medium caused by a sound ("amplitude").

Because of the wide range of pressures and intensities encountered during measurements of sound, a logarithmic scale known as the decibel is used to evaluate these properties; in acoustics, "level" indicates a sound measurement in decibels. The decibel [dB] scale expresses the logarithmic strength of a signal (pressure or intensity) relative to a reference value of the same units. This document reports sound levels with respect to sound pressure only. Each increase of 20 dB reflects a ten-fold increase in signal pressure, i.e., an increase of 20 dB means ten times the pressure, 40 dB means one hundred times the pressure, 60 dB means one thousand times the pressure, and so on.

The sound levels in this document are given as sound pressure levels [SPL]. For measurements of underwater sound, the standard reference pressure is 1 microPascal [μPa, or 10^{-6} Pascals], and is expressed as "dB re 1μPa". For airborne sounds, the reference value is 20 μPa, expressed as "dB re 20 μPa". Sound levels measured in air and water are not directly comparable, and it is important to note which reference value is associated with a given sound level.

Airborne sounds are commonly referenced to human hearing using a method which weights sound frequencies according to measures of human perception, de-emphasizing very low and very high frequencies which are not perceived well by humans. This is called A-weighting, and the decibel level measured is called the A-weighted sound level [dBA]. A similar method has been proposed for evaluating underwater sound levels with respect to marine mammal hearing. While preliminary weighting functions for marine mammal hearing have been developed

(Southall et al. 2007), they are not yet applied to sound exposure from pile driving activities. Therefore, underwater sound levels given in this document are not weighted and evaluate all frequencies equally.

Table B-1 summarizes common acoustic terminology. Two of the most common descriptors are the instantaneous peak SPL and the root-mean-square [rms] SPL. The peak SPL is the instantaneous maximum or minimum over- or underpressure observed during each sound event and is presented in dB re 1 µPa peak. The rms level is the square root of the energy divided by a defined time period, given as dB re 1 µPa rms.

Table B-1. Definitions of Acoustical Terms

Term	Definition
Decibel [dB]	A unit describing the amplitude of sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure or intensity of the sound measured to the appropriate standard reference value. This document uses only sound pressure measurements to calculate decibel levels. The reference pressure for water is 1 microPascal (µPa) and for air is 20 µPa (approximate threshold of human audibility).
Sound Pressure Level [SPL]	Sound pressure is the force per unit area, usually expressed in microPascals (or 20 micro Newtons per square meter), where 1 Pascal is the pressure resulting from a force of 1 Newton exerted over an area of 1 square meter. Sound pressure level is the quantity that is directly measured by a sound level meter, and is expressed in decibels referenced to the appropriate air or water standard.
Frequency, Hz	Frequency is expressed in terms of oscillations, or cycles, per second. Cycles per second are commonly referred to as Hertz (Hz). Typical human hearing ranges from 20 Hz to 20,000 Hz; hearing ranges in non-humans are widely variable and species specific.
Peak Sound Pressure (unweighted), dB re 1µPa peak	The maximum absolute value of the instantaneous sound pressure expressed as dB re 1µPa peak.
Root-Mean-Square [rms], dB re 1µPa	The rms level is the square root of the pressure divided by a defined time period, expressed in decibels. For impulsive sounds, the rms has been defined as the average of the squared pressures over the time that comprise that portion of waveform containing 90 percent of the sound energy for one impact pile driving impulse. For non-impulsive sounds, rms energy represents the average of the squared pressures over the measurement period and is not limited by the 90 percent energy criterion. Expressed as dB re 1µPa.
Sound Exposure Level [SEL], dB re 1µPa^2 sec	Sound exposure level is a measure of energy. Specifically, it is the dB level of the time integral of the squared-instantaneous sound pressure, normalized to a 1-second period. It can be an extremely useful metric for assessing cumulative exposure because it enables sounds of differing duration to be compared in terms of total energy.
Waveforms, µPa over time	A graphical plot illustrating the time history of positive and negative sound pressure of individual pile strikes shown as a plot of µPa over time (i.e., seconds).
Frequency Spectra, dB over frequency range	A graphical plot illustrating the frequency content over a given frequency range. Bandwidth is generally defined as linear (narrowband) or logarithmic (broadband) and is stated in frequency (Hz).
A-Weighted Sound Level, dBA	A frequency-weighted measure used for airborne sounds only. A-weighting de-emphasizes the low and high frequency components of a given sound in a manner similar to the frequency response of the human ear and correlates well with subjective human reactions to noise. A-weighted levels are referenced to 20 µPa unless otherwise noted.

Term	Definition
Ambient Noise Level	The background noise level, which is a composite of sounds from all sources near and far. The normal or existing level of environmental noise at a given location, given in dB referenced to the appropriate pressure standard.

Adapted and derived from URS Corporation (2007)

B.2 Sound vs. Noise

Sound may be purposely created to convey information, communicate, or obtain information about the environment. Examples of such sounds are sonar pings, marine mammal vocalizations/echolocations, tones used in hearing experiments, and small sonobuoy explosions used for submarine detection.

Noise is undesired sound (ANSI S1.1-1994). Whether a sound is noise depends on the receiver (i.e., the animal or system that detects the sound). For example, small explosives and sonar used to locate an enemy submarine produce *sound* that is useful to sailors engaged in anti-submarine warfare, but is likely to be considered undesirable *noise* by marine mammals. Sounds produced by naval aircraft and vessel propulsion are considered noise because they represent possible energy inefficiency and increased detectability, which are undesirable.

Noise also refers to all sound sources that may interfere with detection of a desired sound and the combination of all of the sounds at a particular location (ambient noise).

B.3 Description of Noise Sources

Ambient noise in the project area is a composite of sounds from natural sources, normal port activities, and temporary projects such as maintenance dredging or pile driving. Ambient noise in the Mayport turning basin is addressed in Chapter 5 of the IHA Application.

In-water construction activities associated with this project include vibratory and impact pile driving. The sounds produced by these activities fall into two sound types: impulsive (impact driving) and non-impulsive (vibratory driving). Distinguishing between these two general sound types is important because of each sound type may cause different types of physical effects, particularly with regard to hearing (Ward 1997).

Impulsive sounds (e.g., explosions, seismic airgun pulses, and impact pile driving) are referred to as pulsed sounds in Southall et al. (2007), and are brief, broadband, atonal transient sounds which can occur as isolated events or be repeated in some succession (Southall et al. 2007). Impulsive sounds are characterized by a relatively rapid rise from ambient pressure to a maximal pressure value followed by a decay period that may include a period of diminishing, oscillating maximal and minimal pressures (Southall et al. 2007). Impulsive sounds generally have a greater capacity to induce physical injury compared with sounds that lack these features (Southall et al. 2007).

Non-impulsive sounds ("non-pulsed" in Southall et al. 2007) can be tonal, broadband, or both. They lack the rapid rise time and can have longer durations than impulsive sounds. Non-impulsive sounds can be either intermittent or continuous sounds. Examples of non-impulsive sounds include vessels, aircraft, and machinery operations such as drilling, dredging, and vibratory pile driving (Southall et al. 2007).

In environments with non-porous boundaries (i.e. rock seafloor, rigid sides, etc.), reverberation may extend the duration of both impulsive and non-impulsive sounds.

B.4 Vocalization and Hearing of Marine Mammals

All marine mammals that have been studied can produce sounds and use sounds to forage, orient, detect and respond to predators, and facilitate social interactions (Richardson et al., 1995). Measurements of marine mammal sound production and hearing capabilities provide some basis for assessing whether exposure to a particular sound source may affect a marine mammal behaviorally or physiologically. Marine mammal hearing abilities are quantified using live animals either via behavioral audiometry or electrophysiology (see Schusterman 1981; Au 1993; Wartzok and Ketten 1999; Nachtigall et al. 2007). Behavioral audiograms, which are plots of animals' exhibited hearing threshold versus frequency, are obtained from captive, trained live animals using standard testing procedures with appropriate controls, and are considered to be a more accurate representation of a subject's hearing abilities. Behavioral audiograms of marine mammals are difficult to obtain because many species are too large, too rare, and too difficult to acquire and maintain for experiments in captivity. Consequently, our understanding of a species' hearing ability may be based on the behavioral audiogram of a single individual or small group of animals. In addition, captive animals may be exposed to local ambient sounds and other environmental factors that may impact their hearing abilities and may not accurately reflect the hearing abilities of free-swimming animals. For animals not available in captive or stranded settings (including large whales and rare species), estimates of hearing capabilities are made based on anatomical and physiological structures, the frequency range of the species' vocalizations, and extrapolations from related species.

Electrophysiological audiometry measures small electrical voltages produced by neural activity when the auditory system is stimulated by sound. The technique is relatively fast, does not require a conscious response, and is routinely used to assess the hearing of newborn humans. It has recently been adapted for use on non-humans, including marine mammals (Dolphin, 2000). For both methods of evaluating hearing ability, hearing response in relation to frequency is a generalized U-shaped curve or audiogram showing the frequency range of best sensitivity (lowest hearing threshold) and frequencies above and below with higher threshold values.

Direct measurement of hearing sensitivity exists for approximately 25 of the nearly 130 species of marine mammals. Table B-2 provides a summary of sound production and hearing capabilities for marine mammal species in the Project Area. For purposes of this analysis, marine mammals are arranged into the following functional hearing groups based on their generalized hearing sensitivities: high-frequency cetaceans, mid-frequency cetaceans, low-frequency cetaceans (mysticetes), phocid pinnipeds (true seals), otariid pinnipeds (sea lions and fur seals); of these, only mid- and low-frequency cetaceans occur in the Project Area.

Table B-2. Hearing and Vocalization Ranges for Marine Mammal Functional Hearing Groups and Species Potentially Occurring within the Project Area

Functional Hearing Group	Species	Sound Production		General Hearing Ability Frequency Range
		Frequency Range	Source Level (dB re 1 µPa @ 1 m)	
Mid-Frequency Cetaceans	Bottlenose dolphin	100 Hz to 100kHz	137 to 236	150 Hz to 160 kHz
Low-Frequency Cetaceans	North Atlantic right whale; humpback whale	10 Hz to 20 kHz	137 to 192	7 Hz to 22 kHz

Adapted and derived from Southall et al. (2007) and Richardson et al. (1995)
dB re 1 µPa @ 1 m: decibels (dB) referenced to (re) 1 micro (µ) Pascal (Pa) at 1 meter; Hz: Hertz; kHz: kilohertz

B.4.1 Auditory Masking

Natural and artificial sounds can disrupt behavior by auditory masking, or interfering with a marine mammal's ability to detect and interpret other relevant sounds, such as communication and echolocation signals (Wartzok et al. 2004). Masking occurs when both the signal and masking sound have similar frequencies and either overlap or occur very close to each other in time. A signal is very likely to be masked if the noise is within a certain "critical bandwidth" around the signal's frequency and its energy level is similar or higher (Holt 2009). Noise within the critical band of a marine mammal signal will show increased interference with detection of the signal as the level of the noise increases (Wartzok et al. 2004). In delphinid subjects, for example, relevant signals needed to be 17 to 20 dB louder than masking noise at frequencies below 1 kHz in order to be detected and 40 dB greater at approximately 100 kHz (Richardson et al. 1995). Noise at frequencies outside of a signal's critical bandwidth will have little to no effect on the detection of that signal (Wartzok et al. 2004).

Additional factors influencing masking are the temporal structure of the noise and the behavioral and environmental context in which the signal is produced. Continuous noise is more likely to mask signals than intermittent noise of the same amplitude; quiet "gaps" in the intermittent noise allow detection of signals which may not be detectable during continuous noise (Brumm and Slabbekoorn, 2005). The behavioral function of a vocalization (e.g. contact call, group cohesion vocalization, echolocation click, etc.) and the acoustic environment at the time of signaling may both influence call source level (Miksis-Olds and Tyack, 2009; Holt et al. 2011), which directly affects the chances that a signal will be masked (Nemeth and Brumm, 2010).

Noise from anthropogenic sources could cause masking of vocalizations which may rise to the level of behavioral harassment (as defined by the MMPA) if it disrupts communication, echolocation, or other hearing-dependent behaviors. Impact pile driving produces high-amplitude low-frequency noise (10 – 2,000 Hz), which is likely to be audible to all three marine mammal species considered, and is likely to overlap the vocalizations of low-frequency cetaceans (North Atlantic right and humpback whales; Table B-2). While the amplitude of impact pile driving noise may exceed marine mammal vocalization amplitudes within an unknown range of the driven pile, impact pile driving noise is unlikely to entirely mask social (non-echolocation)

signals due to the intermittent nature impact pile driving noise and the limited duration of impact pile driving associated with this project. Impact pile driving will be conducted only in the rare event that an obstruction is encountered during vibratory pile driving, and will be limited to a maximum of 20 strikes per day. We therefore estimate that the likelihood of noise from impact pile driving masking signals important to the behavior and survival of any of the three marine mammal species in the project area is negligible.

Vibratory pile driving produces frequencies from 10 Hz to 2 kHz, which would be within the range of audible sound and vocal production (see Table B-2) for all marine mammal species that may occur in the project area. Given the source levels (151 – 180 dB rms re 1 μPa at 10m) and frequency range (10 – 2,000 Hz) of vibratory pile driving noise (Illingworth & Rodkin 2012), we estimate that any masking event that could rise to Level B harassment under the MMPA would occur within the zones of behavioral harassment estimated for vibratory pile driving (see Chapter 5 in the IHA Application) (Parks et al. 2011). Therefore, potential masking effects are not considered separately in this IHA application.

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APPENDIX G
Biological Assessment for National Marine Fisheries Service

Naval Station (NAVSTA) Mayport

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FINAL

Biological Assessment for the Wharf Bravo Recapitalization at Naval Station Mayport, Jacksonville, Florida

June 2016

Abstract: The Proposed Action identifies and evaluates the potential effects of Wharf Bravo recapitalization (repairs and facilities maintenance) activities at NAVSTA Mayport. Activities include the construction of a new steel sheet pile bulkhead that ties into an existing steel sheet pile structure, placement of fill between existing and new steel sheet pile bulkheads, installation of a concrete pile cap and concrete encasement of sheet pile, asphalt wharf deck paving, repairs to electrical and mechanical shore utilities, and upgrades to area lighting and anti-terrorism force protection waterfront enclave facilities. No adverse effects on any protected species within the NAVSTA Mayport Action Area would occur as a result of the Wharf Bravo recapitalization activities.

Submitted To:
Office of Protected Species
National Marine Fisheries Service
National Oceanographic and Atmospheric Administration

Executive Summary

Introduction – In compliance with the Endangered Species Act (ESA) and in support of an informal Section 7 consultation, the U.S. Department of the Navy (Navy) has prepared this Biological Assessment (BA) to evaluate the potential environmental effects on Federally listed species and critical habitat associated with the recapitalization of Wharf Bravo at Naval Station (NAVSTA) Mayport. The Navy has additionally included Federal candidate species petitioned for listing, and proposed designated critical habitat in support of a Section 7 informal conference. The Navy has prepared and submitted two separate BAs in compliance with the ESA, one to the U.S. Fish and Wildlife Service (USFWS) and another to the National Marine Fisheries Service (NMFS), for species and critical habitats under their respective jurisdictions.

NAVSTA Mayport is located in northern Florida, east of Jacksonville along the St. Johns River and the Atlantic Ocean. NAVSTA Mayport maintains and operates facilities that provide operational deployment support to the home-based and transient Navy ships, aviation units, and staff. The NAVSTA Mayport Turning Basin is approximately 2,000 feet by 3,000 feet in area, and is connected to the St. Johns River by a 500-foot-wide entrance channel (Figure ES-1). A port security barrier has been installed at the mouth of the NAVSTA Mayport Turning Basin and there is a Restricted Area that prohibits all persons, vessels, and craft from entering without the permission of the Commanding Officer, NAVSTA Mayport, or his authorized representative.

Purpose and Need - The purpose of the Proposed Action is to resolve the increasing deterioration of the bulkhead so the facility can provide adequate ship berthing, cold iron support, and ordnance handling capability. Adequate and efficiently configured facilities are required to provide general purpose ordnance loading and maintenance berthing for ships homeported at and visiting NAVSTA Mayport. The need for the Proposed Action is based on the failing functionality and structural integrity of the wharf, which has been deteriorating since it was built.

Proposed Action – The Preferred Alternative of the *Environmental Assessment for the Wharf Bravo Recapitalization at Naval Station Mayport, Jacksonville, Florida* supports the Proposed Action of this BA. The Preferred Alternative of the EA and for this BA proposes to perform recapitalization at Wharf Bravo at NAVSTA Mayport. Wharf Bravo recapitalization activities include the construction of a new steel sheet pile bulkhead that ties into an existing steel sheet pile structure, placement of fill between existing and new steel sheet pile bulkheads, installation of a concrete pile cap and concrete encasement of sheet pile, asphalt wharf deck paving, repairs to electrical and mechanical shore utilities, and upgrades to area lighting and anti-terrorism/force protection waterfront enclave facilities. The Project would result in a wharf footprint increase (and basin decrease) of approximately 12,000 square feet and installation of downward-facing, shielded lighting on and around the wharf surface. No dredging requirements have been identified for this project.

The Action Area includes the NAVSTA Mayport Turning Basin out to the limit of the most distant of the acoustic thresholds (airborne and in-water) for all protected species being addressed for the Wharf Bravo repair and facilities maintenance Project (Figure ES-2).

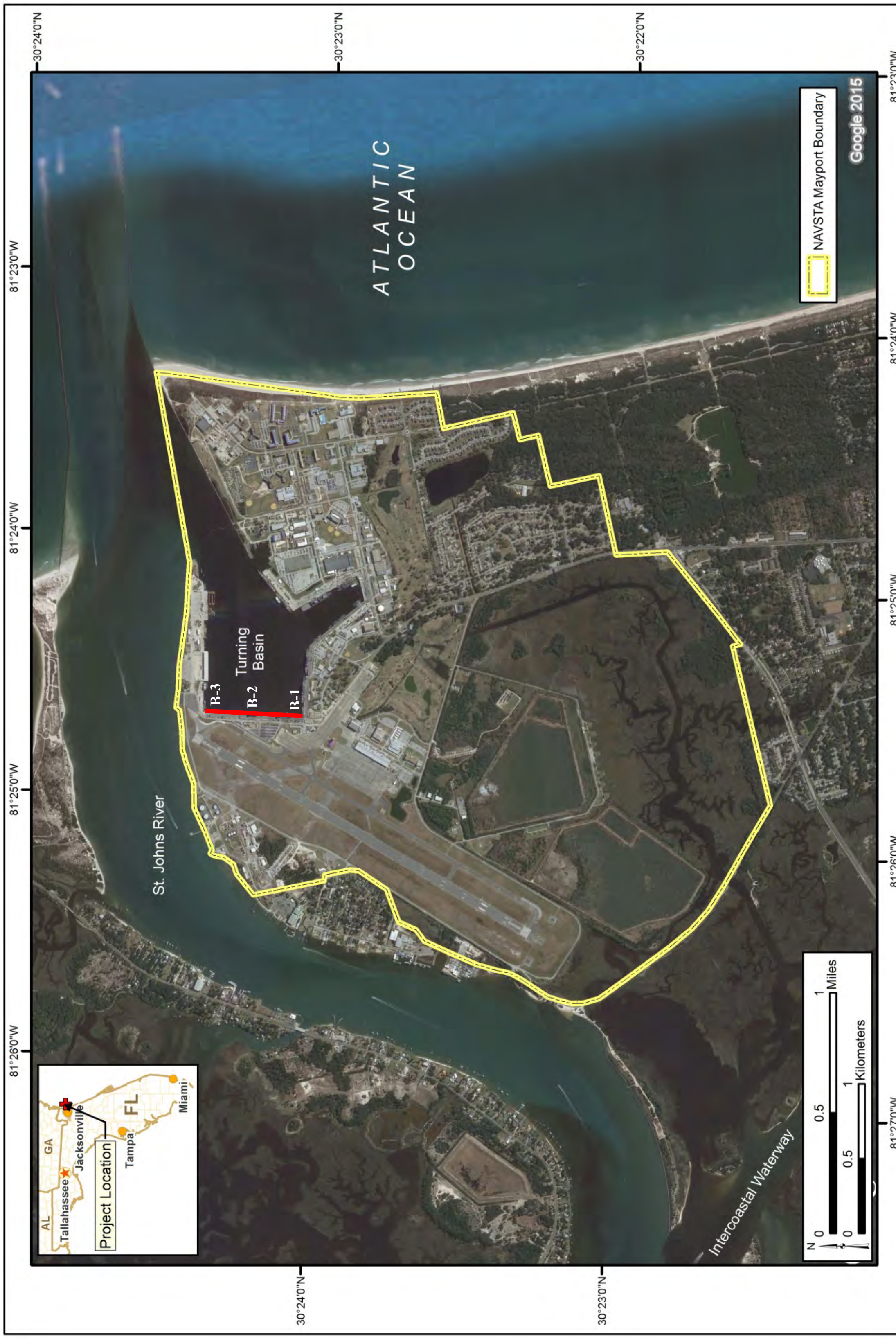

Figure ES-1. NAVSTA Mayport Location Map with Installation Boundary

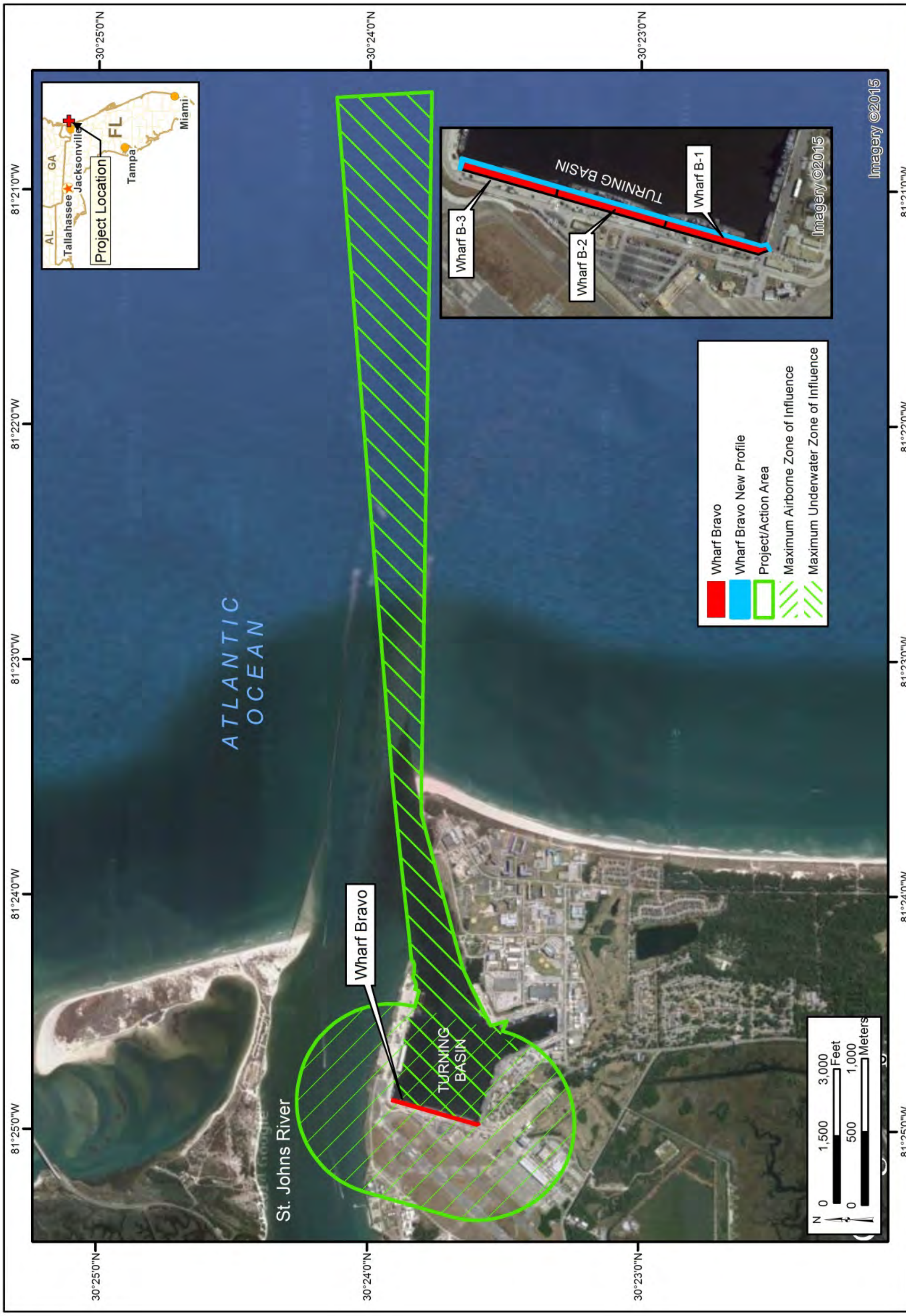

Figure ES-1. Action Area Defined by the Overall Airborne and Underwater Zones of Influence

The *Species Accounts and Species Status in the Action Area* section of the BA addresses the species that may occur in the Action Area that are within the NMFS jurisdiction. These species, habitats, and the Navy's effects determinations are summarized in Table ES-1.

Table ES-1. ESA Federally Listed Species (Threatened or Endangered) and Critical Habitat Potentially Affected by the Proposed Action within NMFS Jurisdiction

Common Name	Scientific Name	Status	Effects Determination
Fishes			
Atlantic sturgeon	*Acipenser oxyrinchus oxyrinchus*	Endangered	Not Likely to Adversely Affect
Shortnose sturgeon	*Acipenser brevirostrum*	Endangered	Not Likely to Adversely Affect
Smalltooth sawfish	*Pristis pectinata*	Endangered	Not Likely to Adversely Affect
American eel	*Anguilla rostrata*	Candidate/Threatened	Not Jeopardize the Continued Existence
Common thresher shark	*Alopias vulpinus*	Candidate/Threatened or Endangered	Not Jeopardize the Continued Existence
Dwarf seahorse	*Hippocampus zosterae*	Candidate/Threatened or Endangered	Not Jeopardize the Continued Existence
Marine Mammals			
North Atlantic right whale	*Eubalaena glacialis*	Endangered	Not Likely to Adversely Affect
North Atlantic right whale critical habitat		Designated	No Effect
North Atlantic right whale proposed critical habitat		Proposed	No Effect
Humpback whale	*Megaptera novaeangliae*	Endangered	Not Likely to Adversely Affect
Sea Turtles			
Green sea turtle	*Chelonia mydas*	Endangered[1]	Not Likely to Adversely Affect
Hawksbill sea turtle	*Eretmochelys imbricata*	Endangered	Not Likely to Adversely Affect
Loggerhead sea turtle	*Caretta caretta*	Threatened	Not Likely to Adversely Affect
Leatherback sea turtle	*Dermochelys coriacea*	Endangered	Not Likely to Adversely Affect
Kemp's ridley sea turtle	*Lepidochelys kempii*	Endangered	Not Likely to Adversely Affect

[1]As a species, the green sea turtle is listed as threatened. However, the Florida and Mexican Pacific coast nesting populations are listed as endangered. It should be noted that green sea turtles found along the east coast might not all be from the Florida population.

Standard Operating Procedures, including *Best Management Practices,* have been identified that would further minimize the potential impacts on any Federally protected species or critical habitat. A summary of the potential impacts and the *Determination of Effects on Federally Listed Species and Critical Habitat* are provided in the paragraphs to follow.

Fishes – There are three Federally listed endangered fish species that exist within the vicinity of the Action Area: the Atlantic sturgeon (*Acipenser oxyrinchus oxyrinchus*), the shortnose sturgeon (*Acipenser brevirostrum*), and the smalltooth sawfish (*Pristis pectinata*). Additionally, candidate species including the American eel (*Anguilla rostrata*) petitioned as threatened, the common thresher shark (*Alopias vulpinus*) petitioned as threatened or endangered, and the dwarf seahorse (*Hippocampus zosterae*) petitioned as threatened or endangered, are all potentially within the Action Area. Highly mobile juvenile or adult fish would be able to move quickly away from the disturbance area. The pile driving and backfill of the wall activities associated with the recapitalization would cause resuspension of sediments. This would result in a temporary increase in suspended solids or turbidity that may cause temporary negligible impacts on fishes. Fish near the sheet pile driving activities may also experience sound intensities that could affect their behavior and damage their hearing ability. There is the potential for minor and temporary adverse impacts on protected species inhabiting the water column. The Navy concludes that activities would result in a "may affect, but not likely to adversely affect" determination for the Federally listed Atlantic sturgeon, the shortnose sturgeon, and the smalltooth sawfish. The Navy further concludes that the activities would "not jeopardize the continued existence" of the Federal candidate species that are petitioned for listing including American eel (threatened), common thresher shark (threatened or endangered), and the dwarf sea horse (threatened or endangered). In compliance with the Magnusson-Stevens Act and to support an informal Essential Fish Habitat (EFH) consultation, the Navy submitted the associated EA containing the EFH Assessment to NMFS, Division of Habitat Conservation. The Navy initiated informal consultation with NMFS, Southeast Regional Office, on August 6, 2015, requesting their review of the BA and EA and concurrence with its effects determinations. On February 4, 2016, NMFS provided a letter that concurred with the Navy's effects determinations, thus fulfilling the requirements of the ESA and requiring no further action.

Marine Mammals - This BA addresses two marine mammal species listed under the ESA: North Atlantic right whale (*Eubalaena glacialis*) endangered and the humpback whale (*Megaptera novaeangliae*); endangered. Collisions of construction vessels and marine mammals are not expected during construction activities because vessel speeds would be low and limited vessels would be required for an otherwise shore-based construction activity. Furthermore, in-water activities would cease if any North Atlantic right whales or humpback whales were sited by marine mammal observers performing observations in compliance with obligations under the Marine Mammal Protection Act (MMPA). Marine mammals are expected to avoid the immediate construction area due to increased harbor vessel traffic, noise and human activity, increased turbidity, and possible temporary disruptions in prey availability.

The Navy concludes that the Proposed Action activities would result in a "may affect, but not likely to adversely affect" determination for the North Atlantic right whale and humpback whale. No effects on the designated or proposed critical habitat for the North Atlantic right whale are anticipated to result from in-water noise generated by the Project. The essential calving features specific to Unit 2 (e.g., sea state, surface temperature, water depth) are unaffected by Project noise. The Navy further concludes that a "no effect" determination is appropriate for the North Atlantic right whale designated critical habitat and the North Atlantic right whale proposed critical habitat. On February 4, 2016, NMFS provided a letter that concurred with the Navy's effects determinations, thus fulfilling the requirements of the ESA and requiring no further action.

Sea Turtles – All sea turtle species are protected under the ESA. Five species of sea turtles may occur within the Action Area: the loggerhead sea turtle (*Caretta caretta*), the green sea turtle (*Chelonia mydas*), the leatherback sea turtle (*Dermochelys coriacea*), the hawksbill sea turtle (*Eretmochelys imbricata*), and the Kemp's ridley sea turtle (*Lepidochelys kempii*). Collisions of construction vessels and sea turtles are not expected during construction activities because vessel speeds would be low and limited vessels would be required for an otherwise shore-based construction activity. Sea turtles are expected to avoid the immediate construction area due to increased construction vessel traffic, noise and human activity, increased turbidity, and possible temporary disruptions in prey availability. Impacts on water quality and prey availability are anticipated to have short-term and minimal impacts on sea turtles.

The effects of lighting at Wharf Bravo would be principally mitigated by the new 30-foot-tall fixtures which will utilize light-emitting diode (LED) technology and will be full cutoff type with a BUG (Backlight-Uplight-Glare) rating of B1-B2, U0, G1-G2. The main lighting units will provide approximately 3 foot-candles average illumination for the wharf with a sharp cutoff at the edge of the wharf. A secondary lighting system will be provided for times of low activity. This system will provide 0.5 foot-candle of illumination at a "turtle friendly" 590nm wavelength (approximately 1800 degrees kelvin) yellow/red color temperature, thus substantially reducing the amount of light pollution compared to the current lighting system. As such, the new lights attempt to balance turtle-safe recommendations without violating Antiterrorism Force/Protection (AT/FP) and Occupational Safety and Health Administration (OSHA) requirements and are a significant improvement over lighting currently emplaced at comparable locations (Wharf C-1). Direct light from the new luminaries would not be visible from the waters of the Study Area, including NAVSTA Mayport beaches and the mouth of the St. Johns River. It is anticipated that these lighting upgrades would serve as a net beneficial change and improvement in the overall lighting profile, thus mitigating any potential adverse effects on sea turtles.

The NMFS threshold value for onset of injury to sea turtles due to both impact pile driving and vibratory pile driving is 190 dB re 1 micro (μ) pascal (Pa) sound pressure level rms. None of the anticipated pile driving scenarios result in sound above the 190 dB re 1 μPa; as such, no injuries associated with pile driving are anticipated for any species of sea turtle. No behavior criteria for sea turtles exist, but it is understood that behavioral impacts could still occur.

No significant amount of foraging or migratory habitat for sea turtles would be lost or degraded. Additionally, few individuals may be behaviorally impacted and no injuries are anticipated. No significant effects from pile driving activities on Federally endangered green, hawksbill, Kemp's ridley, or leatherback sea turtle habitat or prey are anticipated. However, there is a small chance that individuals of these species may be present; as such, the Navy concludes that a "may affect, but not likely to adversely affect" determination would be appropriate for green sea turtles, hawksbill sea turtles, Kemp's ridley sea turtles, and leatherback sea turtles. No significant effects on Federally listed loggerhead sea turtle habitat or prey are anticipated. Due to the number of loggerhead sea turtles nesting near and foraging in the Action Area, the Navy concludes that a "may affect, but not likely to adversely affect" determination is appropriate for the loggerhead sea turtle. No critical habitat for any Federally listed sea turtle species is present in or near the Action Area. As such, the Navy concludes that a "no effect" determination is appropriate for sea turtle critical habitat. On February 4, 2016, NMFS provided a letter that concurred with the Navy's effects determinations, thus fulfilling the requirements of the ESA and requiring no further action.

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Acronyms and Abbreviations

µPa .... *MicroPascal*

°C .... *degrees Celsius*

°F .... *degrees Fahrenheit*

AICUZ .... *Air Installation Compatible Use Zone*

ANSI .... *American National Standards Institute*

ASMFC .... *Atlantic States Marine Fisheries Commission*

AT .... *Anti-terrorism*

BA .... *Biological Assessment*

BMPs........ *Best Management Practices*

BUG .... *Backlight-Uplight-Glare*

CEQ........ *Council on Environmental Quality*

CFCs .... *Chlorofluorocarbons*

CFR .... *Code of Federal Regulations*

CH_4........ *Methane*

cm........ *Centimeter*

CNO .... *Chief of Naval Operations*

CNRSE........ *Commander, Navy Region Southeast*

CO .... *Carbon Monoxide*

CO_2 .... *Carbon Dioxide*

CRI........ *Color Rendering Index*

CV .... *Coefficient of Variation*

CVN .... *Nuclear-Powered Aircraft Carrier*

CZMA .... *Coastal Zone Management Act*

dB........ *Decibels*

DNL .... *Daytime Noise Levels*

DoD .... *Department of Defense*

DON .... *Department of the Navy*

DPS .... *Distinct Population Segments*

EA .... *Environmental Assessment*

EEZ .... *Economic Exclusion Zone*

EFH .... *Essential Fish Habitat*

EIS .... *Environmental Impact Statement*

ELMR .... *Estuarine Living Marine Resources*

ESA .... *Endangered Species Act*

FDEP .... *Florida Department of Environmental Protection*

FMU .... *Fishery Management Unit*

FONSI .... *Finding of No Significant Impact*

FP .... *Force Protection*

FR .... *Federal Register*

ft .... *Feet*

ft^2 .... *Square Feet*

FWC .... *Florida Fish and Wildlife Conservation Commission*

FWRI .... *Fisheries and Wildlife Research Institute*

GMFMC .... *Gulf of Mexico Fishery Management Council*

GHG .... *Greenhouse Gases*

GSRC .... *Gulf South Research Corporation*

HAPC .... *Habitat of Particular Concern*

HCFCs .... *Hydrochlorofluorocarbons*

HMS .... *Highly Migratory Species*

Hz ..... *Hertz*

IDA ..... *International Dark-Sky Association*

IHA ..... *Incidental Harassment Authorization*

INST ..... *Instruction*

IPCC ..... *Intergovernmental Panel on Climate Change*

k ..... *Kilometer*

kg ..... *Kilogram*

kHz ..... *Kilohertz*

km^2 ..... *Square Kilometers*

L ..... *Liter*

LED ..... *Light-emitting Diode*

LOA ..... *Letter of Authorization*

LZ ..... *Lighting Zones*

m ..... *Meter*

mg ..... *Milligrams*

mm ..... *Millimeters*

m^2 ..... *Square Meter*

M ..... *Environmental Readiness Program Manual*

MAFMC ..... *Mid-Atlantic Fishery Management Council*

MBTA ..... *Migratory Bird Treaty Act*

MLLW ..... *Mean Lower Low Water*

MMPA ..... *Marine Mammal Protection Act*

MRA ..... *Marine Resources Assessment*

MSA ..... *Magnuson-Stevens Fishery Conservation and Management Act*

MSDD ..... *Marine Species Density Database*

MSC .... *Military Sealift Command*

N_2O .... *Nitrous Oxide*

NAAQS .... *National Ambient Air Quality Standards*

NAVFAC .... *Naval Facilities Engineering Command*

NAVSTA .... *Naval Station*

Navy .... *U.S. Navy*

NEPA .... *National Environmental Policy Act*

NMFS .... *National Marine Fisheries Service*

NO_2 .... *Nitrogen Dioxide*

NOA .... *Notice of Availability*

NOAA .... *National Oceanographic and Atmospheric Administration*

NODE .... *Navy OPAREA Density Estimates*

O_3 .... *Ozone*

OPAREA .... *Operational Area*

OPNAV .... *Office of the Chief of Naval Operations*

OSHA .... *Occupational Safety and Health Administration*

Pa .... *Pascals*

PAH .... *Polycyclic Aromatic Hydrocarbon*

PCB .... *Polychlorinated Biphenyl*

POC .... *Point of Contact*

ppt .... *Parts per Thousand*

PTS .... *Permanent Threshold Shift*

re .... *Referenced*

rms .... *Root mean square*

RL .... *Received Level*

RTE .... *Rare, Threatened, and Endangered*

SAFMC .... *South Atlantic Fishery Management Council*

SEC .... *Secretary of the Navy*

SL .... *Source Level*

SO_2 .... *Sulfur Dioxide*

SOx .... *Sulfur Oxides*

SPL .... *Sound Pressure Levels*

SWFSC .... *Southwest Fisheries Science Center*

TL .... *Transmission Loss*

TTS .... *Temporary Threshold Shift*

UFC .... *Unified Facilities Criteria*

U.S. .... *United States*

USACE .... *U.S. Army Corps of Engineers*

USACHPPM .... *U.S. Army Center for Health Promotion & Preventive Medicine*

U.S.C. .... *U.S. Code*

USCG .... *U.S. Coast Guard*

USEPA .... *U.S. Environmental Protection Agency*

USFWS .... *U.S. Fish and Wildlife Service*

WSDOT .... *Washington State Department of Transportation*

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SECTION 1.0
Project Overview

1.0 Project Overview

1.1 Federal and Agency Requirements

This Biological Assessment (BA) was prepared by the Department of the Navy, Commander, Navy Region Southeast, to address the Proposed Action in compliance with Section 7(c) of the Endangered Species Act (ESA) of 1973, as amended. Section 7 of the ESA requires that, through consultation with the National Marine Fisheries Service (NMFS), Federal actions do not jeopardize the continued existence of any threatened, endangered, or proposed species or result in the destruction or adverse modification of designated or proposed critical habitat. The Navy has additionally included candidate species that have been petitioned for listing to support a Section 7 informal conference under the ESA. This BA evaluates the potential effects on species and habitats that are Federally listed under the ESA and fall under the jurisdiction of NMFS and that are associated with the recapitalization activities at Wharf Bravo, Naval Station (NAVSTA) Mayport, Jacksonville, Florida. The Navy has prepared and submitted another BA in compliance with the ESA for those species and habitats under the jurisdiction of the U.S. Fish and Wildlife Service (USFWS). Specific project design elements are identified in Chapter 4.0 that would aid in avoidance and minimization of adverse effects of the Project on listed species and critical habitat.

In compliance with the Magnusson-Stevens Act and to support an informal Essential Fish Habitat (EFH) consultation, the Navy submitted the associated EA containing the EFH Assessment to NMFS, Division of Habitat Conservation. In compliance with the Marine Mammal Protection Act (MMPA), the Navy applied for an Incidental Harassment Authorization (IHA) from NMFS, Office of Protected Species.

1.2 Project Description

The Navy proposes to perform recapitalization at Wharf Bravo at NAVSTA Mayport, Jacksonville, Florida. The Proposed Action activities include the construction of a new steel sheet pile bulkhead that ties into an existing steel sheet pile structure, placement of fill between the existing and new steel sheet pile bulkheads, installation of a concrete pile cap and concrete encasement of sheet pile, asphalt wharf deck paving, repairs to electrical and mechanical shore utilities, and upgrades to area lighting and anti-terrorism/force protection (AT/FP) waterfront enclave facilities. The Project would result in a wharf footprint increase of approximately 12,000 square feet (ft^2; 1,115 square meters [m^2]) and installation of downward-facing, shielded lighting on and around the wharf surface.

Construction of the wharf is anticipated to occur over a 12- to 24-month period projected to begin on or after October 1, 2016. A maximum of 130 days of in-water pile driving work would take place over the course of the Project. Piles would be driven using both vibratory and impact driving methods. Impact driving methods would only be used for areas with obstructions when vibratory methods are inadequate. Chapter 4.0 describes in detail the elements of the Proposed Action. There are no interrelated or interdependent projects associated with the Project. Because activities are for the repair of existing facilities only, no increase in level of use or operation is expected. No net change in the amount of vessel traffic in and around the turning basin is expected as a result of the Project.

1.3 Project Location and Setting

NAVSTA Mayport is located in northern Florida east of Jacksonville along the St. Johns River and the Atlantic Ocean (Figure 1-1). NAVSTA Mayport maintains and operates facilities that provide operational deployment support to the home-based and transient Navy ships, aviation units, and staff. NAVSTA Mayport also provides logistic support for operating forces, dependent activities, and other commands as assigned. NAVSTA Mayport covers approximately 3,409 acres and supports more than 60 commands, detachments, and private organizations. NAVSTA Mayport is homeport to 17 surface combatants, one Military Sealift Command (MSC) ship, and one Coast Guard cutter. NAVSTA Mayport routinely hosts port visits by various deep draft ships up to and including nuclear aircraft carriers and nuclear-powered ballistic missile submarines, as well as visiting ships undergoing afloat training group exercises.

NAVSTA Mayport ship berthing facilities are provided at 16 berthing locations along wharves A through F located around the turning basin perimeter. The NAVSTA Mayport Turning Basin is approximately 2,000 feet (ft; [610 meters (m)]) by 3,000 ft (914 m) in size, and is connected to the St. Johns River by a 500-ft-wide entrance channel. A port security barrier has been installed at the mouth of the turning basin and there is a Restricted Area that prohibits all persons, vessels, and craft, except those vessels operated by the Navy, visiting foreign navies, and the U.S. Coast Guard, from entering without the permission of the Commanding Officer, NAVSTA Mayport, or his authorized representative (Figure 1-2). NAVSTA Mayport has an approximately 1 mile-long beach area that is closed to the general public and is patrolled by the NAVSTA Mayport Security Department. This restricted area (33 Code of Federal Regulations [CFR] 334.500) extends 380 ft (116 m) seaward from the mean high water line of the beach.

Wharf Bravo is a deep draft, general purpose berthing wharf that was constructed in 1970 and lies at the western edge of the NAVSTA Mayport turning basin. Wharf Bravo is approximately 2,000 ft long (610 m), 125 ft wide (38 m), and has a design berthing depth of 50 ft (15.3 m) mean lower low water (MLLW). The wharf is one of two primary deep draft berths and is capable of berthing ships up to and including large amphibious ships; it is one of three primary ordnance handling berths. The wharf is a diaphragm steel sheet pile cell structure with a concrete apron, partial concrete encasement of the piling, and asphalt-paved deck.

Currently, the wharf is in poor condition due to the advanced deterioration of the steel sheeting and lack of corrosion protection. A major structural repair of the wharf is needed to maintain the long-term serviceability of the structure because of widespread pitting and section loss of the steel sheet piles. Also, Wharf Bravo berth 2 (B-2) has inadequate cold iron electrical capacity to support nesting of ships. Cold iron support provides shore-based power and support to vessels during periods of maintenance and long-term shutdown of main and auxiliary engines.

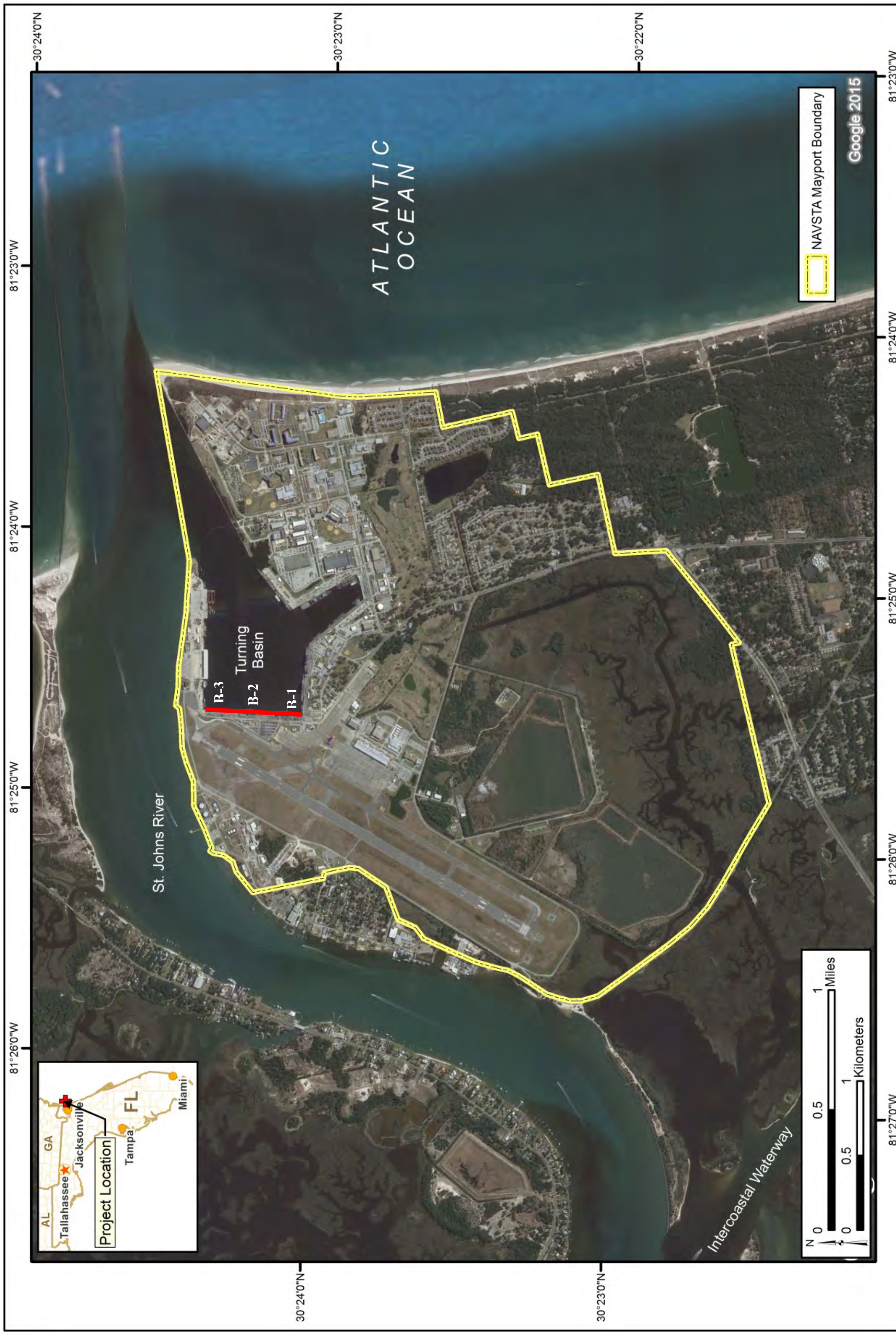


Figure 1-1. NAVSTA Mayport Location Map with Installation Boundary

Figure 1-2. NAVSTA Mayport In-water Restricted Area

SECTION 2.0
Project Action Area

2.0 Project Action Area

The Action Area is defined as the immediate vicinity of Wharf Bravo out to the limit of the most distant of the underwater and in-air acoustic thresholds for all protected species being addressed. In the absence of official airborne criteria for any protected species being addressed, the Navy has adopted the City of Jacksonville's airborne noise limit of 64 A-weighted decibels at any sensitive receptor as the in-air boundary of the Action Area (Jacksonville Environmental Protection Board 1995). The most distant underwater threshold is the marine mammal behavioral disturbance (120 decibels [dB] reference [re] 1 micro [μ] pascal [Pa] root mean square [rms]) threshold. Under certain conditions, areas in and outside of the NAVSTA Mayport Turning Basin may have average ambient noise levels exceeding the 120 dB threshold.

However, given the lack of actual ambient sound recording data for this project location, the Navy has assumed ambient noise levels are below 120 dB re 1 μPa rms. The distance to the 120 dB re 1 μPa rms threshold is, therefore, the maximum range at which the Navy expects to exert an environmental impact under water, and represents a reasonable boundary for the Action Area. The airborne and underwater zones of influence were modeled (see Appendix E [Fundamentals of Acoustics] for full description of modeling methodologies) and incorporated into a single-boundary layer (Figure 2-1).

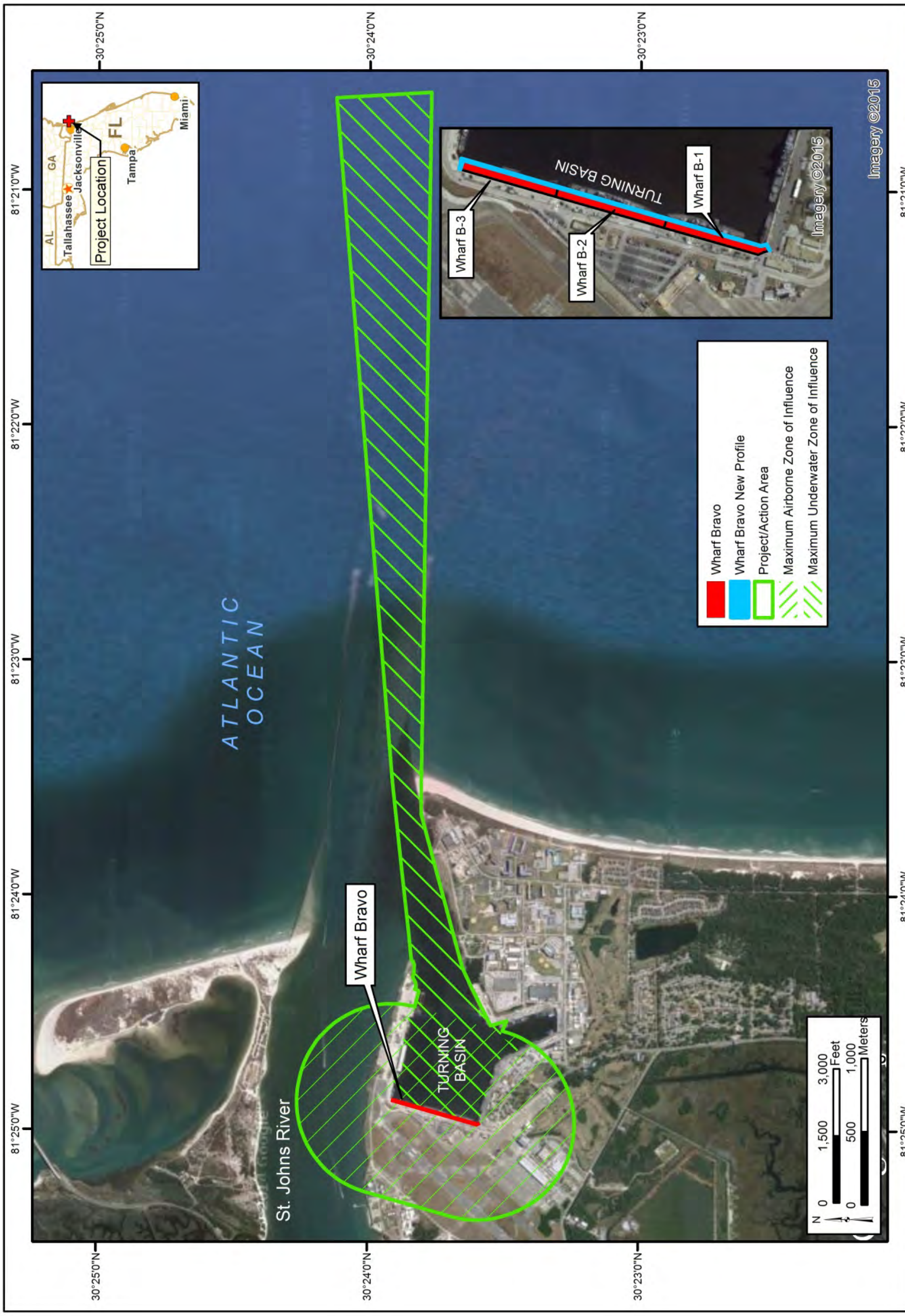


Figure 2-1. Action Area Defined by the Overall Airborne and Underwater Zones of Influence

SECTION 3.0
Species Accounts and Species Status in the Action Area

3.0 Species Accounts and Species Status in the Action Area

3.1 Fishes Potentially in the Action Area

There are three Federally listed endangered fish species within the NMFS jurisdiction that are potentially within the Action Area: the Atlantic sturgeon (*Acipenser oxyrinchus oxyrinchus*), the shortnose sturgeon (*Acipenser brevirostrum*), and the smalltooth sawfish (*Pristis pectinata*). Additionally, candidate species including the American eel (*Anguilla rostrata*) petitioned as threatened, the common thresher shark (*Alopias vulpinus*) petitioned as threatened or endangered, and the dwarf seahorse (*Hippocampus zosterae*) petitioned as threatened or endangered, are all potentially within the Action Area, and are included to support a Section 7 informal conference.

3.1.1 Federally Listed Fishes and Designated Critical Habitat

3.1.1.1 Atlantic Sturgeon

Status and Management – On February 6, 2012, the Carolina and South Atlantic distinct population segments (DPSs) of Atlantic sturgeon were Federally listed as endangered (77 Federal Register [FR] 5914). The Atlantic sturgeon is a long-lived, estuarine-dependent, anadromous fish. The South Atlantic DPS could occur in the Action Area. The Atlantic sturgeon is also managed under a fishery management plan implemented by the Atlantic States Marine Fisheries Commission (ASMFC), but a coast-wide moratorium on its harvest has been in effect since the end of 1997 (Greene et al. 2009). The NMFS augmented the ASMFC moratorium with a similar moratorium for Federal waters in 1999. Amendment 1 to Atlantic States Marine Fisheries Commission's Atlantic Sturgeon Fishery Management Plan also includes measures for preservation of existing habitat, habitat restoration and improvement, monitoring of bycatch and stock recovery, and breeding and stocking protocols (75 Federal Register [FR] 838).

Habitat and Geographic Range – Atlantic sturgeon can grow to approximately 14 feet (4.3 m) long and can weigh up to 800 pounds (370 kilogram [kg]). It is currently in danger of extinction throughout its range due to precipitous declines in population sizes and the protracted period in which sturgeon populations have been depressed, the limited amount of current spawning, and the impacts and threats that have and would continue to prevent population recovery (FR 2012). As an anadromous fish, mature Atlantic sturgeon undergo seasonal migrations between freshwater habitats where they spawn and marine waters where they forage and grow. During nonspawning years, adults remain in marine waters either year-round or seasonally (Bain 1997). Spawning adults migrate upriver in spring, beginning in February in the south, April in the mid-Atlantic, and May in Canadian waters (Dadswell 2006). After spawning in freshwater in the spring and early summer, adults migrate back into estuarine and marine waters. Tagging data indicate that immature Atlantic sturgeon disperse widely once they move into coastal waters (Secor et al. 2000). Dispersal is extensive: north and south along the Atlantic coast and seaward to the edge of the continental shelf (Bain 1997; 75 FR 838).

Atlantic sturgeon can occur in the U.S. as far north as the St. Croix River in Maine and as far south as the St. Johns River in Florida. Atlantic sturgeon juveniles in the Northeast U.S. Continental Shelf and Scotian Shelf Large Marine Ecosystems may occur in salinities ranging from 5 to 25 parts per thousand in estuaries, usually over a mud-sand bottom (Dadswell 2006).

Subadults and adults live in coastal waters and estuaries when not spawning, generally in shallow (35–165 ft. [10–50 m]) inshore areas of the continental shelf where they feed (75 FR 838). In a 2004 study using fisheries bycatch data, Atlantic sturgeon were found to be strongly associated with specific coastal areas, such as the mouths of Narragansett Bay and Chesapeake Bay and the inlets of the North Carolina Outer Banks; most fish were caught within a narrow range of depths (30–160 ft. [10–50 m]) over gravel and sand, and to lesser extent, silt and clay (Stein et al. 2004).

Population and Abundance – Numbers of Atlantic sturgeon in the South Atlantic DPS are low compared to historic levels. Currently there are several hundred to a few thousand adult Atlantic sturgeon spawning annually in the Altahama River – the closest major breeding territory, approximately 70 miles from NAVSTA Mayport (Wilcox pers. comm. 2013). Documented occurrences of Atlantic sturgeon in the vicinity of the Project have been limited to recreational catches, all prior to the species listing under the ESA. The most recent documented occurrence was in 2011. It is assumed that the St. Johns River spawning population has been completely eliminated (NMFS no date [n/d]).

Predator/Prey Interactions and Foraging – Atlantic sturgeon feed along the bottom on invertebrates such as isopods, crustaceans, worms, and mollusks (NMFS 2010a). They have also been documented to feed on fish (Bain 1997). Evidence of predation on sturgeon is scarce, but some researchers believe they are taken by the American alligator (*Alligator mississippiensis*), alligator gar (*Atractosteus spatula*), and striped bass (*Morone saxatilis*) (Dadswell 2006). Sharks likely prey on all species of sturgeon in the marine environment (NMFS 1998).

Threats – Threats to already depressed populations of Atlantic sturgeon from habitat degradation and being accidentally caught and potentially injured or killed by fishermen are working in combination to put the South Atlantic DPS in danger of extinction. Other specific activities threatening the continued existence of the Atlantic sturgeon are dredging impacts, water quality degradation, climate change, and continued incidental fisheries bycatch.

Critical Habitat – No critical habitat has been designated for this species.

3.1.1.2 Shortnose Sturgeon

The shortnose sturgeon remains on the list as endangered (Endangered Species Preservation Act of 1966, which predated the ESA) throughout its range along the Atlantic coast (NMFS 1998). NMFS manages 19 DPSs on the anadromous shortnose sturgeon; the St. Johns River population is included in the DPSs. Although a DPS has been designated for shortnose sturgeon in the St. Johns River, there is no evidence suggesting their abundance in the estuary. The Estuarine Living Marine Resources database does not include shortnose sturgeon in the list of species for the St. Johns River. The shortnose sturgeon primarily occurs in freshwater rivers and coastal estuaries of the northeastern and southeastern U.S. and into the nearshore coastal waters (NMFS 1998). Adults are found in deep water (35-100 ft [10-30 m]) in winter and shallow water (7-35 ft) in summer (Welsh et al. 2002).

Habitat and Geographic Range – The historical range of shortnose sturgeon has extended from New Brunswick, Canada, to as far south as the St. Johns River in Florida. More recently, the species has been observed only as far south as the Altamaha River in Georgia. Generally, shortnose sturgeon are more abundant in northern and mid-Atlantic populations as compared to southern populations, due to characteristics of watersheds or anthropogenic disturbances (NOAA

Fisheries 2015i). After hatching in upstream reaches of rivers, shortnose sturgeon larvae orient into the river current and away from light sources, generally staying near the bottom and seeking cover. By 2 weeks of age, the larvae emerge from cover and swim in the water column, moving downstream from the spawning site. By 2 months, juvenile behavior becomes similar to adults, with active swimming and foraging at night along the bottom (Richmond and Kynard 1995). In estuarine systems, juveniles and adults occupy areas with little or no current over a bottom composed primarily of mud and sand (Secor et al. 2000). Adults are found in deep water (35–100 ft. [10 –30 m]) in winter and in shallow water (7–35 ft. [2–10 m]) during summer (Welsh et al. 2002). Individual shortnose sturgeon do not disperse far along the coastline beyond their home river estuaries (NMFS 1998).

Population and Abundance – No data analysis for the St. Johns River population size has been conducted. Extensive sampling was conducted in 2002 and 2003 and only one specimen was captured during that effort. Further, in the 1980s and early 1990s other survey efforts were performed with no incidental captures (Wilcox pers. comm. 2013). Therefore, it is unlikely that any sizable population of shortnose sturgeon currently exists in the St. Johns River. This species' reproduction generally requires rocky or gravel substrate or limestone outcroppings - habitat rarely found in the St. Johns River or its tributaries. No reproduction of sturgeon in the St. Johns River has ever been documented, and no large adults have been positively identified (all known specimens have been less than 10 pounds). The last recorded shortnose sturgeon in the St. Johns River was observed in 2002 (South Atlantic Fishery Management Council [SAFMC] 2004). In other southern rivers, the species uses thermal refuges, such as springs, but no sturgeon have been observed in the numerous springs in the St. Johns River. Given the low-quality habitat it is possible that shortnose sturgeon have not actively spawned in the St. Johns River system, and those individuals that have been documented were transients from other river systems (FWC n/d).

Predator/Prey Interactions and Foraging – In southern rivers, feeding has been observed during winter at or just downstream of where saltwater and freshwater meet (Kynard 1997). Shortnose sturgeon in the southeastern U.S. reduce their feeding activity during summer months (NMFS 1998). Feeding patterns of the shortnose sturgeon vary seasonally between northern and southern river systems. In northern rivers, some sturgeon feed in freshwater during summer and over sand-mud bottoms in the lower estuary during fall, winter, and spring (NMFS 1998). The shortnose sturgeon feeds by suctioning polychaetes (marine worms), crustaceans, mollusks, and small fish from the bottom (NMFS 1998; Stein et al. 2004). Young-of-the-year sturgeon (individuals less than a year old) have been found in the stomachs of yellow perch (NMFS 1998); predation on adult sturgeon is not well-documented, although sharks, lampreys, and pinnipeds may prey on them in the marine environment (NMSF 1998, Massachusetts Division of Fisheries and Wildlife 2012, Mierzykowski 2012).

Threats – NMFS (2015) has documented threats to shortnose sturgeon populations to include construction of dams, mainly during the period of industrial growth (late 1800s-early 1900s), which may have resulted in substantial loss of suitable habitat, pollution of many large northeastern river systems, habitat alterations from discharges; dredging or disposal of material into rivers, and related development activities involving estuarine/riverine mudflats and marshes (National Oceanographic and Atmospheric Administration [NOAA] Fisheries 2015i).

Critical Habitat – There is no critical habitat designated for shortnose sturgeon.

3.1.1.3 Smalltooth Sawfish

Status and Management – As part of a group of fishes called elasmobranchs that includes all rays and sharks, the smalltooth sawfish was Federally listed as endangered in 2003 (68 FR 15674-15680); the U.S. DPS historically inhabited waters off New York south to Florida, and around the Florida peninsula to Texas. The smalltooth sawfish was once common in the Gulf of Mexico and along the east coast of the United States. Today, the severely depleted population is restricted mostly to southern Florida (Poulakis and Seitz 2004; Simpfendorfer 2002; Simpfendorfer and Wiley 2005, 2006).

Habitat and Geographic Range – The smalltooth sawfish typically inhabits shallow subtropical or tropical estuarine and marine waters. It remains close to the bottom, in deep holes of sand or muddy sand, or over limestone hard bottom, coral reefs, and live bottoms (Poulakis and Seitz 2004). Nursery areas are in shallow nearshore regions and estuaries, especially in mangrove habitat (NMFS 2010a; Seitz and Poulakis 2006; Simpfendorfer and Wiley 2005). Mangrove prop roots provide refuge from predators, and the sawfish's compressed body allows it to navigate very shallow waters (3 ft [1 m]) that typically exclude large sharks (NMFS 2009). Young-of-the-year sawfish (less than 39 inches [in] or 100 centimeters [cm]) have been observed swimming in only a few inches of water (NMFS 2009). Juvenile smalltooth sawfish exhibit a high site fidelity to nearshore areas, often residing in one area between 15 and 55 days (Simpfendorfer 2006). Larger individuals may occur down to 400 ft (120 m) (Poulakis and Seitz 2004; Simpfendorfer 2006), although tagging studies indicate that adults spend more time in shallow water than previously suspected and are only occasionally found in deeper waters (Simpfendorfer and Wiley 2005). The smalltooth sawfish may also be associated with sea fans, artificial reefs, and offshore drilling platforms (Poulakis and Seitz 2004).

Population and Abundance – No estimates of the size of the smalltooth sawfish population are available. The best available data suggest that the current population is a small fraction of its historical size (NMFS 2010a; Simpfendorfer 2006). Limited scientific survey data are available for this species, but dockside surveys of recreational anglers in Everglades National Park beginning in 1972 suggest that the population there has at least stabilized and may be increasing. Between 1989 and 2004, the population increased by approximately 5 percent per year (Carlson et al. 2007). While historical records indicate that the St. Johns River once had high numbers of smalltooth sawfish (NMFS 2000), there have been no incidental reports in the past few years.

Predator/Prey Interactions and Foraging – The smalltooth sawfish feeds primarily at night (NMFS 2009) and uses its saw while feeding to stir the substrate to expose crustaceans or to stun and slash schooling fish (74 FR 45353). Smalltooth sawfish, particularly juveniles, are preyed upon by bull sharks and other sharks occurring in shallow coastal waters.

Threats – Smalltooth sawfish are extremely vulnerable to overexploitation. This is primarily due to their susceptibility for entanglement, their restricted habitat, and low population growth rates. Abundance declines are also a result of bycatch in various fisheries, particularly in gill nets. The loss of juvenile habitat has also likely contributed to the decline of smalltooth sawfish. Many of their habitats have been modified or lost due to waterfront development in Florida and other southeastern states (NMFS 2015).

Critical Habitat – Two areas have been designated (2009) as critical habitat for the smalltooth sawfish and include the Charlotte Harbor Estuary Unit and the Ten Thousand Islands/Everglades Unit (74 FR 45353). The primary constituent elements of smalltooth sawfish critical habitat are

designated as red mangroves and shallow habitats characterized by variable salinities with water depths between the mean high water line and 3 ft. (0.9 m) measured at MLLW (74 FR 45353). Neither of these units is located near the Action Area. Because no critical habitat for the smalltooth sawfish is present near the Action Area, no further consideration of impacts on the critical habitat for smalltooth sawfish will be included in this BA.

3.1.2 Federal Candidate Fishes and Proposed Critical Habitat

3.1.2.1 American Eel

Status and Management – On September 29, 2011, the USFWS announced a 90-day finding on a petition (76 FR 600432) to list the American eel as threatened under the ESA. Based on their review, USFWS found that the petition presents substantial scientific or commercial information indicating that listing this species may be warranted. The ASMFC has had a fishery management plan for the American eel since 1999 (ASMFC 2000).

Habitat and Geographic Range – The American eel ranges from Greenland south along the Atlantic Coast and into the Caribbean (USFWS 2011). The American eel is catadromous, meaning it is born in saltwater and migrates into freshwater to mature (Jessop et al. 2002). Spawning of the U.S. population of American eel is believed to occur in the Sargasso Sea of the Atlantic Ocean. From there, eggs, larvae, and juveniles are dispersed largely via the Gulf Stream and other oceanic currents as they feed at the surface of the ocean. As juveniles, or “glass eels,” they enter coastal waters where they further mature into “elvers” and then a late juvenile stage known as “yellow eels” (USFWS 2011). Older juveniles and adults occupy estuarine and freshwater habitats, often swimming far upriver into lakes, ponds, and headwater streams, where they may spend up to 30 years as adults. Mature adults, or “silver eels,” migrate to the Sargasso Sea to spawn and die (USFWS 2011). Peak migration in the St. Johns River takes place between January and February (FWC 2015a).

Population and Abundance –The American eel exists as a single population that disperses widely from its spawning grounds in the Sargasso Sea, making abundance difficult to determine (Haro et al. 2000). Demographic structure is difficult to determine because nonbreeding individuals are spread over an extremely large geographic range (USFWS 2011). There is a small commercial fishery for American eels in Florida, which operates almost exclusively in the St. Johns River system (FWC 2007). Annual landings of American eels have been reported since the early 1980s. However, commercial eel harvest has been declining since the early 1990s (FWC 2015a).

Predator/Prey Interaction and Foraging – American eel feed on a wide variety of prey items including benthic invertebrates, insects, crustaceans, mollusks, worms, and finfish. It is preyed upon by a wide variety of species including fish, seabirds, sharks, and rays (Dalton et al. 2009; UFWS 2011).

Threats – American eel have been extirpated from portions of its historical freshwater habitat during the last 100 years, mostly resulting from the construction of dams. Eels lose habitat and migration corridors when waters are obstructed by dams and other mechanisms. Localized population declines are also attributed to mortality in hydropower plant turbines, degradation of current habitat, and overharvest.

Critical Habitat – This species is not listed under the ESA; therefore, no critical habitat has been designated.

3.1.2.2 Common Thresher Shark

Status and Management – On March 3, 2015, NMFS announced (80 FR 11379) the 90-day finding for a petition to list the common thresher shark as either endangered or threatened under ESA. The Fishery Management Plan for U.S. West Coast Fisheries for Highly Migratory Species includes an annual harvest guideline of 340 metric tons for the common thresher shark. This level of commercial catch is estimated to be 75 percent of the regional sustainable yield (NOAA Fisheries 2015j).

Habitat and Geographic Range – In the North Atlantic, common thresher sharks occur from Newfoundland, Canada, to Cuba in the west and from Norway and the British Isles to the African coast in the east (Gervelis and Natanson, 2013). Landings along the South Atlantic coast of the United States and in the Gulf of Mexico are rare. Juveniles tend to remain over the continental shelf in shallow water, while adults are most common in deeper water but rarely range beyond 200 miles from the coast. Both juveniles and adults are often associated with highly productive or "green" water in regions of upwelling or intense mixing (Smith et al. 2008).

Population and Abundance – A population abundance estimate for common thresher sharks has not been determined. The estimated life expectancy range of common thresher sharks is from 19 to 50 years of age. Growth rates are estimated to be approximately 30 cm (1 ft) per year over the first 5 years reaching a maximum size of approximately 18 ft (550 cm) total length, with only slight variations among geographical regions around the world. Common thresher sharks reach sexual maturity at approximately 5 years old. Their reproduction is via aplacental ovovivaparity and oophagous, where eggs are deposited into one of two uterine horns and developing embryos are nourished by feeding on other eggs. The typical litter size of common thresher sharks is between 2 to 4 pups, and gestation is thought to be about 9 months. The pupping season is thought to occur in the spring, and mating is thought to occur in the summer.

Predator/Prey Interaction and Foraging – Common thresher sharks feed at mid-trophic levels on small pelagic fish and squid. Given their more specialized diet compared to other local pelagic sharks, they are more likely to exert top-down effects on their prey, although this remains to be demonstrated. Based on studies at the Southwest Fisheries Science Center (SWFSC), the top six prey species, in order, are anchovy, sardine, hake, mackerel, jack, and squid (Preti 2001; NOAA Fisheries 2015j). Common thresher sharks have been observed to use their long caudal fin to bunch up, disorient, and stun prey at or near the surface and are often caught on longlines tailhooked (NOAA Fisheries 2015j).

Threats – Common thresher sharks are taken incidentally as bycatch in the swordfish drift gillnet (DGN) fishery. Other natural or man-made factors such as low reproductive rates make the common thresher more susceptible to exploitation and human population growth.

Critical Habitat – This species is not listed under the ESA; therefore, no critical habitat has been designated. The petitioner requests that NMFS designate critical habitat for the species in U.S. waters.

3.1.2.3 Dwarf Seahorse

Status and Management – The dwarf seahorse became a candidate for listing as threatened or endangered under the ESA on May 4, 2012 (77 FR 26478). Dwarf seahorses are harvested in Florida's commercial seahorse fishery, primarily in the southeast portion of the state through diving, seining, or dredging (Bruckner 2005; 77 FR 26478). The state imposes a commercial bag

limit of 400 dwarf seahorses per person or per vessel per day, whichever is less, and a recreational bag limit of 5 dwarf seahorses per person per day. There are no seasonal restrictions or closures for this fishery (77 FR 26478). On January 4, 2016, the Florida Fish and Wildlife Conservation Commission's (FWC) proposed a final rule to amend the dwarf seahorse regulations in the Marine Life Chapter, 68B-42, Florida Administrative Code (FAC). The proposed final rule would establish an allowable harvest area for dwarf seahorses, modify recreational and commercial bag limits, and establish an annual commercial quota.

Habitat and Geographic Range – The dwarf seahorse inhabits tropical and subtropical/warm-temperate waters of Florida, the Gulf of Mexico, and the Caribbean (Masonjones and Lewis 1996). The species primarily occurs in south Florida estuaries and in the Florida Keys, preferring protected bays/lagoons with low water flow, high organic content, mid- to high-salinities and depths less than 6 ft. (2 m) (Bruckner 2005; Foster and Vincent 2004). Dwarf seahorses are almost exclusively associated with seagrass beds, particularly eelgrass (*Zostera* spp.) (Bruckner 2005). Other habitats used by the dwarf seahorse include mangrove areas, unattached algae, and inshore drifting vegetation (Center for Biological Diversity 2011; Hoese and Moore 1998; Tabb and Manning 1961). While most seahorse species exhibit strong site-fidelity, in terms of home ranges and spawning habitat (Masonjones and Lewis 1996) suggests that further seahorse dispersal outside of home ranges may occur. Dispersal may be enhanced by clinging to drifting *Sargassum* (algae of the genus *Sargassum*) or floating debris within inshore habitats (Foster and Vincent 2004; Masonjones and Lewis 1996). Dwarf seahorse spawning occurs between February and November. In winter they move to deeper water or into tide pools with heavy vegetation. The maximum recorded adult height of this species is 2.5 cm (Foster and Vincent 2004). Based on habitat requirements, particularly seagrass and subtropical water temperatures, dwarf seahorses are not expected to occur in the Action Area.

Population and Abundance – There are no published data on current global population trends or total numbers of mature dwarf seahorses; however, some population data exist in Florida based on numbers derived from the commercial seahorse fishery. The NMFS reported a five-fold increase in seahorse landings between 1991 and 1992 (from 14,000 harvested in 1991 to 83,700 harvested in 1992) (77 FR 26478), with the increased landings primarily attributed to dwarf seahorses. Over a longer period, the number of dwarf seahorses landed during 1990 to 2003 ranged from 2,142 to 98,779 individuals per year (Bruckner 2005). Additional density data are from ichthyoplankton tows conducted in portions of southern Florida and range from 0 to six seahorses per 100 cubic meters in subtidal pools, seagrass beds, in channels, and along restored marsh edges (Powell et al. 2002; Thayer et al. 1999).

Predator/Prey Interaction and Foraging – Seahorses are ambush predators, consuming primarily live, mobile nekton, such as small amphipods and other invertebrates (Bruckner 2005).

Threats – The primary threat to the dwarf seahorse is habitat decline. The loss and degradation of seagrass habitat increases the species' vulnerability. In addition, the dwarf seahorse is harvested commercially to be sold as aquarium fish and also to be dried and sold as curios. They are also subject to accidental capture in non-selective fishing gear (bycatch) (Lourie et al. 2004).

Critical Habitat – This species is not listed under the ESA; therefore, no critical habitat has been designated.

3.2 Marine Mammals Potentially in the Action Area

There are two baleen whale species that are Federally listed as endangered that may potentially occur in the waters of the Action Area: the North Atlantic right whale (*Eubalaena glacialis*) and humpback whale (*Megaptera novaeangliae*).

3.2.1 Federally Listed Marine Mammals and Designated Critical Habitat

3.2.1.1 North Atlantic Right Whale

Status and Management – The North Atlantic right whale is Federally listed as endangered under the ESA (35 FR 18319); its listing was revised in 2008 (73 FR 12024). A 5-year review was completed in August 2012 with a recommendation to maintain the species' classification as endangered (NMFS 2012). North Atlantic right whales are designated as depleted under the MMPA.

Habitat and Geographic Range – Right whales are large baleen whales, generally 13.7 m to 16.7 m in length, and can weigh up to 70 tons. Female right whales are larger than males. Right whales feed from spring to fall and, in certain areas, also in winter. North Atlantic right whales are most often seen as individuals or pairs (Jefferson et al. 1993). They migrate annually between the north and south Atlantic coasts of the United States. They can generally be found in calving grounds off Georgia and Florida from mid-November to mid-April. North Atlantic right whale calves are born during December through March after 12 to 13 months of gestation (Kraus et al. 2001). Recent analysis of sightings data suggests a slight growth in population size to 450 (NOAA Fisheries 2015a).

Population and Abundance – The western North Atlantic minimum stock size is based on a census of individual whales identified using photo-identification techniques. A review of the photo-ID recapture database as it existed on October 21, 2011, indicated that 425 individually recognized whales in the catalog were known to be alive during 2009. Whales catalogued by this date included 20 of the 39 calves born during that year. Thus, adding the 19 calves not yet catalogued brings the minimum number alive in 2009 to 444. Based on annual surveys conducted from December through March between 1985 and 2007, North Atlantic right whales are relatively common visitors to waters offshore from NAVSTA Mayport and the Federal navigation channel (New England Aquarium 2013; Loop pers. comm. 2012). Incidental sightings of North Atlantic right whales are an infrequent occurrence in the St. Johns River and NAVSTA Mayport turning basin, with the most recent sighting of two individuals occurring at the mouth of the St. Johns River in December 2012 (Gibbons 2011, Loop 2015b). Based on data in the Navy's Marine Species Density Database (MSDD), a density of 0.00005 individual/square kilometer (km^2) has been estimated for the Action Area.

Predator/ Prey Interaction and Foraging – Right whales are skimmers; they feed by removing prey from the water using baleen while moving with their mouth open through a patch of zooplankton. The right whale occurs primarily in coastal or shelf waters, with a range strongly correlated to the distribution of its prey. Although the location of much of the population is unknown during winter, right whales do occur in lower latitudes during the winter and migrate to higher latitudes during the spring or summer. A total of 95 sightings of the North Atlantic right whale have been documented during 2014 off the coast of southern Georgia/northern Florida. These sightings ranged from a group size of 1 through 6 with the most sights (69) in a group size of 2 individuals (NOAA Fisheries 2015a).

Threats – Threats to the North Atlantic right whale are mostly human-related. Historically, the right whale population was largely depleted by commercial whaling. Currently, the primary threats to right whales include serious injury or mortality from becoming entangled in fishery gear and being struck by ships (NOAA Fisheries 2015a). From 2007 through 2011, the minimum rate of annual human-caused mortality and serious injury (incidental fishery entanglement and ship strike) to North Atlantic right whales averaged 4.05 per year, or a total of 21 that were classified as serious injury or mortality (Waring et al. 2013). Other reasons for decline may include habitat degradation, contaminants, climate and ecosystem change, and predators. Activities that may cause further disturbance to the right whales include whale-watching and noise from industrial activities. NMFS approved a Final Recovery Plan for the North Atlantic right whale in 1991, and the recovery plan was revised in 2005 (70 FR 32293).

The ultimate goal of the recovery effort is to allow the right whale to be delisted; the intermediate goal is to reclassify the species from endangered to threatened (NMFS 2005). Criteria for delisting the species were not included in the recovery plan because decades of population growth would likely be required before the population could attain such abundance for NMFS to consider delisting the species (NMFS 2005). NMFS has updated its serious injury designation and reporting process, which uses guidance from previous serious injury workshops, expert opinion, and analysis of historic injury cases to develop new criteria for distinguishing serious from non-serious injury (NMFS 2012). NMFS defines serious injury as an "injury that is more likely than not to result in mortality." All injury determinations for this stock assessment were performed under the new guidelines. The new process involves proration of serious injury determinations where there is uncertainty regarding the severity or cause.

Seasonal Management Areas – NOAA Fisheries has established a Southeastern U.S. Seasonal Management Area in support of the Compliance Guide for Right Whale Ship Strike Reduction Rule (50 CFR 224.105). This Seasonal Management Area imposes and enforces a Mandatory Speed Restriction from November 15 through April 15 in the designated Calving and Nursery Grounds. Vessels may operate at a speed greater than 10 knots only if necessary to maintain a safe maneuvering speed in an area where conditions severely restrict vessel maneuverability as determined by the pilot or master. Vessel speed is restricted in the area bounded to the north by latitude 31º27'N; to the south by latitude 29º45'N; and to the east by longitude 80º51'36"W (NOAA Fisheries 2015a).

Critical Habitat – NMFS designated critical habitat for the North Atlantic right whale in 1994 (59 FR 28805). The whale's southeastern critical habitat unit is designated above the 28th parallel (NOAA Fisheries 2015). On February 20, 2015, NMFS further proposed a revision, recommending an expansion of the current designated critical habitat area due to improved scientific understanding of the essential calving features for the North Atlantic right whale.

The specific area where the essential calving features are located ("Unit 2") is in the South Atlantic Bight and covers a total area of approximately 8,611 nm^2; within Unit 2, the essential features are:

- Sea surface conditions associated with Force 4 or less on the Beaufort Scale,
- Sea surface temperatures of 7°C to 17°C, and
- Water depths of 6 to 28 m.

Figure 3-3-1. North Atlantic Right Whale Critical Habitat near the Action Area

On January 27, 2016, NMFS issued a final rule (81 FR 4837) to replace the critical habitat for right whales in the North Atlantic with two new areas. The areas being designated as critical habitat contain approximately 29,763 square nautical miles (nm^2) of marine habitat in the Gulf of Maine and Georges Bank region (Unit 1) and off the southeast U.S. coast (Unit 2) (Figure 3-1).

These features occur simultaneously over contiguous areas of at least 231 nm^2 of ocean waters between the months of November and April. When these features are available, they are selected by right whale cows and calves in dynamic combinations that are suitable for calving, nursing, and rearing, and which vary, within the ranges specified, depending on factors such as weather and age of the calves.

3.2.1.2 Humpback Whale

Status and Management – Humpback whales are listed as endangered under the ESA (35 FR 18319). A status review was initiated in 2009 (74 FR 40568). NOAA Fisheries proposed (April 14, 2015) to revise the listing status (80 FR 22304) of the species by dividing the globally listed endangered species into 14 DPSs, remove the current species-level listing, and in its place list 2 DPSs as endangered and 2 DPSs as threatened. A distinguishing characteristic of humpback whales is their long pectoral fins, which can be up to 4.6 m in length (NOAA Fisheries 2015b). Similar to the North Atlantic right whale (and other baleens), adult females are larger than adult males. Whale watchers enjoy the humpback's aerial display and slapping of the surface. Humpback whale abundance is increasing through much of the species' range. Individuals that occur in the Action Area are from the Gulf of Maine stock. Humpback whales are designated as depleted under the MMPA.

Habitat and Geographic Range – During the winter, most of the North Atlantic population of humpback whales is believed to migrate south to calving grounds in the West Indies region (Whitehead and Moore 1982; Smith et al. 1999; Stevick et al. 2003), over shallow banks and along continental coasts, where calving occurs. Calving peaks from January through March, with some animals arriving as early as December and a few not leaving until June. The mean sighting dates in the West Indies for individuals from the United States and Canada are February 16 and 15, respectively (Stevick et al. 2003). Humpbacks are found in high-latitude feeding grounds during the summer; in the winter they migrate to calving grounds. The seasonal migration of the humpback whale consists of long distances. During migration, humpbacks stay near the surface of the ocean, but while feeding and calving, humpbacks are found in shallow (warmer) waters (Waring et al. 2013). Gestation lasts about 11 months and mothers are protective of their calves; males do not provide support for the calves. Since humpback whales migrate south to calving grounds during the fall and make return migrations to the northern feeding grounds in spring, they are not expected off the coast of Florida during summer. There has been an increasing occurrence of humpbacks, which appear to be primarily juveniles, during the winter along the U.S. Atlantic coast from Florida north to Virginia (Clapham et al. 1993; Swingle et al. 1993; Wiley et al. 1995; Laerm et al. 1997).

The coastal region of Florida is not designated as an area of concentrated occurrence for humpback whales (Department of the Navy [DON] 2008). Examination of whaling catches revealed that both northward and southward migrations are characterized by a staggering of sexual and maturational classes; lactating females are among the first to leave summer feeding grounds in the fall, followed by subadult males, mature males, non-pregnant females, and pregnant females (Clapham 1996). On the northward migration, this order is broadly reversed, with newly pregnant females among the first to begin the return migration to high latitudes.

Based on sightings, strandings, and life history, humpbacks will be expected to occur in waters off NAVSTA Mayport during fall, winter, and spring. The likelihood of occurrence is low, however, and even lower for the NAVSTA Mayport Turning Basin and Action Area.

Population and Abundance – The most recent line-transect survey, which did not include the Scotian Shelf portion of the stock, produced an estimate of abundance for Gulf of Maine humpback whales of 331 animals (Coefficient of Variation [CV] = 0.48) with a resultant minimum population estimate for this stock of 228 animals. The line-transect based minimum estimate is unrealistic because at least 500 uniquely identifiable individual whales from the Gulf of Mexico stock were seen during the calendar year of that survey and the actual population would have been larger because re-sighting rates have historically been less than one. Using the minimum count from at least 2 years prior to the year of a stock assessment report has allowed NMFS time to resight whales known to be alive prior to and after the focal year. Thus the minimum population estimate is set to the 2008 mark-recapture based count of 823. Current data suggest the Gulf of Maine stock is steadily increasing in numbers (Waring et al. 2013). Based on data in the Navy's MSDD, a year-round density of 0.000113 individual/km^2 has been estimated for the activity area.

Predator /Prey Interaction and Foraging – Humpback whales feed on a variety of plankton, invertebrates, and small schooling fishes. The most common invertebrate prey are krill; the most common fish prey are herring, mackerel, sand lance, sardines, anchovies, and capelin (Clapham and Mead 1999). Feeding occurs both at the surface and in deeper waters, wherever prey is abundant. The humpback whale is the only species of baleen whale that shows strong evidence of cooperation when feeding in large groups (D'Vincent et al. 1985).

Threats – Threats facing the humpback whale are the same as those facing the North Atlantic right whale and specifically include entanglement in fishing equipment, ship strikes, whale watch harassment, habitat impacts, and harvest (NOAA Fisheries 2015b). From 2007 through 2011, twenty-seven human-caused serious injuries or death of humpback whales were recorded. Entanglements accounted for eight mortalities and 39 serious injuries (Waring et al. 2013).

A final Recovery Plan was issued in 1991 (55 FR 29646), and a 5-year status review was initiated in August of 2009 (74 FR 40568). The recovery plan describes three types of goals for the plan: 1) a biological goal, 2) a numerical goal, and 3) a political goal (NMFS and USWFS 1991). The biological goal is to build and maintain populations large enough to withstand chance events. The numerical goal is to achieve population sizes at least 60 percent of the historic environmental carrying capacity in waters under U.S. jurisdiction. The political goal is to enable certain sub-species of the humpback whale to be down-listed or delisted completely.

Critical Habitat – There is no critical habitat designated for the humpback whale.

3.3 Sea Turtles Potentially in the Action Area

There are five species of sea turtles that may occur within the Action Area: the loggerhead sea turtle (*Caretta caretta*), the green sea turtle (*Chelonia mydas*), the leatherback sea turtle (*Dermochelys coriacea*), the hawksbill sea turtle (*Eretmochelys imbricata*), and the Kemp's ridley sea turtle (*Lepidochelys kempii*). Two species, the green sea turtle and loggerhead sea turtle, are listed by population and DPS, respectively. Additionally, critical habitat has been designated for the loggerhead sea turtle, where areas of the Nearshore Reproductive Habitat

(nesting beaches) component of the critical habitat lie approximately 3 nautical miles south of the Action Area (ending at the southern boundary of the Kathryn Abbey Hanna Park); therefore, this critical habitat would not be analyzed.

The olive ridley sea turtle (*Lepidochelys olivacea*) was considered for inclusion, but its occurrence in the Action Area is extralimital (outside the species' normal range), and therefore the species will not be analyzed. Currently, there are no olive ridley nesting beaches in the eastern United States, and there are no known feeding, breeding, or migration areas within the vicinity of the Action Area.

3.3.1 Federally Listed Sea Turtles and Designated Critical Habitat

3.3.1.1 Loggerhead Sea Turtle

Status and Management – Loggerhead sea turtles were Federally listed as threatened throughout their range on July 28, 1978 (43 FR 32808). In 2011, NMFS and USFWS listed five DPSs as endangered and retained four other DPSs as threatened under the ESA (NOAA Fisheries 2015d). The Northwest Atlantic Ocean DPS (threatened) is the only one that occurs within the Action Area. Therefore, individual loggerheads occurring in the Action Area would most likely belong to the Northwest Atlantic Ocean DPS. This DPS is projected to decline in the foreseeable future, primarily as a result of fishery bycatch (Conant et al. 2009). Within the DPS, there are at least five demographically independent loggerhead sea turtle nesting groups or subpopulations of the Northwest Atlantic Ocean. The Peninsular Florida Recovery Unit, along Florida's Atlantic coast to Key West (NMFS and USFWS 2009) falls within the region of the Action Area of NAVSTA Mayport.

Habitat and Geographic Range – Loggerhead sea turtles occur in temperate and tropical marine waters worldwide. Depending on the life stage, loggerheads may occur in terrestrial, oceanic, or nearshore habitats. Loggerhead sea turtles in U.S. waters occur in habitats ranging from coastal estuaries to waters far beyond the continental shelf (Dodd 1988). Loggerheads typically nest on beaches close to reef formations and next to warm currents (Dodd 1988), preferring beaches facing the ocean or along narrow bays (NMFS and USFWS 1998). At emergence, hatchlings swim to offshore currents and remain in the open ocean, often associating with floating mats of *Sargassum* (Witherington and Hirama 2006). Migration between oceanic and nearshore habitats occurs during the juvenile stage as sea turtles move seasonally from open-ocean current systems to nearshore foraging areas where they would settle as adults (Mansfield 2006).

In the southeastern United States, nesting season for loggerheads takes place from May to October (FWC 2007b). Large nesting colonies exist in Florida, with more limited nesting along the Gulf Coast and north through Virginia. Duval County hosts a moderate amount of nesting on beaches throughout the county. NAVSTA Mayport itself has several suitable nesting beaches that see regular, small amounts of nesting each season (DON 2014). Limited foraging habitat for juveniles and adults exists in the Action Area. In the NAVSTA Mayport Turning Basin and navigation channel, the muddy bottom provides habitat for invertebrates, which are a major food source for loggerhead sea turtles.

Population and Abundance – Annual loggerhead nest counts on Florida's 26 core index beaches from 1989 through 2014 varied from a peak of 59,918 in 1998 to a low of 28,074 in 2007. In the most recent nesting season (2014), nest counts were slightly higher than in 2013 (FWC-FWRI 2015a). Survey effort remained nearly identical. Analysis of index nesting beach survey data

has shown a decline in nesting. Results indicated that there has been a decrease of 26 percent over the 20-year period from 1989 to 2008 and a 41 percent decline since 1998. The mean annual rate of decline for the 20-year period was 1.6 percent. Surveys conducted in 2014 identified 119 loggerhead nests along Duval County beaches, representing the lowest in 5 years (FWC-FWRI 2015a). Loggerheads have historically nested on NAVSTA Mayport beaches and continue to do so each year. In 2014, six nests, 563 hatchlings, and three false crawls were documented at the installation (Loop 2015b). In-water abundances of loggerhead sea turtles in the Action Area is unknown. However, given presence of nesting and foraging habitat nearby, loggerhead sea turtles can be expected to occur regularly in the Action Area.

Predator/Prey Interaction and Foraging – The diet of a loggerhead sea turtle varies by age class (Godley et al. 1998). The gut contents of post-hatchlings found in masses of *Sargassum* contained parts of zooplankton, jellyfish, larval shrimp and crabs, and gastropods (Carr and Meylan 1980; Richardson and McGillivary 1991; Witherington 1994). Juvenile and subadult loggerhead sea turtles are omnivorous, foraging on crabs, molluscs, jellyfish, and vegetation captured at or near the surface (Dodd 1988). Adult loggerhead sea turtles are generalized carnivores that forage on nearshore bottom-dwelling invertebrates (molluscs, crustaceans, and anemones) and sometimes fish (Dodd 1988). During migration through the open sea, they eat jellyfish, sea slugs, floating molluscs, floating egg clusters, fish, and squid. As with other sea turtle species, the loggerhead's esophagus is lined with papillae (spiny projections) that trap food before swallowing.

Threats – Specific threats to loggerhead sea turtles include incidental capture in fishing gear, primarily in longlines and gillnets, but also in trawls, traps and pots, and dredges; and directed harvest. General threats to marine sea turtles include entanglement in gillnets, pound nets, and the lines associated with longline and trap/pot fishing gear; ingestion of or becoming entangled in marine debris; environmental contamination; disease; and vessel strikes (NOAA Fisheries 2015h).

Globally, common predators of eggs and hatchlings on nesting beaches are ghost crabs, raccoons, feral pigs, foxes, coyotes, armadillos, and fire ants (Dodd 1988), though this is less of an issue in Florida due to intense nest protection efforts. In the water, hatchlings are susceptible to predation by birds and fish. Sharks are the primary predator of juvenile and adult loggerhead sea turtles (Fergusson et al. 2000; Simpfendorfer et al. 2001).

Critical Habitat – On July 10, 2014, NMFS designated specific areas of critical habitat that include 38 occupied marine areas within the range of the Northwest Atlantic Ocean distinct population segments (DPS) of loggerhead sea turtles. These areas contain one or a combination of nearshore reproductive habitats, winter areas, breeding areas, migratory corridors, and *Sargassum* habitats (FR 2014a). Additionally, USFWS addressed the designation of approximately 685 miles of nesting beaches (in North Carolina, South Carolina, Georgia, Florida, Alabama, and Mississippi) in a separate rulemaking (79 FR 39756) on the same date (FR 2014b). Nesting beaches constitute the Nearshore Reproductive Habitat component of the critical habitat. The closest of these areas lies approximately 3 miles south of the Action Area (ending at the southern boundary of the Kathryn Abbey Hanna Park); therefore, this critical habitat component will not be analyzed.

The *Sargassum* habitat component has been defined as the top 33 ft (10 m) of the water column in the South Atlantic EEZ bounded by the western edge of the Gulf Stream. However, *Sargassum* occurs in both the neritic and oceanic environments. Most pelagic *Sargassum* in the

Atlantic Ocean circulates between 20° N and 40° N latitude, and between 30° W longitude and the western edge of the Florida Current/Gulf Stream, and the Gulf of Mexico (SAFMC 2002). The survival of loggerhead sea turtles, in particular the post-hatchling and small oceanic juvenile stages, is dependent upon suitable foraging and shelter habitat, both of which are provided by the algae of the genus *Sargassum* in the Atlantic Ocean and Gulf of Mexico (Witherington et al. 2012). The closest areas of the *Sargassum* habitat component of the critical habitat lie approximately 72 nautical miles to the east of the Action Area; therefore, this critical habitat component will not be analyzed.

3.3.1.2 Green Sea Turtle

Status and Management – The green sea turtle was listed on July 28, 1978, as threatened throughout its range except for Florida and the Pacific Coast of Mexico, where it was listed as endangered (43 FR 32808). Individuals from both threatened and endangered populations may be present in the Action Area. A recent petition (80 FR 15272) on March 23, 2015, entitled "Identification and Proposed Listing of Eleven Distinct Population Segments of Green Sea Turtles (*Chelonia mydas*) as Endangered or Threatened and Revision of Current Listings" proposes to remove the current range-wide listing and, in its place, list eight DPSs as threatened and three as endangered. USFWS and NMFS also propose to apply existing protective regulations to the DPSs.

Habitat and Geographic Range – The green sea turtle is globally distributed and generally found in tropical and subtropical waters along continental coasts and islands between 30° North and 30° South. Nesting occurs in over 80 countries throughout the year (though not throughout the year at each specific location). Green sea turtles are thought to inhabit coastal areas of more than 140 countries (NOAA Fisheries 2015k). In the U.S., green sea turtles nest primarily along the coast of eastern Florida. After emerging from the nest, green sea turtle hatchlings swim to offshore areas where they float passively in major current systems. At the juvenile stage (estimated at 5 to 6 years) they leave the open-ocean habitat and retreat to protected lagoons and open coastal areas that are rich in seagrass or marine algae (Bresette et al. 2006), where they would spend most of their lives (Bjorndal and Bolten 1988). Along Florida's Atlantic coast, juvenile green sea turtles occur in high-wave-energy, nearshore reef environments less than 2 m deep that support an abundance of macroalgae and submerged aquatic vegetation (Holloway-Adkins 2006). Adult green sea turtles can also utilize these habitats in between migrations for mating and nesting.

Population and Abundance – Although nesting activity has been recorded in almost every coastal county in Florida, most green sea turtle nesting is concentrated along the southeast coast of Florida. Annual green sea turtle nest counts on core Index beaches since 1989 to 2014, have ranged from 267 to 36,195, peaking in 2013. Numbers show a mostly biennial pattern of fluctuation, with the 2013 counts exceeding twice the next highest year (FWC-FWRI 2015b). An annual average of 16,064 green sea turtles nested in Florida from 2010 to 2014, with 2013 representing an all-time record with 36,195 nests (18,190 in Brevard County). In 2014, however, only one green sea turtle nest was laid in Duval County. This is comparable to the past 5 years of available nesting data (FWC-FWRI 2015b). This nest was not on the NAVSTA Mayport beach; however, green sea turtles have nested (two nests) there as recently as 2013 (Loop 2015b). Green sea turtles have been recorded in the NAVSTA Mayport Turning Basin (U.S. Army Corps of Engineers [USACE] 2001). In addition to individuals from the Florida nesting population, adult and juvenile males and females from nesting colonies in the wider Caribbean could occur in the waters of the Action Area.

Predator/Prey Interaction and Foraging – The green sea turtle is the only species of sea turtle that, as a subadult and adult, primarily consumes plants and other types of vegetation (Mortimer 1995). Very young green sea turtles are omnivorous (Bjorndal 1997). Salmon et al. (2004) reported that post-hatchling green sea turtles were found to feed near the surface on seagrasses or at shallow depths on small jellyfish and fish eggs. Pelagic juveniles eat worms, young crustaceans, aquatic insects, grasses, and algae (Bjorndal 1997). The loss of eggs to land-based predators such as mammals, snakes, crabs, and ants occurs on some nesting beaches globally, though this is less of an issue in Florida due to intense nest protection efforts. As with other sea turtles, hatchlings may be preyed on by birds and fish. Sharks are the primary nonhuman predators of juvenile and adult green sea turtles at sea (NOAA Fisheries 2015k).

Threats – Specific threats to green sea turtles include harvest of eggs and adults (historically, though the practice continues in some areas of the world), incidental capture in fishing gear, and fibropapillomatosis (disease). General sea turtle threats include entanglement in gillnets, pound nets, and the lines associated with longline and trap/pot fishing gear; ingestion of or becoming entangled in marine debris; environmental contamination; and vessel strikes (NOAA Fisheries 2015h).

Critical Habitat – Critical habitat for the green sea turtle was designated in 1998 (63 FR 46693), but does not occur in or near the Action Area.

3.3.1.3 Leatherback Sea Turtle

Status and Management – Leatherback sea turtles were Federally listed as endangered throughout their range on June 2, 1970 (35 FR 8495). On October 10, 2012, USFWS and NMFS advertised the near conclusion of a 5-year review (2007 – 2012) for Kemp's ridley, olive ridley, leatherback, and hawksbill sea turtles (77 FR 161573). In November 2013, USFW and NMFS published the 5-Year Review: Summary and Evaluation report (NMFS and USFWS 2013a). Based on the best available information, USFWS and NMFS reported that they do not believe the leatherback sea turtle should be delisted or reclassified. However, USFWS and NMFS further reported that they have information that indicates an analysis and review of the species should be conducted in the future to determine the application of the DPS policy to the leatherback sea turtle (NMFS and USFWS 2013a).

Habitat and Geographic Range – Upwelling areas serve as nursery grounds for post-hatchling and early juvenile leatherback sea turtles because these areas provide a high level of prey (Musick and Limpus 1997). Late juvenile and adult leatherback sea turtles are known to range from mid-ocean to the continental shelf and nearshore waters (Grant and Ferrell 1993; Schroeder and Thompson 1987; Shoop and Kenney 1992). Juvenile and adult foraging habitats include both coastal and offshore feeding areas (Frazier 2001). In Florida, nesting begins around March and continues through July or August. Suitable nesting habitat occurs throughout Duval County and on the beaches of NAVSTA Mayport. The waters of the Action Area exterior to the turning basin may serve as nearshore foraging habitat when their preferred prey is nearby. Leatherback sea turtles may also occur in the Action Area while migrating between nesting habitat south of the Action Area on their way to more productive foraging habitat in the North Atlantic.

Population and Abundance – Since 1989, there has been a substantial increase in the nesting population along the east coast of Florida (FWC-FWRI 2015c). This increase has coincided with an upsurge in the wider Caribbean population. Leatherbacks typically nest along the beaches from Brevard County south to Broward County, south of the Action Area. Annual leatherback

sea turtle nest counts on core Index beaches since 1989 to 2014, have ranged from 27 to 641. These counts, however, do not include leatherback nesting at the beginning of the season before May 15, nor do they represent all the beaches in Florida where leatherbacks nest. The index provided by these counts does serve as a representative reflection of trends.

Similar to nest counts for green sea turtles, leatherback nest counts have been increasing exponentially. Contrarily, the FWC/FWRI Statewide Nesting Beach Survey Program Database as of February 20, 2015, reported an annual average of 1,440 leatherback sea turtles nested in Florida from 2010 to 2014, with 2014 recording 6,604 nests. In 2014, however, only one leatherback sea turtle nest was laid in Duval County, representing lower-than-average nesting activity for Duval County (FWC-FWRI 2015c). This nest was not on a NAVSTA Mayport beach; however, leatherback sea turtles have recently nested (three nests) there from 2011 through 2013 (Loop 2015b). In-water abundances for the Action Area are unknown. Leatherbacks from the Florida stock may occur in the nearshore waters of NAVSTA Mayport during the nesting season. Migrating individuals from other stocks may pass through or forage in Action Area waters, though it is unlikely that individuals from any stock would utilize the turning basin for foraging habitat.

Predator/Prey Interaction and Foraging – Leatherbacks have pointed tooth-like cusps and sharp-edged jaws that are adapted for a diet of soft-bodied open-ocean prey such as jellyfish, which are their main food source (Aki et al. 1994; Bjorndal 1997; James and Herman 2001; Salmon et al. 2004). Leatherback sea turtles feed throughout the water column (Davenport 1988; Eckert et al. 1989; Eisenberg and Frazier 1983; Grant and Ferrell 1993; James et al. 2005; Salmon et al. 2004). Globally, predators of leatherback sea turtles' eggs and hatchlings include feral pigs, dogs, raccoons, ghost crabs, and fire ants, though this is less of an issue in Florida due to intense nest protection efforts. As with other sea turtle species, leatherback hatchlings are preyed on by birds and large fish such as tarpon and snapper. Sharks and killer whales (*Orcinus orca*) are predators of adult leatherbacks (NMFS and USFWS 2007b).

Threats – Specific threats to leatherback sea turtles include harvest of eggs and adults, and incidental capture in fishing gear. General sea turtle threats include entanglement in gillnets, pound nets, and the lines associated with longline and trap/pot fishing gear; ingestion of or becoming entangled in marine debris; environmental contamination; and vessel strikes (NOAA Fisheries 2015h).

Critical Habitat – Critical habitat was designated for the leatherback's terrestrial environment on St. Croix in 1978. No critical habitat occurs along the continental U.S. for the leatherback sea turtle. Revision to the critical habitat designation was finalized for specific areas in the Pacific on January 26, 2012 (77 FR 4170).

3.3.1.4 Hawksbill Sea Turtle

Status and Management – The hawksbill was Federally listed as endangered on June 2, 1970 (35 FR 8495). On October 10, 2012, USFWS and NMFS advertised the near conclusion of a 5-year review (2007 – 2012) for Kemp's ridley, olive ridley, leatherback, and hawksbill sea turtles (77 FR 161573). In June 2013, USFW and NMFS published the 5-Year Review: Summary and Evaluation report (NMFS and USFWS 2013b). Based on the best available information, USFWS and NMFS reported that they do not believe the hawksbill sea turtle should be delisted or reclassified.

Habitat and Geographic Range – The hawksbill is the most tropical of the world's sea turtles, rarely occurring above 35° N or below 30° S (The State of the World's Sea Turtles Team 2008; Witzell 1983). Hatchlings are believed to occupy open-ocean waters, associating themselves with surface algal mats in the Atlantic Ocean (Parker 1995; Witherington and Hirama 2006; Witzell 1983). Juveniles leave the open-ocean habitat after 3 to 4 years and settle in coastal foraging areas, typically coral reefs (Mortimer and Donnelly 2008). Juveniles and adults share the same foraging areas, including tropical nearshore waters associated with coral reefs, hardbottoms, or estuaries with mangroves (Musick and Limpus 1997). Hawksbills are common in the waters off southern Florida, although nesting is rare. Hawksbill sea turtles use different habitats at different stages of their life cycle, but are most commonly associated with healthy coral reefs (NOAA Fisheries 2015e). Sightings north of Florida are rare, and Texas is the only other state where hawksbills are sighted with any regularity (Keinath et al. 1991; Lee and Palmer 1981; Parker 1995; Plotkin 1995).

Population and Abundance – The 2007 5-year review (NMFS and USFWS 2007b) assessed nesting abundance and nesting trends in all regions inhabited by hawksbill sea turtles. An analysis of 25 index sites around the world indicated that hawksbill nesting has declined globally by at least 80 percent over the last three hawksbill generations (Meylan and Donnelly 1999). In the wider Caribbean, population trends vary, and trends are not known for many locations (NMFS and USFWS 2007b). Nesting data for Duval County or Florida are not available, as hawksbill sea turtles nest rarely or not at all in Florida. Hawksbill sea turtles are cryptic nesters (Bjorndal et al. 1985), and the rare hawksbill nest could be missed in areas with high number of other species nesting, or where beach coverage is incomplete. Because of its location north of the species' normal nesting range, and its lack of suitable juvenile and adult habitat, it is very unlikely that any hawksbill sea turtles would occur in the Action Area. There has been no documented hawksbill nesting on NAVSTA Mayport beaches from 1998 to 2014 (Loop 2015b).

Predator/Prey Interaction and Foraging – Older juvenile and adult hawksbill sea turtles fill a unique ecological niche in marine and coastal ecosystems, feeding on sponges helps to control populations of sponges that may otherwise compete for space with reef-building corals (Hill 1998; Leon and Bjorndal 2002). Post-hatchling hawksbills feed on floating *Sargassum* in the open ocean (Plotkin and Amos 1998). During the juvenile stage, hawksbills are considered omnivorous, feeding on sponges, sea squirts, algae, mollusks, crustaceans, jellyfish, and other aquatic invertebrates (Bjorndal 1997). As with other sea turtles, hatchlings may be preyed on by terrestrial predators upon emergence from the nest, and birds and fish at sea. Sharks are the primary nonhuman predators of juvenile and adult hawksbills at sea (Witzell 1983).

Threats – The Services believe that hawksbills remain in danger of extinction because of ongoing and threatened destruction, modification, and curtailment of their habitat. Specific threats to hawksbill sea turtles include habitat loss of coral reef communities, harvest of their eggs and meat, commercial exploitation (historically, but still permitted in some parts of the world), increased recreational and commercial use of nesting beaches in the Pacific, and incidental capture in fishing gear. One of the most detrimental human threats to hawksbill sea turtles is the intentional and intensive exploitation of eggs from nesting beaches. In some countries, very few eggs hatch outside protected hatcheries (Mortimer and Donnelly 2008), particularly in Indonesia, Thailand, Malaysia, and Sri Lanka. General sea turtle threats include entanglement in gillnets, pound nets, and the lines associated with longline and trap/pot fishing gear; ingestion of or becoming entangled in marine debris; environmental contamination; and vessel strikes (NOAA Fisheries 2015h).

Critical Habitat – Critical habitat was designated for hawksbill terrestrial nesting areas in Puerto Rico in 1982 (47 FR 27295), but it does not occur in or near the Action Area.

3.3.1.5 Kemp's Ridley Sea Turtle

Status and Management – The Kemp's ridley sea turtle was listed as endangered throughout its range on December 2, 1970 (35 FR 18320). On October 10, 2012, USFWS and NMFS advertised the near conclusion of a 5-Year review (2007 to 2012) for Kemp's ridley, olive ridley, leatherback, and hawksbill sea turtles (77 FR 161573). The 5-Year Review: Summary and Evaluation report for Kemp's ridley sea turtle resulting from this USFWS and NMFS review effort is not available.

Habitat and Geographic Range – The Kemp's ridley sea turtle is found only in the Gulf of Mexico and North Atlantic Ocean, north of the Caribbean Sea. Habitats frequently used by juvenile and adult Kemp's ridley sea turtles are warm-temperate to subtropical sounds, bays, estuaries, tidal passes, shipping channels, and beachfront waters, where their preferred food, the blue crab, is abundant (Lutcavage and Musick 1985; Seney and Musick 2005). Juveniles migrate to habitats along the U.S. Atlantic continental shelf from Florida to New England (Morreale and Standora 1998; Peña 2006) at around 2 years of age. Adult female Kemp's ridley sea turtles take part in mass synchronized nesting emergences known as "arribadas" on only a few nesting beaches; this nesting strategy is unique to *Lepidochelys* spp. Kemp's ridley sea turtles may also be solitary nesters, but this is less common and generally occurs outside of the main nesting areas in Mexico. Only rare nesting is known to occur on the east coast of Florida and has not been documented in Duval County in the last 25 years (FWRI 2014).

Population and Abundance – The Final Bi-National (U.S. and Mexico) Revised Recovery Plan in English and Spanish (2nd revision) reported that from 2002 to 2010, a total of 911 Kemp's ridley nests have been documented on the Texas coast (NMFS et al. 2011). This is more than 11 times the 81 nests recorded over the previous 54 years from 1948 to 2001 (Shaver and Rubio 2008, Shaver et. al 2005). An updated population model predicts the population would grow 19 percent per year from 2010 to 2020, assuming current survival rates within each life stage remain constant. The population could attain at least 10,000 nesting females (one criterion for downlisting) in a season by 2011 (NMFS et al. 2011). Historic nesting records range from Mustang Island, Texas, in the north to Veracruz, Mexico in the south. Most nesting occurs in Mexico. The main nesting beach is a 16-mile stretch of beach near the village of Rancho Nuevo in Tamaulipas, Mexico. In 2014, a total of 119 nests were recorded in Texas, 103 of which were documented at Padre Island National Seashore (National Park Service 2015). Kemp's ridley sea turtles have been recorded in nearby Kings Bay, Georgia, and thus may be present in the NAVSTA Mayport Turning Basin (USACE 2006). Occurrences within the turning basin are expected to be seasonal, rare, and correlated with presence of preferred prey species. Nesting is not expected to occur near the Action Area and no nests have been documented on NAVSTA Mayport beaches since 1998 (Loop 2015b).

Predator/Prey Interaction and Foraging – Kemp's ridley sea turtles feed primarily on crabs but are also known to prey on molluscs, shrimp, fish, jellyfish, and plant material (Frick et al. 1999; Marquez-M. 1994). Blue crabs and spider crabs are important prey species for the Kemp's ridley (Keinath et al. 1987; Lutcavage and Musick 1985; Seney and Musick 2005). Major predators of Kemp's ridley sea turtle eggs and hatchlings on nesting beaches include raccoons, dogs, pigs, skunks, badgers, and fire ants. Predatory fishes such as jackfish and redfish may feed

on hatchlings at sea. Sharks are the primary predator of juvenile and adult Kemp's ridley sea turtles (NMFS and USFWS 2011).

Threats – Specific threats to Kemp's ridley sea turtles include incidental capture in fishing gear (primarily in shrimp and other trawls, but also in gill nets, longlines, traps/ pots, and dredges) and egg collection (historically). General sea turtle threats include entanglement in gillnets, pound nets, and the lines associated with longline and trap/pot fishing gear; ingestion of or becoming entangled in marine debris; environmental contamination; and vessel strikes (NOAA Fisheries 2015h).

Critical Habitat – In 2010, NOAA Fisheries and USFWS were jointly petitioned to designate critical habitat for Kemp's ridley sea turtles in nesting beaches along the Texas coast and marine habitats in the Gulf of Mexico and Atlantic Ocean (WildEarth Guardians 2010). No further consideration of this petition has been documented.

SECTION 4.0
Environmental Setting

4.0 Environmental Setting

4.1 Exclusions

Wharf Bravo repairs and maintenance activities associated with the Project would have no effect on terrestrial wildlife. Project activities would occur entirely within the water and immediate vicinity of the Wharf Bravo structures. Construction activities would not adversely impact terrestrial habitats and airborne sound associated with construction would not harm native terrestrial wildlife (e.g., where wildlife for this BA does not include birds). Any land-based construction equipment and material staging or support activities, if required, would take place in previously disturbed and built areas of NAVSTA Mayport. Therefore, the activities associated with the Project would have no effect on terrestrial wildlife.

4.2 Water Quality

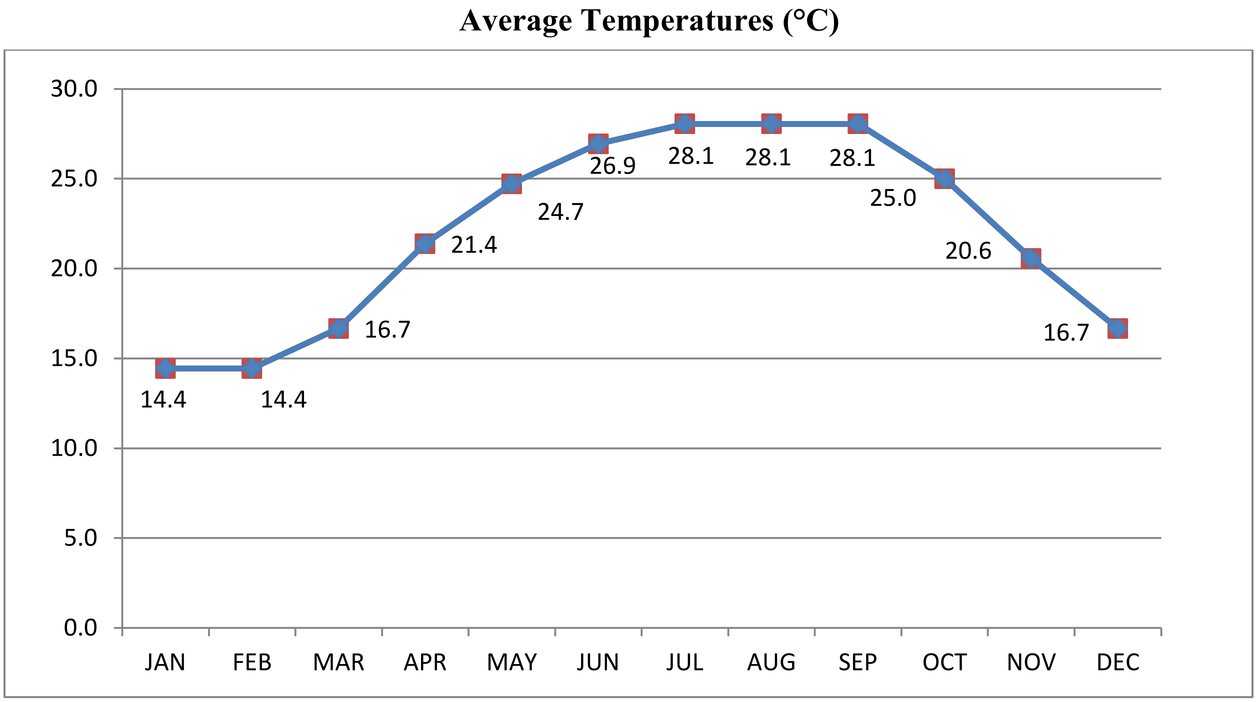
Salinity and temperature data for the Action Area are summarized in Table 4-1 and Figure 4-1, respectively. Based on available data, the water quality in the NAVSTA Mayport Turning Basin and entrance channel meets the Florida Department of Environmental Protection Class III Marine Water Quality Standards (DON 2013). Tides within the NAVSTA Mayport entrance channel are semi-diurnal (two highs and two lows per day). The mean and spring tidal ranges at the NAVSTA Mayport Turning Basin are 4.5 ft to 5.3 ft, respectively.

Table 4-1. Minimum and Maximum Surface and Bottom Salinities

Location	Tide	Water Column	Salinity (psu/ppt)[1]
NAVSTA Mayport Turning Basin	Ebb	Surface	30.6
		Bottom	33.8
	Flood	Surface	30.2
		Bottom	33.6
NAVSTA Mayport Entrance Channel	Ebb	Surface	30.0
		Bottom	32.4
	Flood	Surface	32.4
		Bottom	34.7
Federal Navigation Channel	Ebb	Surface	32.5
		Bottom	33.8
	Flood	Surface	33.3
		Bottom	35.2

Source: DON 2008 Note: [1] psu = practical salinity units; ppt = parts per thousand

Water temperatures for the Action Area are best described by the average monthly temperatures from the closest NOAA National Oceanographic Data Center tide station located at Bar Pilot's Dock. Seasonal water temperatures for 2014 ranged from 58.0 °F (14.4 °C) in January to 78 °F (28.1 °C) during July through August (Figure 4-1).



Source: NOAA, National Oceanographic Data Center (NODC) 2015

Figure 4-1. Average Monthly Surface Water Temperatures for 2014 at Bar Pilot's Dock, St. Johns River, Mayport, Florida

Due to the close proximity of the Atlantic Ocean, the presence of semi-diurnal tides and other hydrodynamic influences, flushing occurs continually within the NAVSTA Mayport Turning Basin and NAVSTA Mayport Entrance Channel. As part of an elutriate analysis, turning basin surface water samples were collected in March 2000 and analyzed for metals and semivolatile organic compound. No detectable concentrations of these substances were found in the samples, illustrating the relatively high quality of water and sediment in the NAVSTA Mayport Turning Basin (DON 2000).

Only limited information is readily available for dissolved oxygen levels in the turning basin or entrance channel. Data collected in 1993 revealed no significant stratification from the surface to -40-foot water depths. Despite the deep water depths and hot summertime conditions, the maximum dissolved oxygen change from top to bottom was 1.43 parts per million (ppm) (ppm is equivalent to milligrams/liter) and the minimum change was 0.20 ppm. No values were less than 4.0 ppm and many values were above 5.0 ppm, suggesting that mixing is ongoing (DON 2000).

4.3 Marine Sediments

The Project is expected to disturb and temporarily suspend marine sediment in the water column. The use of the vibratory hammer and (contingency only) impact hammer could cause the fine silt and clay layers to be susceptible to liquefaction and subsequent contraction. Suspended sediments would be localized to the immediate area of the pile being driven, and are expected to quickly settle back to the bottom of the Action Area.

The NAVSTA Mayport turning basin was constructed during the early 1940s by dredging the eastern part of Ribault Bay. Dredge material from the basin was used to fill parts of Ribault Bay

and other low-lying areas in order to elevate the land surface. The basin was originally dredged to a depth of -29 ft MLLW, and in 1952, the basin was deepened to a depth of -40 ft MLLW to provide access to larger ships. Prior to 1960, the turning basin was dredged to -42 ft MLLW. The NAVSTA Mayport Turning Basin is currently maintained at an average depth of -42 ft MLLW, with ship berths ranging in depth from -30 to -50 ft MLLW. The NAVSTA Mayport Turning Basin is a deepwater surface ship berthing facility whose entrance channel meets the main navigation channel at the mouth of the St. Johns River. The NAVSTA Mayport Entrance Channel is approximately 500 ft wide, extending approximately 5,000 ft until it joins with the Federal Navigation Channel. The depth ranges of the Federal Navigation Channel are between -51 ft to -42 ft MLLW (DON 2008).

Sediment sampling and testing conducted in March 2007, in support of the *Final EIS for the Proposed Homeporting of Additional Surface Ships at Naval Station Mayport, Florida* (DON 2008), indicated sediments within the NAVSTA Mayport Turning Basin consist primarily of fine grained materials (e.g., silt and clay). Six sediment samples were collected. Water depths in the NAVSTA Mayport Turning Basin ranged from -40 ft to -45 ft MLLW. The sediment that lies on the surface is silt/clay across the basin floor, ranging in thickness from 3 ft to 10 ft (DON 2008). Five of the six March 2007 sediment samples were analyzed for the presence of chemical contaminants. Testing was conducted for bulk chemical parameters including metals, polychlorinated biphenyls, semi-volatile organics or polycyclic aromatic hydrocarbons, pesticides, and inorganics. The majority of these tests did not detect the presence of any contaminants in the dredge profile. The analyses did, however, find low concentrations of metals, some polycyclic aromatic hydrocarbons analytes (PAH), and some polychlorinated biphenyls (PCB) in the samples.

Of the substances detected in the NAVSTA Mayport Turning Basin sediments, only one metal (arsenic) and two of the PAHs (acenaphthene and fluorine) had concentrations exceeding NOAA Effects Range Low thresholds in two of the five sediment samples collected. These three incidents of exceedance are only slightly above the Effects Range Low threshold and are well below the Effects Range Medium levels. All of the other detected concentrations of metals, PAHs, and PCBs are well below the respective Effects Range Low levels (DON 2008). Results of the tests generally reflected a low contamination level for marine sediments in the NAVSTA Mayport Turning Basin to depths of -56 ft MLLW. Additionally, the contaminant levels of the March 2007 results correlate favorably with those found during testing conducted prior to recent maintenance dredging projects at NAVSTA Mayport (DON 2008).

Construction activities would not result in the discharge of wastes containing metals or otherwise alter the concentrations of trace metals in bottom sediments. Construction activities would also not result in the discharge of high levels of contaminants or otherwise alter the concentrations of organic contaminants in bottom sediments. Because the magnitude of metal and organic compound concentrations in sediment can vary as a function of grain size (higher concentrations typically are associated with fine-grained sediments due to higher interior surface areas), small changes in grain size associated with construction-related disturbances to bottom sediments could result in minor changes in metal and organic compound concentrations. Due to the small scale of temporary operations and the general lack of sediment contaminants in the Action Area, there would be no long-term impacts on sediments.

4.4 Estuarine Habitat

Project activities within the NAVSTA Mayport Action Area would not directly or indirectly affect inland freshwater habitats. The St. Johns River's highest flows occur at the mouth, at times exceeding 150,000 cubic feet per second (Bourgerie 1999). It is tidally influenced by the ocean, producing an estuarine environment with the generally constant 36 parts per thousand salinity of the Atlantic Ocean (USACE 1994). The area of the St. Johns River where NAVSTA Mayport is located is on the southern side of the ocean inlet. Water movement characteristic of inlets on the east coast of Florida typically includes extreme inflow and outflow of the area where the inlet meets the ocean. It would be assumed that this extreme movement of water during a flood tide would result in water from the area near NAVSTA Mayport potentially affecting (by temporarily increased sediment suspension) areas west of the inlet that are brackish, and eventually freshwater. But unlike the majority of the rivers in the United States, the St. Johns River's flow is from south to north, and then east towards the inlet to the ocean (St. Johns River Water Management District 2007).

4.5 Marine Vegetation

Features that influence the distribution and abundance of marine vegetation in the Action Area are the availability of light, water quality, water clarity, salinity level, seafloor type (important for rooted or attached vegetation), currents, tidal schedule, and temperature (Green and Short 2003). Marine ecosystems depend almost entirely on the energy produced by marine vegetation through photosynthesis (Castro and Huber 2000). In the lighted surface waters of coastal waters, marine algae and flowering plants provide oxygen and habitat for many organisms in addition to forming the base of the marine food web (Dawes 1998). The Action Area habitats include hardened shorelines grading steeply to depths of over 12 m (40 ft.) (NOAA 2015a) in sheltered, high salinity estuarine waters (NOAA 2015b). Substrate on the bottom is dredged, unconsolidated material (USGS 2000).

Algae can typically grow down to bottom areas receiving one percent or more of surface light intensity (Wetzel 2001). Microalgae, including phytoplankton, are widespread and abundant in the estuarine water column where light is sufficient for growth. The dominant genus of floating macroalgae, *Sargassum,* is widely distributed in offshore waters of the North Atlantic Ocean (Gower and King 2008; South Atlantic Fishery Management Council 2002), but may find its way to nearshore water and estuaries on the winds and tides. Attached macroalgae (i.e., kelp, seaweed) form "meadows" or "beds" where they dominate intertidal shores or subtidal bottoms. Although kelp does not occur in the Action Area (Mathieson et al. 2009; Steneck et al. 2002), other species of seaweeds may grow attached to hard bottom substrate (Nybakken 1993) in the Action Area. Green seaweed species (e.g., *Enteramorpha, Ulva, Codium*) may also grow on mudflats in sheltered estuarine waters (Gosner 1978). Attached macroalgae inhabit the hardened shoreline and shallower depths of the Action Area. Despite comprehensive mapping efforts, there are no seagrass beds mapped in this area of Florida, (FWC-FWRI 2013). There are no anticipated population-level impacts on any species of marine vegetation from Project activities.

4.6 Marine Invertebrates

The hardened structures along the shoreline provide habitat for sedentary invertebrate beds and associated mobile invertebrates. There may also be slow-moving invertebrates inhabiting the

sediment around the base of the pier footprint, and highly-mobile species in the overlying water column. No Federally listed or candidate marine invertebrate species, however, occur in the Action Area. The Project would impact benthic invertebrates (oysters on the pile and bulkhead structures) through burial or replacement of existing substrate foundations, disruption of the sediment surface, and subsurface during the installation of each pile. The estimated area of vertical oyster habitat impacted depends on the surface area of subtidal structures buried (concrete fill) and the density-at-depth distribution of oysters. The perimeter of the concrete curtain is 609 m (2,000 ft) x approximately 1 m (6 ft) (visible width of oyster reefs), which equals an area of 609 m^2 (0.15 acres). This area assumes equal width of oyster reef along the entire length, and no growth on the support pilings and submerged debris.

4.7 Prey Fishes

The St. Johns River provides nursery and refuge areas for a number of euryhaline forage fish species including shads, herrings, anchovies, and some species of juvenile panfish (NOAA 2015a). As a result, these species may also occur within the Action Area. Small, schooling fishes form a critical link between the marine zooplankton community and larger predatory fish, seabirds, and marine mammals in the marine food web (Penttila 2007). They feed mainly on zooplankton and smaller fish and reside in the upper levels of the water column and nearshore areas. It is expected that forage fish would be present in the Action Area year-round. All species would most likely be present in larger abundances during peak spawning time, generally late winter and early spring (NOAA 2015a).

There are no anticipated population-level impacts on any species of fish from Project noise or other activities. Analyses performed for Federally listed and candidate fish species (Section 6.1.2 and Appendix E; Fundamentals of Acoustics) suggest low likelihood of negative effects on fish, and only when they are very close to an intense sound source. Individual fish near the vicinity of in-water Project activities may experience sound intensities that could affect their behavior or damage their hearing ability. Since many fish use their swim bladders for buoyancy, they are susceptible to rapid expansion/decompression due to peak pressure waves from underwater noises (Hastings and Popper 2005). The onset of injury threshold resulting from this rapid expansion/decompression is supported by data presented on selected species by the Fisheries Hydroacoustic Working Group (2008). However, since nearly all pile driving will be vibratory, peak pressure waves will be mitigated, which will greatly reduce the acoustic risks to fishes.

The Action Area also includes unconsolidated seafloor habitats, estuarine and intertidal habitats (subtidal flats, attached macroalgae, and oyster reefs), and marine water column (high salinity bay and open estuarine waters) components of EFH for fishery management units including the snapper-grouper complex, coastal migratory pelagics, shrimp, and the summer flounder (*Paralichthys dentates)*. The EFH habitat components for each of these managed species would experience only temporary impacts of minor intensity. In compliance with the Magnuson-Stevens Act and to support an informal EFH consultation, the Navy submitted the associated EA containing the EFH Assessment to NMFS, Division of Habitat Conservation.

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SECTION 5.0
Project Details

5.0 Project Details

5.1 Project Schedule

Repairs and facilities maintenance to Wharf Bravo would occur over a 12- to 24-month period projected to begin on or after October 1, 2016. In-water pile driving work would be conducted year-round as needed, for no more than 130 days total.

5.2 Access and Staging

Since there are no weight-bearing or structural integrity issues on the current Wharf Bravo, crane barges would likely not be necessary, and shore-based equipment would be deployed. Shore-based equipment consisting of a pile installation suite (pile leads, vibratory hammer, and an impact hammer) would mobilize to the project site. Any land-based construction equipment and material staging or support activities, if required, would take place in previously disturbed areas. No clearing or excavation would be required. Piles and sediments would be stored in a containment area near the Project location. The level of vehicular and marine traffic would not differ significantly from that of current conditions at NAVSTA Mayport. Barge operations, if required, may be restricted to tide elevations adequate to prevent grounding of a barge.

5.3 Project Components

The Project would perform recapitalization at Wharf Bravo. These activities include the construction of a new steel sheet pile bulkhead that ties into an existing steel sheet pile structure, placement of fill between the existing and new steel sheet pile bulkheads, installation of a concrete pile cap and concrete encasement of sheet pile, asphalt wharf deck paving, repairs to electrical and mechanical shore utilities, and upgrades to area lighting and AT/FP waterfront enclave facilities. The Project would result in a wharf footprint increase of approximately 12,000 square feet (ft^2; 1,115 square meters [m^2]) and installation of downward-facing, shielded lighting on and around the wharf surface.

Construction using metal sheet piles would be configured as interlocking pairs (Illustration 5-1) where each single pile dimension is approximately 27.56 in (70 cm) by 19.69 inches (50 cm). Since piles would be driven in pairs, the disturbance footprint is estimated to be approximately 7.535 ft^2 (0.70 m^2). A sheet pile in the form of a plank would be driven in close contact or interlocking with others to provide a tight wall to resist the lateral pressure of water, adjacent earth, or other materials.

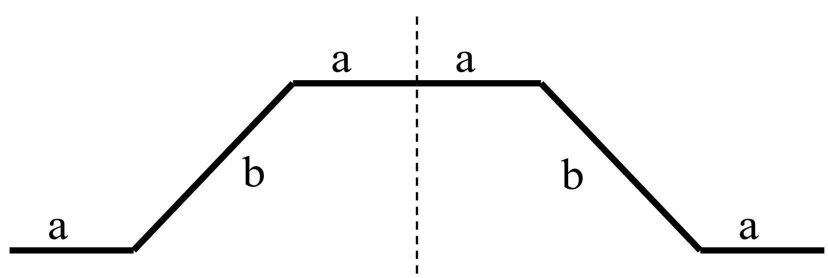


Illustration 5-1. Diagram of an AZ 19-700 Style Sheet Pile Pair

The wall would be anchored at the top and fill consisting of clean gravel or flowable concrete would be placed behind the wall. A concrete cap would be formed along the top and outside face of the wall to tie the entire structure together and provide a berthing surface for vessels (Illustration 5-2).

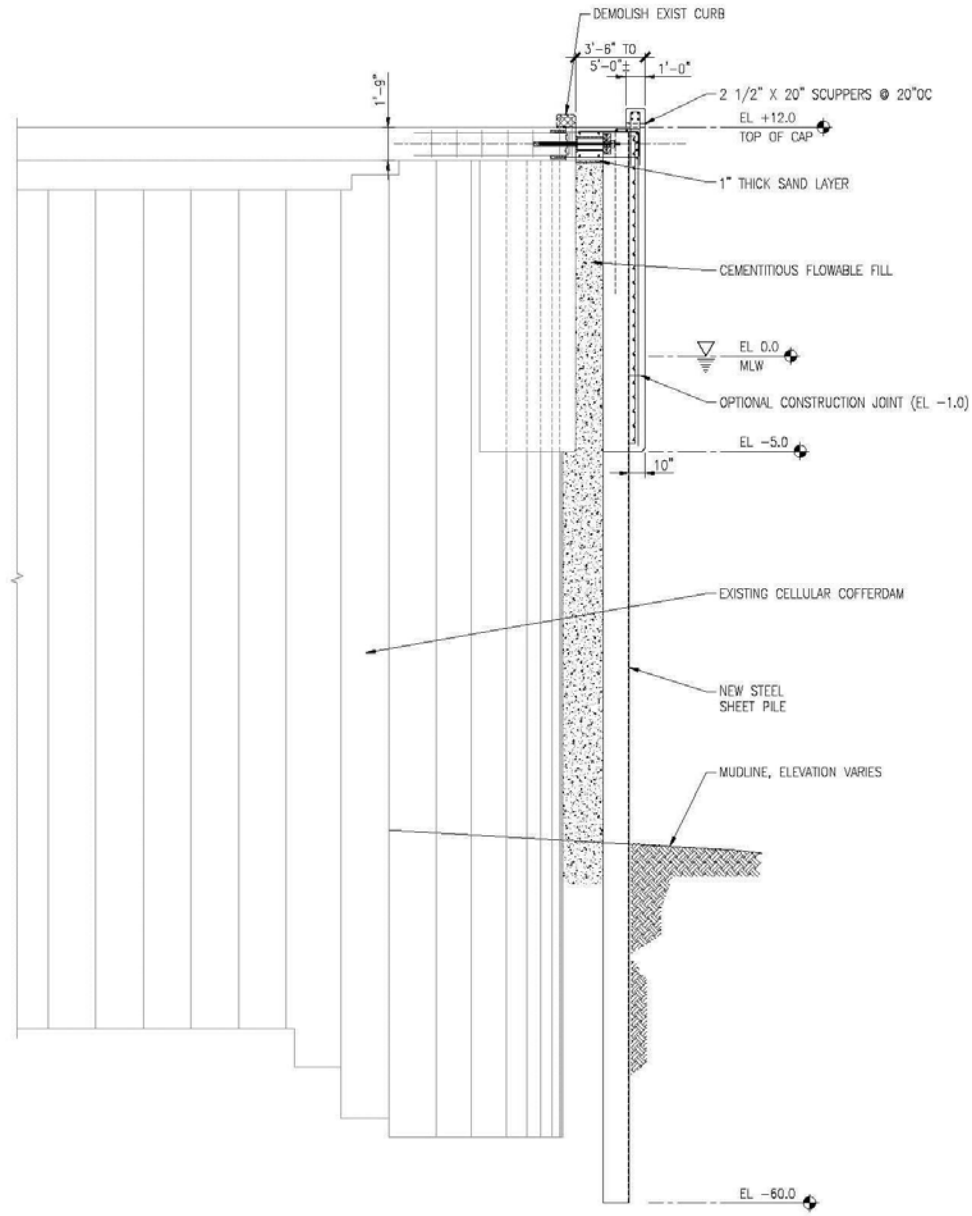


Illustration 5-2. Lateral View of Project Plan

The Project would include the installation of approximately 880 single sheet piles to be conducted in two phases. Phase I (Wharves B-2 and B-3) would include the installation of approximately 590 single sheet piles over the course of approximately 73 days, averaging approximately 10 sheet pile pairs installed per day. Phase II (Wharf B-1) would include the installation of approximately 290 single sheet piles over the course of approximately 37 days, averaging approximately eight to nine sheet piles installed per day. Of the 130 days of installation, 110 days are reserved for vibratory hammer driving, and the remaining 20 days are reserved for contingency impact driving.

Vibratory pile driving would be continuous for each pile and is anticipated to require no more than 45 seconds to drive a sheet pile pair to depth. This method of pile driving would be used every day to drive up to 10 piles a day. Impact pile driving would only be used as a contingency when the substrate or a buried obstruction prevents vibratory pile driving from being successful. Impact pile driving is intermittent, such that the hammer must be repeatedly lifted and dropped, creating an interval of silence between each strike.

As a point of reference, only 2 days of impact pile driving occurred during the adjacent Wharf Charlie One (C-1) project in 2012 (DON 2013). Impact pile driving, if it were to be necessary, could occur on the same day as vibratory pile driving, but driving rigs would not be operated simultaneously. No net change in the amount of vessel traffic in or around the NAVSTA Mayport Turning Basin is anticipated as a result of the Project. No dredging is required or anticipated during the Project.

5.3.1 Construction Activities

Construction activities would include the following:

- demolish existing concrete pile cap, wharf deck, and utilities (including lateral supply lines from utilities such as water and electrical)
- remove existing miscellaneous concrete and timber pile obstructions
- install new steel combination wall with tieback anchors
- place a combination of self-hardening, flowable fill, and clean fill between existing and new walls
- install new concrete cap that partially encases the new steel wall
- install sacrificial anode cathodic protection system for the new steel wall
- install new foam-filled fenders
- install new utilities
- repair wharf deck by milling and re-paving
- upgrade area lighting fixtures with light-emitting diode (LED) fixtures
- replace security fencing

5.3.2 Construction Sequence

5.3.2.1 Preparation and Demolition

- Existing underwater obstructions and debris that may interfere with the installation of the new steel sheet pile wall would be removed utilizing divers and cranes. It is quite probable that multiple concrete and timber piles would be removed from the Study Area utilizing a crane. The points where the new steel sheet pile wall attaches to the existing sheet pile wall would be demolished above and below the waterline to expose the existing steel.
- Along the face of the existing wall, the curb and a portion of existing concrete cap would be removed to accommodate the new concrete pavement that would be placed between

the new wall and the existing wall. The concrete apron along the waterside perimeter of the wharf and the utilities (including lateral supply lines from utilities such as water, fuel, steam, waste, electrical, and communications) would be removed.

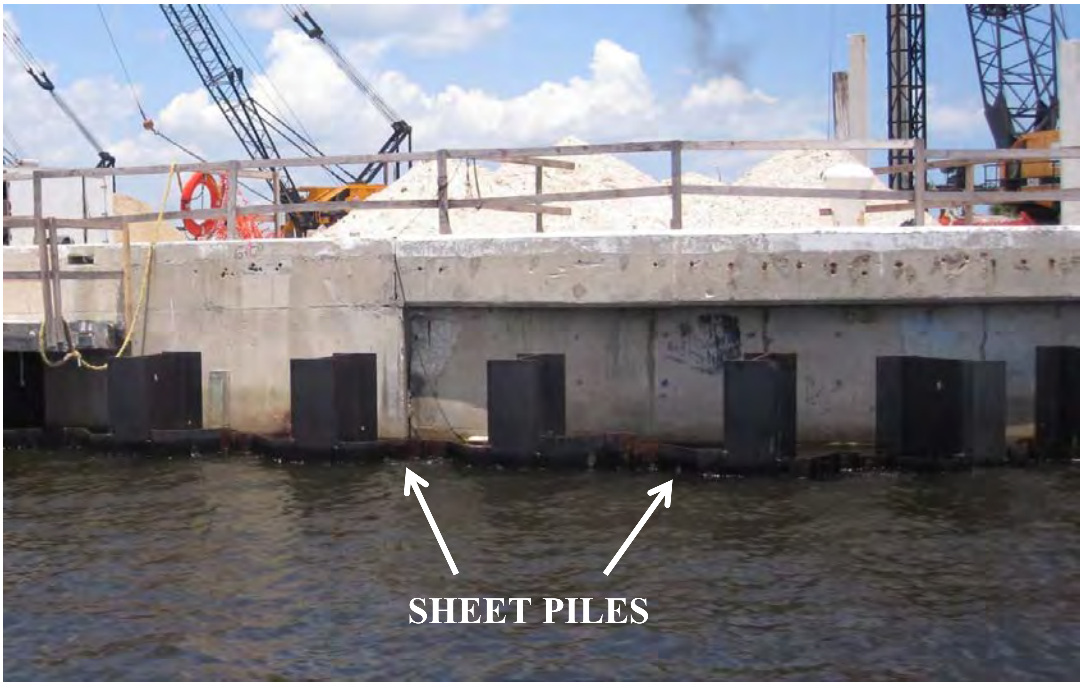
5.3.2.2 Installation of New Bulkhead

- Since there are no weight-bearing or structural integrity issues on the current Wharf Bravo, crane barges would likely not be necessary, and shore-based equipment would be deployed. Shore-based equipment consisting of a pile installation suite (pile leads, vibratory hammer, and an impact hammer) would mobilize to the project site. Once properly aligned, the metal sheet piles would be driven to the appropriate depth using the vibratory hammer (Photograph 5-1).

Photograph 5-1. Vibratory Installation of Sheet Piles at NAVSTA Mayport

- Sheet piles would be driven in pairs (Photograph 5-2). A total of 880 single sheet piles would be installed. Installation of up to a maximum of 10 sheet pile pairs per pile-driving day is anticipated. Impact driving would be a contingency employed only if vibratory methods are inadequate; a similar project that has been completed at adjacent Wharf C-1 required impact pile driving on only seven piles (DON 2013a).
- Once all of the piles are driven, closure plates would be attached between the existing adjacent sheet pile walls and the new wall end terminations. Typically, these are welded in place using underwater welding techniques.
- In general, the pile-driving process begins by placing a choker cable around a pile and lifting it into vertical position with a crane. The pile is then lowered into position inside the template and set in place at the mudline. During vibratory driving, the pile is

stabilized by the template while the vibratory driver installs the pile to the required tip elevation.



Photograph 5-2. Sheet Piles at NAVSTA Mayport

- Impact hammers have guides that hold the hammer in alignment with the pile while a heavy piston moves up and down, striking the top of the pile, driving the pile into the substrate from the downward force of the hammer.

- Once piles are in position, installation typically takes 45 seconds (per sheet pile pair) to reach the required tip elevation depending on site conditions (e.g., bedrock, loose soils), driving method, and equipment used.

5.3.2.3 Placement of Fill Behind Wall

- After the anchors are installed, fill operations would be conducted behind the new wall. This would consist of placement of either gravel fill or concrete flowable fill into the space behind the wall; trapped water behind the wall would be displaced.

5.3.2.4 Form and Placement of Pile Cap

- After the fill operation has been completed, the concrete pile cap would be formed and placed along the top of the new interlocking sheet pile wall. This would consist of installation of either wood or steel forms along the top of the wall down to some point below mean low water elevation. Water would be removed from the forms, steel reinforcement would be placed in the forms, and concrete would be poured to the required elevations.

5.3.2.5 Deck and Utility Replacement

- After the pile cap is in place, a new reinforced concrete apron would be installed, and the wharf deck would be repaired by milling and paving. A new high-mast lighting system,

new security fencing, and new utilities would be installed to replace those that were removed.

5.3.2.6 Lighting Fixture Upgrades

- Lighting is required to support the maintenance and repair activities associated with Wharf Bravo. Safety and security lighting for personnel required to operate during hours of darkness on the wharf is also required. In accordance with Unified Facilities Criteria (UFC) 3-530-01 (Department of Defense [DoD] 2012) and UFC 4-152-01 (DoD 2015) Wharf Bravo lighting would be designed for lighting levels commensurate to lighting zones (LZ) 2 to LZ3.

- Currently lighting of the wharf is accomplished utilizing "cobra head" street lights mounted on 30-ft-high poles. The estimated lighting levels from these fixtures vary between 3.0 footcandles (30LUX [one lumen per square meter]) and 0.0 foot-candle (0LUX). This lighting level is inconsistent with the UFC requirements for working areas of the wharf. The existing fixtures have a glass refractor on the face of the fixture to direct the light from the source. Refractors tend to allow stray illumination into the night sky causing light pollution.

- Wharf Bravo is within the clearance zone of the adjacent airfield. Therefore, height restrictions have been imposed on the lighting poles currently employed. Due to the current FAA waivers, the new lighting system would maintain the existing pole locations and 30-ft-heights.

- The new fixtures would utilize light-emitting diode (LED) light technology and would be full cutoff type with a Backlight-Uplight-Glare (BUG) rating of B1-B2, U0, and G1-G2. The main lighting units would provide approximately 3.0 footcandles average illumination for the wharf with a sharp cutoff at the edge of Wharf Bravo. A secondary lighting system would be provided for times of low activity. This system would provide 0.5 foot-candle of illumination at a "turtle friendly" 590 nanometers wavelength (approximately 1,800 degrees kelvin) yellow/red color temperature, substantially reducing the amount of light pollution allowed by the current lighting system.

- There are fourteen (14) 30-ft light poles currently on Wharf Bravo with two street lights on each pole. Fourteen (14) new 30-ft-high light poles would be installed in those same locations. Each new light pole would have six (6) light fixtures mounted to the pole; two (2) LED turtle light fixtures, two (2) LED area light fixtures (flood light), one (1) LED street light fixture, and one (1) obstruction light fixture (FAA). The two (2) flood light LED fixtures would only be turned on during berthing operations. The two (2) turtle LED light fixtures would be turned on from dusk to dawn, providing lighting similar to parking lot conditions. The one (1) street LED light fixture would provide roadway lighting for the road behind the fence of Wharf Bravo.

- After-dark operations on Wharf Bravo would require the use of the primary white lights to facilitate operational safety and mitigate potential liability for injuries or accidents. Otherwise, only the secondary turtle-friendly lights would be used after dark. The LED area light fixtures (flood lights) would only be turned on during berthing operations. These fixtures are Dark Sky Friendly, International Dark-Sky Association (IDA) approved with a color temperature of 4000 Kelvin at 70 color rendering index (CRI).

- From dusk to dawn, the LED turtle light fixtures would be turned on along Wharf Bravo. These fixtures are listed as turtle friendly with an Amber color of 590 nanometers (standard), designed to provide an average illumination level of 0.5 foot-candle on the wharf surface. The street LED light fixtures are similar to street LED fixtures already installed at Mayport. These fixtures have a color temperature of 4000 Kelvin at 70 CRI and have a BUG rating of B2 U0 G2 (Uplight = 0). These fixtures also have a backlight shield as an accessory option to block any backlight or glare onto Wharf Bravo, if required, to prevent directional light towards nesting beaches on NS Mayport to the east and Huguenot Park to the north. These fixtures are designed to provide an average illumination level of 1.0 foot-candle along the road behind Wharf Bravo.

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SECTION 6.0
Effects Analysis

6.0 Effects Analysis

Effects on all Federally listed and Federal candidate species addressed in this BA are anticipated to be of such a scale or duration that they would be temporary, minor, and discountable.

6.1 Direct Effects

Direct effects are defined as the direct or immediate effects resulting from the Project on the species or its habitat. Direct effects include those resulting from interdependent or interrelated actions (NMFS 2009b). Effects on existing water quality, marine sediments, estuarine habitat, marine vegetation, marine invertebrate conditions are anticipated to be similar throughout the Action Area. Therefore, they are discussed collectively below.

6.1.1 Non-ESA Protected Resources

6.1.1.1 Water Quality

The Project is anticipated to result in only very localized, temporary degradation of the existing water quality. Direct discharges of waste to the marine environment would not occur. Impacts on water quality would be limited to temporary, short-term, and localized changes associated with re-suspension of bottom sediments from pile installation and limited barge and tug operations, such as anchoring and propeller wash. These changes would be spatially limited to the immediate vicinity of Wharf Bravo. Construction-related impacts would not violate applicable state or Federal water quality standards. Standard operating procedures discussed in Section 6.5 would be employed to prevent accidental losses or spills of construction debris or hazardous materials into the water.

6.1.1.2 Marine Sediments

The Project is anticipated to result in only very localized, temporary degradation of the existing marine sediment conditions. There would be no direct discharge of wastes to the marine environment during construction. Effects on the marine sediment quality would be limited to localized changes associated with disturbances of bottom sediments from pile installation over the 12- to 18-month period. Setting spuds and anchors for the barges, if required, and propeller wash from tugs represent other sources for disturbance of marine sediments. Standard operating procedures discussed in Section 6.5 would be employed to prevent accidental losses or spills of construction debris into waters.

Some degree of localized changes in sediment composition may occur as a result of in-water construction activities. In particular, sediments that are re-suspended would be dispersed by currents and eventually re-deposited on the bottom. The distance over which suspended sediments are dispersed would depend on a number of factors, such as the sediment characteristics, currents, and height above the bottom. Project-related construction activities would not create sediment contamination concentrations or physical changes that violate state standards or interfere with designated uses of waters in the Action Area.

6.1.1.3 Estuarine Habitat

Project activities within the Action Area would not directly affect inland freshwater habitats. It is anticipated that the extreme inflow movement of water due to the proximity of the inlet during a flood tide would result in water from the area near NAVSTA Mayport potentially affecting (by temporarily increased sediment suspension) areas west of the inlet that are brackish, and eventually freshwater. Project-related construction activities would not cause direct impacts on estuarine habitats from Project activities. Standard operating procedures discussed in Section 6.5 would be employed to minimize excessive impacts on sediments and estuarine habitat.

6.1.1.4 Marine Vegetation

The Project is anticipated to result in only very localized, temporary degradation of the existing marine vegetation conditions in the Action Area. Any debris from construction-related activities would be collected and disposed of and would not impact marine vegetation. Based on the disturbance regime in the NAVSTA Mayport Turning Basin (e.g., regular dredging, high level of vessel traffic, propeller wash), the overall quality of marine vegetation is considered degraded and would not improve or decline. Because the Project would result in an expansion of Wharf Bravo deck by a maximum of 6 ft from its current footprint, displacement of up to of 12,000 ft^2 (1,115 m^2) of existing vegetation may occur. Any shading that occurs from barges, if barges are utilized, would be temporary in nature, and is not anticipated to have an effect on marine vegetation. Decreased water and sediment quality can impede the growth of marine vegetation important to fish and other animals, and promote the growth of harmful algae. Impacts on water quality from the Project would be limited to temporary and localized changes associated with re-suspension of bottom sediments. Similarly, pile driving activities would not discharge contaminants or otherwise appreciably alter the concentrations of trace metal or organic contaminants in bottom sediments. As such, project-related construction activities would not cause direct adverse impacts on marine vegetation. Standard operating procedures discussed in Section 6.5 would be employed to minimize impacts on marine vegetation.

Direct effects on existing water quality, marine sediments, estuarine habitat, marine vegetation, and marine invertebrates conditions are summarized in Table 6-1.

Table 6-1. Potential Impacts on Water Quality, Marine Sediments, Estuarine Habitats, and Marine Vegetation Resulting from the Project Activities

Aspect	Determination
Timing	May occur for up to 130 days over the duration of the Project, year-round.
Proximity[1]	May occur only in the immediate vicinity of Wharf Bravo
Duration	At least 12 months (October 2016 – September 2017), with intermittent pile driving
Frequency	May occur on pile driving days or when barges or vessels are repositioned
Distribution	Immediate vicinity of Wharf Bravo
Expected Recurrence	Would not occur once repair activities are complete

Note: [1]Some sediment deposition may occur a distance from the individual piles or location of anchor deployment depending on currents and sediment characteristics; however, no sediment deposition/disturbance is expected to occur outside the Action Area.

6.1.1.5 Marine Invertebrates

Depending upon the species, impacts on individual benthic invertebrates could range from temporary disturbance to mortality. Some slow-moving or sessile invertebrates would be physically crushed and lost within the footprint of the piles. It is estimated that an area of

approximately 0.15 acre of vertical oyster habitat would be permanently impacted by replacement (concrete fill) with the repairs to Wharf Bravo. Affected areas may experience some temporary reduction in diversity and abundance of benthic invertebrates. However, the rapid regrowth of oysters on the new structures is anticipated to compensate for the long-term impacts on oysters residing on the existing bulkhead structures. Annelids, in particular, are very resilient to habitat disturbance and are likely to recover to pre-disturbance levels within a relatively short period of time (CH2M Hill 1995; Parametrix 1994, 1999; Anchor Environmental 2002; Romberg 2005). Therefore, the Project is not expected to have any population-level impacts on marine invertebrates.

6.1.1.6 Prey Fishes

Fish near the sheet pile driving activities may also experience sound intensities that could affect their behavior or damage their hearing ability. The criteria and resulting exposure areas suggest only the most limited mortality of fish, and only when they are very close to an intense sound source. Highly mobile juvenile or adult fish would be able to move quickly away from the disturbance area. The pile driving and backfill of the wall activities associated with the recapitalization would cause resuspension of sediments that would result in a temporary increase of suspended solids or turbidity and may cause temporary negligible impacts on fishes. There is no population-level impact on prey fishes anticipated from the sound intensities modeled.

6.1.2 ESA Protected Resources

6.1.2.1 Fish – Atlantic Sturgeon, Shortnose Sturgeon, Smalltooth Sawfish, American Eel, and Dwarf Seahorse

6.1.2.1.1 Determination

The Proposed Action "may affect, but is not likely to adversely affect" Atlantic sturgeon, shortnose sturgeon, smalltooth sawfish, common thresher sharks, and American eels; and would have "no effect" on dwarf seahorses. The Proposed Action would have "no effect" on smalltooth sawfish critical habitat.

6.1.2.1.2 Effects from Changes to Water Quality

Water quality impacts would be largely confined to the western end of the turning basin and would not likely affect the St Johns River migratory corridor for sturgeons, sawfish, and eels. Likely impacts would include resuspension of bottom sediments due to vessel operations, new pile installation, and contingency dredging. Resuspended sediments would temporarily increase turbidity and reduce dissolved oxygen periodically during in-water construction activities. The overall level of sediment disturbance associated with the Project would be significantly lower than that of maintenance dredging in the NAVSTA Mayport Turning Basin, and resuspended sediments are expected to dissipate within a few hours (NMFS 2009c). Frequent tidal flushing would also dilute the concentration of contaminants in the basin water column. Direct effects on fish from changes in water quality are therefore expected to be minimal.

6.1.2.1.3 Effects from Pile Driving Noise

Appendix E (Fundamentals of Acoustics and Analysis) provides full details on the Navy's approach for sound modeling. The zones of influence for potential effects of vibratory and contingency-only impact pile driving noise are illustrated in Figure 6-1.

Figure 6-1. Underwater Zones of Influence based on Fish Criteria for Vibratory and Impact Pile Driving

The potential exposure time for pile driving noise on any given day would be intermittent and brief (less than one minute at a time) and limited to less than 30 aggregate minutes (Table 6-2).

Table 6-2. Conservative Estimate of Daily Exposure to Pile Driving Noise

Pile Type	Notional Duration to Drive Pile	Maximum Pile per Day	Maximum Total Time in a 24-Hour Period
Steel Sheet Pile Pair	1 Minute[1]	27	30 Minutes

Note: [1]Each pile is anticipated to take 45 seconds to 1 minute to install, based on measurements from a similar NAVSTA Mayport Project.

The fish sound level "Interim Criteria" were reviewed and revised in 2008 following a multi-agency (including NMFS) agreement (Fisheries Hydroacoustic Working Group 2008). Table 6-3 provides the acoustic criteria for behavioral disturbance and onset of injury that were used for calculating the zones of influence for the Federally listed fish. Table 6-3 also provides the distance and area of each of the zones of influence.

Table 6-3. Acoustic Criteria for Fish Behavioral Disturbance and Onset of Injury from the Sound Produced by Vibratory and Impact Pile Driving

Pile Driving Method	Threshold	Distance (m)	Area (km^2)
Vibratory	Behavioral (all):150 dB re 1 μPa rms	73.6	0.0114
Impact (contingency)	Injury (all): 206 dB re 1 μPa rms	8.6	0.0005
	Injury (≥ 2g): 187 dB re 1 μPa^2sec SEL	100.2	0.0189
	Injury (< 2g): 183 dB re 1 μPa^2sec SEL	185.1	0.0487
	Behavioral (all):150 dB re 1 μPa rms	3,981.1	1.52

Note: No injury criteria for fish for vibratory driving; all sound levels expressed in dB re 1 μPa rms. dB=decibel; rms=root-mean-square; μPa=micro Pascal; Practical spreading loss (15 log, or 4.5 dB per doubling of distance) used for calculations.

The underwater zones of influence for pile driving noise extend into and beyond southern portions of the mouth of the St. Johns River but, due to land shadowing, nearly the entire breadth of the St. Johns River would remain unaffected by noise (see Figure 6-1). The effects of underwater noise on listed fishes from vibratory pile installation would be strictly behavioral, and the level of annoyance would depend on a number of variables, including species, size, and physical condition of the fish, presence of a swim bladder, maximum sustained sound pressure and frequency, shape of the sound wave (rise time), depth of the water, depth of the fish in the water column, size and number of waves on the water surface, bottom substrate composition and texture, currents, and presence of predators. There is no documented injury or mortality with the use of vibratory hammers (NMFS 2005). Injury to fish is possible in close proximity to impact hammers (Hastings and Popper 2005); however, impact driving would be used only as a contingency method, and soft-start procedures would be employed to ensure fish species are afforded time to move to a safe distance. If impact pile driving is required (i.e., in the event that an obstruction of some type is encountered and vibratory driving is insufficient), it is anticipated that the duration of the driving event would last only minutes.

6.1.2.2 Marine Mammals – North Atlantic Right Whale and Humpback Whale

6.1.2.2.1 Determination

The Proposed Action "may affect, but is not likely to adversely affect" North Atlantic right whales and humpback whales, and would have "no effect" on right whale designated or proposed critical habitat.

6.1.2.2.2 Effects from Changes to Water Quality

No direct impacts on marine mammals are expected due to changes in water quality during construction. Water quality impacts would be largely confined to the western end of the turning basin and would not likely affect the St Johns River migratory corridor. Water quality would be impacted during the limited vessel operations and installation of new piles because bottom sediments would be temporarily resuspended. Resuspended sediments would increase turbidity and reduce dissolved oxygen periodically during in-water construction activities. The overall level of sediment disturbance associated with the Project would be significantly lower than that of maintenance dredging in the NAVSTA Mayport Turning Basin, and resuspended sediments are anticipated to dissipate within a few hours (DON 2008b).

Marine mammal observers would be in place to ensure compliance with the MMPA. While incidental harassment of North Atlantic right whales and humpback whales has not been authorized under the MMPA for this project at this time, the Navy has submitted an IHA application, along with the observer requirements, which will mitigate any effects. The marine mammal observers would call for a shut-down of pile driving activities long before individuals of either species entered the area where turbidity could be an issue for them. The activities that generate suspended sediments would be short-term and localized, and suspended sediments are anticipated to disperse and settle to the bottom rapidly after construction activities cease.

6.1.2.2.3 Effects from Pile Driving Noise

The effects of pile driving noise on North Atlantic right whales and humpback whales would be practically eliminated since in-water pile driving would cease if an individual of either species entered the calculated zones of influence calculated for compliance with a pending MMPA incidental harassment authorization. Under that authorization, marine mammal observers would be stationed to continually monitor the zones of influence during in-water pile driving and call for a cessation of pile driving when needed (Appendix D).

Current NMFS practice regarding exposure of marine mammals to high underwater level sounds is that whales exposed to impulsive sounds greater than 180 re 1 μPa rms are considered to have been injured. Injury thresholds have not been established for non-impulsive sounds such as vibratory pile driving, but the Navy applied the threshold values for impulsive sounds to vibratory sound in the analysis for the IHA application that was submitted to NMFS to comply with the MMPA.

Behavioral harassment is considered to have occurred when whales are exposed to underwater sounds greater than 160 dB rms re 1 μPa for impulsive sound from impact pile driving and 120 dB rms re 1 μPa for non-impulsive sound produced by vibratory pile driving, but below injurious thresholds.

These injury and behavioral thresholds were used for calculating the zones of influence for in-water pile-driving noise. The Fundamentals of Acoustics (Appendix E) provides full details on the Navy's approach for sound modeling. The zones of influence for potential effects of vibratory and contingency-only impact pile driving noise are illustrated in Figure 6-2 and Figure 6-3. The potential exposure time for pile driving noise is limited to discreet 60-second actions, totaling no more than 30-minutes on any given day (see Table 6-2). The time required to drive each pile and the number of piles to be driven each day were determined using very conservative guidelines. Further, pile driving would be intermittent throughout the day, and no species is expected to remain static in the vicinity of the Action Area.

No physiological or behavioral effects on North Atlantic right whales and humpback whales are expected from activities associated with the Project since marine mammal observers would call for a cessation of in-water pile driving if an individual of either species is spotted in the described zones of influence. Further, vibratory pile driving, which would be the primary installation method, does not generate sufficient peak sound pressure levels that are commonly associated with physiological damage.

Impact pile driving, if performed at all, would only occur for a short period of time (estimated to be no more than 45 seconds to a minute per pile [see Table 6-3]) and only if an obstruction, such as a broken timber pile or broken segment of a ship rail, is encountered in the sediment. In such a case, the marine mammal observers would ensure no whales were present in the described zone of influence before impact driving began. The minimization measures which the Navy would employ (Section 6.5) would also greatly reduce the chance that North Atlantic right whales or humpback whales may be exposed to sound pressure levels that could cause physical harm.

6.1.2.2.4 Effects on Critical Habitat

No effects on the designated or proposed critical habitat for the North Atlantic right whale are anticipated to result from in-water noise generated by the Project. The essential calving features specific to Unit 2 (e.g., sea state, surface temperature, water depth) are unaffected by Project noise. Other effects, such as short-term reductions in water quality may occur, but are anticipated to be temporary and highly localized to the immediate vicinity of Wharf Bravo. Therefore, the Navy concludes that a "**no effect**" determination is appropriate for North Atlantic right whale designated and proposed critical habitat.

6.1.2.3 Sea Turtles – Loggerhead Sea Turtle, Green Sea Turtle, Leatherback Sea Turtle, Hawksbill Sea Turtle, and Kemp's Ridley Sea Turtle

6.1.2.3.1 Determination

The Proposed Action "may affect, but is not likely to adversely affect" loggerhead sea turtles, green sea turtles, leatherback sea turtles, hawksbill sea turtles, and Kemp's ridley sea turtles. A "no effect" determination was made for loggerhead, green sea turtle, leatherback sea turtle, and hawksbill sea turtle critical habitat, based on distance from the Action Area.

Figure 6-2. Underwater Zones of Influence Based on Marine Mammal Criteria for Vibratory Pile Driving

Figure 6-3. Underwater Zones of Influence Based on Marine Mammal Criteria for Impact Pile Driving

6.1.2.3.2 Effects from Changes to Water Quality

Resuspended sediments would increase turbidity and could affect foraging success for sea turtles, which are visual predators. The overall level of sediment disturbance associated with the Project would be significantly lower than that of maintenance dredging in the NAVSTA Mayport Turning Basin, and resuspended sediments are expected to dissipate within a few hours (NMFS 2009c). Frequent tidal flushing would also dilute the concentration of contaminants in the basin water column. Thus fish exposed to resuspended sediments are not likely to be impacted by contaminants. The activities that generate suspended sediments would be short-term and highly localized to the area immediately around Wharf Bravo, and suspended sediments are expected to disperse and/or settle rapidly. Therefore, direct effects on sea turtles from changes in water quality are expected to be minimal.

6.1.2.3.3 Effects from Lighting Upgrades

As part of the Wharf Bravo repair and facilities maintenance activities, new lighting fixtures would be installed. Currently, lighting of the wharf is accomplished utilizing “cobra head” street lights mounted on 30-foot poles. The estimated lighting levels from these fixtures vary between 3 footcandles (30LUX) and 0.0 foot-candle (0LUX). This lighting level is inconsistent with the UFC requirements for working areas of Wharf Bravo. The existing fixtures have a glass refractor on the face of the fixture to direct the light from the source. Refractors tend to allow stray illumination into the night sky causing light pollution.

Wharf Bravo is within the clearance zone of the adjacent airfield. Therefore, unlike Wharf Charlie, height restrictions have been imposed on the lighting poles currently employed. Due to the current FAA waivers, the new lighting system would maintain the existing pole locations and 30-foot-heights. The new 30-foot fixtures would utilize LED light technology and would be full cutoff type with a BUG rating of B1-B2, U0, and G1-G2. The main lighting units would provide approximately 3 footcandles average illumination for the wharf with a sharp cutoff at the edge of the wharf. A secondary lighting system would be provided for times of low activity. This system would provide 0.5 foot-candle of illumination at a “turtle friendly” 590 nanometers wavelength (approximately 1,800 degrees kelvin) yellow/red color temperature.

These fixtures would substantially reduce the amount of light pollution allowed by the current lighting system. As such, the new lights attempt to balance turtle safe recommendations without violating Antiterrorism/Force Protection (AT/FP) and Occupational Safety and Health Administration (OSHA) requirements and are a significant improvement over lighting currently emplaced at comparable locations (Wharf C-1). Direct light from the new luminaries would not be visible from the waters of the Study Area, including NAVSTA Mayport beaches and the mouth of the St. Johns River.

6.1.2.3.4 Effects from Pile Driving Noise

The effects of pile driving noise on sea turtles are dependent on several factors, including the size, type, and depth of the animal, the depth, intensity, and duration of the pile driving sound;, the depth of the water column, the substrate of the habitat, the standoff distance between the pile and the animal, and the sound propagation properties of the environment. Impacts on sea turtles from pile driving activities are anticipated to be intrinsically related to the received level and duration of the sound exposure, which are in turn influenced by the distance between the animal and the source. The farther away from the source, the less intense the exposure is expected to be. The substrate and depth of the habitat affect the sound propagation properties of the

environment. Shallow environments (such as the Action Area) are typically more structurally complex, which leads to rapid sound attenuation. In addition, soft substrates in the basin (i.e., sand and mud) would absorb or attenuate the sound more readily than hard substrates (rock), which may reflect the acoustic wave. Soft substrates, such as those found in the Action Area, also require less time to drive the pile, in this case, less than 60 seconds, which would decrease the intensity of the acoustic source.

Possible effects of sound from in-water pile driving range from behavioral effects, such as startle reactions and behavioral changes (e.g., ceasing foraging). Injurious effects, such as temporary or permanent loss of hearing and damage to internal organs, are also possible for sea turtles in close vicinity to impact pile driving; however, impact pile driving would only be used as a contingency in this Project and no in-water pile driving would occur at all if a sea turtle was within 50 feet of the action, in compliance with the Sea Turtle and Smalltooth Sawfish Construction Conditions (Appendix B). The threshold value used by the Navy for onset of injury to sea turtles due to both impact pile driving and vibratory pile driving is 190 dB re 1 μPa sound pressure level root mean square. This criterion was developed in cooperation with the NMFS and is not based on experimental evidence of injuries caused to sea turtles by pile driving sound, but was adopted from pinniped thresholds as a precautionary measure when addressing impacts from pile driving on sea turtles. No behavioral criteria have been adopted by the NMFS for sea turtles for pile driving sound and behavioral effects must be assessed qualitatively. As detailed in Appendix E (Fundamentals of Acoustics), sound levels from pile driving would not reach the 190 dB re 1 μPa threshold. Based upon all of these factors, no injuries to sea turtles from sound associated with pile driving are anticipated.

There are limited studies of sea turtle behavioral responses to sounds. A few studies examined sea turtle reactions to airguns, which produce broadband impulsive sound. For the purposes of comparison, effects from impulsive sound would be applicable only to contingency impact pile driving during the Project. O'Hara and Wilcox (1990) attempted to create a sound barrier at the end of a canal using seismic airguns. They reported that loggerhead sea turtles kept in a 984 ft x 148 ft (300 m x 45 m) enclosure in a canal 33 ft (10 m) deep maintained a standoff range of 98 ft (30 m) from airguns fired simultaneously at intervals of 15 seconds (s) with strongest sound components within the 25 to 1,000 Hz frequency range. McCauley et al. (2000) estimated that the received level at which sea turtles avoided sound in the O'Hara and Wilcox (1990) experiment was 175 to 176 dB re 1 μPa rms.

Moein Bartol et al. (1995) investigated the use of air guns to repel juvenile loggerhead sea turtles from hopper dredges. Sound frequencies of the airguns ranged from 100 to 1,000 Hz at three levels: 175, 177, and 179 dB re 1 μPa at 1 m. The sea turtles avoided the airguns during the initial exposures (mean range of 24 m), but additional trials several days afterward did not elicit statistically significant avoidance. They concluded that this was due to either habituation or a temporary shift in the sea turtles' hearing capability. McCauley et al. (2000) exposed caged green and loggerhead sea turtles to an approaching-departing single air gun to gauge behavioral responses. The trials showed that above a received level of 166 dB re 1 μPa rms, the sea turtles noticeably increased their swimming activity compared to nonoperational periods, with swimming time increasing as air gun levels increased during approach.

Above 175 dB re 1 μPa rms, behavior became more erratic, possibly indicating the sea turtles were in an agitated state (McCauley et al. 2000). The authors noted that the point at which the sea turtles showed the more erratic behavior and exhibited possible agitation would be expected

to approximate the point at which active avoidance would occur for unrestrained sea turtles (McCauley et al. 2000).

No obvious avoidance reactions by free-ranging sea turtles, such as swimming away, were observed during a multi-month seismic survey using airgun arrays, although fewer sea turtles were observed when the seismic airguns were active than when they were inactive (Weir 2007). The author noted that sea state and the time of day affected both airgun operations and sea turtle surface basking behavior, making it difficult to draw conclusions from the data. More recently, DeRuiter and Doukara (2012) noted several possible startle or avoidance reactions to a seismic airgun array in the Mediterranean by basking loggerhead sea turtles.

As a precautionary measure against possible behavioral effects, a shutdown zone of 50 ft (15 m) would be observed incompliance with the Sea Turtle and Smalltooth Sawfish Construction Conditions (Appendix B). If a sea turtle approaches or enters the shutdown zone, pile driving would cease and would not resume until the animal has moved out of the area.

No behavior criteria for sea turtles exist, but it is understood that behavioral impacts could still occur over the course of the Project outside the shutdown zone, but these impacts are not anticipated to result in adverse effects on sea turtles. In the absence of established criteria and quantitative density data, impacts can only be assessed qualitatively, based on the relative abundance of a given species, our general knowledge of sea turtle reactions to sound in the water, and the mitigation measures and best management practices in place. With the implementation of the shutdown zone, the very limited amount of impact pile driving (and its associated higher sound source levels) that may be performed, and the overall short construction duration, little opportunity exists for behavioral effects to occur.

No waters directly off of nesting beaches would be impacted by the sound produced during the Project.

6.1.2.3.5 Effects on Critical Habitat

The Navy concludes that a "**no effect**" determination is appropriate for loggerhead sea turtle, green sea turtle, leatherback sea turtle, and hawksbill sea turtle critical habitat, based on distance from the Action Area.

6.2 Indirect Effects

Indirect effects are caused by the action and occur later in time after the action is completed. Effects for the duration of the Project have been addressed in this BA. Upon completion of the in-water work, conditions are expected to return to their previous state within a relatively short amount of time. Sound in the water would return to normal ambient levels immediately upon completion of each discrete in-water pile driving action. As discussed in Section 6, baseline conditions such as water quality, marine sediments, estuarine habitat, and marine vegetation are expected to return to prior states within hours (in the case of sediments and water quality) to a few months (in the case of marine vegetation) under normal deposition and succession regimes. With the exception of a slight projected increase in the Wharf Bravo footprint (up to 6 ft beyond existing dimensions [see Section 6.1.2; Marine Sediments and Section 6.1.1.4; Marine Vegetation]), no permanent alteration of predator/prey relationships, habitat, or existing facility

use is anticipated, and no new negative effects on species or their habitat are expected to begin once the Project is complete.

6.3 Interrelated and Interdependent Actions and Activities

Actions and activities that are related to the Project include routine docking and transits by vessels entering and leaving the turning basin. The Project would not result in a net change in the number of vessels approaching or leaving the turning basin, and would therefore result in no change to current risk of ships strikes for marine mammals.

6.4 Standard Operating Procedures

The Navy would employ the measures listed in this section to avoid and minimize impacts on fish, marine mammals, and sea turtles, as well as their habitats and forage species. Best Management Practices (BMPs) are intended to avoid and minimize potential environmental impacts. BMPs and minimization measures are included in the construction contract plans and specifications and must be agreed upon by the contractor prior to any construction activities. Upon signing the contract, it becomes a legal agreement between the contractor and the Navy. Failure to follow the prescribed BMPs and minimization measures is a contract violation.

6.4.1 General Construction Best Management Practices

- All work will adhere to performance requirements of the Clean Water Act, Section 404 permit and Section 401 Water Quality Certification. No in-water work will begin until after issuance of regulatory authorizations.
- The construction contractor is responsible for preparation of an Environmental Protection Plan. The plan will be submitted and implemented prior to the commencement of any construction activities and is a binding component of the overall contract. The plan will identify construction elements and recognize potential spill sources at the site. The plan will outline BMPs, responsive actions in the event of a spill or release, and notification and reporting procedures. The plan will also outline contractor management elements, such as personnel responsibilities, project site security, site inspections, and training.
- No petroleum products, lime, chemicals, or other toxic or harmful materials will be allowed to enter surface waters. Washwater resulting from washdown of equipment or work areas will be contained for proper disposal, and will not be discharged unless authorized.
- Equipment that enters surface waters will be maintained to prevent any visible sheen from petroleum products.
- No oil, fuels, or chemicals will be discharged to surface waters, or onto land where there is a potential for re-entry into surface waters. Fuel hoses, oil drums, oil or fuel transfer valves, fittings, etc. will be checked regularly for leaks and will be maintained and stored properly to prevent spills.
- No cleaning solvents or chemicals used for cleaning tools or equipment will be discharged to ground or surface waters.

- Construction materials will not be stored where high tides, wave action, or upland runoff could cause materials to enter surface waters.
- Barge operations will be restricted to tidal elevations adequate to prevent grounding of a barge.

6.5 Pile Removal and Installation Best Management Practices

- A containment boom surrounding the work area will be used during creosote-treated pile removal to contain and collect any floating debris and sheen. In some cases, the boom may be lined with oil-absorbing material to absorb released creosote.
- Oil-absorbent materials will be used in the event of a spill if any oil product is observed in the water.
- All creosote-treated material and associated sediments will be disposed of in a landfill that meets Florida environmental standards.
- Removed piles and associated sediments (if any) will be contained on a barge. If a barge is not utilized, piles and sediments may be stored in a containment area near the construction site.
- Piles that break or are already broken below the waterline may be removed by wrapping the piles with a cable or chain and pulling them directly from the sediment with a crane. If this is not possible, they will be removed with a clamshell bucket. To minimize disturbance to bottom sediments and splintering of piles, the contractor will use the minimum size bucket required to pull out piles based on pile depth and substrate. The clam shell bucket will be emptied of piles and debris on a contained barge before it is lowered into the water. If the bucket contains only sediment, the bucket will remain closed and be lowered to the mud line and opened to redeposit the sediment. In some cases (depending on access, location, etc.), piles may be cut below the mud line and the resulting hole backfilled with clean sediment.
- Any floating debris generated during installation of piles will be retrieved. Any debris in a containment boom will be removed by the end of the workday or when the boom is removed, whichever occurs first. Retrieved debris will be disposed of at an upland disposal site.
- Whenever activities that generate sawdust, drill tailings, or wood chips from treated timbers are conducted, tarps or other containment material will be used to prevent debris from entering the water.
- If excavation around piles to be replaced is necessary, hand tools or a siphon dredge will be used to excavate around piles to be replaced.

6.5.1 Timing Restrictions

All in-water construction activities will occur during daylight hours (sunrise to sunset). Non in-water construction activities could occur between 6:00 a.m. and 10:00 p.m. during any time of the year. Sunrise and sunset are to be determined based on the NOAA (Internet URL: http://www.srrb.noaa.gov/highlights/ sunrise/sunrise.html).

6.5.2 Additional Procedures for Marine Species

Potential effects on listed species from Project activities are discussed above in Sections 6.1.1 through 6.1.3. The following measures will be implemented during pile driving to avoid and minimize exposure to noise levels that could cause injury or behavioral disturbance for all Federally listed and candidate species.

6.5.3 Coordination

The Navy will conduct a pre-construction briefing with the contractor. During the briefing, all personnel working in the Action Area will watch the Navy's Marine Species Awareness Training video. Information will also be provided on how to identify piping plovers, wood storks, and red knots.

6.5.4 Acoustic Minimization Measures

Vibratory installation will be used to the extent possible to drive steel piles to minimize higher sound pressure levels associated with impact pile driving.

6.5.5 Soft Start

The objective of a soft start is to provide a warning and give animals in proximity to pile driving a chance to leave the area prior to an impact driver operating at full capacity, thereby exposing fewer animals to loud underwater and airborne sounds. Should the brief use of impact pile driving be necessary, a soft start procedure will be used.

There is no soft start for vibratory pile driving. For impact pile driving, the contractor will provide an initial set of strikes from the impact hammer at reduced energy, followed by a 30-second waiting period, then two subsequent sets. (The reduced energy levels of an individual hammer cannot be quantified because they vary by individual drivers. Also, the number of strikes will vary at reduced energy because raising the hammer at less than full power and then releasing it results in the hammer "bouncing" as it strikes the pile resulting in multiple "strikes.")

6.5.6 Standard Conditions

The contractor will adhere to all requirements of the following:

- NMFS 2006 Sea Turtle and Smalltooth Sawfish Construction Conditions (Appendix B)
- NMFS 2012 Southeast Region Marine Mammal and Sea Turtle Viewing Guidelines (Appendix C)

6.5.7 Sea Turtle Lighting Conditions

- Lighting on construction equipment will be minimized through reduction, shielding, lowering, and appropriate placement to avoid excessive illumination of the nearby marine sea turtle nesting beach while still being consistent with human safety requirements.
- All permanent exterior lighting fixtures associated with the wharf redevelopment will be assessed by NAVSTA Mayport Environmental Department and designed according to the

NAVSTA Mayport Light Management Plan to minimize light contribution to urban sky glow which could be visible from the marine sea turtle nesting beach.

6.5.8 Visual Monitoring and Shutdown Procedures

A separate Marine Species Monitoring Plan is being submitted to NMFS and USFWS; it includes all details for Project monitoring efforts. Major components of the monitoring plan are summarized below.

6.5.8.1 Observers and Procedures:

The Navy will conduct a pre-construction briefing with the contractor. During the briefing, all contractor personnel working in the Action Area will watch the Navy's Marine Species Awareness Training video. An informal guide (Marine Species Monitoring Plan Attachment 1) has been included with the Monitoring Plan to aid in identifying species should they be observed in the vicinity of the Project.

Marine species observers ("observers") designated by the contractor will be placed at the best vantage point(s) practicable to monitor for protected species and implement shutdown/delay procedures when applicable by calling for the shutdown to equipment operators. The observers will have no other construction related tasks while conducting monitoring.

The contractor will adhere to all requirements of the following:

6.5.8.2 Methods:

The observer(s) will monitor the shutdown zone (Figure 6-4) before, during, and after pile driving and removal. The observer(s) will be placed at the best vantage point practicable (e.g., from a small boat, construction barges, on shore, or any other suitable location) to monitor for marine species and implement shutdown/delay procedures when applicable by calling for the shutdown to the equipment operator(s).

Elevated positions are preferable, and it will be the contractor's responsibility to ensure that appropriate safety measures are implemented to protect observers on elevated observation points. If a boat is used for monitoring, the boat will maintain minimum distances from all species (should they occur) as described in NMFSs' 2012 Southeast Region Marine Mammal and Sea Turtle Viewing Guidelines (Appendix C).

- During all observation periods, observers will use binoculars and the naked eye to search continuously for marine mammals;
- If the shutdown zone is obscured by fog or poor lighting conditions, pile driving will not be initiated until the entire shutdown zone is visible.
- The shutdown zone will be monitored for the presence of protected species before, during, and after any pile driving or removal activity.

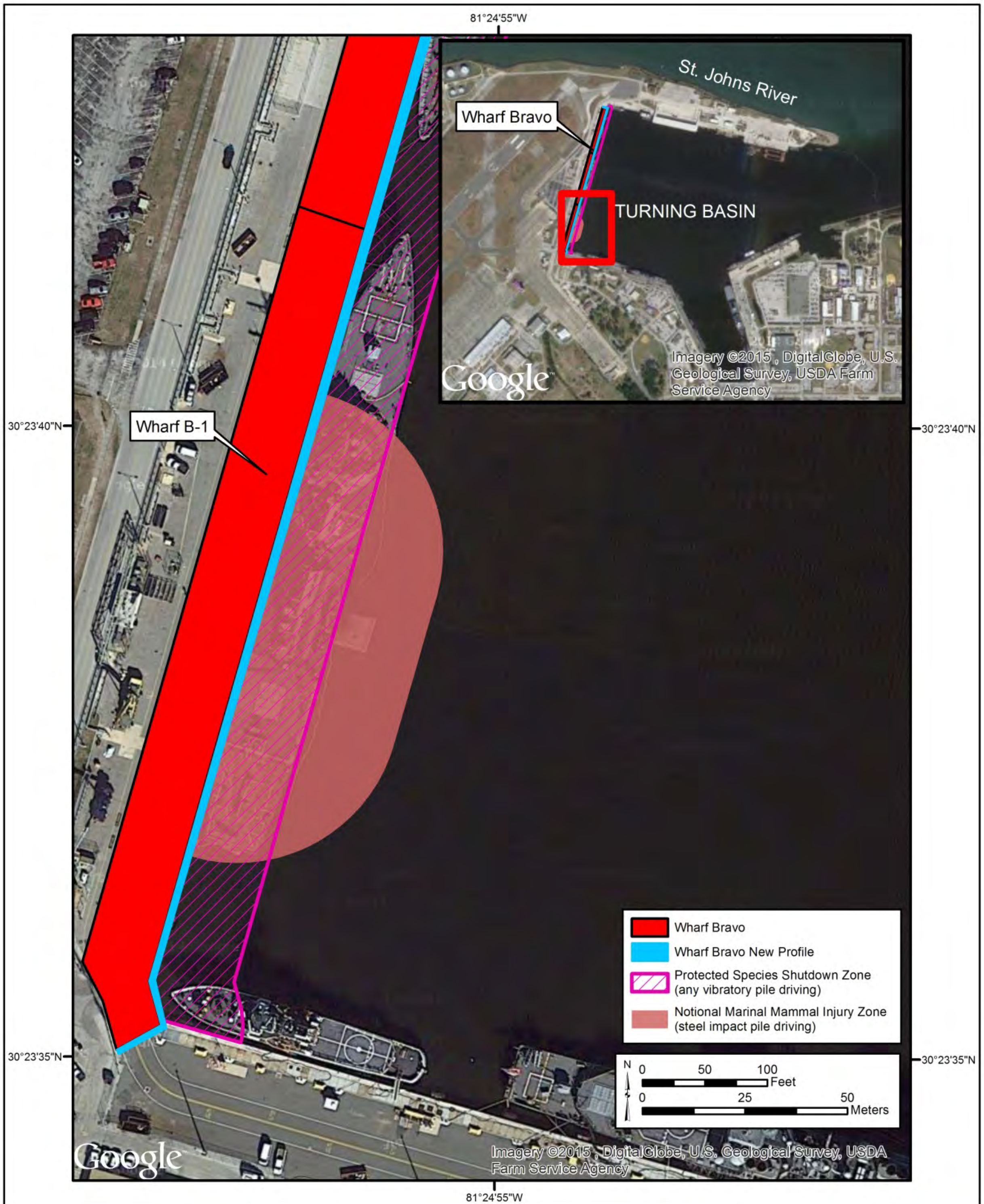

Figure 6-4. Shutdown Zones for Vibratory and (Contingency Only) Impact Pile Driving Activities

6.5.8.3 Pre-Activity Monitoring:

The shutdown zone will be monitored for 15 minutes prior to in-water construction/demolition activities. If a protected species is observed in or approaching the shutdown zone, the activity will be delayed until the animal(s) leave the shutdown zone.

Activity will resume only after the observer has determined, through re-sighting or by waiting approximately 15 minutes, that the animal(s) has moved outside the shutdown zone. The observer(s) will notify the monitoring coordinator/construction foreman/point of contact (POC) when construction activities can commence.

6.5.8.4 Activity Monitoring

The shutdown zone will always be a minimum of 15 m (50 ft) to prevent injury from physical interaction of protected species with construction equipment (see Figure 4-1). For contingency impact pile driving, the larger 40 m (130 ft) shutdown zone (see Figure 4-1) will be implemented for marine mammals only; the standard shutdown zone will continue to be applied for all other protected species.

If a protected species approaches or enters a shutdown zone during any in-water work, activity will be halted and delayed until either the animal has voluntarily left and been visually confirmed beyond the shutdown zone or 15 minutes have passed without re-detection of the animal.

Bulkhead sheet pile installation will be completed only after confirmation that no manatees or marine sea turtles will be trapped in the area to be filled between the existing and new bulkheads.

6.5.8.5 Post-Activity Monitoring

Monitoring of the shutdown zone will continue for 15 minutes following the completion of the activity.

6.5.8.6 Data Collection

The following information will be collected on sighting forms used by observers:

- Date and time that pile driving or removal begins or ends
- Construction activities occurring during each observation period
- Weather parameters identified in the acoustic monitoring (e.g., wind, temperature, percent cloud cover, and visibility)
- Tide and sea state (Marine Species Monitoring Plan Attachments 5 and 6)

If a protected species approaches or enters the shutdown zone, the following information will be recorded once shutdown procedures have been implemented:

- Species, numbers, and, if possible, sex and age class of the species
- Behavior patterns observed, including bearing and direction of travel
- Location of the observer and distance from the animal(s) to the observer

If possible, photographs of the animal(s) will be taken and forwarded to the NAVFAC SE point of contact.

Data collection forms will be furnished to the Environmental point of contact within a mutually agreeable timeframe.

6.5.8.7 Interagency Notification and Reporting

If the Navy encounters an injured, sick, or dead marine mammal, NMFS will be notified immediately. Such sightings will be called into the NMFS Stranding Coordinator for the Southeast:

Erin Fougeres, Ph.D.
Marine Mammal Stranding Program Administrator
Southeast Regional Office
263 13th Avenue South
St. Petersburg, Florida 33701
e-mail: erin.fougeres@noaa.gov
office: 727-824-5323
fax: 727-824-5309

The Navy will provide NMFS with the species or description of the animal(s), the condition of the animal (including carcass condition if the animal is dead), location, the date and time of first discovery, observed behaviors (if alive), and photo or video (if available).

Care should be taken in handling dead specimens to preserve biological materials in the best possible state for later analysis of cause of death, if that occurs. In preservation of biological materials from a dead animal, the finder (i.e., marine mammal observer) has the responsibility to ensure that evidence associated with the specimen is not unnecessarily disturbed.

A draft report of any incidents of marine mammals entering the shutdown zone will be forwarded to NMFS no later than December 30, 2017. A final report will be prepared and submitted to NMFS within 30 days following receipt of comments on the draft report from NMFS.

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SECTION 7.0
Effects Determinations

7.0 Effects Determinations

A summary of the Navy's determinations for effects on Federally listed and candidate species and their critical habitat is listed in Table 7-1.

Table 7-1. Effects Determinations for All Federally Listed and Candidate Species, and Designated and Proposed Critical Habitat

Species	Subspecies/DPS	Navy Determination	
		Species	Critical habitat
Atlantic sturgeon	Carolina / South Atlantic DPS	May affect, but not likely to adversely affect	n/a
Shortnose sturgeon	n/a	May affect, but not likely to adversely affect	n/a
Smalltooth sawfish	U.S.	May affect, but not likely to adversely affect	No effect
American eel	n/a	Not jeopardize the continued existence	n/a
Common thresher shark	n/a	Not jeopardize the continued existence	n/a
Dwarf seahorse	n/a	Not jeopardize the continued existence	n/a
North Atlantic right whale	n/a	May affect, but not likely to adversely affect	No effect
Humpback whale	n/a	May affect, but not likely to adversely affect	n/a
Loggerhead sea turtle	Northwest Atlantic Ocean DPS	May affect, but not likely to adversely affect	No effect
Green sea turtle	Florida nesting population	May affect, but not likely to adversely affect	No effect
Leatherback sea turtle	n/a	May affect, but not likely to adversely affect	No effect
Hawksbill sea turtle	n/a	May affect, but not likely to adversely affect	No effect
Kemp's ridley sea turtle	n/a	May affect, but not likely to adversely affect	n/a

The Navy initiated informal consultation with NMFS, Southeast Regional Office on August 6, 2015, requesting their review of the BA and EA, and concurrence with its effects determinations. The project was assigned to a NMFS Consultation Biologist on October 23, 2015, and consultation was initiated (SER-20 15-17189) by NMFS on November 18, 2015. On February 4, 2016, NMFS provided a letter that concurred with the Navy's effects determinations, thus fulfilling the requirements of the ESA and requiring no further action.

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SECTION 8.0
List of Preparers

8.0 List of Preparers

The following people were primarily responsible for the preparation of this BA.

Name	Agency / Organization	Discipline / Expertise	Experience	Role in Preparing BA
Royce Kemp	NAVFAC SE	NEPA Compliance Section Head	20 years of Environmental Science	BA review and comment
John Conway	NAVFAC SE	NEPA Compliance Specialist	20 years of Environmental Science	BA Project Manager
Jered Jackson	NAVFAC SE	Natural Resources Specialist	12 years of Natural Resources	BA review and comment
Cara Hotchkin	NAVFAC Atlantic	Natural Resources Specialist	15 years of Natural Resources	Marine Mammal and Noise Sections; IHA
Dennis Peters	Gulf South Research Corporation	NEPA/Marine Biologist	32 years of EA/EIS studies	Project Manager and BA preparation
Steve Oivanki	Gulf South Research Corporation	Environmental Compliance	32 years of EA/EIS studies	BA review and comment
Todd Wilkinson	Gulf South Research Corporation	Natural Resource Management	21 years of Natural Resources and NEPA studies	Natural Resources
Ann Guissinger	Gulf South Research Corporation	Socioeconomics and Planning; QA/QC	32 years of Socioeconomics analysis	Socioeconomics and Environmental Justice; EA review and comment
Liz Ayarbe-Perez	Gulf South Research Corporation	GIS/Graphics	16 years of GIS and Graphics experience	Graphics production
Jason Glenn	Gulf South Research Corporation	Technical Editor	10 years of Technical Editing experience	Technical editing

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SECTION 9.0
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9.0 References

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APPENDIX A
Agency Correspondence

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southeast Regional Office
263 13th Avenue South
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F/SER31:KBD

C.R. Destafney, Professional Engineer
Environmental Business Line Coordinator
Naval Facilities Engineering Command, Southeast
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Jacksonville, Florida 32212-0030

FEB 0 4 2016

Dear Sir or Madam:

This letter responds to your requests for consultation with us, the National Marine Fisheries Service (NMFS), pursuant to Section 7 of the Endangered Species Act (ESA) for the following actions.

Applicant	**SER Number**	**Project Type**
Department of the Navy, Kings Bay Naval Submarine Base	SER-2015-17389	Infrastructure Repair and Maintenance
Department of the Navy, Naval Station Mayport	SER-2015-17189	Wharf Recapitalization

Consultation History

We received letters on August 6, 2015, and September 15, 2015, requesting consultation for the projects referenced above. They were assigned to a Consultation Biologist on October 23, 2015, and consultation was initiated for both projects on November 18, 2015.

Project Locations

Address	**Latitude/Longitude** (North American Datum 1983)	**Water body**
Naval Submarine Base Kings Bay, Camden County, Georgia	30.7978°N, 81.5125°W	Cumberland Sound
Wharf Bravo, Naval Station Mayport, Jacksonville, Duval County, Florida	30.3950°N, 81.4150°W	St. Johns River

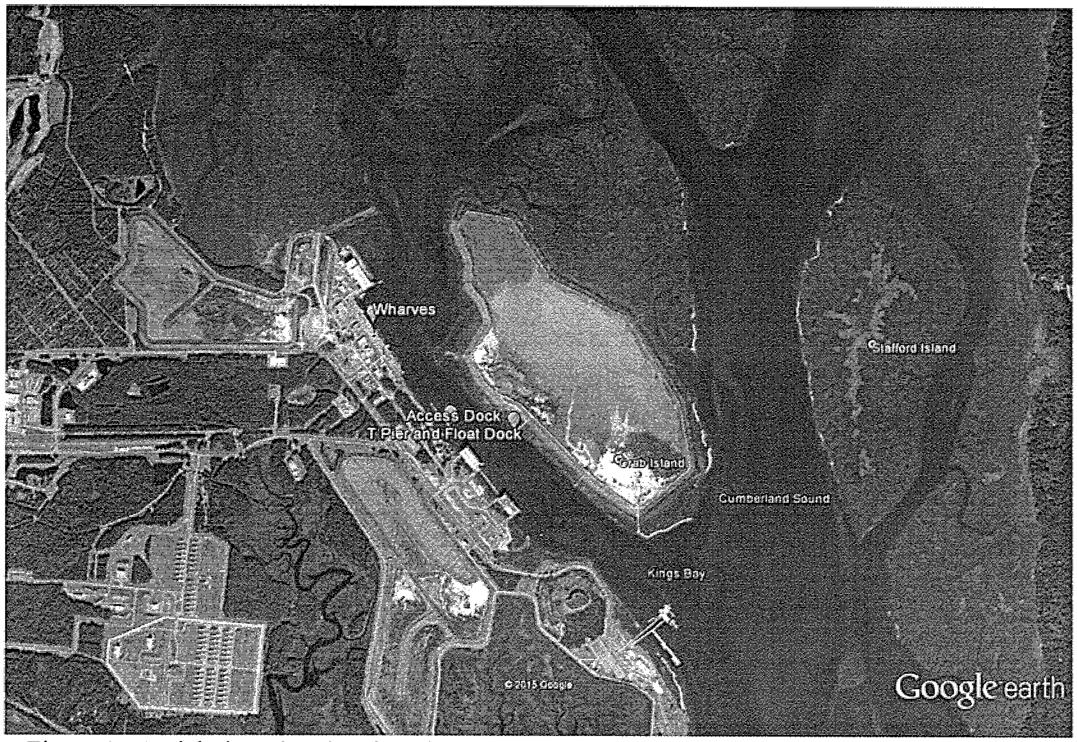

Figure 1. Aerial view showing the Kings Bay Naval Submarine Base location in a side channel of the Crooked River, Camden County, Georgia (©2015 Google Earth)

Figure 2. Aerial view showing Naval Station Mayport wharf recapitalization location in the St. Johns River, Duval County, Florida (©2015 Google Earth)

Existing Site Conditions
The bottom sediments found adjacent to both project sites consist of sand and unconsolidated mud.

Project Descriptions
Naval Submarine Base Kings Bay
The Navy has proposed infrastructure repairs and maintenance along several locations at Naval Submarine Base Kings Bay to allow for mooring of submarines that are fitted with Conformal Acoustic Velocity and Sonar Large Vertical Arrays. The project consists of modification of wharves 1, 2, and 3, rehabilitation of the T Pier, replacement of the small craft floating dock and its guide piles, and replacement of the General Access Pier and guide piles on Crab Island.

Reconfiguration of the 3 wharves will require the removal of 3 concrete fender piles and installation of 3 steel guide piles with 24 inch (in) diameters using an impact hammer. Guide piles would be filled with concrete once they are installed. The installation of each 24-in steel pile is expected to require no more than 70 strikes from the impact hammer. In-water pile removal and installation is projected to take no more than 90 minutes per pile. One day of removal and one day of installation would occur at each wharf, for a total of 6 days of in-water work.

Rehabilitation of the T Pier will require the removal of 179 timber piles and the installation of 140 square pre-stressed concrete piles with 18 in diameters using an impact hammer. Each pile is expected to take up to 60 minutes to extract or to install. Up to 7 piles may be installed each day, for a total of 50 days of active pile driving. Replacing the small craft floating dock will require placing polyethylene jackets on 4 existing steel guide piles and installation of 1 new 24-in fiber-reinforced polymer pile by impact hammer. The new pile will be filled with concrete and will require approximately 2 hours of active pile driving. Repair of the General Access Pier at Crab Island will require the removal of 3 timber guide piles and the installation of 2 square pre-stressed concrete guide piles with 18-in diameters by impact hammer. Pile driving of the concrete piles will require approximately 2 hours. Removal of all of the piles for the different aspects of the project will be conducted by vibratory extraction.

Construction Conditions
A "soft start" procedure will be used in the event that impact hammer pile driving is utilized. Pile driving will occur only during daylight hours. The Navy will comply with NMFS's *Sea Turtle and Smalltooth Sawfish Construction Conditions*, dated March 23, 2006. In the event that an ESA species is observed in the immediate vicinity of pile driving and extraction activities, work will cease until the listed species has moved beyond the 50-ft shutdown zone.

Wharf Bravo Naval Station Mayport
The Navy has proposed the recapitalization of Wharf Bravo, which is located along the west wall of the turning basin at Naval Station Mayport. The project consists of construction of a new steel sheet pile bulkhead that ties into an existing steel sheet pile structure, placement of fill between existing and new steel sheet pile bulkheads, installation of a concrete pile cap and concrete encasement of sheet pile, asphalt wharf deck paving, repairs to electrical and mechanical shore utilities, and upgrades to area lighting and antiterrorism force protection waterfront enclave facilities.

Piles would be driven using vibratory and impact driving methods, but impact driving methods would only be used for areas with obstructions when vibratory methods are inadequate. Existing concrete and timber piles in the project site would be removed by divers and cranes. Construction of the bulkhead would include the installation of approximately 880 single sheet piles to be conducted

in 2 phases. Phase I would include the installation of approximately 590 single sheet piles over 73 days, averaging approximately 10 sheet pile pairs installed per day. Phase II would include the installation of approximately 290 single sheet piles during 37 days, averaging approximately 8-9 sheet piles installed per day. Vibratory hammering is planned with impact driving reserved as a contingency.

Construction Conditions
The Navy will comply with NMFS's *Sea Turtle and Smalltooth Sawfish Construction Conditions*, dated March 23, 2006. In the event that an ESA species is observed in the immediate vicinity of pile driving and extraction activities, work will cease until the listed species has moved beyond the 50-ft shutdown zone. Construction of the wharf is anticipated to occur over a 1-2 year period with a maximum of 130 days of in-water pile driving work. Pile driving will occur only during daylight hours. A "soft start" procedure will be used when impact hammers are used.

Pile Installation at Kings Bay Naval Submarine Base

Pile Types	Number of Piles	Installation Method	Confined Space or Open Water
24-in steel guide	3	impact	open water
18-in concrete	142	impact	open water
24-in polymer	1	impact	open water

Pile Installation at Naval Station Mayport

Pile Types	Number of Piles	Installation Method	Confined Space or Open Water
Steel sheet	880	vibratory or impact	confined space

Action Agency's and NMFS's Effects Determinations

Species	ESA Listing Status	Kings Bay Submarine Base Effect Determination	NMFS Effect Determination	Naval Station Mayport Effect Determination	NMFS Effect Determination
Sea Turtles					
Green	E/T[1]	NLAA	NLAA	NLAA	NLAA
Kemp's ridley	E	NLAA	NLAA	NLAA	NLAA
Leatherback	E	NLAA	NE	NLAA	NE
Loggerhead (Northwest Atlantic Ocean distinct population segment [DPS])	T	NLAA	NLAA	NLAA	NLAA
Hawksbill	E	NLAA	NE	NE	NE
Fish					
Smalltooth sawfish (U.S. DPS)	E	NLAA	NP	NLAA	NP
Shortnose sturgeon	E	NLAA	NLAA	NLAA	NP
Atlantic sturgeon (South Atlantic DPS)	E	NLAA	NLAA	NLAA	NLAA
Whales					
North Atlantic Right	E	NP	NP	NLAA	NP
Humpback	E	NP	NP	NLAA	NP
E = endangered; T = threatened; NLAA = may affect, not likely to adversely affect; NP = not present; NE = no effect					

We believe the projects will have no effect on hawksbill and leatherback sea turtles, due to the species' very specific life history strategies, which are not supported at the project sites. Leatherback sea turtles have pelagic, deepwater life history, where they forage primarily on jellyfish. Hawksbill sea turtles typically inhabit inshore reef and hard bottom areas where they forage primarily on encrusting sponges. In addition, we do not believe smalltooth sawfish would be found in either of the project areas. Kings Bay Submarine Base is situated adjacent to Cumberland Sound, which is

[1] Green turtles are listed as threatened except for the Florida and Pacific coast of Mexico breeding populations, which are listed as endangered.

located in the extreme northern end of the known range for smalltooth sawfish, and the inshore habitat is salt marsh and not the typical red mangrove habitat preferred by the species. The turning basin at Naval Station Mayport is a small area that was excavated from upland that also doesn't offer preferred red mangrove habitat. We also do not believe that North Atlantic right and humpback whales would be found within the small area of the turning basin at Naval Station Mayport. Although historically they were found as far south as the St. Johns River in northern Florida, shortnose sturgeon are thought to no longer occur south of the Altamaha River in Georgia. Extensive sampling in 2002 and 2003 in the St. Johns River resulted in only 1 sturgeon being captured. Even if they do still occur in the St. Johns River, they would not be expected to be present in the turning basin of Naval Station Mayport as it does not offer suitable habitat for foraging or resting.

Critical Habitat
While North Atlantic right whale designated critical habitat borders the project area on the Atlantic Ocean side of Naval Station Mayport, the actual footprint of the project is not located in designated critical habitat, and there are no potential routes of effect to any other designated critical habitat.

Analysis of Potential Routes of Effects to Species
Kings Bay Naval Submarine Base
We believe that Atlantic and shortnose sturgeon and green, loggerhead, and Kemp's ridley sea turtles may be present in the action area and may be affected by the project. We have identified the following potential effects to these species and concluded that the species are not likely to be adversely affected:

Effects to Atlantic and shortnose sturgeon, and green, loggerhead, and Kemp's ridley sea turtles include the risk of injury from the physical action of pile driving and the removal of existing structures, which will be discountable due to the species' ability to move away from the project site. The Navy's compliance with NMFS's *Sea Turtle and Smalltooth Sawfish Construction Conditions*, dated March 2006, will provide an additional measure of protection.

Atlantic and shortnose sturgeon, and green, loggerhead, and Kemp's ridley sea turtles may be affected by noise from the impact driving of the steel piles.

Concrete piles (18-in-diameter): Based on noise data calculations regarding the impact hammer installation of the 18-in-diameter concrete piles (Appendix I – Compendium of Pile Driving Sound Data, updated in 2012) from the California Department of Transportation,[2] this project's noise levels will likely be below the NMFS-accepted peak pressure and single-strike sound exposure level (sSEL) thresholds for injury to fish and sea turtles. Peak pressure noise levels at the source will be 200 decibels (dB) or less, while the peak-pressure injury threshold is 206 dB. The sSEL noise levels will be 170 dB or less at the source, while the sSEL injury threshold is 187 dB. Based on the installation schedule and an sSEL level of 170 dB at the source, according to the model, cumulative sound exposure level (cSEL) injury may occur at a distance of up to 5 meters (m) from the pile-driving activities.

In terms of behavioral effects, the project's impact pile driving will produce about 181 dB root mean square (RMS) of noise at the source, while the NMFS-accepted threshold for behavioral disturbance

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[2] California Department of Transportation. 2009. Technical Guidance for Assessment and Mitigation of the Hydroacoustic Effects of Pile Driving on Fish (with updated 2012 Compendium). Final. February (ICF 645.10). Prepared by ICF Jones & Stokes, Sacramento, CA and Illingworth & Rodkin, Inc., Petaluma, CA.

is 150 dB RMS for fishes and 160 dB RMS for sea turtles. Based on this information, sturgeon may exhibit behavioral changes when within 117 m of the project's active impact pile driving and sea turtles when within 25 m, because that is the distance at which noise levels are expected to dissipate to the respective behavioral disturbance thresholds.

Polymer piles: No noise information was available on the polymer piles, but it is assumed that installation would be quieter than the concrete piles, so it was included in the analysis for the 18-in-diameter concrete piles.

Steel guide piles (24-in-diameter): Based on noise data calculations regarding the installation of the 24-in-diameter steel guide piles by impact hammer, this project's noise levels could result in peak pressure or sSEL injury to fish and sea turtles. Peak-pressure noise levels at the source will be 218 dB, while the peak pressure injury threshold is 206 dB. The sSEL noise levels will be 192 dB at the source, while the sSEL injury threshold is 187 dB. Peak pressure injury may occur within 6 m of the pile-driving activities, and sSEL injury within 2.16 m. Based on the installation schedule and an sSEL level of 192 dB at the source, according to the model, cSEL injury may occur at a distance of up to 76 m from the pile-driving activities.

In terms of behavioral effects, the project's impact pile driving will produce about 205 dB RMS of noise at the source, while the NMFS-accepted threshold for behavioral disturbance is 150 dB RMS for fishes and 160 dB RMS for sea turtles. Based on this information, sturgeon may exhibit behavioral changes when within 4,642 m of the project's active impact pile driving and sea turtles when within 1,000 m, because that is the distance at which noise levels are expected to dissipate to the respective behavioral disturbance thresholds.

Due to their expected avoidance of project noise and activity, we would not expect a sturgeon or sea turtle to remain stationary within the injury or behavioral disturbance radii during pile-installation operations. The use of the "soft start" technique will give sturgeon and sea turtles ample time to leave the area as noise levels increase incrementally and before injury occurs. The site has adequate avenues for animals to escape or avoid the project area during pile-driving activities. There are many other suitable foraging and resting areas in the vicinity of the project that lie outside of the injury and behavioral disturbance zones that listed species could utilize when pile driving is occurring. If an individual chooses to remain within the behavioral disturbance zone, it could be exposed to behavioral noise impacts during pile installations. However, the project area could still be used by these species during quiet periods between pile installations, and during early evening and night hours when pile driving and other construction activities will not occur. In addition, the channel adjacent to the action area terminates into a shallow salt marsh habitat just beyond the action area and would not be expected to be used as a pathway by migrating sturgeon especially since the adjacent Crooked River is a tributary of the St. Marys River and there are no known breeding Atlantic or shortnose sturgeon in the St. Marys River. In summary, we believe the effects on sturgeon and sea turtles caused by noise generated during the installation of piles via impact hammer during this project will be discountable for potential injury effects and insignificant for potential behavioral effects.

Wharf Bravo Naval Station Mayport

We believe that Atlantic sturgeon and green, loggerhead, and Kemp's ridley sea turtles may be present in the action area and may be affected by the project. We have identified the following potential effects to these species and concluded that the species are not likely to be adversely affected.

Effects to Atlantic sturgeon, and green, loggerhead, and Kemp's ridley sea turtles include the risk of injury from the physical action of pile driving and the removal of existing structures, which will be discountable due to the species' ability to move away from the project site. The Navy's compliance with NMFS's *Sea Turtle and Smalltooth Sawfish Construction Conditions*, dated March 2006, will provide an additional measure of protection.

Atlantic sturgeon, and green, loggerhead, and Kemp's ridley sea turtles may be affected by noise from the vibratory driving of the 24-in-wide steel sheet piles.

Vibratory hammer: Based on noise data calculations regarding the vibratory hammer installation of the steel sheet piles, this project's noise levels will likely be below the NMFS-accepted peak-pressure, sSEL, and cSEL thresholds for injury to fish and sea turtles. Peak pressure noise levels at the source will be 192 dB or less, while the peak-pressure injury threshold is 206 dB. The sSEL noise levels will be 178 dB or less at the source, while the sSEL injury threshold is 187 dB. Based on the installation schedule and an sSEL level of 178 dB at the source, according to the model, there will be no cSEL injury.

In terms of behavioral effects, the project's vibratory pile driving will produce about 178 dB RMS of noise at the source, while the NMFS-accepted threshold for behavioral disturbance is 150 dB RMS for fishes and 160 dB RMS for sea turtles. Based on this information, sturgeon may exhibit behavioral changes when within 74 m of the project's active vibratory pile driving and sea turtles when within 16 m, because that is the distance at which noise levels are expected to dissipate to the respective behavioral disturbance thresholds.

Impact Hammer: Because impact hammer pile driving may be used for installation of some of the 24-in-wide steel sheet piles, we also calculated noise data regarding the impact hammer installation of the piles. This project's noise levels will likely be above the NMFS-accepted peak pressure and sSEL thresholds for injury to fish and sea turtles. Peak pressure noise levels at the source will be 220 dB or less, while the peak pressure injury threshold is 206 dB. The sSEL noise levels will be 194 dB or less at the source, while the sSEL injury threshold is 187 dB. Peak pressure injury may occur within 9 m of the pile-driving activities, and sSEL injury within 2.9 m. Based on the installation schedule and an sSEL level of 194 dB at the source, according to the model, cSEL injury may occur at a distance of up to 100 m from pile-driving activities.

In terms of behavioral effects, the project's impact pile driving will produce about 204 dB RMS of noise at the source, while the NMFS-accepted threshold for behavioral disturbance is 150 dB RMS for fishes and 160 dB RMS for sea turtles. Based on this information, sturgeon may exhibit behavioral changes when within 3,981 m of the project's active impact pile driving and sea turtles when within 858 m, because that is the distance at which noise levels are expected to dissipate to the respective behavioral disturbance thresholds.

Due to their expected avoidance of project noise and activity, we would not expect a sturgeon or sea turtle to remain stationary within the injury or behavioral disturbance radii during sheet pile installation operations. The use of the "soft start" technique will give sturgeon and sea turtles ample time to leave the area as noise levels increase incrementally and before injury occurs. The project has adequate avenues for animals to escape or avoid the project area during sheet pile-driving activities. There are many other suitable foraging and resting areas in the vicinity of the project that lie outside of the injury and behavioral disturbance zones that listed species could utilize when pile

driving is occurring. If an individual chooses to remain within the behavioral disturbance zone, it could be exposed to behavioral noise impacts during sheet pile installations. However, the project area could still be used by these species during quiet periods between pile installations, and during early evening and night hours when pile driving and other construction activities will not occur. In addition, the project area is located in a man-made basin created from upland and does not offer resting or foraging habitat for sturgeon or sea turtles. In summary, we believe the effects on sturgeon and sea turtles caused by noise generated during the installation of sheet piles via vibratory hammer or impact hammer during this project will be discountable for potential injury effects and insignificant for potential behavioral effects.

Conclusion
Because all potential project effects to listed species were found to be discountable, insignificant, or beneficial, we conclude that the proposed actions are not likely to adversely affect listed species under NMFS's purview. This concludes the Navy's consultation responsibilities under the ESA for species under NMFS's purview. Consultation must be reinitiated if a take occurs or new information reveals effects of the action not previously considered, or the identified actions are subsequently modified in a manner that causes an effect to the listed species or critical habitat in a manner or to an extent not previously considered, or if a new species is listed or critical habitat designated that may be affected by the identified action. NMFS's findings on the project's potential effects are based on the project description in this response. Any changes to the proposed action may negate the findings of this consultation and may require reinitiation of consultation with NMFS.

We have enclosed additional relevant information for your review. We look forward to further cooperation with you on other projects to ensure the conservation of our threatened and endangered marine species and designated critical habitat. If you have any questions on this consultation, please contact Kay Davy, Consultation Biologist, at (727) 415-9271, or by email at kay.davy@noaa.gov.

Sincerely,

Roy E. Crabtree, Ph.D.
Regional Administrator

Enc.: *PCTS Access and Additional Considerations for ESA Section 7 Consultations* (Revised March 10, 2015)

File: 1514-22.F.3

APPENDIX B
Sea Turtle and Smalltooth Sawfish Construction Conditions

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southeast Regional Office
263 13th Avenue South
St. Petersburg, FL 33701

SEA TURTLE AND SMALLTOOTH SAWFISH CONSTRUCTION CONDITIONS

The permittee shall comply with the following protected species construction conditions:

a. The permittee shall instruct all personnel associated with the project of the potential presence of these species and the need to avoid collisions with sea turtles and smalltooth sawfish. All construction personnel are responsible for observing water-related activities for the presence of these species.

b. The permittee shall advise all construction personnel that there are civil and criminal penalties for harming, harassing, or killing sea turtles or smalltooth sawfish, which are protected under the Endangered Species Act of 1973.

c. Siltation barriers shall be made of material in which a sea turtle or smalltooth sawfish cannot become entangled, be properly secured, and be regularly monitored to avoid protected species entrapment. Barriers may not block sea turtle or smalltooth sawfish entry to or exit from designated critical habitat without prior agreement from the National Marine Fisheries Service's Protected Resources Division, St. Petersburg, Florida.

d. All vessels associated with the construction project shall operate at "no wake/idle" speeds at all times while in the construction area and while in water depths where the draft of the vessel provides less than a four-foot clearance from the bottom. All vessels will preferentially follow deep-water routes (e.g., marked channels) whenever possible.

e. If a sea turtle or smalltooth sawfish is seen within 100 yards of the active daily construction/dredging operation or vessel movement, all appropriate precautions shall be implemented to ensure its protection. These precautions shall include cessation of operation of any moving equipment closer than 50 feet of a sea turtle or smalltooth sawfish. Operation of any mechanical construction equipment shall cease immediately if a sea turtle or smalltooth sawfish is seen within a 50-ft radius of the equipment. Activities may not resume until the protected species has departed the project area of its own volition.

f. Any collision with and/or injury to a sea turtle or smalltooth sawfish shall be reported immediately to the National Marine Fisheries Service's Protected Resources Division (727-824-5312) and the local authorized sea turtle stranding/rescue organization.

g. Any special construction conditions, required of your specific project, outside these general conditions, if applicable, will be addressed in the primary consultation.

Revised: March 23, 2006
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APPENDIX C
Marine Mammal and Sea Turtle Viewing Guidelines

Adapted from Southeast Region Marine Mammal & Sea Turtle Viewing Guidelines available at http://www.nmfs.noaa.gov/pr/education/southeast/guidelines.htm

Viewing "Code of Conduct"

These guidelines are intended to inform the public about protection of marine mammals and sea turtles. They are not a replacement for Federal legal requirements.

1. Remain a respectful distance from marine mammals and sea turtles. The minimum recommended distances are:
   - dolphins, porpoises, seals = 50 yards
   - sea turtles = 50 yards
   - whales = 100 yards*
     Federal law prohibits all approaches to North Atlantic right whales within 500 yards.
2. Marine mammals and sea turtles should not be encircled or trapped between watercraft, or watercraft and shore.
3. If approached by a marine mammal or sea turtle, put your watercraft's engine in neutral and allow the animal to pass. Any vessel movement should be from the rear of the animal.*
   Pursuit of marine mammals and sea turtles is prohibited by Federal law.
4. Never feed or attempt to feed marine mammals or sea turtles.*
   Federal law prohibits feeding or attempting to feed marine mammals.

Detailed Guidelines

Limit your viewing time.

- Prolonged exposure to one or more vessels increases the likelihood that marine mammals will be disturbed.
- Since individual animals' reactions will vary, carefully observe all animals and leave the vicinity if you see signs of disturbance.
- Your vessel may not be the only vessel in the day that approaches the same animal(s); please be aware of cumulative impacts.

Travel in a predictable manner.

- Marine mammals appear to be less disturbed by vessels that are traveling in a predictable manner.
- The departure from a viewing area has as much potential to disturb animals as the approach.

- If a marine mammal or sea turtle approaches, put your engine in neutral and allow the animal to pass.
- Never pursue of follow marine wildlife.
- Never attempt to herd, chase, or separate groups of marine mammals or females from their young.
- Avoid excessive speed or sudden changes in speed or direction in the vicinity of animals.

If you need to move around marine wildlife, do so from behind (i.e., never approach head-on).

- Vessels that wish to position themselves so that the animals would pass them, should do so in a manner that stays fully clear of the animal's path.

Be aware that marine mammals may surface in unpredictable locations.

- Breaching and flipper slapping whales may endanger people and/or vessels.

Marine mammals are more likely to be disturbed when more than one boat is near them.

- Avoid approaching the animals when another vessel is near.
- Always leave marine mammals an "escape route."
- When several vessels are in an area, communication between operators will help ensure that you do not cause disturbance.

Marine mammals have sensitive hearing and many species communicate by vocalizing underwater.

- Underwater sound produced by a vessel's engines and propellers can disturb these animals.

Cautiously move away from the animals if you observe any of the following behaviors:

- Rapid changes in direction or swimming speed.
- Erratic swimming patterns.
- Escape tactics such as prolonged diving, underwater exhalation, underwater course changes, or rapid swimming at the surface.
- Tail slapping or lateral tail swishing at the surface.
- Female attempting to shield a calf with her body or by her movements.

Even if approached by a marine mammal or sea turtle:

- Do not touch or swim with the animals.

Never feed or attempt to feed marine mammals or sea turtles.

- It can alter their natural behavior, make them dependent on handouts, and can be harmful to their health.

- Marine mammals, like all wild animals, may bite and inflict injuries to people who try to feed them.

Note: NMFS regulations at 50 CFR § 216.3 strictly prohibit feeding or attempting to feed a marine mammal in the wild.

Close approaches by humans to marine mammals may cause them to lose their natural wariness and become aggressive towards people. They are also vulnerable to injury or death from entanglement in fishing gear or boat strikes. NMFS strongly encourages people to follow the guidelines presented here while spending time on or near the water.

APPENDIX D
Marine Mammal Monitoring Plan

MARINE MAMMAL MONITORING PLAN
FOR BRAVO WHARF RECAPITALIZATION
AT NAVSTA MAYPORT, JACKSONVILLE, FLORIDA
NAVY REGION SOUTHEAST

Submitted to:

Office of Protected Resources,
National Marine Fisheries Service,
National Oceanographic and Atmospheric Administration

Prepared by:

Naval Facilities Engineering Command Southeast
and
Naval Facilities Engineering Command Atlantic

June 2015

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ACRONYMS AND ABBREVIATIONS

C-1	Charlie One (Wharf)
dB	decibel
EA	Environmental Assessment
ft.	foot / feet
IHA	Incidental Harassment Authorization
μPa	microPascal
m	meter
MMPA	Marine Mammal Protection Act
NAVSTA	Naval Station
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service
POC	point of contact
Project	Bravo Wharf Recapitalization Project
PTS	Permanent Threshold Shift
TTS	Temporary Threshold Shift
USFWS	U.S. Fish and Wildlife Service
ZOI	Zone of Influence

1.0 INTRODUCTION

1.1 Purpose of the Monitoring Plan

The purpose of this Monitoring Plan is to provide protocols for marine mammal monitoring during the proposed recapitalization of Bravo Wharf (berths B-1, B-2, and B-3) at Naval Station (NAVSTA) Mayport, Florida (Figures 1-1 and 1-2). Recapitalization includes demolishing and replacing the existing concrete pile cap, wharf deck, and utilities and installation of a new steel sheet pile bulkhead around the existing wharf. This plan was developed to support the National Marine Fisheries (NMFS) Incidental Harassment Authorization (IHA) Application (U.S. Department of the Navy 2015).

Marine mammal monitoring will be conducted before, during, and after pile driving activities within the zones detailed in Section 2.3, and will represent an important minimization measure to reduce the likelihood of potential injury to marine mammals.

1.2 Scope and Timing

The scope of this Monitoring Plan includes pile driving activities that are necessary for the Bravo Wharf recapitalization project (Project). Sea turtles and smalltooth sawfish (as practicable) will be included in monitoring efforts. However, for the purposes of this submittal to NMFS in support of compliance with the Marine Mammal Protection Act (MMPA), the scope of monitoring in this document is limited to marine mammals under NMFS' purview. Marine mammal monitoring would be integrated with other marine environmental monitoring if it is required as a result of the Navy's National Environmental Policy Act (NEPA) project review or as a condition of approval by other regulatory agencies.

This Monitoring Plan will be implemented when pile driving is taking place during the period of the requested IHA (1 October 2016 to 30 September 2017) for the Project.

1.3 Management

The Monitoring Plan will be managed by Naval Facilities Engineering Command (NAVFAC) Southeast. Marine mammal monitoring will be carried out by private contractors supported by local technical staff from NAVFAC Southeast and NAVSTA Mayport. NAVFAC Southeast will also be responsible for preparation of the Monitoring Report for the IHA.

Figure 1-1. Regional Location – Naval Station Mayport, Mayport, Florida

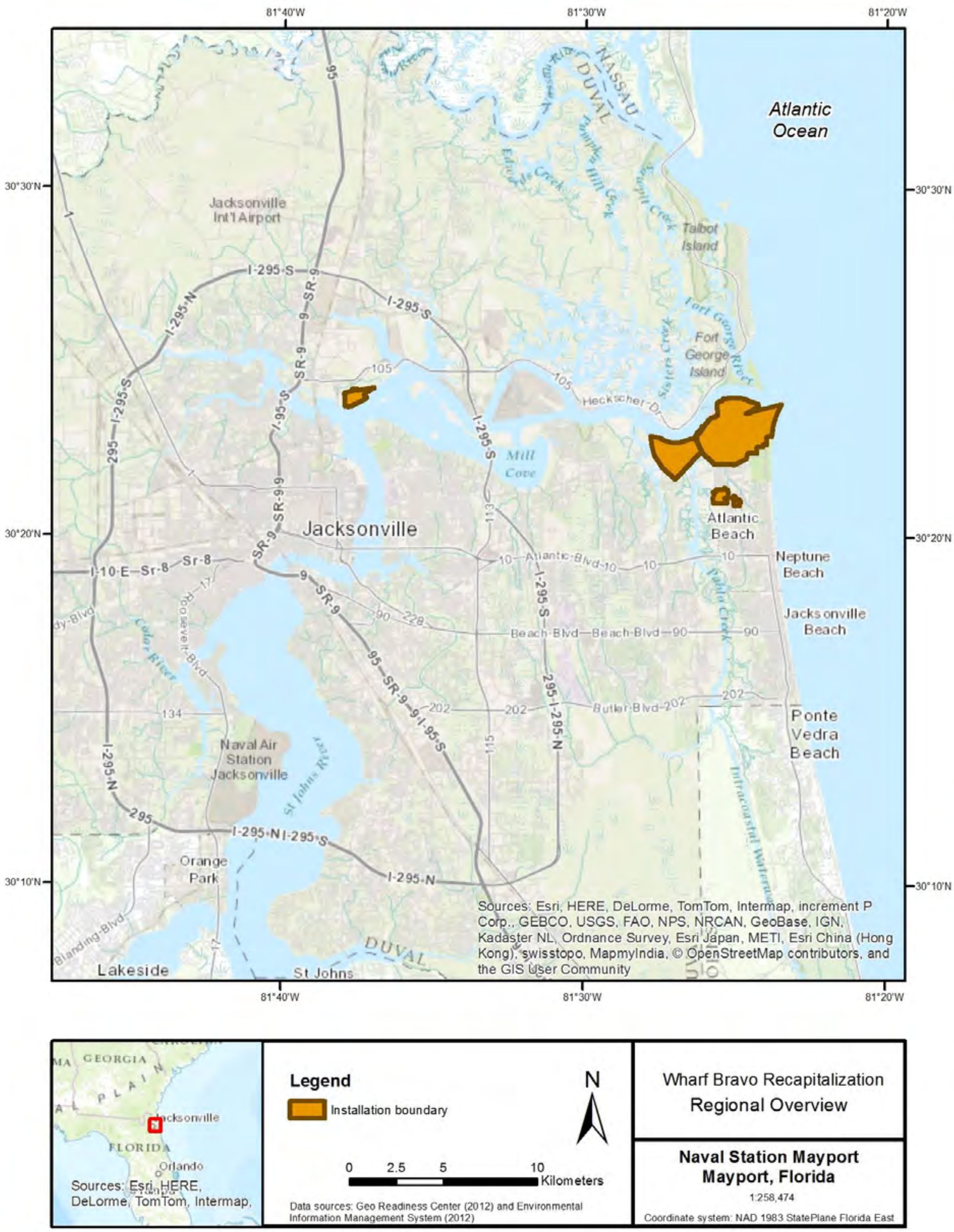
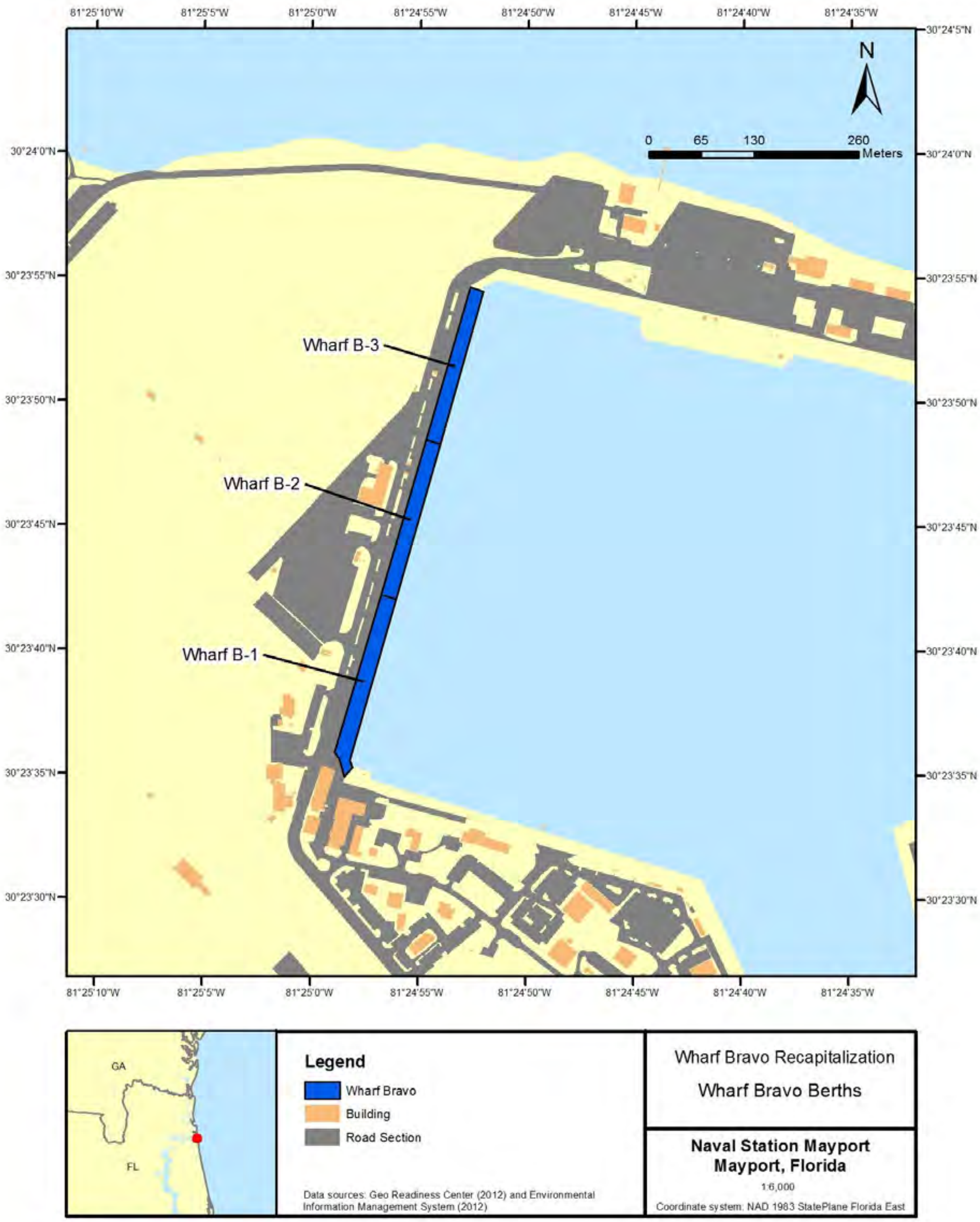


Figure 1-2. Bravo Wharf berths B-1, B-2, and B-3 – Naval Station Mayport, Mayport, Florida



2.0 BRAVO WHARF RECAPITALIZATION PROJECT

Refer to the Environmental Assessment (EA) (U.S. Department of the Navy 2015) and current IHA Application (U.S. Department of the Navy 2015) for a full description of the Project.

2.1 Project Area

The project area is along the Atlantic coast of northern Florida, and includes the NAVSTA Mayport turning basin out to the limit of the most distant of the acoustic thresholds for all protected species being addressed for the Project (Figure 2-1). The lesser acoustic threshold distances are displayed in Figure 2-2. Acoustic thresholds used in this monitoring report are based on criteria developed by NMFS[1] (70 FR 1871; 74 FR 41684).

2.2 Activities to be Monitored

Activities which would be subject to marine mammal monitoring include the following:

- Vibratory pile driving of steel sheet piles necessary to construct a new steel sheet pile wall outside the existing bulkhead. Approximately 880 steel sheet piles will be installed with a vibratory driver.
- Contingency-only impact installation of steel sheet piles. Impact driving will only be used if vibratory driving is inadequate or an obstruction that prevents vibratory installation of is encountered.

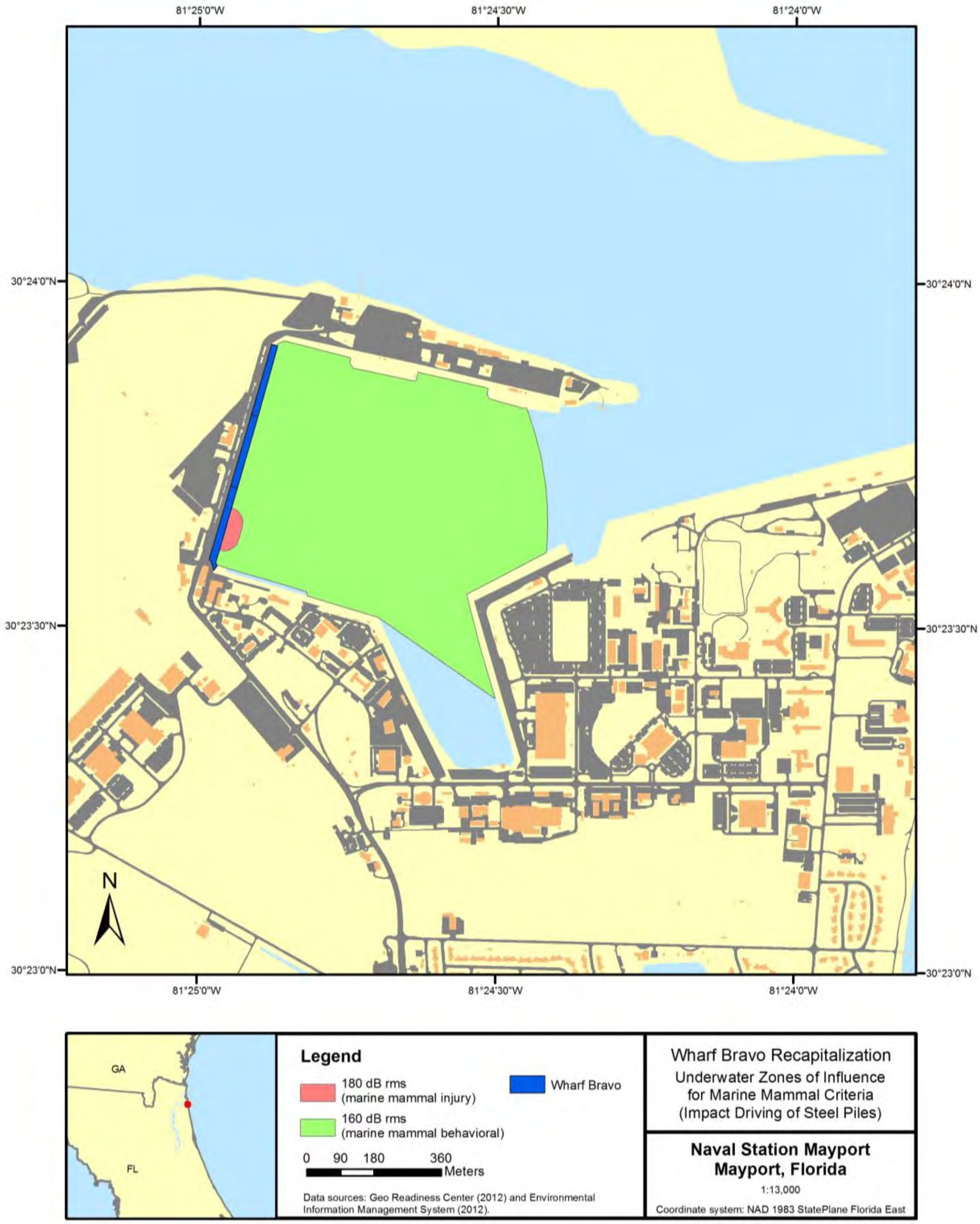
Marine mammal monitoring will be performed to ensure that in-water activities are stopped if animals occur within the zone of influence (ZOI) for potential injury or a standard 50 feet (ft.) buffer from pile driving activities (Figure 2-3). Monitoring methods are described in Section 3 of this document.

[1] New acoustic criteria covering permanent and temporary threshold shifts (PTS and TTS, respectively) were proposed by NMFS in December 2013. At the time of submittal, these criteria have not been finalized and no implementation guidance has been issued. They are therefore not addressed in this mitigation plan.

Figure 2-1. Injury and Behavioral Zones of Influence for Marine Mammals[2] – Vibratory Driving of Steel Sheet Piles

[2] Official criteria have not been established for West Indian manatees. The Navy's IHA application, Appendix C – Standards Manatee Conditions for In-Water Work, cover standards of practice promulgated by The U.S. Fish and Wildlife Service (USFWS) for manatees.

Figure 2-2. Injury and Behavioral Zones of Influence for Marine Mammals[3] – Impact Driving of Steel Sheet Piles (Contingency Only)



[3] Official criteria have not been established for West Indian manatees; marine mammal injury zone of influence illustrated represents a notional template location

Pile Installation
The acoustic analysis for vibratory pile driving used the assumption a maximum 27 sheet pile pairs would be driven each day. Each pile is anticipated to require no more than 60 seconds to drive by vibratory methods. Impact pile driving would only be used as a contingency in cases when vibratory driving is insufficient (a similar project that has been completed at adjacent Wharf C-1 required impact pile driving on only seven piles).

2.3 Monitoring and Shutdown Zones

Table 2-1 lists the monitoring and shutdown zones, and measures associated with the occurrence of a marine mammal in each zone. For all in-water construction and demolition activities, a minimum protective shutdown zone of 15 m (50 ft.) is proposed. Sound-generating activities with larger shutdown zones follow, based on the maximum modeled distance to the Level A (injury) threshold:

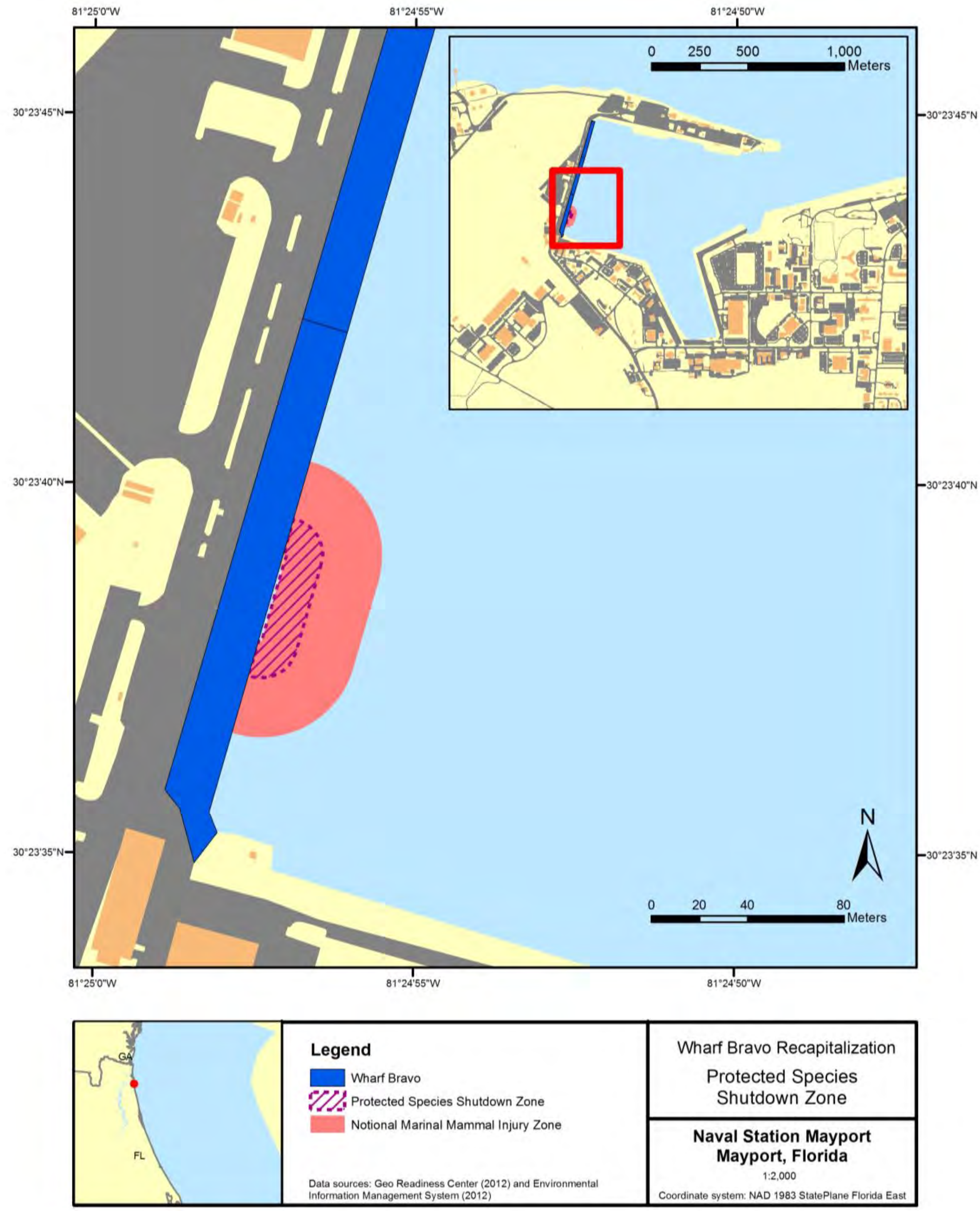
- During vibratory pile driving, the shutdown distance will initially be 15 m.
- If impact driving of steel piles is needed, the shutdown distance for cetaceans will be 40 m during the brief duration of such activities.

Table 2-1. Monitoring and Shutdown Zones

Type of Activity	Distance from Pile Being Driven and Active In-water Equipment (any direction in water)	Measure
All in-water work[1]	50 ft. (15 m)	Shut down all in-water work if a marine mammal, sea turtle, or smalltooth sawfish (surface) is observed in the zone
Impact driving of steel piles (contingency only)	130 ft. (40 m)	Shut down pile driving if a marine mammal is observed in the zone

[1] In-water work is defined as any activity where personnel or equipment are working in the water column. Vessel movement does not constitute in-water work.

Figure 2-3. Monitoring / Shutdown Zone



3.0 MARINE MAMMAL MONITORING

3.1 Observers and Procedures

The Navy shall conduct a pre-construction briefing with the contractor. During the briefing, all contractor personnel working in the Project area will watch the Navy's Marine Species Awareness Training presentation.

Marine mammal observers ("observers") designated by the contractor will be placed at the best vantage point(s) practicable to monitor for marine mammals and implement shutdown/delay procedures when applicable by calling for the shutdown to the hammer operator. The observers will have no other construction related tasks while conducting monitoring.

The contractor will adhere to all requirements of the following:

- U.S. Fish and Wildlife Services (USFWS) 2011 Standard Manatee Conditions for In-Water Work (Attachment 1)
- National Marine Fisheries Service 2006 Sea Turtle and Smalltooth Sawfish Construction Conditions (Attachment 2)
- National Marine Fisheries Services 2012 Southeast Region Marine Mammal and Sea Turtle Viewing Guidelines (Attachment 3)
- Requirements of IHA upon issuance by NMFS.

3.2 Methods

The observer(s) will monitor the shutdown zone before, during, and after pile driving and removal.

The observer(s) will be placed at the best vantage point practicable (e.g. from a small boat, construction barges, on shore, or any other suitable location) to monitor for marine mammals and implement shutdown/delay procedures when applicable by calling for the shutdown to the equipment operator(s). Elevated positions are preferable; it shall be the contractor's responsibility to ensure that appropriate safety measures are implemented to protect observers on elevated observation points. If a boat is used for monitoring, the boat will maintain minimum distances from species (should they occur) as described in National Marine Fisheries Services' 2012 Southeast Region Marine Mammal and Sea Turtle Viewing Guidelines (Attachment 3).

- During all observation periods, observers would use binoculars and the naked eye to search continuously for marine mammals;
- If the shutdown zone is obscured by fog or poor lighting conditions, pile driving will not be initiated until the entire shutdown zone is visible.
- The shutdown zone will be monitored for the presence of marine mammals before, during, and after any pile driving or removal activity.

Pre-Activity Monitoring:

The shutdown zone will be monitored for 15 minutes prior to in-water construction/demolition activities. If a marine mammal is present within or approaching the edge of the shutdown zone, the activity would be delayed until the animal(s) leave the shutdown zone. Activity would resume only after the observer has determined, through re-sighting or by waiting 15 minutes with no further sightings that the animal(s) has moved outside the shutdown zone. The observer will notify the monitoring coordinator/construction foreman / POC when construction activities can commence.

During Activity Monitoring:

The shutdown zone shall include all areas where the underwater sound pressure levels are anticipated to equal or exceed the Level A (injury) criteria for marine mammals (180 dB re 1 μPa isopleth for cetaceans). The shutdown zone will always be a minimum of 15 meters (m) (50 ft.) to prevent injury from physical interaction of marine mammals with construction equipment (Figure 2-3).

If a marine mammal, sea turtle, or smalltooth sawfish enters a shutdown zone during any in-water work, activity will be halted and delayed until either the animal has voluntarily left and been visually confirmed beyond the shutdown zone or 15 minutes have passed without re-detection of the animal.

Post-Activity Monitoring:

Monitoring of the shutdown zone will continue for 15 minutes following the completion of the activity.

3.3 Data Collection

The following information will be collected on sighting forms used by observers:

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

If a bottlenose dolphin or other cetacean enters the relevant ZOIs and/or a manatee, sea turtle, or smalltooth sawfish enters the shutdown zone, the following information will be recorded once shutdown procedures have been implemented:

- Species, numbers, and if possible sex and age class of marine mammals
- Behavior patterns observed, including bearing and direction of travel
- Location of the observer and distance from the animal(s) to the observer

If possible, photographs of the animal(s) will be taken and forwarded to the Naval Facilities Engineering Command Southeast Environmental point of contact.

Data collection forms shall be furnished to the Environmental point of contact within a mutually agreeable timeframe.

3.4 Equipment

The observer(s) shall be equipped with the following:

- binoculars (7 x 50 power or greater) to ensure sufficient visual acuity while investigating sightings
- portable radios or cellular phone(s) to rapidly communicate with the appropriate construction personnel to initiate shutdown of pile driving activity if required
- a digital camera for photographing any marine species sighted
- data collection forms
- Compass/GPS

3.5 Observer Monitoring Locations

In order to effectively monitor the shutdown zones, marine mammal observers will be positioned at the best practicable vantage point(s), taking into consideration the behavior of marine mammal species likely to enter the area, security, safety, and space limitations at the waterfront, in order to properly monitor these zones. Observers may be stationed in small vessels or on the wharf at a location that will provide adequate visual coverage for the marine mammal shutdown zone.

3.6 Interagency Notification

If the Navy encounters an injured, sick, or dead marine mammal, NMFS will be notified immediately. Such sightings will be called into the NMFS Stranding Coordinator for the Southeast:

Erin Fougeres, Ph.D.
Marine Mammal Stranding Program Administrator
NOAA Fisheries
Southeast Regional Office
263 13th Avenue South
St. Petersburg, FL 33701
e-mail: erin.fougeres@noaa.gov
office: 727-824-5323
fax: 727-824-5309

The Navy will provide NMFS with the species or description of the animal(s), the condition of the animal (including carcass condition if the animal is dead), location, the date and time of first discovery, observed behaviors (if alive), and photo or video (if available).

Care should be taken in handling dead specimens to preserve biological materials in the best possible state for later analysis of cause of death, if that occurs. In preservation of biological materials from a dead animal, the finder (i.e. marine mammal observer) has the responsibility to ensure that evidence associated with the specimen is not unnecessarily disturbed.

4.0 REPORTING

A draft report of any incidents of marine mammals entering the shutdown zone will be forwarded to NMFS / USFWS no later than 31 December 2017. This report will also include observed cetacean sightings in the larger ZOIs and other protected species in the shutdown zone. A final report would be prepared and submitted to NMFS within 30 days following receipt of comments on the draft report from NMFS.

5.0 REFERENCES

Hannigan, P. (2011). Pile Driving Equipment. 2011 PDCA Professor Pile Institute. Produced by GRL Engineers, Inc. Retrieved from http://www.piledrivers.org/pdpi-pat-hannigan.htm. Accessed on 04 November 2012

National Marine Fisheries Service. (2013). Incidental Harassment Authorization for Wharf C-2 Recapitalization Project at Mayport, FL. Issued 25 November 2013.

U.S. Department of the Navy (2015b). Environmental Assessment Bravo Wharf Recapitalization at Naval Station Mayport, Florida.

U.S. Department of the Navy. (2015). Request for an Incidental Harassment Authorization Under the Marine Mammal Protection Act for the Bravo Wharf Recapitalization Project, Navy Region Southeast. April 2015.

APPENDIX E
Fundamentals of Acoustics

Fundamentals of Acoustics

Bioacoustics, or the study of how sound affects living organisms, is a complex and interdisciplinary field that includes the physics of sound production and propagation, the source characteristics of sounds, and the perceptual capabilities of receivers. This appendix is intended to introduce the reader to the basics of sound measurements and sound propagation, as well as the hearing and vocal production abilities of species that may occur in the project area. The potential for noise from pile driving to cause auditory masking for marine mammals within the project area is also considered.

B.1 Fundamentals of Acoustics

Sound is an oscillation in pressure, particle displacement, or particle velocity, as well as the auditory sensation evoked by these oscillations, although not all sound waves evoke an auditory sensation (i.e., they are outside of an animal's hearing range) (ANSI S1.1-1994). Sound may be described in terms of both physical and subjective attributes. Physical attributes may be directly measured. Subjective (or sensory) attributes cannot be directly measured and require a listener to make a judgment about the sound. Physical attributes of a sound at a particular point are obtained by measuring pressure changes as sound waves pass. The following material provides a short description of some of the basic parameters of sound.

Sound can be characterized by several factors, including frequency, intensity, and pressure (Richardson et al. 1995). Sound frequency (measured in Hertz [Hz]) and intensity (amount of energy in a signal [Watts per meter^2]) are physical properties of the sound which are related to the subjective qualities of pitch and loudness (Kinsler et al. 1999). Sound intensity and sound pressure (measured in Pascals [Pa]) are also related; of the two, sound pressure is easier to measure directly, and is therefore more commonly used to evaluate the amount of disturbance to the medium caused by a sound ("amplitude").

Because of the wide range of pressures and intensities encountered during measurements of sound, a logarithmic scale known as the decibel is used to evaluate these properties; in acoustics, "level" indicates a sound measurement in decibels. The decibel [dB] scale expresses the logarithmic strength of a signal (pressure or intensity) relative to a reference value of the same units. This document reports sound levels with respect to sound pressure only. Each increase of 20 dB reflects a ten-fold increase in signal pressure, i.e., an increase of 20 dB means ten times the pressure, 40 dB means one hundred times the pressure, 60 dB means one thousand times the pressure, and so on.

The sound levels in this document are given as sound pressure levels [SPL]. For measurements of underwater sound, the standard reference pressure is 1 microPascal [μPa, or 10^{-6} Pascals], and is expressed as "dB re 1μPa". For airborne sounds, the reference value is 20 μPa, expressed as "dB re 20 μPa". Sound levels measured in air and water are not directly comparable, and it is important to note which reference value is associated with a given sound level.

Airborne sounds are commonly referenced to human hearing using a method which weights sound frequencies according to measures of human perception, de-emphasizing very low and very high frequencies which are not perceived well by humans. This is called A-weighting, and the decibel level measured is called the A-weighted sound level [dBA]. A similar method has been proposed for evaluating underwater sound levels with respect to marine mammal hearing. While preliminary weighting functions for marine mammal hearing have been developed

(Southall et al. 2007), they are not yet applied to sound exposure from pile driving activities. Therefore, underwater sound levels given in this document are not weighted and evaluate all frequencies equally.

Table D-1 summarizes common acoustic terminology. Two of the most common descriptors are the instantaneous peak SPL and the root-mean-square [rms] SPL. The peak SPL is the instantaneous maximum or minimum over- or underpressure observed during each sound event and is presented in dB re 1 µPa peak. The rms level is the square root of the energy divided by a defined time period, given as dB re 1 µPa rms.

Table B-1. Definitions of Acoustical Terms

Term	Definition
Decibel [dB]	A unit describing the amplitude of sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure or intensity of the sound measured to the appropriate standard reference value. This document uses only sound pressure measurements to calculate decibel levels. The reference pressure for water is 1 microPascal (µPa) and for air is 20 µPa (approximate threshold of human audibility).
Sound Pressure Level [SPL]	Sound pressure is the force per unit area, usually expressed in microPascals (or 20 micro Newtons per square meter), where 1 Pascal is the pressure resulting from a force of 1 Newton exerted over an area of 1 square meter. Sound pressure level is the quantity that is directly measured by a sound level meter, and is expressed in decibels referenced to the appropriate air or water standard.
Frequency, Hz	Frequency is expressed in terms of oscillations, or cycles, per second. Cycles per second are commonly referred to as Hertz (Hz). Typical human hearing ranges from 20 Hz to 20,000 Hz; hearing ranges in non-humans are widely variable and species specific.
Peak Sound Pressure (unweighted), dB re 1µPa peak	The maximum absolute value of the instantaneous sound pressure expressed as dB re 1µPa peak.
Root-Mean-Square [rms], dB re 1µPa	The rms level is the square root of the pressure divided by a defined time period, expressed in decibels. For impulsive sounds, the rms has been defined as the average of the squared pressures over the time that comprise that portion of waveform containing 90 percent of the sound energy for one impact pile driving impulse. For non-impulsive sounds, rms energy represents the average of the squared pressures over the measurement period and is not limited by the 90 percent energy criterion. Expressed as dB re 1µPa.
Sound Exposure Level [SEL], dB re 1µPa^2 sec	Sound exposure level is a measure of energy. Specifically, it is the dB level of the time integral of the squared-instantaneous sound pressure, normalized to a 1-second period. It can be an extremely useful metric for assessing cumulative exposure because it enables sounds of differing duration to be compared in terms of total energy.
Waveforms, µPa over time	A graphical plot illustrating the time history of positive and negative sound pressure of individual pile strikes shown as a plot of µPa over time (i.e., seconds).
Frequency Spectra, dB over frequency range	A graphical plot illustrating the frequency content over a given frequency range. Bandwidth is generally defined as linear (narrowband) or logarithmic (broadband) and is stated in frequency (Hz).
A-Weighted Sound Level, dBA	A frequency-weighted measure used for airborne sounds only. A-weighting de-emphasizes the low and high frequency components of a given sound in a manner similar to the frequency response of the human ear and correlates well with subjective human reactions to noise. A-weighted levels are referenced to 20 µPa unless otherwise noted.

Term	Definition
Ambient Noise Level	The background noise level, which is a composite of sounds from all sources near and far. The normal or existing level of environmental noise at a given location, given in dB referenced to the appropriate pressure standard.

Adapted and derived from URS Corporation (2007)

B.2 Sound vs. Noise

Sound may be purposely created to convey information, communicate, or obtain information about the environment. Examples of such sounds are sonar pings, marine mammal vocalizations/echolocations, tones used in hearing experiments, and small sonobuoy explosions used for submarine detection.

Noise is undesired sound (ANSI S1.1-1994). Whether a sound is noise depends on the receiver (i.e., the animal or system that detects the sound). For example, small explosives and sonar used to locate an enemy submarine produce *sound* that is useful to sailors engaged in anti-submarine warfare, but is likely to be considered undesirable *noise* by marine mammals. Sounds produced by naval aircraft and vessel propulsion are considered noise because they represent possible energy inefficiency and increased detectability, which are undesirable.

Noise also refers to all sound sources that may interfere with detection of a desired sound and the combination of all of the sounds at a particular location (ambient noise).

B.3 Description of Noise Sources

Ambient noise in the project area is a composite of sounds from natural sources, normal port activities, and temporary projects such as maintenance dredging or pile driving. Ambient noise in the Mayport turning basin is addressed in Chapter 5 of the IHA Application.

In-water construction activities associated with this project include vibratory and impact pile driving. The sounds produced by these activities fall into two sound types: impulsive (impact driving) and non-impulsive (vibratory driving). Distinguishing between these two general sound types is important because of each sound type may cause different types of physical effects, particularly with regard to hearing (Ward 1997).

Impulsive sounds (e.g., explosions, seismic airgun pulses, and impact pile driving) are referred to as pulsed sounds in Southall et al. (2007), and are brief, broadband, atonal transient sounds which can occur as isolated events or be repeated in some succession (Southall et al. 2007). Impulsive sounds are characterized by a relatively rapid rise from ambient pressure to a maximal pressure value followed by a decay period that may include a period of diminishing, oscillating maximal and minimal pressures (Southall et al. 2007). Impulsive sounds generally have a greater capacity to induce physical injury compared with sounds that lack these features (Southall et al. 2007).

Non-impulsive sounds ("non-pulsed" in Southall et al. 2007) can be tonal, broadband, or both. They lack the rapid rise time and can have longer durations than impulsive sounds. Non-impulsive sounds can be either intermittent or continuous sounds. Examples of non-impulsive sounds include vessels, aircraft, and machinery operations such as drilling, dredging, and vibratory pile driving (Southall et al. 2007).

In environments with non-porous boundaries (i.e. rock seafloor, rigid sides, etc.), reverberation may extend the duration of both impulsive and non-impulsive sounds.

B.4 Vocalization and Hearing of Marine Mammals

All marine mammals that have been studied can produce sounds and use sounds to forage, orient, detect and respond to predators, and facilitate social interactions (Richardson et al., 1995). Measurements of marine mammal sound production and hearing capabilities provide some basis for assessing whether exposure to a particular sound source may affect a marine mammal behaviorally or physiologically. Marine mammal hearing abilities are quantified using live animals either via behavioral audiometry or electrophysiology (see Schusterman 1981; Au 1993; Wartzok and Ketten 1999; Nachtigall et al. 2007). Behavioral audiograms, which are plots of animals' exhibited hearing threshold versus frequency, are obtained from captive, trained live animals using standard testing procedures with appropriate controls, and are considered to be a more accurate representation of a subject's hearing abilities. Behavioral audiograms of marine mammals are difficult to obtain because many species are too large, too rare, and too difficult to acquire and maintain for experiments in captivity. Consequently, our understanding of a species' hearing ability may be based on the behavioral audiogram of a single individual or small group of animals. In addition, captive animals may be exposed to local ambient sounds and other environmental factors that may impact their hearing abilities and may not accurately reflect the hearing abilities of free-swimming animals. For animals not available in captive or stranded settings (including large whales and rare species), estimates of hearing capabilities are made based on anatomical and physiological structures, the frequency range of the species' vocalizations, and extrapolations from related species.

Electrophysiological audiometry measures small electrical voltages produced by neural activity when the auditory system is stimulated by sound. The technique is relatively fast, does not require a conscious response, and is routinely used to assess the hearing of newborn humans. It has recently been adapted for use on non-humans, including marine mammals (Dolphin, 2000). For both methods of evaluating hearing ability, hearing response in relation to frequency is a generalized U-shaped curve or audiogram showing the frequency range of best sensitivity (lowest hearing threshold) and frequencies above and below with higher threshold values.

Direct measurement of hearing sensitivity exists for approximately 25 of the nearly 130 species of marine mammals. Table provides a summary of sound production and hearing capabilities for marine mammal species in the Project Area. For purposes of this analysis, marine mammals are arranged into the following functional hearing groups based on their generalized hearing sensitivities: high-frequency cetaceans, mid-frequency cetaceans, low-frequency cetaceans (mysticetes), phocid pinnipeds (true seals), otariid pinnipeds (sea lions and fur seals); of these, only mid- and low-frequency cetaceans occur in the Project Area.

Table B-2. Hearing and Vocalization Ranges for Marine Mammal Functional Hearing Groups and Species Potentially Occurring within the Project Area

Functional Hearing Group	Species	Sound Production		General Hearing Ability Frequency Range
		Frequency Range	Source Level (dB re 1 µPa @ 1 m)	
Mid-Frequency Cetaceans	Bottlenose dolphin	100 Hz to 100kHz	137 to 236	150 Hz to 160 kHz
Low-Frequency Cetaceans	North Atlantic right whale; humpback whale	10 Hz to 20 kHz	137 to 192	7 Hz to 22 kHz

Adapted and derived from Southall et al. (2007) and Richardson et al. (1995)
dB re 1 µPa @ 1 m: decibels (dB) referenced to (re) 1 micro (µ) Pascal (Pa) at 1 meter; Hz: Hertz; kHz: kilohertz

B.4.1 Auditory Masking

Natural and artificial sounds can disrupt behavior by auditory masking, or interfering with a marine mammal's ability to detect and interpret other relevant sounds, such as communication and echolocation signals (Wartzok et al. 2004). Masking occurs when both the signal and masking sound have similar frequencies and either overlap or occur very close to each other in time. A signal is very likely to be masked if the noise is within a certain "critical bandwidth" around the signal's frequency and its energy level is similar or higher (Holt 2009). Noise within the critical band of a marine mammal signal will show increased interference with detection of the signal as the level of the noise increases (Wartzok et al. 2004). In delphinid subjects, for example, relevant signals needed to be 17 to 20 dB louder than masking noise at frequencies below 1 kHz in order to be detected and 40 dB greater at approximately 100 kHz (Richardson et al. 1995). Noise at frequencies outside of a signal's critical bandwidth will have little to no effect on the detection of that signal (Wartzok et al. 2004).

Additional factors influencing masking are the temporal structure of the noise and the behavioral and environmental context in which the signal is produced. Continuous noise is more likely to mask signals than intermittent noise of the same amplitude; quiet "gaps" in the intermittent noise allow detection of signals which may not be detectable during continuous noise (Brumm and Slabbekoorn, 2005). The behavioral function of a vocalization (e.g. contact call, group cohesion vocalization, echolocation click, etc.) and the acoustic environment at the time of signaling may both influence call source level (Miksis-Olds and Tyack, 2009; Holt et al. 2011), which directly affects the chances that a signal will be masked (Nemeth and Brumm, 2010).

Noise from anthropogenic sources could cause masking of vocalizations which may rise to the level of behavioral harassment (as defined by the MMPA) if it disrupts communication, echolocation, or other hearing-dependent behaviors. Impact pile driving produces high-amplitude low-frequency noise (10 – 2,000 Hz), which is likely to be audible to all three marine mammal species considered, and is likely to overlap the vocalizations of low-frequency cetaceans (North Atlantic right and humpback whales; Table D-2). While the amplitude of impact pile driving noise may exceed marine mammal vocalization amplitudes within an unknown range of the driven pile, impact pile driving noise is unlikely to entirely mask social (non-echolocation)

signals due to the intermittent nature impact pile driving noise and the limited duration of impact pile driving associated with this project. Impact pile driving will be conducted only in the rare event that an obstruction is encountered during vibratory pile driving, and will be limited to a maximum of 20 strikes per day. We therefore estimate that the likelihood of noise from impact pile driving masking signals important to the behavior and survival of any of the three marine mammal species in the project area is negligible.

Vibratory pile driving produces frequencies from 10 Hz to 2 kHz, which would be within the range of audible sound and vocal production (see Table D-2) for all marine mammal species that may occur in the project area. Given the source levels (151 – 180 dB rms re 1 μPa at 10m) and frequency range (10 – 2,000 Hz) of vibratory pile driving noise (Illingworth & Rodkin 2012), we estimate that any masking event that could rise to Level B harassment under the MMPA would occur within the zones of behavioral harassment estimated for vibratory pile driving (see Chapter 5 in the IHA Application) (Parks et al. 2011). Therefore, potential masking effects are not considered separately in this IHA application.

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APPENDIX H
Biological Assessment for U.S. Fish and Wildlife Service

Naval Station (NAVSTA) Mayport

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FINAL

Biological Assessment for the Wharf Bravo Recapitalization at Naval Station Mayport, Jacksonville, Florida

June 2016

Abstract: The Proposed Action identifies and evaluates the potential effects of Wharf Bravo recapitalization (repairs and facilities maintenance) activities at NAVSTA Mayport. Activities include the construction of a new steel sheet pile bulkhead that ties into an existing steel sheet pile structure, placement of fill between existing and new steel sheet pile bulkheads, installation of a concrete pile cap and concrete encasement of sheet pile, asphalt wharf deck paving, repairs to electrical and mechanical shore utilities, upgrades to area lighting, and anti-terrorism force protection waterfront enclave facilities. No adverse effects on any protected species or critical habitat within the NAVSTA Mayport Action Area would occur as a result of the Wharf Bravo recapitalization activities.

Submitted To:
United States Fish and Wildlife Service

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Acronyms and Abbreviations

AT ... *Anti-terrorism*

BA ... *Biological Assessment*

BMPs ... *Best Management Practices*

BUG ... *Backlight-Uplight-Glare*

CRI ... *Color Rendering Index*

dB ... *Decibels*

EA ... *Environmental Assessment*

ESA ... *Endangered Species Act*

FAA ... *Federal Aviation Administration*

FAA ... *Federal Aviation Administration*

FP ... *Force Protection*

ft ... *Foot*

GSRC ... *Gulf South Research Corporation*

IDA ... *International Dark-Sky Association*

LED ... *Light-emitting diode*

LUX ... *Luminous Flux*

LZ ... *Lighting Zones*

MMPA ... *Marine Mammal Protection Act*

m ... *Meters*

NAVFAC ... *Naval Facilities Engineering Command*

NAVSTA ... *Naval Station*

Navy ... *Department of the Navy*

NEPA ... *National Environmental Policy Act*

NMFS ... *National Marine Fisheries Service*

NOAA .... *National Oceanographic and Atmospheric Administration*

POC .... *Point of Contact*

rms .... *Root mean square*

UFC .... *Unified Facilities Criteria*

U.S.C. .... *U.S. Code*

USFWS .... *U.S. Fish and Wildlife Service*

Biological Assessment

Introduction **-** In compliance with the Endangered Species Act (ESA) and in support of an informal Section 7 consultation, the U.S. Department of the Navy (Navy) has prepared this Biological Assessment (BA) to evaluate the potential environmental effects on Federally listed species and critical habitat associated with the recapitalization of Wharf Bravo at Naval Station (NAVSTA) Mayport. The Navy has prepared and submitted two separate BAs in compliance with the ESA, one to the U.S. Fish and Wildlife Service (USFWS) and another to the National Marine Fisheries Service (NMFS), for species and critical habitats under their respective jurisdictions.

NAVSTA Mayport is located in northern Florida east of Jacksonville along the St. Johns River and the Atlantic Ocean. NAVSTA Mayport maintains and operates facilities that provide operational deployment support to the home-based and transient Navy ships, aviation units, and staff. The NAVSTA Mayport Turning Basin is approximately 2,000 feet (ft) by 3,000 ft in area, and is connected to the St. Johns River by a 500-ft-wide entrance channel (Figure 1). A port security barrier has been installed at the mouth of the NAVSTA Mayport Turning Basin, and there is a Restricted Area that prohibits all persons, vessels, and craft from entering without the permission of the Commanding Officer, NAVSTA Mayport, or his authorized representative.

Purpose and Need **-** The purpose of the Proposed Action is to resolve the increasing deterioration of the Wharf Bravo bulkhead so the facility can provide adequate ship berthing, cold iron support, and ordnance handling capability. Adequate and efficiently configured facilities are required to provide general purpose ordnance loading and maintenance berthing for ships homeported at and visiting NAVSTA Mayport. The need for the Proposed Action is based on the failing functionality and structural integrity of Wharf Bravo, which has been deteriorating since it was built.

Proposed Action **-** The Preferred Alternative of the *Environmental Assessment for Wharf Bravo Recapitalization at Naval Station Mayport, Jacksonville, Florida* supports the Proposed Action of this BA. The Preferred Alternative of the EA and for this BA proposes to perform recapitalization at Wharf Bravo at NAVSTA Mayport. Wharf Bravo recapitalization activities include the construction of a new steel sheet pile bulkhead that ties into an existing steel sheet pile structure, placement of fill between existing and new steel sheet pile bulkheads, installation of a concrete pile cap and concrete encasement of sheet pile, asphalt wharf deck paving, repairs to electrical and mechanical shore utilities, and upgrades to area lighting and anti-terrorism/force protection waterfront enclave facilities (Project). The Project would result in a wharf footprint increase of approximately 12,000 square ft and installation of downward-facing, shielded lighting on and around the wharf surface. No dredging requirements have been identified for this Project.

The Project would include the installation of approximately 880 single sheet piles to be conducted in two phases. Phase I (Wharves B-2 and B-3) would include the installation of approximately 590 single sheet piles over the course of approximately 73 days, averaging approximately 10 sheet pile pairs installed per day. Phase II (Wharf B-1) would include the installation of approximately 290 single sheet piles over the course of approximately 37 days, averaging approximately eight to nine sheet piles installed per day. Of the 130 days of installation, 110 days are reserved for vibratory pile driving, and the remaining 20 days are reserved for contingency impact pile driving (Appendix B).

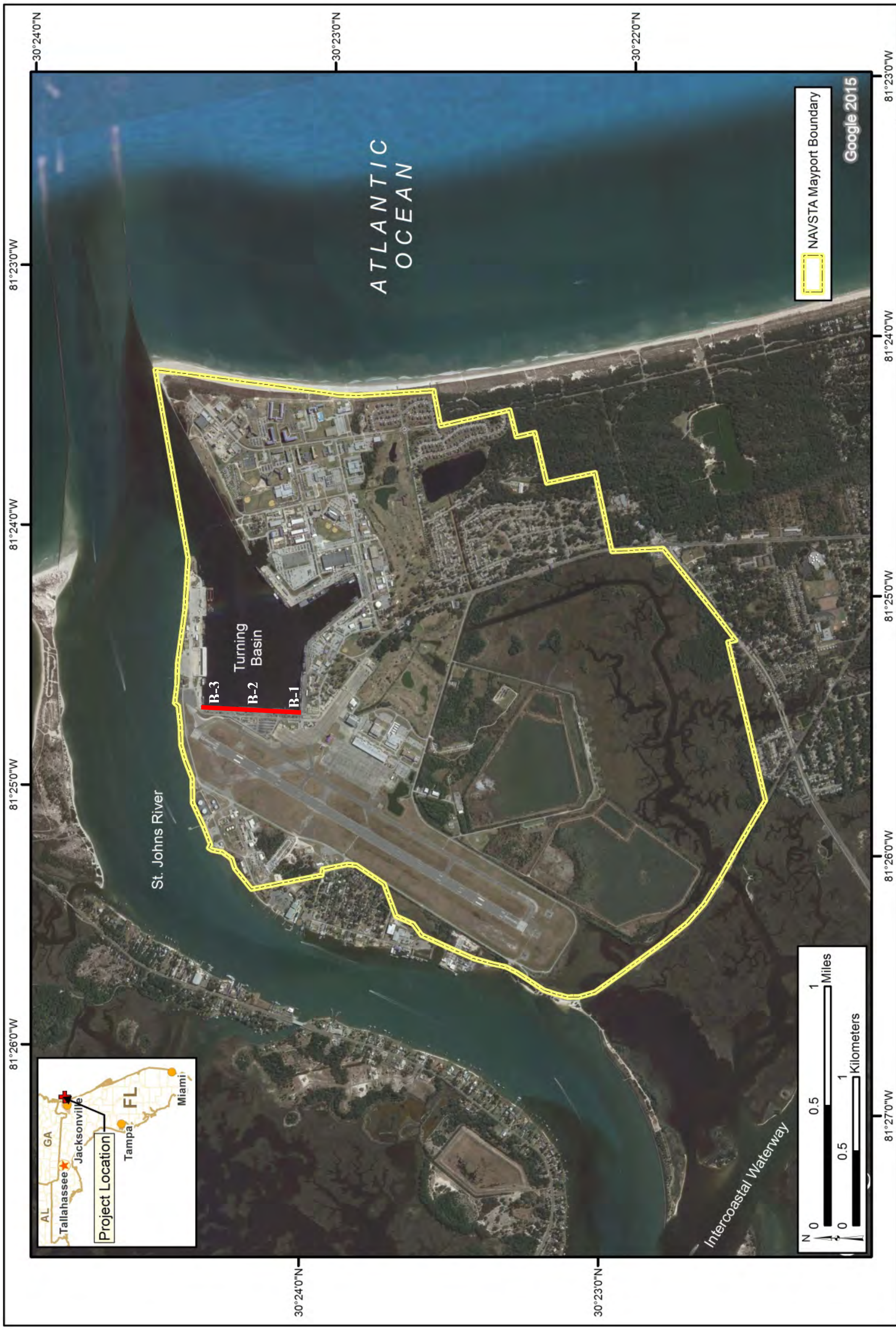

Figure 1. NAVSTA Mayport Location Map with Installation Boundary

Action Area - The Action Area includes the NAVSTA Mayport Turning Basin out to the limit of the most distant of the airborne and in-water acoustic zones of influence for all protected species being addressed for the Wharf Bravo repair and facilities maintenance Project (Figure 2). This BA addresses the species that may occur in the Action Area that are within the USFWS jurisdiction. These species, critical habitats, and the Navy's effects determinations are summarized in Table 1.

Table 1. ESA Federally Listed Species (Threatened or Endangered) and Critical Habitat Potentially Affected by the Proposed Action

Common Name	Scientific Name	Status	Effects Determination
Birds			
Piping plover	*Charadrius melodus*	Threatened	Not Likely to Adversely Affect
Piping plover critical habitat		Designated	No Effect
Wood stork	*Mycteria americana*	Endangered	Not Likely to Adversely Affect
Rufa red knot	*Calidris canutus rufa*	Threatened	Not Likely to Adversely Affect
Marine Mammals			
West Indian (Florida) manatee	*Trichechus manatus latirostris*	Endangered	Not Likely to Adversely Affect
West Indian (Florida) manatee critical habitat		Designated	No Effect
Nesting Sea Turtles			
Loggerhead sea turtle	*Caretta caretta*	Threatened	Not Likely to Adversely Affect
Green sea turtle	*Chelonia mydas*	Endangered[1]	Not Likely to Adversely Affect
Leatherback sea turtle	*Dermochelys coriacea*	Endangered	Not Likely to Adversely Affect

[1]As a species, the green sea turtle is listed as threatened. However, the Florida and Mexican Pacific coast nesting populations are listed as endangered. It should be noted that green sea turtles found along the East Coast might not all be from the Florida population.

Standard Operating Procedures, including *Best Management Practices,* which would further minimize the potential impacts on any Federally protected species or critical habitat, have been identified (Appendix C). A summary of the potential impacts and the determination of effects on Federally listed species and critical habitat are provided in the paragraphs to follow.

Species and Effects Determination

Birds - A variety of bird species could occur in the vicinity of the Action Area and the NAVSTA Mayport Turning Basin; most are protected under the Migratory Bird Treaty Act. Of the species, three Federally listed birds are known to occur in and around the Action Area: piping plovers (*Charadrius melodus*), wood storks (*Mycteria americana*), and rufa red knots *(Calidris canutus rufa)*. Designated critical habitat for wintering piping plovers is found to the north of the Action Area, and includes a portion of the St. Johns River on Fort George Island within Huguenot Memorial Park.

There are no established thresholds for airborne, pile driving, noise-related injury, or disturbance impacts on these species. Birds exposed to pile driving noise that exceeds ambient sound levels (65 A-weighted Decibels) may exhibit startle responses, avoidance, or other behavioral reactions, but they habituate rapidly to repetitive noises. No significant impacts on bird populations are anticipated. The Navy concludes that a "may affect, but not likely to adversely affect" determination is appropriate for the wood stork, piping plover, and red knot. Additionally, the Navy concludes that a "no effect" determination is appropriate for piping plover critical habitat.

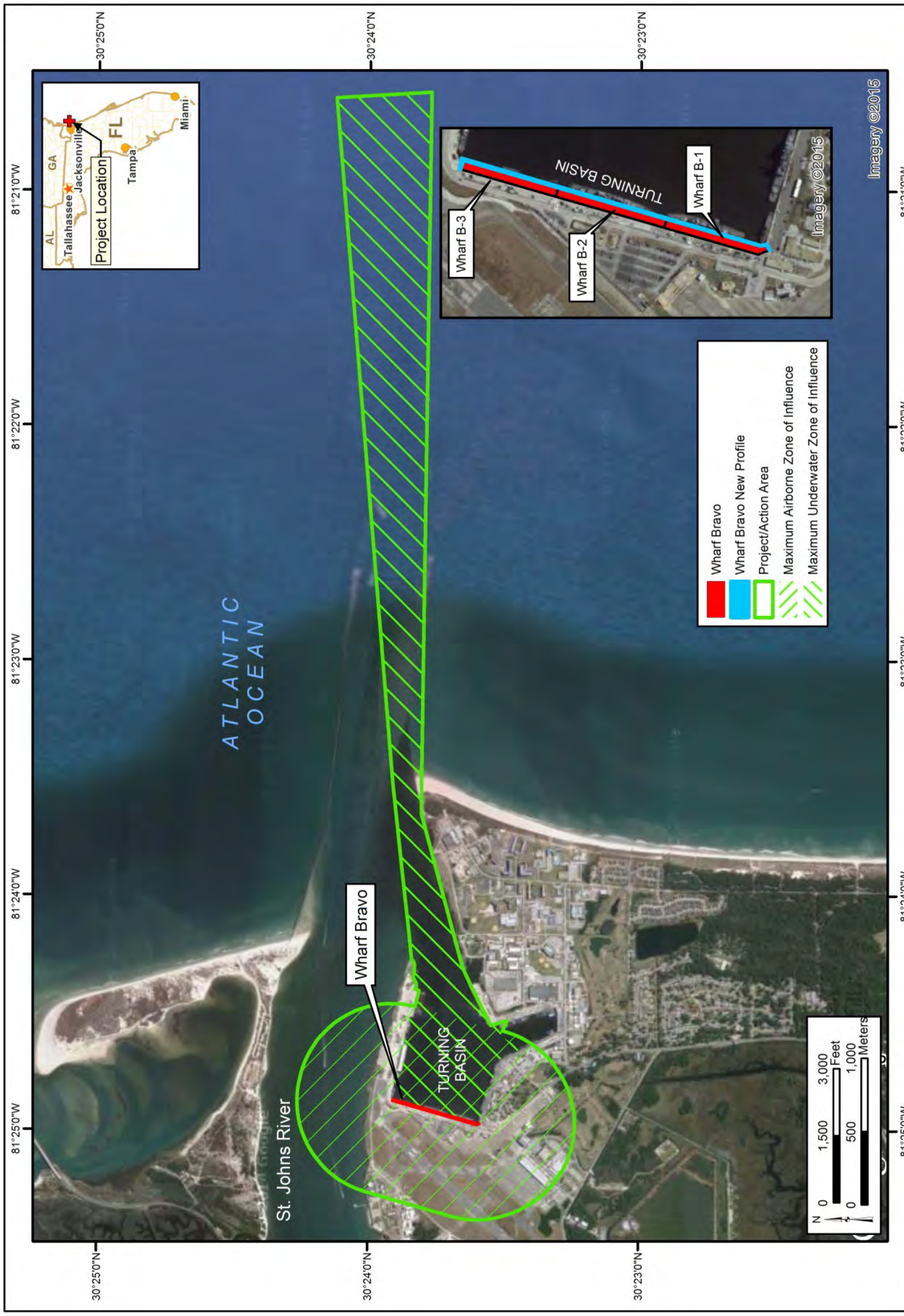

Figure 2. Action Area Defined by the Overall Airborne and Underwater Zones of Influence

Manatees - The West Indian manatee (*Trichechus manatus latirostris*; endangered) is protected under the Marine Mammal Protection Act (MMPA) and ESA. Collisions of construction vessels and marine mammals are not expected during construction activities because vessel speeds would be low and few vessels would be required for an otherwise shore-based construction activity. Manatees are expected to avoid the immediate construction area due to harbor vessel traffic, noise, human activity, increased turbidity, and possible temporary disruptions in forage availability.

The Navy will adhere to the *2011 Standard Manatee Conditions* (Appendix A) to further mitigate potential impacts on manatees (Appendix D). These conditions require the shutdown of in-water operations if a manatee comes within 50 ft of the operations. The Navy concludes that the Proposed Action activities would result in a "may affect, but not likely to adversely affect" determination for the West Indian manatee. Critical habitat is designated in multiple inland rivers and coastal waterways throughout Florida, including the St. Johns River; however, no primary constituent elements are defined for these areas. The Navy concludes that a "no effect" determination would be appropriate for the West Indian manatee critical habitat.

Sea Turtles - All sea turtle species are protected under the ESA. Three species of sea turtles may utilize Action Area beaches for nesting and thus hatchlings may also occur: the loggerhead sea turtle (*Caretta caretta*), the green sea turtle (*Chelonia mydas*), and the leatherback sea turtle (*Dermochelys coriacea*). No sea turtle nesting is present in the immediate Action Area. The acoustic effects of pile driving would not extend to the NAVSTA Mayport beach (see Figure 2). Furthermore, all pile driving would occur during daylight hours so the associated noise would not affect sea turtle nesting even if the noise did extend to the beach. The effects of lighting at Wharf Bravo would be mitigated by the new 30-ft-tall fixtures which will utilize light-emitting diode (LED) technology and will be full-cutoff type with a Backlight-Uplight-Glare (BUG) rating of B1-B2, U0, G1-G2. The main lighting units will provide approximately 3 footcandles average illumination for the wharf with a sharp cutoff at the edge of the wharf. A secondary lighting system will be provided for times of low activity. This system will provide 0.5 footcandles of illumination at a "turtle friendly" 590 nanometer wavelength (approximately 1800 degrees kelvin) yellow/red color temperature, thus substantially reducing the amount of light pollution compared to the current lighting system. It is anticipated that these lighting upgrades would serve as a net beneficial change and improvement in the overall lighting profile, thus further minimizing any potential adverse effects on any nearby emerging hatchlings.

The Navy concludes that a "may affect, but not likely to adversely affect" determination is appropriate for nesting loggerhead, green, and leatherback sea turtles. No critical habitat for any Federally listed turtle species is present in or near the Action Area. The Navy concludes that a "no effect" determination is appropriate for sea turtle critical habitat. Further mitigations will be provided through the Navy's adherence to the *Sea Turtle & Smalltooth Sawfish Construction Conditions* (Appendix E) and the *Southeast Region Marine Mammal & Sea Turtle Viewing Guidelines* (Appendix F). The Navy initiated informal consultation with the USFWS on July 30, 2015, requesting their review of the BA and EA, and concurrence with its effects determinations. On September 4, 2015, USFWS provided (via email) the Navy with several comments, questions, and requests. On October 6, 2015, the Navy provided (via email) the requested supplemental information to the USFWS. On November 20, 2015, the USFWS provided a letter (FWS Log. No. 04EF1000-2015-I-0367), which concurred with the Navy's effects determinations, thus fulfilling the requirements of the ESA and requiring no further action.

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List of Preparers

The following people were primarily responsible for the preparation of this BA.

Name	Agency / Organization	Discipline / Expertise	Experience	Role in Preparing BA
John Conway	NAVFAC SE	NEPA Compliance Specialist	20 years of Environmental Science	BA Project Manager
Jered Jackson	NAVFAC SE	Natural Resources Specialist	12 years of Natural Resources	BA review and comment
Dennis Peters	Gulf South Research Corporation	NEPA/Marine Biologist	32 years of EA/EIS studies	Project Manager and BA preparation
Howard Nass	Gulf South Research Corporation	Natural Resources Management	22 years of Natural Resources and NEPA Studies	BA review and comment
Mark Walker	Gulf South Research Corporation	Natural Resources	28 years of Natural Resources and NEPA Studies	BA review and comment
Ann Guissinger	Gulf South Research Corporation	Socioeconomics/ QA/QC	32 years of Socioeconomic Studies	BA review and comment
Todd Wilkinson	Gulf South Research Corporation	Natural Resources Specialist	21 years of Natural Resources and NEPA studies	Natural Resources; BA review and comment
Liz Ayarbe-Perez	Gulf South Research Corporation	GIS/Graphics	16 years of GIS and Graphics experience	Graphics production
Jason Glenn	Gulf South Research Corporation	Technical Editor	10 years of Technical Editing experience	Technical editing

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APPENDIX A
Agency Correspondence

United States Department of the Interior

U. S. FISH AND WILDLIFE SERVICE

7915 BAYMEADOWS WAY, SUITE 200
JACKSONVILLE, FLORIDA 32256-7517

IN REPLY REFER TO:
FWS Log. No. 04EF1000-2015-I-0367

November 20, 2015

C.R. Destafney, PE
Environmental Business Line Coordinator
Department of the Navy
Naval Facilities Engineering Command Southeast
Naval Air Station, Jacksonville
Jacksonville, Florida 32212-0030
(Attn: Jered Jackson)

Re: Recapitalization of Wharf Bravo: Naval Station Mayport, Florida

Dear Ms. Destafney:

Our office has reviewed your correspondence dated July 30th, 2015, its accompanying Biological (BA) and Environmental Assessments (EA), and email responses to our request for additional information. The Navy proposes to recapitalize Wharf Bravo, which is located along the western border of the Naval Station Mayport (NAVSTA Mayport) Turning Basin. Recapitalization activities include the installation of 880 individual sheet piles through vibratory or impact hammer driving waterward of the existing wharf's sheet pile wall, fill placement between the old and new sheet piles, installation of a concrete pile cap and foam-filled fenders, concrete encasement of sheet pile, wharf deck paving with asphalt, repairs to electrical and mechanical shore utilities, and upgrades to area lighting and anti-terrorism/force protection waterfront enclave facilities. This project will increase the existing wharf footprint by approximately 12,000 square feet. The existing lighting on the current 14, 30-foot pole lights at Wharf Bravo would be replaced by a lighting system consisting of downward facing, shielded (full cut-off) fixtures supporting two (2) LED white flood lights for use during wharf operations, two (2) amber LED sea turtle lights for wharf illumination during non-operational periods, one (1) LED street light fixture providing adjacent roadway lighting, and one (1) Federal Aviation Authority-mandated obstruction light fixture. Sheet pile driving is planned to occur in two phases. Phase 1 (Wharves B-2 and B-3) involves installing 590 single sheet piles, averaging 10 sheet pile pairs per day over approximately 73 days. Phase II (Wharf B-1) involves installing 290 single sheet piles, averaging 8 - 9 sheet piles per day for approximately 37 days. About 85% of the time required for sheet pile installation is reserved for vibratory driving, with the remaining 15 % for contingency impact driving. We provide the following comments in accordance with Section 7 of the Endangered Species Act of 1973, as amended (Act) (16 U.S.C. 1531 *et seq.*).

The Navy determined that the proposed project occurs within the range of the endangered West Indian (Florida) manatee (*Trichechus manatus latirostris*) and its designated critical habitat, the threatened wood stork (*Mycteria americana*), piping plover (*Charadrius melodus*) and one of its designated critical wintering habitat units (FL-35), the federally threatened red knot (*Calidris canutus rufa*), and the threatened loggerhead (*Caretta caretta*) and endangered green (*Chelonia mydas*) and

leatherback (*Dermochelys coriacea*) sea turtles. The Navy determined that the proposed activities, including the noise generated by those activities, are not likely to adversely affect the wood stork, piping plover, and rufa red knot, and have no effect on FL-Unit 35 of piping plover critical wintering habitat. We concur with those determinations. Regarding nesting and hatchling sea turtles, the Navy concluded that replacement of the current cobra head fixtures and high pressure sodium lights present on the 14 pole lights at Wharf Bravo with a lighting system that includes full cut-off, downward directed white LED flood lights for wharf operations, and red/amber (ca 590 nanometers wavelength) LED lighting for use during non-operational periods, is expected to substantially reduce any direct and indirect lighting and sky glow associated with the existing lighting. We agree with this assessment, and therefore support these construction specifications. The Navy in its EA also stated that these and all other permanent exterior project lighting fixtures will be designed to be consistent with the NAVSTA Mayport Light Management Plan. We support this position, and in addition recommend that the Navy apply the Florida Fish and Wildlife Conservation Commission's Sea Turtle Lighting Guidelines (http://myfwc.com/media/418417/SeaTurtle_LightingGuidelines.pdf) and approved lighting reference http://www.myfwc.com/wildlifehabitats/managed/sea-turtles/turtles-lights/recommendations to such lighting to the maximum possible extent. The Navy has agreed to add this recommendation as an additional project specification. With respect to project construction, the EA included a requirement to implement sea turtle lighting conditions that seek to avoid direct and indirect lighting and minimize sky glow visible from adjacent nesting beaches through light reduction, shielding, lowering, and placement consistent with human safety requirements. In-water work will be restricted to daylight hours (one-half hour after sunrise to one-half hour before sunset). Non in-water construction will be restricted to the hours between 6:00 am and 10:00 pm year round. We also support implementation of these conditions.

The Navy determined that the proposed project would not adversely affect three species of nesting and hatchling sea turtles. The project site is between approximately 0.75 and 1.25 miles from the nearest sea turtle nesting beaches. These distances, and the presence of intervening sand dunes and man-made structures are also expected to contribute to the avoidance of adverse impacts to nesting and hatchling sea turtles from direct and indirect lighting and sky glow. Based on these and the preceding conditions, we concur with the Navy's determination.

With respect to the manatee, anecdotal sightings reported to NAVSTA Mayport indicate that individuals occur regularly within the Turning Basin, predominantly from early-spring through mid-fall. Watercraft moored and operating within the basin is restricted to military and other DON-authorized vessels; basin access to the general boating public is prohibited. As a result, ship activity within the basin at any given time is generally less than adjacent waters within the St. Johns River. Such conditions, the presence of attached aquatic vegetation on spill containment booms and permanent in-water structures along the edges of the basin, and irregular discharges of fresh water from ships and storm water and other facilities and operations seasonally attract manatees into the basin. The sighting reports indicated that the majority of animals were observed along the shorelines on the southern side of the turning basin between the tug basin and Alpha wharf. Most of the observations were of single individuals.

The Navy evaluated potential adverse impacts to manatees from all in-water activities including watercraft movement, demolition and removal of underwater obstructions and debris, installation of a new steel, sheet pile bulkhead primarily through vibratory driving and contingency impact hammer driving, installation of new foam-filled fenders, and placement of gravel or concrete flowable fill

between the old and new walls. Due to the structural integrity of the existing wharf, the Navy has deemed the use of barge-based cranes unlikely, and anticipates deploying shore-based equipment and the land-based storage of materials and supplies. Some small vessel use is expected with the project. The Navy has agreed to abide by the 2011 Standard Manatee Conditions for In-Water Work (Standard Conditions), which include a restriction on project-related vessels to travel no faster than slow speed, minimum wake when and where operating in a project-related capacity within the turning basin, and obeying all manatee protective speed zones. The demolition and removal of in-water obstructions and debris will occur physically and mechanically; no blasting is anticipated. The Standard Conditions also will apply to this work, as well as the filling of the space between the old and new bulkhead walls. We further recommend that to avoid potential crushing of manatees between vessels and the new bulkhead, the Navy include in its project plans and specifications the requirement for the new foam-filled fenders to have a stand-off distance of four feet under maximum compression. The Navy has agreed to this inclusion.

With respect to pile driving, the Navy estimated that once positioned, it would take less than 60 seconds to drive each single and paired sheet pile using vibratory driving. Any contingency driving by impact hammer will not exceed 20 strikes per day, and no more than 5 -10 minutes to complete. The Navy used existing sound pressure levels measured from both vibratory and impact hammer driving on steel sheet piles and steel pipe piles for other projects to model potential auditory impacts from the proposed project.

Applying injury/disturbance threshold levels to cetaceans representing National Marine Fisheries Service and Navy estimates for impact hammer (180/120 dB re 1 uPa rms) and vibratory driving (180/160 dB re 1 uPa rms), respectively, to its model, the Navy found injury/disturbance distances of 40/858 m and < 1/7,356 m for impact and vibratory driving, respectively. The calculations assumed a field free of obstruction (open water conditions). Sound attenuation is expected to occur at shorter distances due its encounters with the bottom substrate, basin shorelines, and other solid objects.

Manatee response to in-water sounds is highly variable. Most of the studies have involved movement towards or away from such sounds. When encountering sound at levels within and above the species' range of hearing and vocalization, the most notable response by manatees was to increase the level of vocalization, presumably to maintain communication with other manatees in the same proximity. There is no clear or consistent evidence that anthropogenic sounds at the levels described as resulting in behavioral disturbance to cetaceans causes disruption of behavioral patterns in manatees. Unlike large cetaceans, manatees occupy environments where they can be exposed to ambient sounds that have a significant anthropogenic component. Observations of manatees within the Mayport Ship Turning Basin during the Wharf Charlie 1 (C-1) and Charlie 2 (C-2) recapitalization projects, which included primarily vibratory pile driving over multiple months, did not reveal any disruption of behavioral patterns. Three animals were observed on three different days during the 2012 pile driving activities for C-1 that occurred between January 16th and April 23rd. Nineteen observations of manatees occurred over 9 days out of 48 total pile driving days in 2015 for the C-2 project that began on May 26th and ended September 11th. The observations included adults and calves, some of which were close enough to the pile driving to necessitate shutdowns of the operation. There were 126 anecdotal manatee observations within the Mayport Ship Turning Basin from January through September 2015.

The Wharf Bravo project involves nearly three times the number of sheet piles compared to both the C-1 and C-2 projects. In contrast to the 2 days of impact hammer pile driving that occurred during

the C-1 project, the Navy has reserved 20 days for contingency impact hammer driving. Due to this order of magnitude increase, we recommend that the shutdown zone for manatees during impact hammer use be extended to the same distance (40 meters) as cetaceans. The Navy agreed to incorporate this recommendation into its Marine Mammal Monitoring Plan.

The Navy has determined that the proposed project is not likely to adversely affect the manatee. We concur with this determination and the Navy's agreement to incorporate the two additional manatee protection and conservation recommendations into the project plans and specifications.

Although this does not represent a biological opinion as described in section 7 of the Act, it does fulfill the requirements of the Act and no further action is required. However, if the Navy modifies the project to the extent that affects its determination, it is unable to implement the stated specifications for protected species, if additional information involving effects to the above or other listed species potentially affected by the action becomes available, or if take of any of the above species occurs during the activities identified and considered previously, the Navy shall contact our office within 24 hours to determine what additional actions may be required. For any unauthorized take, the Navy shall further attempt to identify the cause of the take, and provide the Service that information at the initial contact. If after coordination with the Service it appears additional take is imminent from continued operations, we strongly recommend cessation of the operation(s) to avoid potential criminal/civil liability under section 9 of the Act.

If you have any questions regarding this response, please contact Mr. John Milio of my staff at the address on the letterhead, by e-mail at john_milio@fws.gov, or by calling 904-731-3098.

Sincerely,

for Jay B. Herrington
Field Supervisor

cc:
FWC (R. Mezich)

APPENDIX B
Project Details

1.0 Project Details

1.1 Project Schedule

Repairs and facilities maintenance to Wharf Bravo would occur over a 12- to 24-month period projected to begin on or after October 1, 2016. In-water pile driving work would be conducted year-round as needed, for no more than 130 days total.

1.2 Access and Staging

Since there are no weight-bearing or structural integrity issues on the current Wharf Bravo, crane barges would likely not be necessary, and shore-based equipment would be deployed. Shore-based equipment consisting of a pile installation suite (pile leads, vibratory driver, and an impact driver) would mobilize to the Project site. Any land-based construction equipment and material staging or support activities, if required, would take place in previously disturbed areas. No clearing or excavation would be required. Piles and sediments would be stored in a containment area near the Project location. The level of vehicular and marine traffic would not differ significantly from that of current conditions at NAVSTA Mayport. Barge operations may be restricted to tide elevations adequate to prevent grounding of a barge, if utilized.

1.3 Project Components

The Project would perform recapitalization activities at Wharf Bravo. These activities include the construction of a new steel sheet pile bulkhead that ties into an existing steel sheet pile structure, placement of fill between the existing and new steel sheet pile bulkheads, installation of a concrete pile cap and concrete encasement of sheet pile, asphalt wharf deck paving, repairs to electrical and mechanical shore utilities, and upgrades to area lighting and AT/FP waterfront enclave facilities. The Project would result in a wharf footprint increase of approximately 12,000 square feet (ft^2) (1,115 square meters [m^2]) and installation of downward-facing, shielded lighting on and around the wharf surface.

Construction using metal sheet piles would be configured as interlocking pairs (Illustration B-1) where each single pile dimension is approximately 27 inches (70 centimeters [cm]) by 19 inches (50 cm). Since piles would be driven in pairs, the disturbance footprint is estimated to be approximately 7.535 ft^2 (0.70 m^2). A sheet pile in the form of a plank would be driven in close contact or interlocking with others to provide a tight wall to resist the lateral pressure of water, adjacent earth, or other materials.

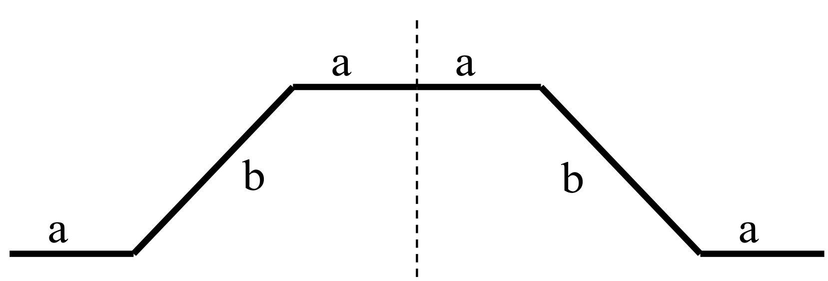


Illustration B-1. Diagram of an AZ 19-700 Style Sheet Pile Pair

The wall would be anchored at the top, and fill consisting of clean gravel or flowable concrete would be placed behind the wall. A concrete cap would be formed along the top and outside face of the wall to tie the entire structure together and provide a berthing surface for vessels (Illustration B-2).

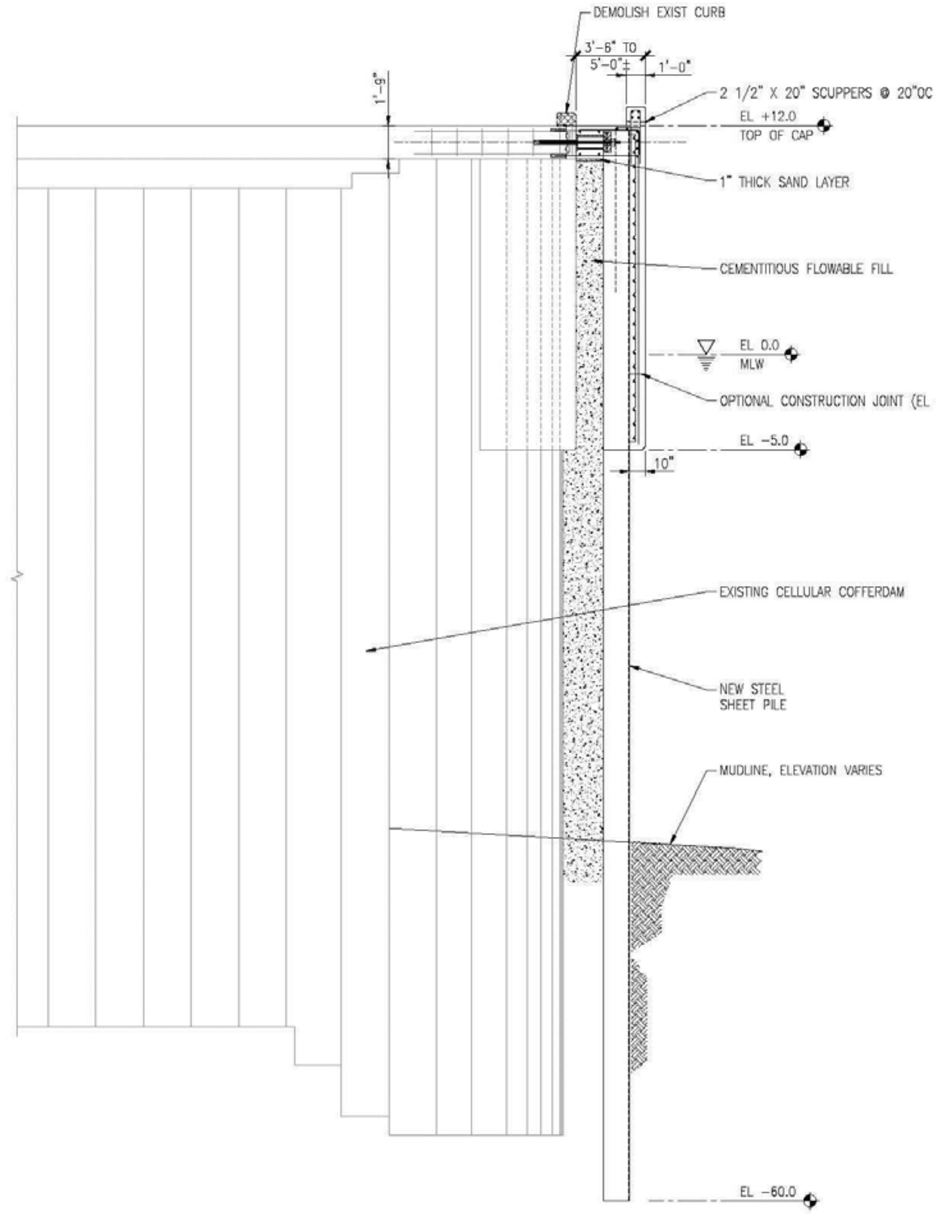


Illustration B-2. Lateral View of Project Plan

The Project would include the installation of approximately 880 single sheet piles to be conducted in two phases. Phase I (Wharves B-2 and B-3) would include the installation of approximately 590 single sheet piles over the course of approximately 73 days, averaging approximately 10 sheet pile pairs installed per day. Phase II (Wharf B-1) would include the installation of approximately 290 single sheet piles over the course of approximately 37 days, averaging approximately eight to nine sheet piles installed per day. Of the 130 days of installation, 110 days are reserved for vibratory hammer driving, and the remaining 20 days are reserved for contingency impact driving.

Vibratory pile driving would be continuous for each pile and is anticipated to require no more than 45 seconds to drive a sheet pile pair to depth. This method of pile driving would be used every day to drive up to 10 piles a day. Impact pile driving would only be used as a contingency when the substrate or a buried obstruction prevents vibratory pile driving from being successful. Impact pile driving is intermittent, such that the hammer must be repeatedly lifted and dropped, creating an interval of silence between each strike. As a point of reference, only 2 days of impact pile driving occurred during the adjacent Wharf Charlie One (C-1) project. Impact pile driving, if it were to be necessary, could occur on the same day as vibratory pile driving, but driving rigs would not be operated simultaneously. No net change in the amount of vessel traffic in or around the NAVSTA Mayport Turning Basin is anticipated as a result of the Project. No dredging is required or anticipated during the Project.

1.3.1 Construction Activities

Construction activities would include the following:

- demolish existing concrete pile cap, wharf deck, and utilities (including lateral supply lines from utilities such as water and electrical)
- remove existing miscellaneous concrete and timber pile obstructions
- install new steel combination wall with tieback anchors
- place a combination of self-hardening, flowable fill, and clean fill between existing and new walls
- install new concrete cap that partially encases the new steel wall
- install sacrificial anode cathodic protection system for the new steel wall
- install new foam-filled fenders
- install new utilities
- repair wharf deck by milling and re-paving
- upgrade area lighting fixtures with LED fixtures
- replace security fencing

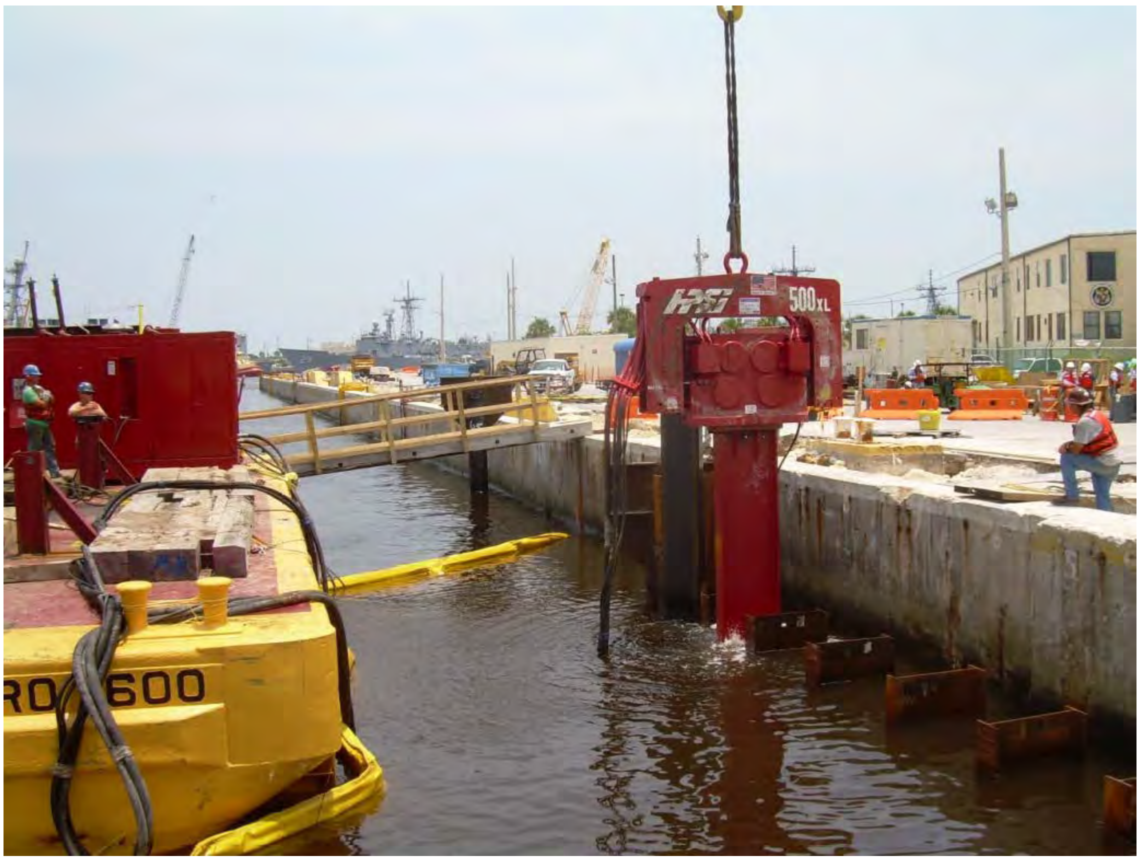
1.3.2 Construction Sequence

1.3.2.1 Preparation and Demolition

- Existing underwater obstructions and debris that may interfere with the installation of the new steel sheet pile wall would be removed utilizing divers and cranes. Up to two concrete and one timber piles would be removed from the Action Area utilizing a crane. The points where the new steel sheet pile wall attaches to the existing sheet pile wall would be demolished above and below the waterline to expose the existing steel.
- Along the face of the existing wall, the curb and a portion of existing concrete cap would be removed to accommodate the new concrete pavement that would be placed between the new wall and the existing wall. The concrete apron along the waterside perimeter of the wharf and the utilities (including lateral supply lines from utilities such as water, fuel, steam, waste, electrical, and communications) would be removed.

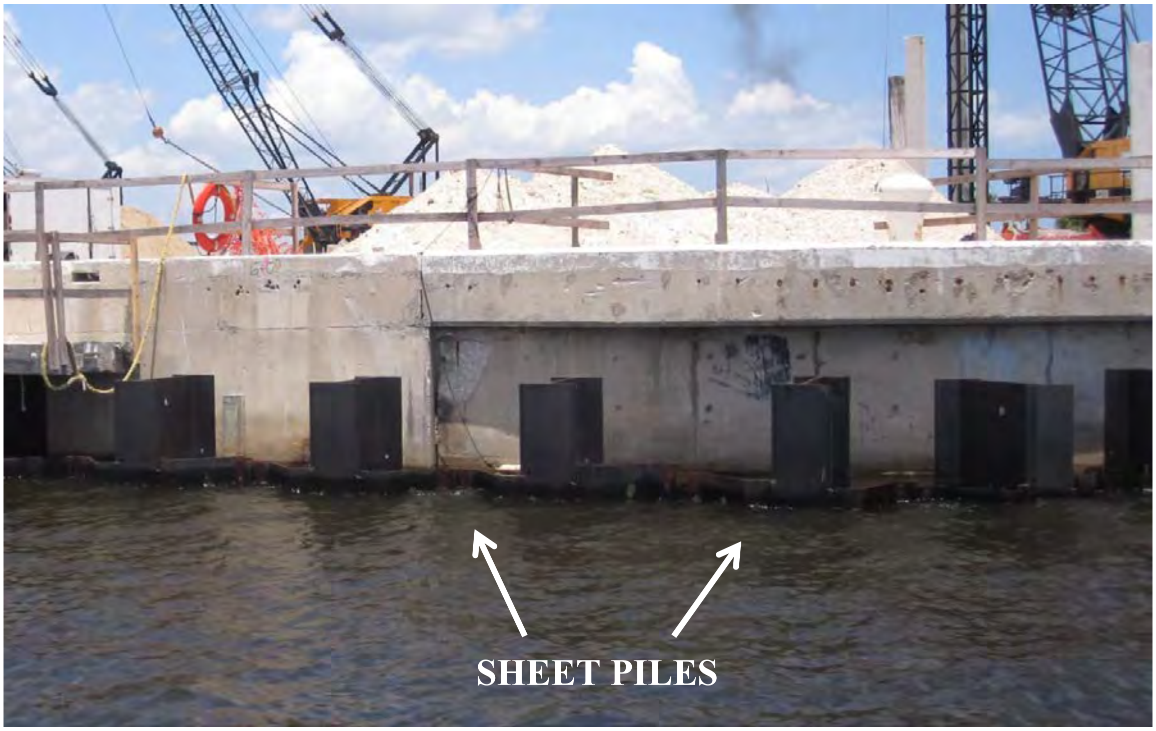
1.3.2.2 Installation of New Bulkhead

- Since there are no weight-bearing or structural integrity issues on the current Wharf Bravo, crane barges would likely not be necessary, and shore-based equipment would be deployed. Shore-based equipment consisting of a pile installation suite (pile leads, vibratory driver, and an impact driver) would mobilize to the Project site. Once properly aligned, the metal sheet piles would be driven to the appropriate depth using the vibratory driver (Photograph B-1).



Photograph B-1. Vibratory Installation of Sheet Piles at NAVSTA Mayport

- Sheet piles would be driven in pairs (Photograph B-2). A total of 880 single sheet piles would be installed. Installation of up to a maximum of 10 sheet pile pairs per pile-driving day is anticipated. Impact driving would be a contingency employed only if vibratory methods are inadequate; a similar project that has been completed at adjacent Wharf C-1 required impact pile driving on only seven piles.
- Once all of the piles are driven, closure plates would be attached between the existing adjacent sheet pile walls and the new wall end terminations. Typically, these are welded in place using underwater welding techniques.
- In general, the pile-driving process begins by placing a choker cable around a pile and lifting it into vertical position with a crane. The pile is then lowered into position inside the template and set in place at the mudline. During vibratory driving, the pile is stabilized by the template while the vibratory driver installs the pile to the required tip elevation.



Photograph B-2. Sheet Piles at NAVSTA Mayport

- Impact drivers have guides that hold the driver in alignment with the pile while a heavy piston moves up and down, striking the top of the pile, driving the pile into the substrate from the downward force of the driver.

- Once piles are in position, installation typically takes 45 seconds (per sheet pile pair) to reach the required tip elevation depending on site conditions (e.g., bedrock, loose soils), driving method, and equipment used.

1.3.2.3 Placement of Fill Behind Wall

- After the anchors are installed, fill operations would be conducted behind the new wall. This would consist of placement of either gravel fill or concrete flowable fill into the space behind the wall; trapped water behind the wall would be displaced.

1.3.2.4 Form and Placement of Pile Cap

- After the fill operation has been completed, the concrete pile cap would be formed and placed along the top of the new interlocking sheet pile wall. This would consist of installation of either wood or steel forms along the top of the wall down to some point below MLW. Water would be removed from the forms, steel reinforcement would be placed in the forms, and concrete would be poured to the required elevations.

1.3.2.5 Deck and Utility Replacement

- After the pile cap is in place, a new reinforced concrete apron would be installed, and the wharf deck would be repaired by milling and paving. A new high mast lighting system, new security fencing, and new utilities would be installed to replace those that were removed.

1.3.2.6 Lighting Fixture Upgrades

- Lighting is required to support the maintenance and repair activities associated with Wharf Bravo. Safety and security lighting for personnel required to operate during hours of darkness on the wharf is also required, in accordance with Unified Facilities Criteria (UFC) 3-530-01 and UFC 4-152-01. Wharf Bravo lighting would be designed for lighting levels commensurate to lighting zones (LZ) 2 to LZ3.

- Currently lighting of the wharf is accomplished utilizing “cobra head” street lights mounted on 30-foot poles. The estimated lighting levels from these fixtures vary between 3.0 footcandles (30LUX [one lumen per m^2]) and 0.0 foot-candle (0LUX). This lighting level is inconsistent with the UFC requirements for working areas of the wharf. The existing fixtures have a glass refractor on the face of the fixture to direct the light from the source. Refractors tend to allow stray illumination into the night sky causing light pollution.

- Wharf Bravo is within the clearance zone of the adjacent airfield. Therefore, height restrictions have been imposed on the lighting poles currently employed. Due to the current Federal Aviation Administration (FAA) waivers, the new lighting system would maintain the existing pole locations and 30-foot heights.

- The new fixtures would utilize LED light technology and would be full cutoff type with a BUG rating of B1-B2, U0, and G1-G2. The main lighting units would provide approximately 3.0 foot-candles average illumination for the wharf with a sharp cutoff at the edge of the wharf. A secondary lighting system would be provided for times of low activity. This system would provide 0.5 foot-candle of illumination at a “turtle friendly” 590 nanometers wavelength (approximately 1,800 degrees kelvin) yellow/red color temperature, substantially reducing the amount of light pollution allowed by the current lighting system.

- There are fourteen (14) 30-foot light poles currently on Wharf Bravo, with two street lights on each pole. Fourteen (14) new 30-foot-high light poles would be installed in those same locations. Each new light pole would have six (6) light fixtures mounted to the pole; two (2) LED turtle light fixtures, two (2) LED area light fixtures (flood lights), one (1) LED street light fixture, and one (1) obstruction light fixture (FAA). The two (2) flood light LED fixtures would only be turned on during berthing operations. The two (2) turtle LED light fixtures would be turned on from dusk to dawn, providing lighting similar to parking lot conditions. The one (1) street LED light fixture would provide roadway lighting for the road behind the fence of Wharf Bravo.

- After-dark operations on the wharf would require the use of the primary white lights to facilitate operational safety and mitigate potential liability for injuries or accidents. Otherwise, only the secondary turtle-friendly lights would be used after dark. The LED area light fixtures (flood lights) would only be turned on during berthing operations. These fixtures are Dark Sky Friendly, International Dark-Sky Association (IDA) approved with a color temperature of 4000 Kelvin at 70 color rendering index (CRI).

- From dusk to dawn, the LED turtle light fixtures would be turned on along the Wharf. These fixtures are listed as turtle-friendly with an Amber color of 590 nanometer (standard), designed to provide an average illumination level of 0.5 foot-candle on the

wharf surface. The street LED light fixtures are similar to street LED fixtures already installed at Mayport. These fixtures have a color temperature of 4000 kelvin at 70 CRI and have a BUG rating of B2 U0 G2 (Uplight = 0). These fixtures also have a backlight shield as an accessory option to block any backlight or glare onto Wharf Bravo, if required, to prevent directional light towards nesting beaches on NAVSTA Mayport to the east and Huguenot Park to the north. These fixtures are designed to provide an average illumination level of 1.0 foot-candle along the road behind Wharf Bravo.

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APPENDIX C
Standard Operating Procedures

1.1 Standard Operating Procedures

The Navy would employ the measures listed in this section to avoid and minimize impacts on birds, manatees, and sea turtles as well as their habitats and forage species. Best Management Practices (BMPs) are intended to avoid and minimize potential environmental impacts. BMPs and minimization measures are included in the construction contract plans and specifications and must be agreed upon by the contractor prior to any construction activities. Upon signing the contract, it becomes a legal agreement between the contractor and the Navy. Failure to follow the prescribed BMPs and minimization measures is a contract violation.

1.1.1 General Construction Best Management Practices

- All work will adhere to performance requirements of the Clean Water Act, Section 404 permit and Section 401 Water Quality Certification. No in-water work will begin until after issuance of regulatory authorizations.

- The construction contractor is responsible for preparation of an Environmental Protection Plan. The plan will be submitted and implemented prior to the commencement of any construction activities and is a binding component of the overall contract. The plan will identify construction elements and recognize potential spill sources at the site. The plan will outline BMPs, responsive actions in the event of a spill or release, and notification and reporting procedures. The plan will also outline contractor management elements, such as personnel responsibilities, Project site security, site inspections, and training.

- No petroleum products, lime, chemicals, or other toxic or harmful materials will be allowed to enter surface waters. Washwater resulting from washdown of equipment or work areas will be contained for proper disposal, and will not be discharged unless authorized.

- Equipment that enters surface waters will be maintained to prevent any visible sheen from petroleum products.

- No oil, fuels, or chemicals will be discharged to surface waters or onto land where there is a potential for re-entry into surface waters. Fuel hoses, oil drums, oil or fuel transfer valves, fittings, etc. will be checked regularly for leaks and will be maintained and stored properly to prevent spills.

- No cleaning solvents or chemicals used for cleaning tools or equipment will be discharged to ground or surface waters.

- Construction materials will not be stored where high tides, wave action, or upland runoff could cause materials to enter surface waters.

- Barge operations will be restricted to tidal elevations adequate to prevent grounding of a barge.

1.2 Pile Removal and Installation Best Management Practices

- A containment boom surrounding the work area will be used during creosote-treated pile removal to contain and collect any floating debris and sheen. In some cases, the boom may be lined with oil-absorbing material to absorbed released creosote.

- Oil-absorbent materials will be used in the event of a spill if any oil product is observed in the water.

- All creosote-treated material and associated sediments will be disposed of in a landfill that meets Florida environmental standards.

- Removed piles and associated sediments (if any) will be contained on a barge. If a barge is not utilized, piles and sediments may be stored in a containment area near the construction site.

- Piles that break or are already broken below the waterline may be removed by wrapping the piles with a cable or chain and pulling them directly from the sediment with a crane. If this is not possible, they will be removed with a clamshell bucket. To minimize disturbance to bottom sediments and splintering of piles, the contractor will use the minimum size bucket required to pull out piles based on pile depth and substrate. The clam shell bucket will be emptied of piles and debris on a contained barge before it is lowered into the water. If the bucket contains only sediment, the bucket will remain closed and be lowered to the mud line and opened to redeposit the sediment. In some cases (depending on access, location, etc.), piles may be cut below the mud line and the resulting hole backfilled with clean sediment.

- Any floating debris generated during installation will be retrieved. Any debris in a containment boom will be removed by the end of the workday or when the boom is removed, whichever occurs first. Retrieved debris will be disposed of at an upland disposal site.

- Whenever activities that generate sawdust, drill tailings, or wood chips from treated timbers are conducted, tarps or other containment material will be used to prevent debris from entering the water.

- If excavation around piles to be replaced is necessary, hand tools or a siphon dredge will be used to excavate around piles to be replaced.

1.2.1 Timing Restrictions

All in-water construction activities will occur during daylight hours (sunrise to sunset). Non in-water construction activities could occur between 6:00 a.m. and 10:00 p.m. during any time of the year. Sunrise and sunset are to be determined based on NOAA data (Internet URL: http://www.srrb.noaa.gov/highlights/ sunrise/sunrise.html).

1.2.2 Additional Procedures for Marine Species

Potential effects on listed species from Project activities are discussed above in Sections 6.1.1 through 6.1.3. The following measures will be implemented during pile driving to avoid and minimize exposure to noise levels that could cause injury or behavioral disturbance for all Federally listed and candidate species.

1.2.3 Coordination

The Navy will conduct a pre-construction briefing with the contractor. During the briefing, all personnel working in the Action Area will watch the Navy's Marine Species Awareness Training video. Information will also be provided on how to identify piping plovers, wood storks, and red knots.

1.2.4 Acoustic Minimization Measures

Vibratory installation will be used to the extent possible to drive steel piles to minimize higher sound pressure sound levels associated with impact pile driving.

1.2.5 Soft Start

The objective of a soft start is to provide a warning and/or give animals in proximity to pile driving a chance to leave the area prior to impact driver operating at full capacity, thereby exposing fewer animals to loud underwater and airborne sounds. A soft start cannot be implemented for vibratory driving due to safety concerns with regard to equipment operation.

Should the brief use of impact pile driving be necessary, a soft start procedure will be used. For impact pile driving, the contractor will provide an initial set of strikes from the impact driver at reduced energy, followed by a 30-second waiting period, then two subsequent sets. (The reduced energy of an individual driver cannot be quantified because they vary by individual drivers. Also, the number of strikes will vary at reduced energy because raising the driver at less than full power and then releasing it results in the driver "bouncing" as it strikes the pile resulting in multiple "strikes.")

1.2.6 Standard Conditions

The contractor will adhere to all requirements of the following:

- USFWS 2011 Standard Manatee Conditions for In-Water Work (Appendix D)
- NMFS 2006 Sea Turtle and Smalltooth Sawfish Construction Conditions (Appendix E)
- NMFS 2012 Southeast Region Marine Mammal and Sea Turtle Viewing Guidelines (Appendix F)

1.2.7 Sea Turtle Lighting Conditions

- Lighting on construction equipment will be minimized through reduction, shielding, lowering, and appropriate placement to avoid excessive illumination of the nearby marine turtle nesting beach while still being consistent with human safety requirements.
- All permanent exterior lighting fixtures associated with the wharf redevelopment will be assessed by NAVSTA Mayport Environmental Department and designed according to the NAVSTA Mayport Light Management Plan to minimize light contribution to urban sky glow, which could be visible from the marine turtle nesting beach.

1.2.8 Visual Monitoring and Shutdown Procedures

- A separate Marine Species Monitoring Plan will be submitted to NMFS and USFWS; it includes all details for Project monitoring efforts. Major components of the monitoring plan are summarized below.

1.2.8.1 Observers and Procedures

The Navy will conduct a pre-construction briefing with the contractor. During the briefing, all contractor personnel working in the Action Area will watch the Navy's Marine Species Awareness Training video. An informal guide (Marine Species Monitoring Plan Attachment 1) has been included with the Monitoring Plan to aid in identifying species should they be observed in the vicinity of the Project.

Marine species observers ("observers") designated by the contractor will be placed at the best vantage point(s) practicable to monitor for protected species and implement shutdown/delay procedures when applicable by calling for the shutdown to equipment operators. The observers will have no other construction-related tasks while conducting monitoring.

1.2.8.2 Methods

The observer(s) will monitor the shutdown zone (Figure 6-1) before, during, and after pile driving and removal. The observer(s) will be placed at the best vantage point practicable (e.g., from a small boat, construction barges, on shore, or any other suitable location) to monitor for marine species and implement shutdown/delay procedures when applicable by calling for the shutdown to the equipment operator(s).

Elevated positions are preferable; it will be the contractor's responsibility to ensure that appropriate safety measures are implemented to protect observers on elevated observation points. If a boat is used for monitoring, the boat will maintain minimum distances from all species (should they occur) as described in National Marine Fisheries Services' 2012 Southeast Region Marine Mammal and Sea Turtle Viewing Guidelines (Marine Species Monitoring Plan; Appendix J).

- During all observation periods, observers will use binoculars and the naked eye to search continuously for marine mammals;
- If the shutdown zone is obscured by fog or poor lighting conditions, pile driving will not be initiated until the entire shutdown zone is visible.
- The shutdown zone will be monitored for the presence of protected species before, during, and after any pile driving or removal activity.

1.2.8.3 Pre-Activity Monitoring

The shutdown zone will be monitored for 15 minutes prior to in-water construction/demolition activities. If a protected species is observed in or approaching the shutdown zone, the activity will be delayed until the animal(s) leave the shutdown zone.

Activity will resume only after the observer has determined, through re-sighting or by waiting approximately 15 minutes that the animal(s) has moved outside the shutdown zone. The observer(s) will notify the monitoring coordinator/construction foreman/point of contact (POC) when construction activities can commence.

1.2.8.4 Activity Monitoring

The shutdown zone will always be a minimum of 15 m (50 ft) to prevent injury from physical interaction of protected species with construction equipment (Figure B-1). For contingency impact pile driving, the larger 40 m (130 ft) shutdown zone (Figure B-1) will be implemented for marine mammals only; the standard shutdown zone will continue to be applied for all other protected species.

If a protected species approaches or enters a shutdown zone during any in-water work, activity will be halted and delayed until either the animal has voluntarily left and been visually confirmed beyond the shutdown zone or 15 minutes have passed without re-detection of the animal.

Bulkhead sheet pile installation will be completed only after confirmation that no manatees or marine turtles will be trapped in the area to be filled between the existing and new bulkheads.

1.2.8.5 Post-Activity Monitoring

Monitoring of the shutdown zone will continue for 15 minutes following the completion of the activity.

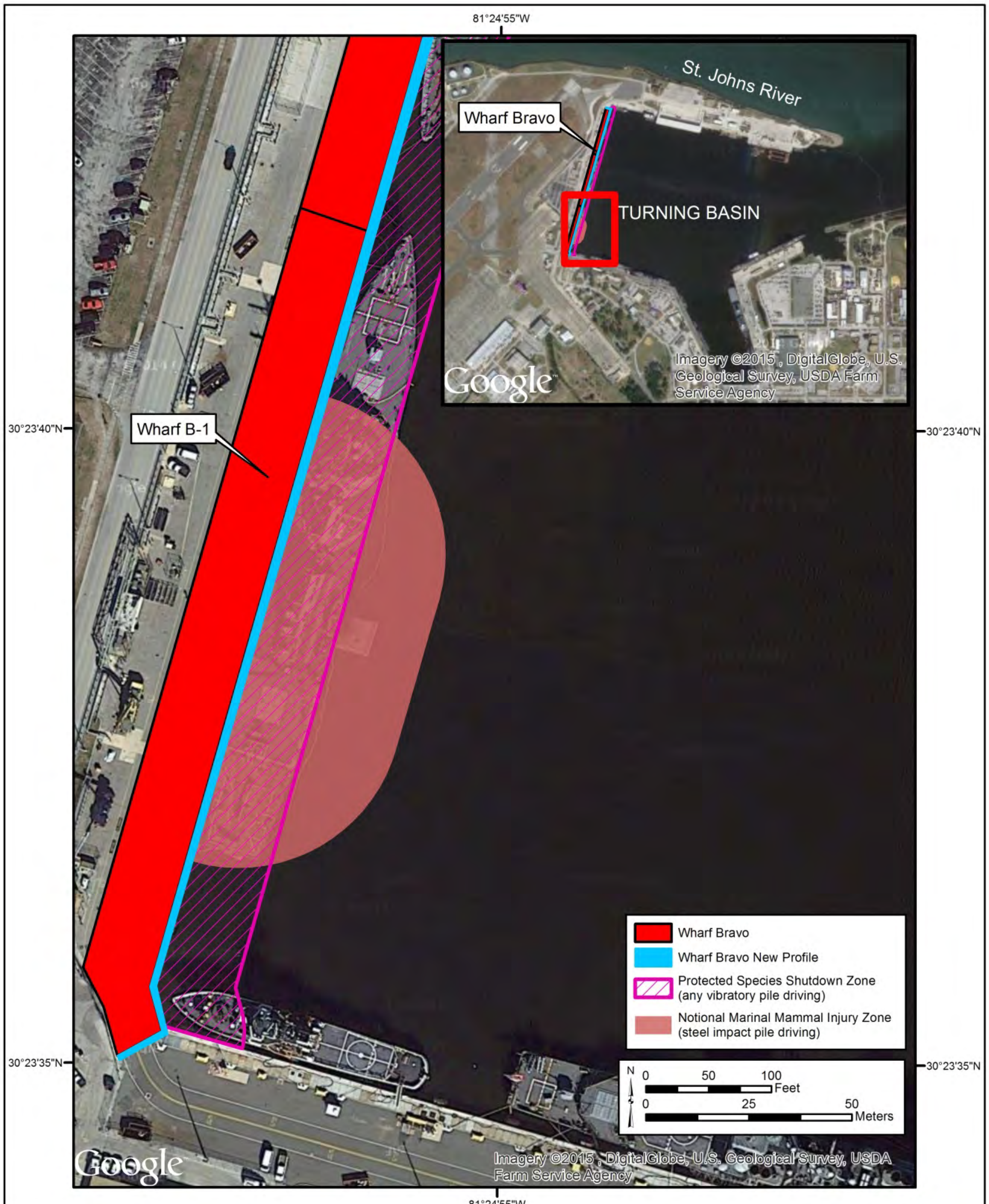

Figure B-1. Shutdown Zones for Vibratory and (Contingency Only) Impact Pile Driving Activities

1.2.8.6 Data Collection

The following information will be collected on sighting forms used by observers:

- Date and time that pile driving or removal begins or ends
- Construction activities occurring during each observation period
- Weather parameters identified in the acoustic monitoring (e.g., wind, temperature, percent cloud cover, and visibility)
- Tide and sea state (Marine Species Monitoring Plan Attachments 5 and 6)

If a protected species approaches or enters the shutdown zone, the following information will be recorded once shutdown procedures have been implemented:

- Species, numbers, and, if possible, sex and age class of the species
- Behavior patterns observed, including bearing and direction of travel
- Location of the observer and distance from the animal(s) to the observer

If possible, photographs of the animal(s) will be taken and forwarded to the Naval Facilities Engineering Command Southeast Environmental point of contact. Data collection forms will be furnished to the Environmental point of contact within a mutually agreeable timeframe.

1.2.8.7 Interagency Notification and Reporting

If the Navy encounters an injured, sick, or dead marine mammal, NMFS will be notified immediately. Such sightings will be called into the NMFS Stranding Coordinator for the Southeast:

Erin Fougeres, Ph.D.
Marine Mammal Stranding Program Administrator
Southeast Regional Office
263 13th Avenue South
St. Petersburg, FL 33701
e-mail: erin.fougeres@noaa.gov
office: 727-824-5323
fax: 727-824-5309

The Navy will provide NMFS with the species or description of the animal(s), the condition of the animal (including carcass condition if the animal is dead), location, the date and time of first discovery, observed behaviors (if alive), and photo or video (if available).

Care should be taken in handling dead specimens to preserve biological materials in the best possible state for later analysis of cause of death, if that occurs. In preservation of biological materials from a dead animal, the finder (i.e., marine mammal observer) has the responsibility to ensure that evidence associated with the specimen is not unnecessarily disturbed.

A draft report of any incidents of marine mammals entering the shutdown zone will be forwarded to NMFS and USFWS no later than January 15, 2017. A final report will be prepared and submitted to NMFS and USFWS within 30 days following receipt of comments on the draft report from the agencies.

APPENDIX D
Standard Manatee Conditions

STANDARD MANATEE CONDITIONS FOR IN-WATER WORK

2011

The permittee shall comply with the following conditions intended to protect manatees from direct project effects:

a. All personnel associated with the project shall be instructed about the presence of manatees and manatee speed zones, and the need to avoid collisions with and injury to manatees. The permittee shall advise all construction personnel that there are civil and criminal penalties for harming, harassing, or killing manatees which are protected under the Marine Mammal Protection Act, the Endangered Species Act, and the Florida Manatee Sanctuary Act.

b. All vessels associated with the construction project shall operate at "Idle Speed/No Wake" at all times while in the immediate area and while in water where the draft of the vessel provides less than a four-foot clearance from the bottom. All vessels will follow routes of deep water whenever possible.

c. Siltation or turbidity barriers shall be made of material in which manatees cannot become entangled, shall be properly secured, and shall be regularly monitored to avoid manatee entanglement or entrapment. Barriers must not impede manatee movement.

d. All on-site project personnel are responsible for observing water-related activities for the presence of manatee(s). All in-water operations, including vessels, must be shutdown if a manatee(s) comes within 50 feet of the operation. Activities will not resume until the manatee(s) has moved beyond the 50-foot radius of the project operation, or until 30 minutes elapses if the manatee(s) has not reappeared within 50 feet of the operation. Animals must not be herded away or harassed into leaving.

e. Any collision with or injury to a manatee shall be reported immediately to the Florida Fish and Wildlife Conservation Commission (FWC) Hotline at 1-888-404-3922. Collision and/or injury should also be reported to the U.S. Fish and Wildlife Service in Jacksonville (1-904-731-3336) for north Florida or Vero Beach (1-772-562-3909) for south Florida, and to FWC at ImperiledSpecies@myFWC.com

f. Temporary signs concerning manatees shall be posted prior to and during all in-water project activities. All signs are to be removed by the permittee upon completion of the project. Temporary signs that have already been approved for this use by the FWC must be used. One sign which reads *Caution: Boaters* must be posted. A second sign measuring at least 8 ½" by 11" explaining the requirements for "Idle Speed/No Wake" and the shut down of in-water operations must be posted in a location prominently visible to all personnel engaged in water-related activities. These signs can be viewed at MyFWC.com/manatee. Questions concerning these signs can be sent to the email address listed above.

APPENDIX E
Sea Turtle and Smalltooth Sawfish Construction Conditions

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southeast Regional Office
263 13th Avenue South
St. Petersburg, FL 33701

SEA TURTLE AND SMALLTOOTH SAWFISH CONSTRUCTION CONDITIONS

The permittee shall comply with the following protected species construction conditions:

a. The permittee shall instruct all personnel associated with the project of the potential presence of these species and the need to avoid collisions with sea turtles and smalltooth sawfish. All construction personnel are responsible for observing water-related activities for the presence of these species.

b. The permittee shall advise all construction personnel that there are civil and criminal penalties for harming, harassing, or killing sea turtles or smalltooth sawfish, which are protected under the Endangered Species Act of 1973.

c. Siltation barriers shall be made of material in which a sea turtle or smalltooth sawfish cannot become entangled, be properly secured, and be regularly monitored to avoid protected species entrapment. Barriers may not block sea turtle or smalltooth sawfish entry to or exit from designated critical habitat without prior agreement from the National Marine Fisheries Service's Protected Resources Division, St. Petersburg, Florida.

d. All vessels associated with the construction project shall operate at "no wake/idle" speeds at all times while in the construction area and while in water depths where the draft of the vessel provides less than a four-foot clearance from the bottom. All vessels will preferentially follow deep-water routes (e.g., marked channels) whenever possible.

e. If a sea turtle or smalltooth sawfish is seen within 100 yards of the active daily construction/dredging operation or vessel movement, all appropriate precautions shall be implemented to ensure its protection. These precautions shall include cessation of operation of any moving equipment closer than 50 feet of a sea turtle or smalltooth sawfish. Operation of any mechanical construction equipment shall cease immediately if a sea turtle or smalltooth sawfish is seen within a 50-ft radius of the equipment. Activities may not resume until the protected species has departed the project area of its own volition.

f. Any collision with and/or injury to a sea turtle or smalltooth sawfish shall be reported immediately to the National Marine Fisheries Service's Protected Resources Division (727-824-5312) and the local authorized sea turtle stranding/rescue organization.

g. Any special construction conditions, required of your specific project, outside these general conditions, if applicable, will be addressed in the primary consultation.

Revised: March 23, 2006
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APPENDIX F
Marine Mammal and Sea Turtle Viewing Guidelines

Adapted from Southeast Region Marine Mammal & Sea Turtle Viewing Guidelines available at http://www.nmfs.noaa.gov/pr/education/southeast/guidelines.htm

Viewing "Code of Conduct"

These guidelines are intended to inform the public about protection of marine mammals and sea turtles. They are not a replacement for Federal legal requirements.

1. Remain a respectful distance from marine mammals and sea turtles. The minimum recommended distances are:
    - dolphins, porpoises, seals = 50 yards
    - sea turtles = 50 yards
    - whales = 100 yards*
      Federal law prohibits all approaches to North Atlantic right whales within 500 yards.
2. Marine mammals and sea turtles should not be encircled or trapped between watercraft, or watercraft and shore.
3. If approached by a marine mammal or sea turtle, put your watercraft's engine in neutral and allow the animal to pass. Any vessel movement should be from the rear of the animal.*
   Pursuit of marine mammals and sea turtles is prohibited by Federal law.
4. Never feed or attempt to feed marine mammals or sea turtles.*
   Federal law prohibits feeding or attempting to feed marine mammals.

Detailed Guidelines

Limit your viewing time.

- Prolonged exposure to one or more vessels increases the likelihood that marine mammals will be disturbed.
- Since individual animals' reactions will vary, carefully observe all animals and leave the vicinity if you see signs of disturbance.
- Your vessel may not be the only vessel in the day that approaches the same animal(s); please be aware of cumulative impacts.

Travel in a predictable manner.

- Marine mammals appear to be less disturbed by vessels that are traveling in a predictable manner.
- The departure from a viewing area has as much potential to disturb animals as the approach.

- If a marine mammal or sea turtle approaches, put your engine in neutral and allow the animal to pass.
- Never pursue of follow marine wildlife.
- Never attempt to herd, chase, or separate groups of marine mammals or females from their young.
- Avoid excessive speed or sudden changes in speed or direction in the vicinity of animals.

If you need to move around marine wildlife, do so from behind (i.e., never approach head-on).

- Vessels that wish to position themselves so that the animals would pass them, should do so in a manner that stays fully clear of the animal's path.

Be aware that marine mammals may surface in unpredictable locations.

- Breaching and flipper slapping whales may endanger people and/or vessels.

Marine mammals are more likely to be disturbed when more than one boat is near them.

- Avoid approaching the animals when another vessel is near.
- Always leave marine mammals an "escape route."
- When several vessels are in an area, communication between operators will help ensure that you do not cause disturbance.

Marine mammals have sensitive hearing and many species communicate by vocalizing underwater.

- Underwater sound produced by a vessel's engines and propellers can disturb these animals.

Cautiously move away from the animals if you observe any of the following behaviors:

- Rapid changes in direction or swimming speed.
- Erratic swimming patterns.
- Escape tactics such as prolonged diving, underwater exhalation, underwater course changes, or rapid swimming at the surface.
- Tail slapping or lateral tail swishing at the surface.
- Female attempting to shield a calf with her body or by her movements.

Even if approached by a marine mammal or sea turtle:

- Do not touch or swim with the animals.

Never feed or attempt to feed marine mammals or sea turtles.

- It can alter their natural behavior, make them dependent on handouts, and can be harmful to their health.

- Marine mammals, like all wild animals, may bite and inflict injuries to people who try to feed them.

Note: NMFS regulations at 50 CFR § 216.3 strictly prohibit feeding or attempting to feed a marine mammal in the wild.

Close approaches by humans to marine mammals may cause them to lose their natural wariness and become aggressive towards people. They are also vulnerable to injury or death from entanglement in fishing gear or boat strikes. NMFS strongly encourages people to follow the guidelines presented here while spending time on or near the water.

APPENDIX I
Notice of Availability

THE FLORIDA TIMES-UNION
Jacksonville, FL
Affidavit of Publication

Florida Times-Union

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JACKSONVILLE FL 32212

Reference: 1000714935
Ad Number: C16644389

State of Florida
County of Duval

Before the undersigned authority personally appeared Sharon Walker who on oath says he/she is a Legal Advertising Representative of The Florida Times-Union, a daily newspaper published in Duval County, Florida; that the attached copy of advertisement is a legal ad published in The Florida Times-Union. Affiant further says that The Florida Times-Union is a newspaper published in Duval County, Florida, and that the newspaper has heretofore been continuously published in Duval County, Florida each day, has been entered as second class mail matter at the post office in Jacksonville, in Duval County, Florida for a period of one year preceding the first publication of the attached copy of advertisement; and affiant further says that he/she has neither paid nor promised any person, firm or corporation any discount, rebate, commission, or refund for the purpose of securing this advertisement for publication in said newspaper.

PUBLISHED ON:	03/25/2016
	03/26/2016
	03/27/2016
FILED ON:	03/25/2016

DEPARTMENT OF DEFENSE
UNITED STATES DEPARTMENT OF THE NAVY
NOTICE OF AVAILABILITY OF A DRAFT FINAL ENVIRON-
MENTAL ASSESSMENT FOR THE WHARF BRAVO RECAPI-
TALIZATION AT NAVAL STATION MAYPORT, JACKSON-
VILLE, FLORIDA

Pursuant to Council on Environmental Quality (CEQ) regulations (40 Code of Federal Regulations §§ 1500 to 1508) implementing the National Environmental Policy Act (NEPA), the United States Department of the Navy gives notice that a Draft Final Environ-
mental Assessment (EA) is being prepared for the Wharf Bravo Recapitalization at Naval Station (NAVSTA) Mayport, Jackson-
ville, Florida. The Proposed Action is to recapitalize Wharf Bravo at NAVSTA Mayport. Wharf Bravo recapitalization activities include the construction of a new steel sheet pile bulkhead that ties into an existing steel sheet pile structure, placement of fill between existing and new steel sheet pile bulkheads, installation of a concrete pile cap and concrete encasement of sheet pile, asphalt wharf deck paving, repairs of electrical and mechanical shore utilities, and upgrades to area lighting and anti-terrorism/force protection waterfront enclave facilities. The purpose of the Pro-
posed Action is to resolve the increasing deterioration of the bulk-
head so the facility can provide adequate ship berthing, cold iron support, and ordnance handling capability. Adequate and effi-
ciently configured facilities are required to provide general pur-
pose ordnance loading and maintenance berthing for ships home-
ported at and visiting NAVSTA Mayport. The need for the Proposed Action is based on the failing functionality and struc-
tural integrity of the wharf.

Interested parties may view a copy of the EA for this action at the following website:
http://www.navfac.navy.mil/navfac_worldwide/atlantic/fecs/south
east/about_us/environmental_planning.html. Responses may be sent via US mail to: Department of the Navy, NAVFAC Southeast, Attention: John Conway, PO Box 30, BLDG 903, DEPT EV21, Jacksonville, Florida 32212-0030; Phone: 904-542-6870. Please pro-
vide any comments by April 25, 2016.

Name: Sharon Walker Title: Legal Advertising Representative
In testimony whereof, I have hereunto set my hand and affixed my official Seal, the day and year aforesaid.

NOTARY: Diana A C-Moore

DIANA A CRUZ-MOORE
MY COMMISSION # EE214520
EXPIRES July 07, 2016
(407) 398-0153 FloridaNotaryService.com