DRAFT ENVIRONMENTAL IMPACT STATEMENT

TRIDENT SUPPORT FACILITIES
EXPLOSIVES HANDLING WHARF (EHW-2)

NAVAL BASE KITSAP BANGOR
SILVERDALE, WA

March 2011

DEPARTMENT OF THE NAVY

Cooperating Agencies:

U.S. ARMY CORPS OF ENGINEERS

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, NATIONAL MARINE FISHERIES SERVICE

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LEAD AGENCY:	United States Department of the Navy
COOPERATING AGENCIES:	U.S. Army Corps of Engineers Seattle, Washington
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ABSTRACT:

This draft environmental impact statement (DEIS) evaluates the environmental effects of constructing and operating a second Explosives Handling Wharf (EHW-2) at Naval Base Kitsap Bangor. It has been prepared by the United States Department of the Navy (Navy) in accordance with the requirements of the National Environmental Policy Act of 1969. The proposed action is needed because the existing EHW alone will not be able to support TRIDENT program requirements. Five action alternatives and the No-Action Alternative are evaluated. The action alternatives consist of combinations of two access trestle layouts (separate and combined) and three wharf configurations (conventional pile-supported, large pile, and floating). The project would also include construction of an upland road, an abutment where the trestles connect to the shore, and an upland construction staging area. Approximately 20 existing facilities and/or structures in proximity to the proposed structure would be modified or demolished to comply with Department of Defense Explosives Safety Board and Naval Ordnance Safety and Security Activity requirements. The marine and terrestrial construction would occur over approximately 4 years. In-water work would be subject to timing and seasonal restrictions to avoid and minimize impacts. The preferred alternative is the Combined Trestle, Large Pile Wharf Alternative.

This DEIS evaluates direct, indirect, and cumulative impacts to the environment. All alternatives would result in the same types of environmental impacts; the magnitude of these impacts would vary among the alternatives. The principal types of impacts during project construction would include pile driving noise (and its effects on marine biota), turbidity, and air pollutant emissions. In the long term, impacts would include loss and shading of marine habitat including eelgrass, macroalgae and benthic community, and interference with migration of juvenile salmon, some species of which are protected under the Endangered Species Act (ESA). All action alternatives would have the potential to adversely affect fish and bird species protected

under the ESA, and marine mammals (behavioral harassment only) protected under the ESA and the Marine Mammal Protection Act (MMPA). Upland impacts would be essentially the same for all alternatives. Upland construction would result in permanent and temporary vegetation disturbance. There would be loss of 0.18 acre of wetland, which would be mitigated. Wildlife would be disturbed by construction noise, especially pile driving; measures are proposed to mitigate these impacts. No terrestrial animals or plants protected under the ESA, Migratory Bird Treaty Act, or Bald and Golden Eagle Protection Act would be affected.

The Navy is working with the National Marine Fisheries Service (NMFS) through the MMPA permitting process to ensure compliance regarding Level B exposures to marine mammals. In accordance with the ESA, the Navy is in consultation with the U.S. Fish and Wildlife Service and NMFS regarding impacts to federally listed species and designated critical habitat. In addition, the Navy is in consultation with NMFS regarding impacts to Essential Fish Habitat. In accordance with the Coastal Zone Management Act, the Navy will prepare and submit a Coastal Consistency Determination to the Washington Department of Ecology. In compliance with the National Historic Preservation Act, the Navy is in consultation with the State Historic Preservation Officer and American Indian tribes. Pursuant to Executive Order 13175 and Department of Defense Policy, the Navy is in consultation with affected American Indian tribes.

Following a 45-day public comment period on the DEIS, the Navy will review and respond to comments in writing and/or as changes in the Final Environmental Impact Statement (FEIS). The resulting FEIS will be circulated for a 30-day wait period (no-action period). Following the 30-day wait period, the Navy will prepare a Record of Decision that will formally document the selected alternative.

EXECUTIVE SUMMARY

INTRODUCTION

The United States (U.S.) Navy proposes to construct and operate a second Explosives Handling Wharf (EHW) at Naval Base Kitsap Bangor (NBK Bangor) to support the OHIO Class Ballistic Missile submarines (SSBN), hereafter referred to as TRIDENT submarines (Figure ES–1). The second EHW (EHW-2) would be adjacent to but separate from the existing EHW. NBK Bangor, located on Hood Canal approximately 20 miles west of Seattle, Washington, provides berthing and support services to TRIDENT submarines. The entirety of NBK Bangor, including the land areas and adjacent waters in Hood Canal, is restricted from general public use. Access is granted by permission to non-Department of Defense (DoD) personnel, including shellfish access for American Indian tribal members. The action proponent is the Navy Strategic Systems Programs (SSP). SSP directs research, development, manufacturing, test, evaluation, and operational support of the TRIDENT Fleet Ballistic Missile (TRIDENT) program. The U.S. Army Corps of Engineers (USACE) and the National Marine Fisheries Service (NMFS) are cooperating agencies pursuant to Title 40 of the Code of Federal Regulations, Parts 1501.6 and 1508.5 (40 CFR 1501.6 and 1508.5).

Development at NBK Bangor over the past 40 years was analyzed in the TRIDENT Facilities Environmental Impact Statement (EIS), which was prepared for construction of the ballistic missile submarine support portion of the base. That EIS was supplemented in 1976 and 1978. The TRIDENT Facilities EIS addressed the need for three EHWs at NBK Bangor for long-term support of the TRIDENT program. Subsequent environmental analyses at NBK Bangor focused on specific development actions at the base and adjacent waterfront. A 1989 Environmental Assessment (EA) for the TRIDENT D5 Facilities Upgrade Program included consideration of the construction of a second EHW. Although the original TRIDENT Facilities EIS identified the need for three EHWs, only one EHW was built during construction of the TRIDENT base. Subsequent analyses (most recently, the Navy Waterfront Functional Plan, 2009 Update [Navy 2009c]) determined that only two EHWs are needed at NBK Bangor.

PURPOSE AND NEED

The Navy proposes to construct the EHW-2 adjacent to the existing EHW at NBK Bangor. The purpose of the proposed action is to support future TRIDENT program requirements for the eight TRIDENT submarines currently homeported at NBK Bangor and the TRIDENT II (D5) Strategic Weapons System. The proposed action is needed because the existing EHW alone will not be able to support TRIDENT program requirements. The Navy has no plans at this time to change the number of TRIDENT submarines at NBK Bangor, and the proposed action is not intended to support an increase in TRIDENT submarines. In an analysis to determine future TRIDENT program needs, the Navy concluded an EHW facility would be required for approximately 400 operational days per year. The existing EHW alone will not be able to support TRIDENT program requirements for two primary reasons: changing operational and weapon systems requirements and the availability of the existing EHW.

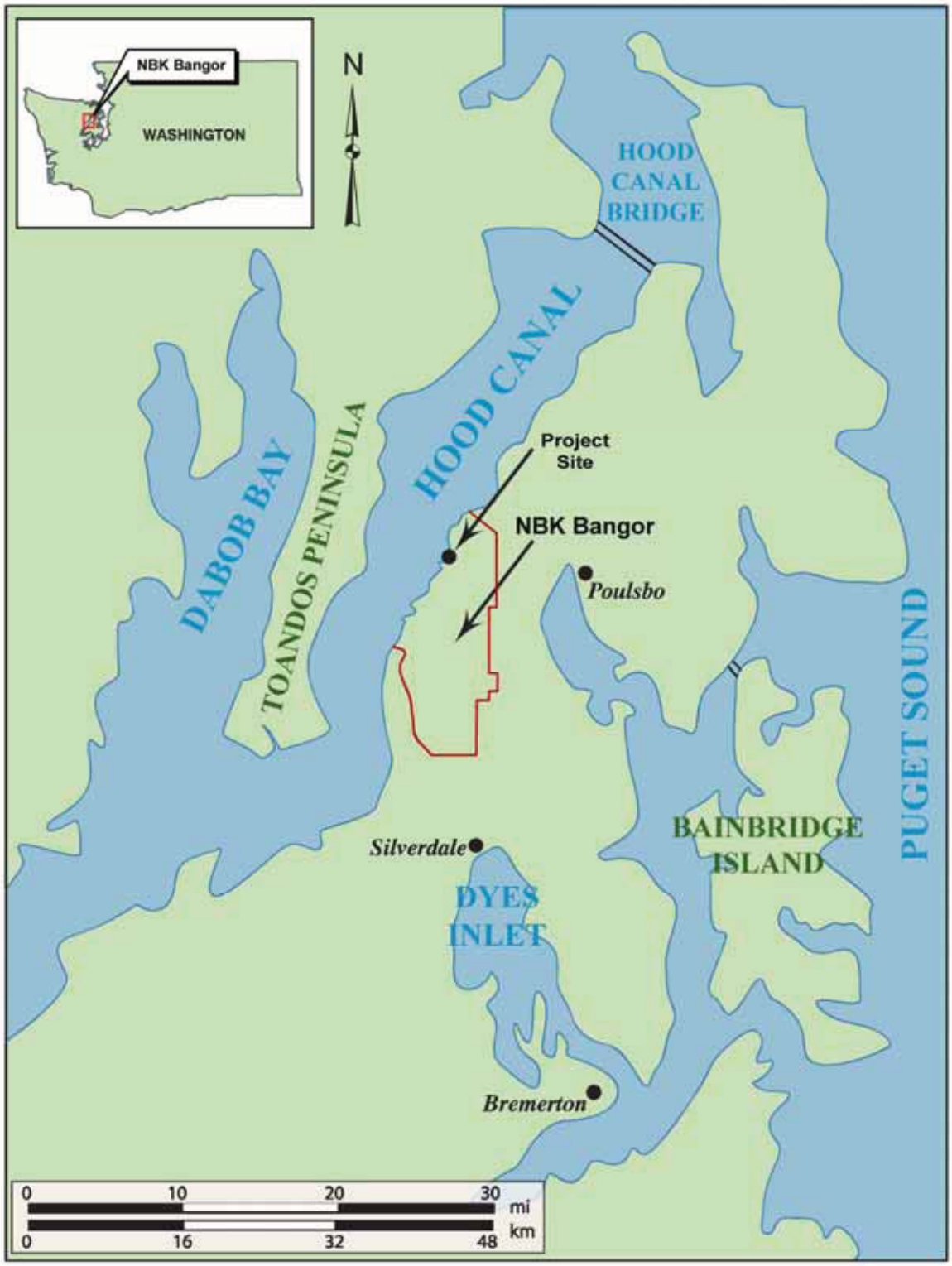


Figure ES–1. Site Location Map for NBK Bangor

The existing EHW was constructed in the late 1970s to handle the TRIDENT I C4 missile (C4). In the 1990s, this missile was replaced by the TRIDENT II D5 missile (D5). The D5 is larger, more complex, and requires more time to handle and maintain than the C4. In 2001 the Navy began the TRIDENT II (D5) Life Extension Program, which will extend the life of the current TRIDENT weapons systems through 2042. Life extension is accomplished through upgrades to missiles (primarily electronics) to address technological obsolescence. As the systems age, these upgrades will require more frequent and longer handling and maintenance. Although some upgrades and maintenance can be performed at locations other than the EHW, the submarines must still dock at the EHW to remove components that are transported to other work locations.

The existing EHW can currently only provide approximately 200 operational days per year due to required facility preventative maintenance and pile replacement. The Navy anticipates that after pile replacement concludes in 2024, the existing EHW will provide approximately 300 operational days per year. A single EHW would not meet TRIDENT program needs of 400 operational days per year.

The proposed EHW-2 would provide 300 operational days per year. Two EHWs would provide an available capacity of approximately 500–600 operational days per year. One EHW does not provide enough operational days to support the TRIDENT mission through 2042. The EHW-2 would be designed to meet all TRIDENT program requirements, with the minimum structure.

ALTERNATIVES

The Navy evaluated a wide range of alternative designs for the EHW-2 using the following criteria:

- Capability to meet TRIDENT mission requirements,
- Ability to avoid or minimize environmental impacts,
- Siting requirements including proximity to existing infrastructure,
- Availability of waterfront property,
- Constructability of essential project features, and
- Explosives safety restrictions.

All of the action alternatives analyzed in this EIS would meet the above criteria.

The EHW-2 would consist of two components: (1) the wharf proper (or Operations Area), including the warping wharf; and (2) access trestle(s). The wharf proper would be either pile-supported or floating. Two types of pile-supported wharf are being considered: a conventional pile-supported wharf and a large-pile wharf. The access trestles would be pile-supported and would be either completely separate or combined for part of their spans. The trestles under either option would come ashore at the same location and tie into existing roads. All piles would be hollow steel pipe piles.

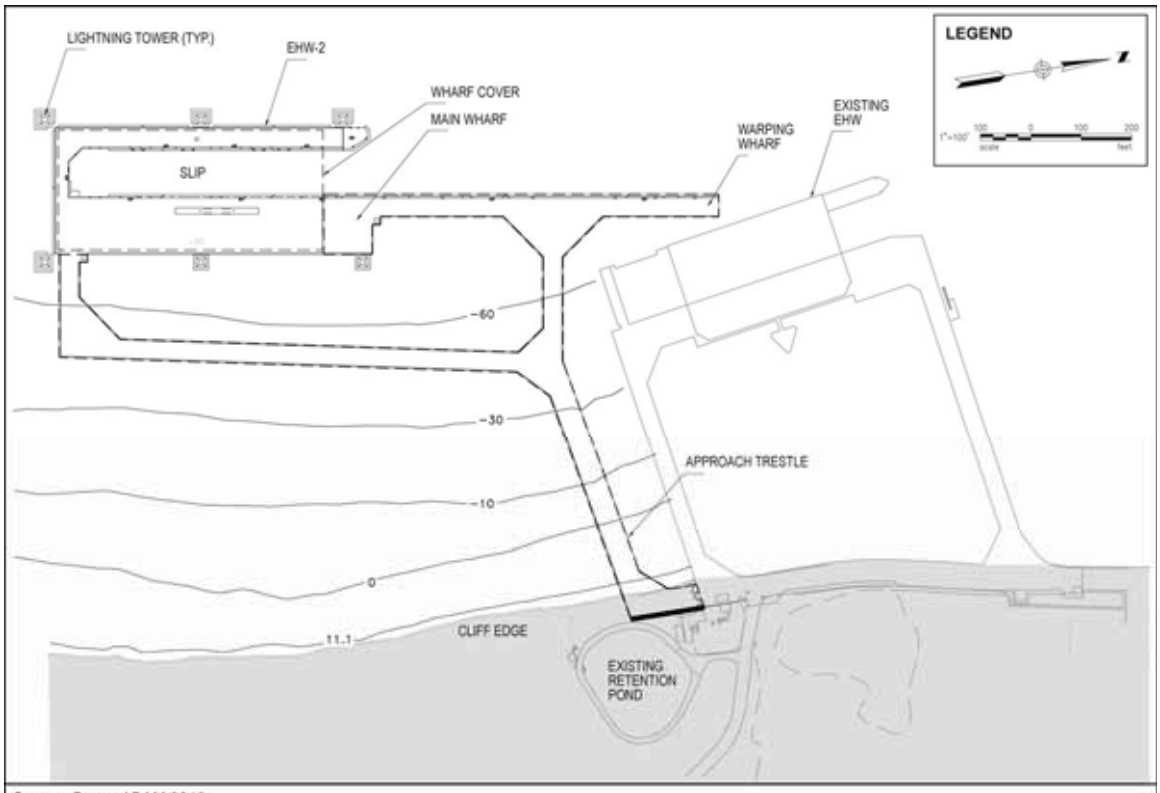
As part of the proposed action, approximately 20 existing facilities and/or structures in proximity to the proposed structure would be modified or demolished to comply with DoD Explosives Safety Board (DDESB) and Naval Ordnance Safety and Security Activity (NOSSA) requirements.

This EIS addresses five action alternatives that are combinations of the wharf and trestle components and a No-Action Alternative. Dimensions and other details of the five action alternatives are provided below and summarized in Table ES–1 (at the end of this Executive Summary).

- *Alternative 1: Combined Trestle, Large Pile Wharf (Preferred Alternative).* Under this alternative, the access trestles would be combined over shallow water to reduce impacts to shallow-water habitat and resources. The wharf would be supported primarily on large (up to 48-inch diameter) piles, along with some smaller (24-inch diameter) piles. Figure ES–2 shows the EHW-2 layout with the combined trestle.
- *Alternative 2: Combined Trestle, Conventional Pile Wharf.* This alternative would have the same combined trestles as Alternative 1, but would use a conventional pile wharf supported on a larger number of smaller piles (24 to 36 inches) than the Large Pile Wharf. Otherwise, the dimensions of the Conventional Pile Wharf would be the same as those of the Large Pile Wharf. Pile driving would take longer than for Alternative 1.
- *Alternative 3: Separate Trestles, Large Pile Wharf.* Unlike Alternatives 1 and 2, this alternative would have completely separate access trestles. As a result, there would be more trestle piles and overwater area, including more area over shallow water. This Large Pile Wharf would be the same as Alternative 1. Figure ES–3 shows the EHW-2 layout with separate trestles.
- *Alternative 4: Separate Trestles, Conventional Pile Wharf.* This alternative would have the same separate trestles as Alternative 3 and the same Conventional Pile Wharf as Alternative 2.
- *Alternative 5: Combined Trestle, Floating Wharf.* This alternative would employ a floating wharf rather than a pile-supported wharf. The wharf would be supported on large concrete pontoons and connected to mooring dolphins. This alternative would use combined trestles similar to Alternatives 1 and 2. The floating wharf would be larger than the pile-supported wharves. This alternative would entail considerably fewer piles than the other alternatives. Figure ES–4 shows the Alternative 5 layout.
- *No Action.* Under this alternative, no EHW-2 would be built, and the Navy would not have the required facilities to perform routine operations and upgrades required to maintain the current fleet of TRIDENT submarines at NBK Bangor through 2042.

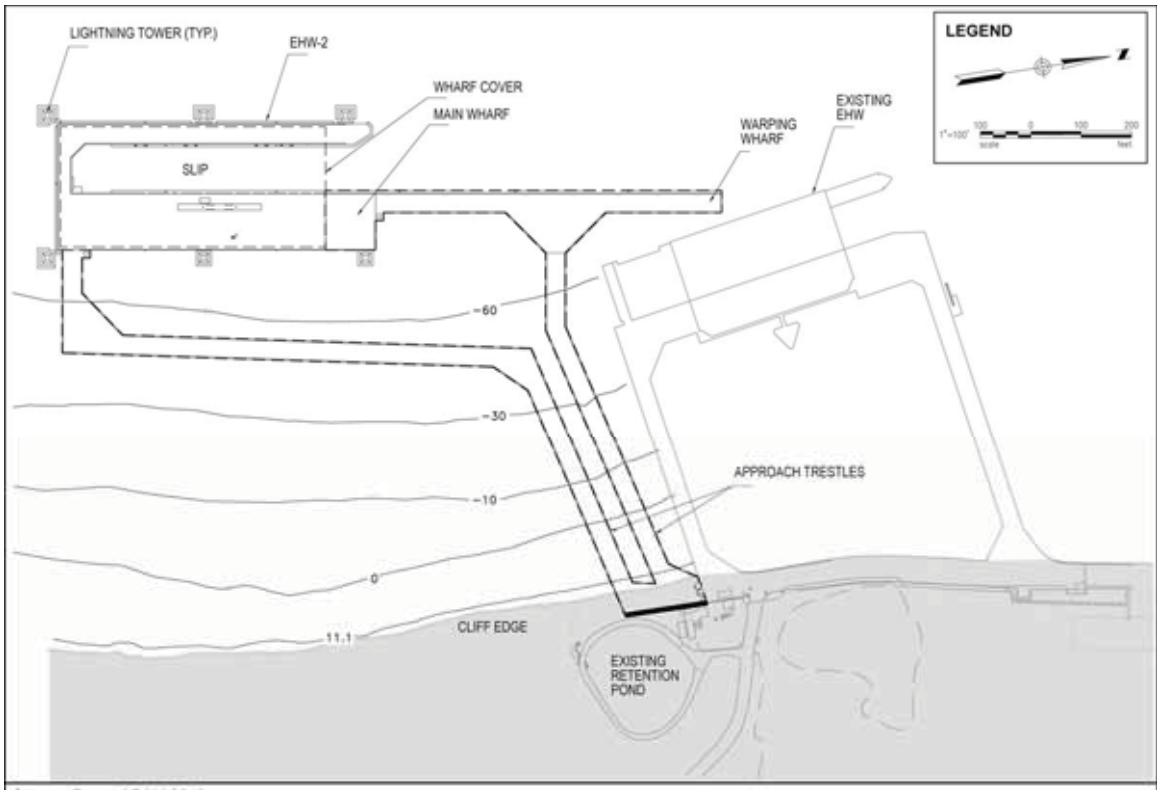
PROJECT COMPONENTS

The wharf proper would lie approximately 600 feet offshore at water depths of 60 to 100 feet, and would consist of a main wharf, a warping wharf, and lightning protection towers. It would include a slip for submarines surrounded on three sides by the operational wharf area. The warping wharf would extend out from the main wharf and be used to line up submarines to move into the slip. The main wharf would include an operations support building providing office and storage space and mechanical/electrical system component housing. Additional facility support at the wharf would include heavy duty cranes supported by the structure that encloses the wharf, power utility booms, six large lightning protection towers, and camels (operational platforms that float next to a moored vessel). The six lightning towers would be steel frame structures. Specific dimensions of project components are detailed in Table ES–1.



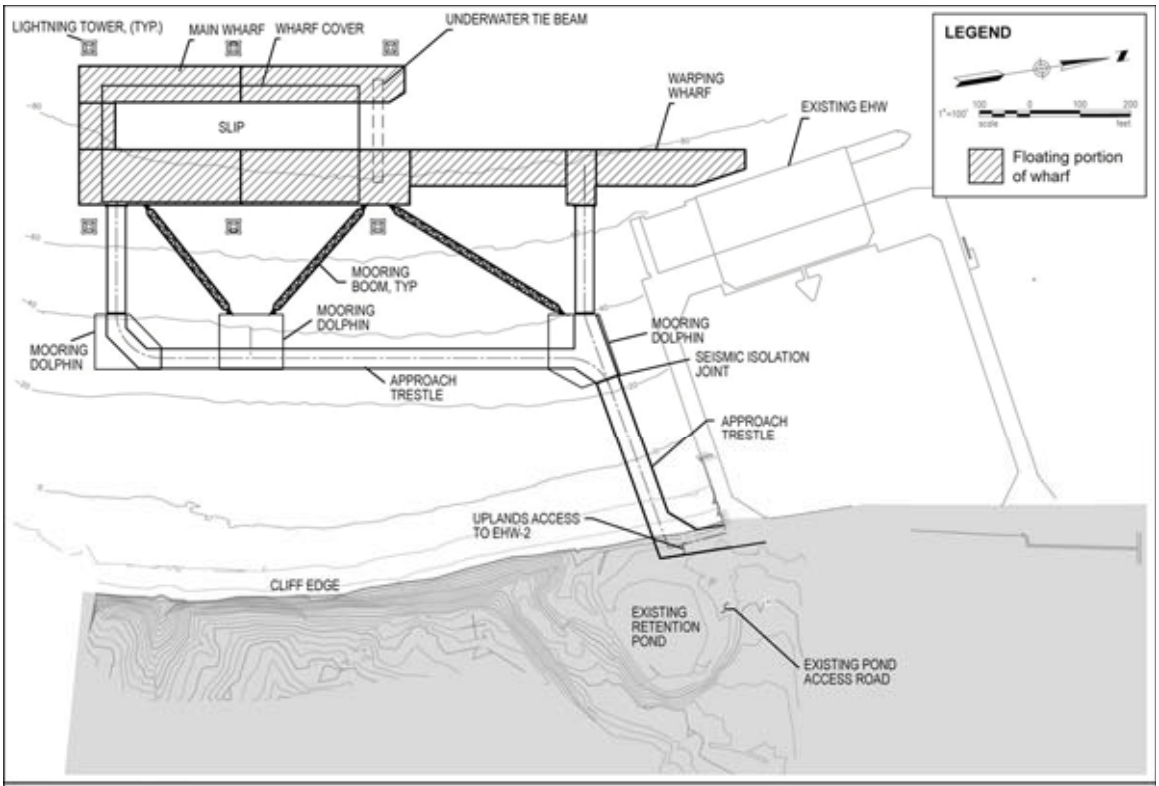
Source: BergerABAM 2010

Figure ES–2. Plan View of Combined Trestle Alternatives 1 and 2



Source: BergerABAM 2010

Figure ES–3. Plan View of Separate Trestle Alternatives 3 and 4



Source: BergerABAM 2010

Figure ES–4. Plan View of Floating Wharf Alternative 5

Entrance and exit trestles would connect the wharf to the shore. The trestles would be pile-supported. Concrete pile caps would be cast in place and would support pre-cast concrete deck sections.[1]

Pile installation would involve the use of vibratory pile drivers to the greatest extent possible for all alternatives. It is anticipated that most piles will be vibratory driven to within several feet of the required depth. If difficult subsurface driving conditions (i.e., cobble/boulder zones) are encountered, it may be necessary to use an impact hammer to drive some piles for the remaining portion of their required depth. Up to three vibratory rigs would operate concurrently during construction of the EHW-2, but only one impact hammer rig would operate at a time. However, the construction schedule would require the operation of the impact rig at the same time as the vibratory rigs. Measures to reduce the environmental impacts of pile driving and other project actions are described below under Mitigation Measures.

The in-water work season for pile driving and other in-water construction at NBK Bangor is July 16 through February 15, as established by the regulatory agencies to protect juvenile salmon. Construction would typically occur 6 days per week, but could occur 7 days per week. Pile driving during the first half of the in-water work window (July 16 to September 30) would only occur between 2 hours after sunrise and 2 hours before sunset to protect breeding marbled

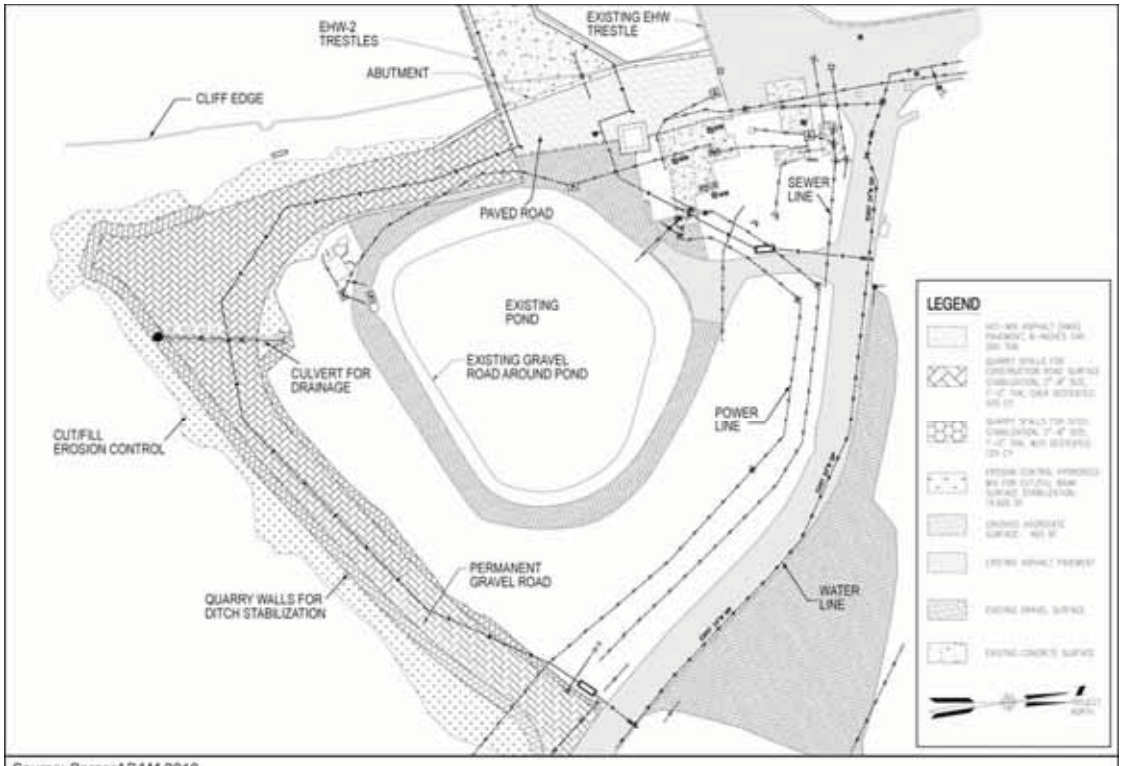
[1] Pile caps are constructed by placing wooden forms and reinforcing steel bars around the top of the piles, and pouring concrete into the forms. Once the concrete has cured, the forms are removed. Pre-cast components are formed and poured at an offsite location. They are brought to the site in their finished form and placed with a crane in their final location.

murrelets. Between October 1 and February 15, pile driving can occur during daylight hours. Non-pile driving construction activities could last until 10:00 PM in accordance with the Washington Administrative Code noise guidelines.

The following upland features would be the same for all alternatives (Figure ES–5). A permanent gravel access road would be built to provide access from Archerfish Road to the upland construction area along the shoreline, while avoiding the nearby detention pond. A permanent paved road would be built to connect the new trestle(s) to an existing road. A security fence would run the length of this road and onto the trestle(s). A gate and guard house would be installed at the end of the new road where it connects to the existing road. A total area of approximately 1.6 acre would be disturbed in this area for the various facilities, including utility projects (see below). Of this area, 0.8 acre would remain permanently occupied by the new roads, while the rest (0.8 acre) would be revegetated.

A 5-acre laydown area approximately 4,000 feet south of the project site would be needed for the upland construction. Storage of material and equipment as well as soil stockpiling would occur within the laydown area. Following construction, this area would be revegetated with native forest species. No new parking lots for construction parking or operational parking would be needed. Archerfish Road would be the primary haul route for construction.

A concrete abutment would be built at the face of the shore cliff, under the trestle(s) where the trestle(s) comes ashore. The abutment would be pile-supported, constructed from the land side, and lie above mean higher high water (MHHW), although excavation below MHHW would be needed for construction. Abutment construction would include installation of piles using the same methods as in-water pile driving.



Source: BergerABAM 2010

Figure ES–5. Plan View of Floating Wharf Alternative 5

New utility facilities and modifications for all alternatives would include the following:

- Two new 12-inch diameter water lines, for domestic use and fire suppression, approximately 200 feet long to connect to an existing water line on Archerfish Road.
- Two new 20- by 20-foot backflow preventer vaults, to prevent backflow into the Navy domestic water system. One would be added at the northwest corner of the new gravel access road and Archerfish Road intersection. The second would be located approximately 5 feet west of the existing paved access road on the project site.
- One new underground 6-inch diameter Sanitary Sewer Forced Main for wharf sewer discharge. The main would extend approximately 220 feet, terminating at an existing manhole located approximately 40 feet east of the existing EHW and the end of Archerfish Road.
- One new underground 4-inch diameter Ship's Overboard Discharge main. The main would be approximately 100 feet in length and would connect to the existing aboveground 10,000-gallon tank.
- Relocation of an aboveground 10,000-gallon oily wastewater tank a short distance to make room for the new security fence (the existing underground tank would not be impacted by the proposed action).
- One new 8-inch diameter storm drain to collect water runoff from the wharf, warping wharf, and trestle structures. The storm drain would be connected to approximately 18 catch basins with filter cartridges. The storm drain and catch basin would be located solely on the proposed structure.
- New 40- by 15-foot steel utility building that would replace an existing utility building. The new utility building would be located within the project site between the southeast corner of the existing EHW and the existing retention pond.
- Two new double-ended substations located on the wharf structure. One substation would contain two 2,500-kilovolt-ampere (kVA) transformers, and the second would contain two 2,000 kVA transformers. Approximately 10 smaller transformers required to meet the energy needs of the new facility would be located on the wharf structure. The substation switchgear would be provided with circuit breakers with substation controls co-located with the transformers. One 200-kilowatt (kW) generator and one 125 kW generator would be located on the wharf structure. The exact dimensions of the substations would be determined during the final design stage.
- Approximately 1,200 feet of new duct bank (an assembly of electrical and communication conduits encased in concrete ducting) that would replace 500 feet of existing ducting. Demolition of the old and installation of the new ducting would be confined between Archerfish Road, the existing retention pond, and the proposed project.
- Three new 8- by 10-foot utility manholes. Two of the new manholes would be located adjacent to the new utility building on the east side. The third would be located on the south side of the end of Archerfish Road.

For all alternatives, the number of construction workers is estimated to be 100. Most of the upland construction would occur in the first 10 months of project construction. General construction (except pile driving) would typically occur between 7:00 AM and 10:00 PM 6 days

per week, but could occur 7 days per week. Construction materials would arrive via truck and barge. Construction debris would be hauled off the site to an approved disposal facility.

As part of the proposed action, approximately 20 existing facilities and/or structures in proximity to the EHW-2 would be modified to comply with DDESB and NOSSA requirements to protect buildings located in the vicinity of explosives handling operations. The scope of facility modifications would primarily include replacement of doors and windows and possibly the modification or addition of building structural components such as walls, interior and exterior columns, beams, and joists and the replacement of existing roof systems. These modifications would not affect vegetated or undeveloped areas near the buildings to be modified.

OPERATIONS

Operation of the EHW-2 would not result in an increase in boat traffic at the NBK Bangor waterfront. Rather, a portion of the ongoing operations and boat traffic at the existing EHW and other facilities within the Waterfront Restricted Area (e.g., Delta Pier and Marginal Wharf) would be diverted to the EHW-2. The EHW-2 may be used as a backup explosives handling facility for OHIO-class guided missile submarines (SSGNs) currently homeported at NBK Bangor when there are no TRIDENT operations at the existing EHW. The EHW-2 may also provide temporary berthing when no ordnance handling operations are occurring at either wharf. No increase in boat traffic would be required to achieve planned operations. The increase in future operations at the waterfront would only require that boats remain at an EHW longer when in port for maintenance and upgrades. Operation of the EHW-2 may require approximately 20 additional military and civilian personnel. The EHW-2 would be staffed 24 hours a day, 7 days a week.

ENVIRONMENTAL IMPACTS

All alternatives would have the same types of environmental impacts; the magnitude of these impacts would vary among the alternatives. The principal types of impacts during project construction would include pile driving noise (and its effects on marine biota), turbidity, and air pollutant emissions. In the long term, impacts would include loss and shading of marine habitat including eelgrass, macroalgae and the benthic community, and interference with the migration of juvenile salmon, some species of which are protected under the Endangered Species Act (ESA). Certain fish species are more susceptible to injury during impact pile driving activities. ESA-listed fish species that may be adversely affected include Hood Canal summer-run chum salmon, Puget Sound Chinook salmon, Puget Sound steelhead, bull trout, bocaccio, yelloweye rockfish, and canary rockfish. All action alternatives may result in behavioral disturbance of marine mammals (Steller sea lion) and bird species (marbled murrelet) protected under the ESA, as well as behavioral harassment of marine mammals protected under the Marine Mammal Protection Act (MMPA). Injury is not expected to any marine mammal, including the Steller sea lion, nor to the marbled murrelet. Marine mammals potentially affected by behavioral harassment would include the ESA-listed Steller sea lion and the following non-ESA-listed species: harbor seals, California sea lions, Dall's porpoises, harbor porpoises, and transient killer whales. ESA-listed southern resident killer whales may be affected indirectly through effects on their prey (salmon). Depending on the species, the ESA effect determination is either "no effect," "may affect, not likely to adversely affect" or "may affect, likely to adversely affect." Mitigation measures would be implemented to minimize impacts from pile driving noise. Impacts to marine habitats and species would be mitigated by actions proposed in the Mitigation Action Plan (Appendix F). The Navy is currently consulting with the NMFS and the U.S. Fish and Wildlife Service under the

ESA, and with NMFS under the Magnuson-Stevens Fishery Conservation and Management Act (MSA). In addition, the Navy is currently working with NMFS on the MMPA compliance process.

Upland impacts would be essentially the same for all alternatives. Upland construction would result in disturbance of approximately 6.6 vegetated acres under all alternatives, with all but 0.8 acre of this (for the two new roads) to be revegetated following construction. There would be a permanent loss of 0.18 acre of wetland, which would be mitigated. Wildlife would be disturbed by construction noise, especially pile driving. No terrestrial animals or plants protected under the ESA, Migratory Bird Treaty Act (MBTA), or Bald and Golden Eagle Protection Act would be affected. Pursuant to the Clean Water Act (CWA), the Navy will seek Section 404 permits from USACE for impacts to wetlands and fill at the shoreline, and an associated Section 401 water quality certification from the Washington Department of Ecology (WDOE). The remaining features of the project including the piles, over-water structure, and trestles would be permitted by USACE under Section 10 of the Rivers and Harbors Act. In accordance with the Coastal Zone Management Act (CZMA), the Navy will prepare and submit a Coastal Consistency Determination to WDOE.

Social impacts would also be similar for all alternatives, except for differences in the duration of construction including pile driving noise. Recreational and residential areas would be disturbed by pile driving noise. Air pollutant emissions would not exceed thresholds for a major source for any alternative. Under all action alternatives, the setting of the existing EHW, which is National Register of Historic Places–eligible, would be adversely affected by the construction; the Navy will consult with the State Historic Preservation Officer (SHPO) and develop a mitigation plan. There would be a small potential for disturbance of archaeological resources during construction; if any such resources were encountered, the Navy would coordinate with the SHPO and tribes. The project is located in a restricted area, which was established pursuant to 33 CFR 334.1220. Access to tribal fishing areas, the closest of which is approximately 5,000 feet south of the proposed site for the EHW-2, would not be affected by any alternative. Implementation of the proposed action would adversely affect fish, which include tribal treaty-reserved resources. Mitigation is included as part of the proposed action to address the impacts to these aquatic resources.

The Navy has invited and is in government-to-government consultation with the five federally recognized American Indian tribes that have Usual and Accustomed (U&A) areas in the vicinity of the project area: the Skokomish, Port Gamble S'Klallam, Lower Elwha Klallam, Jamestown S'Klallam, and Suquamish Tribes. The proposed action would be consistent to the maximum extent practicable with the Washington State Shoreline Management Act, and would be consistent with the NBK Bangor Master Plan and the Kitsap County Comprehensive Plan. Aesthetically, the EHW-2 would add a large industrial structure to the NBK Bangor shoreline; this structure would be larger for the Floating Wharf Alternative (Alternative 5) than for the other alternatives. The proposed action would not have disproportionate adverse effects on minority or disadvantaged populations. For every $100 million spent by the Navy in construction expenditures, an estimated 874 direct jobs would be created, as well as an estimated 394 indirect and induced jobs. Indirect or induced jobs would be concentrated in the following industries: food services and drinking places, real estate establishment, health care, architectural engineering, wholesale trade, and retail stores. The project cost is estimated to be in excess of $500 million, representing the total economic impact of 4,370 direct jobs and 1,970 indirect and induced jobs. Total economic output to the region would be in excess of $722 million. Based on the economic analysis for the proposed

action, the action would provide a substantial economic benefit to the local and regional economy. Existing utility capacity would be sufficient to support the EHW-2, with only minor new connections and stormwater facilities required. Construction and operational impacts to transportation would be minor. Operation of the EHW-2 would result in no increased danger to the public, including children and sensitive receptors in the area.

The preferred alternative (Alternative 1) combines the less-impacting combined trestles with the less-impacting large-pile wharf. The primary difference in impacts between the Combined Trestle Alternatives (1 and 2) and Separate Trestle Alternatives (3 and 4) would be the greater overwater coverage in shallow water for the Separate Trestle Alternatives. As a result, Alternatives 3 and 4 would have a somewhat greater impact to eelgrass, marine algae, the benthic community, and shallow-water fish habitat than Alternatives 1 and 2. The Large Pile Alternatives (1 and 3) would have somewhat fewer piles (1,250–1,290) and a shorter duration of pile driving (200–420 days) than the Conventional Pile Alternatives (2 and 4), which would entail 1,460–1,500 piles and 275–570 pile driving days. As a result, Alternatives 1 and 3 would have less of an impact from pile driving noise than would Alternatives 2 and 4. Overall construction duration would be shorter for Alternatives 1 and 3 than for Alternatives 2 and 4, resulting in less seafloor disturbance, less noise, and less of an impact to water quality, air quality, and transportation.

Compared to the other action alternatives, the Floating Wharf Alternative (Alternative 5) would have lower construction impacts but greater long-term impacts to marine habitat. Alternative 5 would entail considerably fewer piles than the other alternatives, resulting in less of an impact to marine biota from pile driving noise and less displacement of soft-bottom habitat, as well as shorter duration of noise impacts to residential and recreational areas. However, Alternative 5 would result in more total overwater coverage than the other alternatives, resulting in generally greater long-term impacts to marine habitats than the other alternatives.

The environmental impacts of the alternatives are compared in more detail in Section 2.3 and Table 2–2.

CUMULATIVE IMPACTS

Construction and operation of the EHW-2 would contribute to regional cumulative impacts to marine resources such as shallow-water habitat, including loss of eelgrass, macroalgae, and habitat for juvenile salmon and other fish and invertebrate species. The project would also contribute to cumulative impacts to the marine environment. However, through the implementation of proposed actions in the Mitigation Action Plan, the project's contribution to cumulative impacts would be insignificant.

It is possible that construction of the EHW-2 would overlap in time with construction of other waterfront structures at NBK Bangor. In this case, pile driving for the multiple projects could result in cumulative noise impacts. If more than one construction project occurred at the same time, the predominant noise impact would be expansion of the geographic area affected by maximum sound levels. In limited areas where the noise spheres of influence would overlap, the total sound levels would increase by up to 3 A-weighted decibels (dBA). As a result, more individuals of marine species (fish, marine mammals, and marine birds) would be affected, but it is unlikely the population-level effects of the cumulative sound levels would be greater than those of the EHW project alone. Noise impacts to nearby residential and recreational areas would also increase slightly. There are expected to be no major marine construction projects

outside of NBK Bangor with which the NBK Bangor projects could have cumulative noise impacts. The other strictly construction impacts of the proposed action, such as air and water quality effects, would be minor and highly localized, and thus would not contribute significantly to cumulative impacts in the region.

Impacts to upland habitats and species would be minimal, and all but 0.8 acre for new roads would be revegetated, so there would be little contribution to cumulative upland impacts. As discussed above under Environmental Impacts, the construction and operational impacts of the proposed action to other resources would be minimal, and so would have little potential to contribute to cumulative impacts in the region.

CURRENT PRACTICES, BEST MANAGEMENT PRACTICES, MITIGATION MEASURES, AND REGULATORY COMPLIANCE

The following are the principal measures proposed to avoid, minimize, or compensate for the environmental impacts of the proposed action:

Current Practices and Best Management Practices

- Floating debris barriers and oil booms would be used to minimize water quality impacts during construction.
- Tugboat operations would be managed to minimize suspension of bottom sediments from propeller wash.
- To prevent impacts to the seafloor and benthic community, barges and other construction vessels will not be allowed to run aground.
- In-water construction would observe the Puget Sound Marine Area 13 (northern Hood Canal) in-water work window (July 16 to February 15) as outlined in Washington Administrative Code (WAC) 220-110-271 and posted by the USACE Seattle District (USACE 2010a) to minimize in-water project impacts to potentially occurring juvenile salmonids that would otherwise be exposed to construction activities, including underwater noise produced during pile driving.
- Best Management Practices (BMPs) would be implemented to control runoff and siltation and minimize impacts to surface water, per the *Stormwater Management Manual for Western Washington* (WDOE 2005a).

Mitigation Measures

- During pile driving, acoustic monitoring would be performed to confirm or revise noise predictions.
- During pile driving, the area adjacent to the pile driving site would be monitored by trained observers for the presence of marine mammals and marbled murrelets. Pile driving would be suspended while these species were close enough to be injured.
- It is expected that most pile driving would be done using vibratory rather than impact methods, which would reduce noise levels by 20 decibels root-mean-square (dBRMS) at 33 feet from the source.
- During impact hammer pile driving, air bubble curtains or other noise attenuating devices would be used to minimize noise impacts.

- During both impact and vibratory driving, a soft-start approach to pile driving would be used to induce marine mammals and birds to leave the immediate area. This soft-start approach requires contractors to initiate noise from hammers at reduced energy, followed by a waiting period.
- The Navy would, as part of the proposed action, undertake marine habitat mitigation in accordance with the Mitigation Action Plan (Appendix F). This habitat mitigation action, including mitigation of eelgrass impacts, would compensate for the impacts of the proposed action to marine habitat and species.
- Following construction, areas not permanently paved or otherwise used for the proposed action (including any affected wetlands) would be revegetated with native species.

Regulatory Compliance

The Navy must comply with a variety of other federal environmental laws, regulations, and Executive Orders (EOs). These include (among other applicable laws and regulations) the following:

- National Environmental Policy Act (NEPA)
- Federal Water Pollution Control Act (CWA)
- Rivers and Harbors Act
- Endangered Species Act (ESA)
- Marine Mammal Protection Act (MMPA)
- Magnuson-Stevens Fishery Conservation and Management Act (MSA)
- Migratory Bird Treaty Act (MBTA)
- Bald and Golden Eagle Protection Act
- Clean Air Act (CAA)
- Coastal Zone Management Act (CZMA)
- National Historic Preservation Act (NHPA)
- EO 13175, Consultation and Coordination with Indian Tribal Governments
- EO 11593, Protection and Enhancement of the Cultural Environment
- Native American Graves Protection and Repatriation Act (NAGPRA)
- DoD Native American and Alaska Native Policy
- Energy Independence and Security Act (EISA), Section 438
- EO 12898, Environmental Justice
- EO 13045, Children's Health and Safety
- Public Law 85-725, Federal Aviation Act of 1958

In addition, laws and regulations of the state of Washington applicable to Navy actions are identified and addressed in this EIS.

The Navy will engage in consultations and/or permit processes associated with the ESA, MMPA, MSA, NHPA, CWA, CZMA, and Rivers and Harbors Act, and will comply with conservation measures, reasonable and prudent measures, and/or terms and conditions issued by the responsible agencies to the extent practicable.

Table ES–1. Physical Features of the Action Alternatives for the EHW-2

Facility Feature[1]	Alternative 1: Combined Trestle, Large Pile Wharf (Preferred)	Alternative 2: Combined Trestle, Conventional Pile Wharf	Alternative 3: Separate Trestles, Large Pile Wharf	Alternative 4: Separate Trestles, Conventional Pile Wharf	Alternative 5: Combined Trestle, Floating Wharf
Total Overwater Area (wharf, access trestle, lightning towers)	273,108 sq ft (6.3 acres)	Same as Alternative 1	288,956 sq ft (6.6 acres)	Same as Alternative 3	371,000 sq ft (8.5 acres)
Overwater Area Shallower than -30 feet MLLW	17,859 sq ft (0.41 acre)	Same as Alternative 1	32,880 sq ft (0.75 acre)	Same as Alternative 3	34,000 sq ft (0.78 acre)
Total Number of In-Water Piles	Up to 1,250	Up to 1,460	Up to 1,290	Up to 1,500	Up to 440
Number of Piles Shallower than -30 feet MLLW	Approximately 90	Same as Alternative 1	Approximately 160	Same as Alternative 3	Approximately 140
Total Area of Seafloor Displaced by Piles	9,015 sq ft (0.21 acre)	9,050 sq ft (0.21 acre)	9,175 sq ft (0.21 acre)	9,210 sq ft (0.21 acre)	3,360 sq ft (0.08 acre)
Total Area Shallower than -30 feet MLLW Displaced by Piles	361 sq ft (0.008 acre)	Same as Alternative 1	642 sq ft (0.015 acre)	Same as Alternative 3	1,068 sq ft (0.025 acre)
Duration of In-Water Construction*	2 to 3 in-water work seasons, including 200 to 400 pile driving days	3 to 4 in-water work seasons, including 275 to 550 pile driving days	2 to 3 in-water work seasons, including 210 to 420 pile driving days	3 to 4 in-water work seasons, including 290 to 570 pile driving days	2 in-water work seasons, including 135 to 175 pile driving days
Total Construction Duration	42 – 48 months	54 – 64 months	42 – 49 months	54 – 64 months	42 – 44 months

Table ES–1. Physical Features of the Action Alternatives for the EHW-2 (continued)

Facility Feature[1]	Alternative 1: Combined Trestle, Large Pile Wharf (Preferred)	Alternative 2: Combined Trestle, Conventional Pile Wharf	Alternative 3: Separate Trestles, Large Pile Wharf	Alternative 4: Separate Trestles, Conventional Pile Wharf	Alternative 5: Combined Trestle, Floating Wharf
Main Wharf Dimensions and Area	632 x 250 ft Total area: 158,000 sq ft, including 43,500 sq ft slip Covered overwater area: 152,200 sq ft	Same as Alternative 1	Same as Alternative 1	Same as Alternative 1	684 x 284 ft Total area: 194,256 sq ft, including 48,000 sq ft slip Covered overwater area: 184,000 sq ft
Lightning Tower Dimensions and Area	Six, each 30 x 30 ft Total area: 5,400 sq ft.	Same as Alternative 1	Same as Alternative 1	Same as Alternative 1	Same as Alternative 1
Warping Wharf Dimensions and Area	688 x 40 ft 34,300 sq ft, including connection to access trestle	Same as Alternative 1	Same as Alternative 1	Same as Alternative 1	687 x 75 ft 54,000 sq ft
Trestle Dimensions and Area	1,849 ft long x 40–48 ft wide 81,208 sq ft	Same as Alternative 1	2,280 ft long x 40 ft wide 97,056 sq ft	Same as Alternative 3	Trestles: 325 x 48 ft 664 x 40 ft 440 x 38 ft Dolphin width varies (included in the total) Mooring Booms: 15,500 sq ft (included in total) 117,000 sq ft

Table ES–1. Physical Features of the Action Alternatives for the EHW-2 (continued)

Facility Feature[1]	Alternative 1: Combined Trestle, Large Pile Wharf (Preferred)	Alternative 2: Combined Trestle, Conventional Pile Wharf	Alternative 3: Separate Trestles, Large Pile Wharf	Alternative 4: Separate Trestles, Conventional Pile Wharf	Alternative 5: Combined Trestle, Floating Wharf
Mooring Dolphin Dimensions and Area	N/A	N/A	N/A	N/A	150 x 104 ft 131 x 112 ft 136 x 112 ft Total Area = 45,500 sq ft
Pontoon Dimensions	N/A	N/A	N/A	N/A	Main pontoon: 604 x 114 ft Outer pontoon: 557 x 75 ft End pontoon: 284 x 75 ft Warping wharf pontoon: 688 x 75 ft, with 60 x 38 ft ramp landing
Wharf Deck Top Elevation	20.5 feet above MLLW	Same as Alternative 1	Same as Alternative 1	Same as Alternative 1	Varies with tide; 12 feet above water surface
Wharf Deck Bottom Elevation	13 feet above MLLW	Same as Alternative 1	Same as Alternative 1	Same as Alternative 1	20 feet below water surface
Trestle Deck Top Elevation	20.5 to 28 feet above MLLW	Same as Alternative 1	Same as Alternative 1	Same as Alternative 1	22 to 28 feet above MLLW
Trestle Deck Bottom Elevation	15.2 to 22.7 feet above MLLW	Same as Alternative 1	Same as Alternative 1	Same as Alternative 1	16.7 to 22.7 feet above MLLW
Number and Size of Main Wharf Piles	140 24-inch 157 36-inch 263 48-inch	140 24-inch 520 36-inch	Same as Alternative 1	Same as Alternative 2	0

Table ES–1. Physical Features of the Action Alternatives for the EHW-2 (continued)

Facility Feature[1]	Alternative 1: Combined Trestle, Large Pile Wharf (Preferred)	Alternative 2: Combined Trestle, Conventional Pile Wharf	Alternative 3: Separate Trestles, Large Pile Wharf	Alternative 4: Separate Trestles, Conventional Pile Wharf	Alternative 5: Combined Trestle, Floating Wharf
Number and Size of Warping Wharf Piles	80 24-inch 190 36-inch	80 24-inch 300 36-inch	Same as Alternative 1	80 24-inch 255 36-inch	0
Number and Size of Lightning Tower Piles	40 24-inch 90 36-inch	Same as Alternative 1	Same as Alternative 1	Same as Alternative 1	Same as Alternative 1
Number and Size of Trestle Piles	57 24-inch 233 36-inch	Same as Alternative 1	82 24-inch 248 36-inch	Same as Alternative 3	52 24-inch 143 36-inch
Number and Size of Mooring Dolphin Piles	N/A	N/A	N/A	N/A	115 48-inch
Falsework Piles (temporary)	Up to 150 18-inch to 24-inch	Same as Alternative 1	Same as Alternative 1	Same as Alternative 1	Same as Alternative 1
Number of Upland Abutment Piles (all 24-inch)	55 24-inch (11 additional pile driving days)	Same as Alternative 1	80 24-inch (16 additional pile driving days)	Same as Alternative 3	Same as Alternative 1
New Impervious Surface (paved road)	50 x 140 ft 7,000 sq ft (0.16 acre)	Same as Alternative 1	50 x 170 ft 8,500 sq ft (0.20 acre)	Same as Alternative 3	Same as Alternative 1
Construction Laydown Area (temporary)	5 acres	5 acres	5 acres	5 acres	5 acres

Table ES–1. Physical Features of the Action Alternatives for the EHW-2 (continued)

Facility Feature[1]	Alternative 1: Combined Trestle, Large Pile Wharf (Preferred)	Alternative 2: Combined Trestle, Conventional Pile Wharf	Alternative 3: Separate Trestles, Large Pile Wharf	Alternative 4: Separate Trestles, Conventional Pile Wharf	Alternative 5: Combined Trestle, Floating Wharf
Upland Area Disturbed (paved road, gravel access road, utilities, stormwater facilities, construction laydown area)	Temporary: 5.8 acres Permanent: 0.8 acre Total: 6.6 acres	Same as Alternative 1	Same as Alternative 1	Same as Alternative 1	Same as Alternative 1
Trestle Abutment at Shore	103 ft long with 69 ft wing wall on north end Excavation: 2,760 cu yd (300 cu yd below MHHW) Armor rock: 520 cu yd	Same as Alternative 1	160 ft long with two 35 ft wing walls Excavation: 3,560 cu yd (550 cu yd below MHHW) Armor rock: 700 cu yd	Same as Alternative 3	Same as Alternative 1

cu yd = cubic yards; ft = foot/feet; MLLW = mean lower low water; sq ft = square feet

1. Numbers of piles, all categories, are based on the preliminary design.

* In-water work season is July 16 to February 15.

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LIST OF ACRONYMS AND ABBREVIATIONS

°C	degrees Celsius
°F	degrees Fahrenheit
µg/kg	micrograms per kilogram
µg/m^3	micrograms per cubic meter
AAQS	ambient air quality standards
AIRFA	American Indian Religious Freedom Act
APE	Area of Potential Effect
AQI	air quality index
BMP	best management practice
BOD	biochemical oxygen demand
C4	TRIDENT I C4 missile
CAA	Clean Air Act
CCD	Coastal Consistency Determination
CDP	Census Designated Place
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CH_4	methane
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalent
COMNAVREGNWINST	Commander Navy Region Northwest Instruction
CSL	Cleanup Screening Level
cu yd	cubic yard
CWA	Clean Water Act
CZMA	Coastal Zone Management Act
CZMP	Coastal Zone Management Program
D5	TRIDENT II D5 missile
DAHP	Department of Archaeology and Historic Preservation
dB re 1µPa	decibels referenced at 1 micropascal
dB	decibel
dBA	A-weighted decibel
dbh	diameter at breast height
DDESB	Department of Defense Explosives Safety Board
DEIS	draft environmental impact statement
DO	dissolved oxygen
DoD	Department of Defense

LIST OF ACRONYMS AND ABBREVIATIONS (CONTINUED)

DPS	distinct population segment
dw	dry weight
EA	Environmental Assessment
EFH	Essential Fish Habitat
EHW	Explosives Handling Wharf
EIS	environmental impact statement
EISA	Energy Independence and Security Act
ELWS	extreme low water of spring tides
EO	Executive Order
EQ	Extraordinary Quality
ESA	Endangered Species Act
ESU	evolutionarily significant unit
FEIS	final environmental impact statement
FEMA	Federal Emergency Management Agency
FMC	Fishery Management Council
FMP	Fishery Management Plan
FR	Federal Register
ft	foot/feet
FY	fiscal year
g	gravitational acceleration
GHG	greenhouse gas
GIS	Geographic Information System
gpd	gallons per day
gpm	gallons per minute
GWP	global warming potential
HAP	hazardous air pollutants
HAPC	Habitat Areas of Particular Concern
HCCC	Hood Canal Coordinating Council
HCDOP	Hood Canal Dissolved Oxygen Program
HLUC	Historic Land Use Complexes
HPAH	high molecular weight polycyclic aromatic hydrocarbon
Hz	hertz
IHA	Incidental Harassment Authorization
IMPLAN	Impact Analysis for Planning
INRMP	Integrated Natural Resources Management Plan
JARPA	Joint Aquatic Resources Permit Application
KB	Keyport/Bangor
KCDNR	King County Department of Natural Resources

LIST OF ACRONYMS AND ABBREVIATIONS (CONTINUED)

kHz	kilohertz
km	kilometer
kVA	kilovolt-ampere
kW	kilowatt
LOA	Letter of Authorization
LOS	level of service
LPAH	low molecular weight polycyclic aromatic hydrocarbon
m	meter
MBTA	Migratory Bird Treaty Act
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
mgd	million gallons per day
MHHW	mean higher high water
MHWS	mean high water of spring tides
mi	mile
mL	milliliters
MLI	minority and low-income
MLLW	mean lower low water
mm	millimeter
MMPA	Marine Mammal Protection Act
mph	miles per hour
MPN	most probable number
MSA	Magnuson-Stevens Fishery Conservation and Management Act
MSF	Magnetic Silencing Facility
MSGP	Multi-Sector General Permit for Stormwater Discharges Associated with Industrial Activity
MSL	mean sea level
MTCA	Model Toxics Control Act
N_2O	nitrous oxide
NAAQS	National Ambient Air Quality Standards
NAGPRA	Native American Graves Protection and Repatriation Act
NAVFAC	Naval Facilities Engineering Command Northwest
Navy	U.S. Department of the Navy
NBK Bangor	Naval Base Kitsap Bangor
NCP	National Oil and Hazardous Substances Contingency Plan
ND	not detected
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service

LIST OF ACRONYMS AND ABBREVIATIONS (CONTINUED)

NO_2	nitrogen dioxide
NOA	Notice of Availability
NOAA	National Oceanic and Atmospheric Administration
NOC	Notice of Construction
NOI	Notice of Intent
NOSSA	Naval Ordnance Safety and Security Activity
NO_x	nitrous oxides
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
NRHP	National Register of Historic Places
NSWCCD	Navy Surface Warfare Center Carderock Division
NTU	Nephelometric Turbidity Units
O_3	ozone
OPNAVINST	Chief of Naval Operations Instruction
OU	operable unit
PAH	polycyclic aromatic hydrocarbon
PBDE	polybrominated diphenyl ether
PCB	polychlorinated biphenyl
PCE	Primary Constituent Element
PFC	properly functioning condition
PFMC	Pacific Fishery Management Council
PGA	peak ground acceleration
PM_{10}	particulate matter less than 10 microns in diameter
$PM_{2.5}$	particulate matter less than 2.5 microns in diameter
PNPTT	Point No Point Treaty Tribes
PNPTC	Point No Point Treaty Council
ppm	parts per million
ppt	parts per thousand
PSAMP	Puget Sound Ambient Monitoring Program
PSAT	Puget Sound Action Team
PSCAA	Puget Sound Clean Air Agency
PSD	prevention of significant deterioration
PSTRT	Puget Sound Technical Recovery Team
PSU	practical salinity unit
PTRCIT	Property of Traditional Religious and Cultural Importance to an Indian Tribe
PTS	permanent threshold shift
Qva	advanced outwash
Qvt	Vashon till

LIST OF ACRONYMS AND ABBREVIATIONS (CONTINUED)

RCW	Revised Code of Washington
RMS	root-mean-square
ROD	Record of Decision
ROI	Region of Influence
SAIC	Science Applications International Corporation
SARA	Superfund Amendments and Reauthorization Act
SECNAVINST	Secretary of the Navy Instruction
SEL	Sound Exposure Level
SEPA	State Environmental Policy Act
SHPO	State Historic Preservation Officer
SL	source level
SMA	Shoreline Management Act
SMP	Shoreline Management Plan
SMS	Sediment Management Standards
SO_2	sulfur dioxide
SOx	sulfur oxides
SPCC	Spill Prevention, Control, and Countermeasure
SPL	sound pressure level
sq ft	square feet
sq mi	square mile
SQS	sediment quality standards
SR	State Route
SSBN	OHIO Class Ballistic Missile submarines
SSP	Strategic Systems Programs
SUBASE	Naval Submarine Base
SWPPP	Stormwater Pollution Prevention Plan
TCP	Traditional Cultural Property
TL	transmission loss
TMDL	total maximum daily load
TOC	total organic carbon
TRIDENT	TRIDENT Fleet Ballistic Missile
T-ROC	Thorndyke Resources Operation Complex
TSS	total suspended solids
TTS	temporary threshold shift
U&A	Usual and Accustomed
U.S.	United States
UCNI	Department of Defense Unclassified Controlled Nuclear Information

LIST OF ACRONYMS AND ABBREVIATIONS (CONTINUED)

USACE	U.S. Army Corps of Engineers
USC	United States Code
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
VOC	volatile organic compound
W	Watts
WAC	Washington Administrative Code
WDFW	Washington Department of Fish and Wildlife
WDNR	Washington Department of Natural Resources
WDOE	Washington Department of Ecology
WDOH	Washington Department of Health
WSDOT	Washington State Department of Transportation
ZOI	zone of influence