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**MARINE MAMMAL OBSERVATION  
AND ACOUSTIC MONITORING PLAN  
FOR THE  
DEMOLITION/REPLACEMENT OF PIER 32 AND DEMOLITION OF  
PIER 10 AT NAVAL SUBMARINE BASE NEW LONDON  
GROTON, CONNECTICUT**

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Submitted to:

Office of Protected Resources, National Marine Fisheries Service,  
National Oceanographic and Atmospheric Administration

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Prepared for:

Naval Submarine Base New London

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## **Acronyms and Abbreviations**

AT	Acoustic Technician
dB	decibels
dB re 1 $\mu$ Pa	dB referenced to a pressure of 1 microPascal
FEAD	Facilities Engineering and Acquisition Department
FR	Federal Register
ft	foot/feet
GPS	Global Positioning System
LOA	Letter of Authorization
m	meter(s)
PSOs	Protected Species Observers
MMPA	Marine Mammal Protection Act
NAVFAC	Naval Facilities Engineering Command
NMFS	National Marine Fisheries Service
rms	root mean squared
SEL	sound exposure level
SEL <sub>ss</sub>	single strike sound exposure level
SPL	sound pressure level
SPL <sub>pk</sub>	peak sound pressure level
SPL <sub>rms</sub>	root-mean-square sound pressure level
SUBASE	Naval Submarine Base New London
ZOI(s)	zone(s) of influence

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## 1 INTRODUCTION

### 1.1 Purpose of the Marine Mammal and Acoustic Monitoring Plan

The purpose of this Marine Mammal and Acoustic Monitoring Plan (Plan) is to provide protocols for marine mammal and acoustic monitoring activities in accordance with the Letter of Authorization (LOA) issued on October 9, 2018, by the National Marine Fisheries Service (NMFS) for the incidental take of harbor seal (*Phoca vitulina*) and gray seal (*Halichoerus grypus*) (refer to Appendix A). Incidental take is expected as a result of the demolition of Pier 32 and Pier 10 and the construction of a new Pier 32 and Crane Test Area at Naval Submarine Base New London (SUBASE), Groton, Connecticut (Figure 1-1).

The project will also include the extraction of wood piles and steel fender piles from Piers 32 and 10 that will not require the use of vibratory extraction as piles will be pulled with a crane. Therefore, these activities do not have the potential to result in take by acoustic harassment, but will be subject to the same monitoring and precautionary shutdown measures that apply to all in-water construction and demolition that may pose a risk of non-acoustic injury to marine mammals. The project will also dredge the federal and Navy-maintained navigation channel, alongside the new Pier 32, and the footprints of existing Piers 32 and 10 after demolition. Dredging and dredge disposal activities do not have the potential to result in incidental take and do not require monitoring. There are also no known seal haul-out locations in the vicinity of the Project; therefore, airborne noise is not expected to result in incidental take and will not be monitored. These activities are not discussed further in this Plan.

The purpose of monitoring is threefold:

- 1) To minimize the potential for Level A (injury) harassment of marine mammals by implementing a shutdown of activities whenever a marine mammal is within a distance where Level A (injury) harassment could result from those activities;
- 2) To enumerate the numbers and species of marine mammals that occur within established Level A and Level B (behavioral disturbance) zones of influence (ZOIs), and to document any differences in species, numbers, or effects relative to Project-related in-water activities; and
- 3) To empirically measure sound source levels and Level B harassment distances under specific conditions defined in the LOA. If appropriate, and based on concurrence from NMFS, ZOIs and/or monitoring protocols may be adjusted.

The Plan is a requirement of the LOA issued under the Marine Mammal Protection Act (MMPA). Once approved by NMFS, the Plan cannot be modified without NMFS approval. The LOA and this corresponding Plan is valid for take incidental to the specified waterfront construction activities at SUBASE from March 1, 2020 through February 28, 2025.



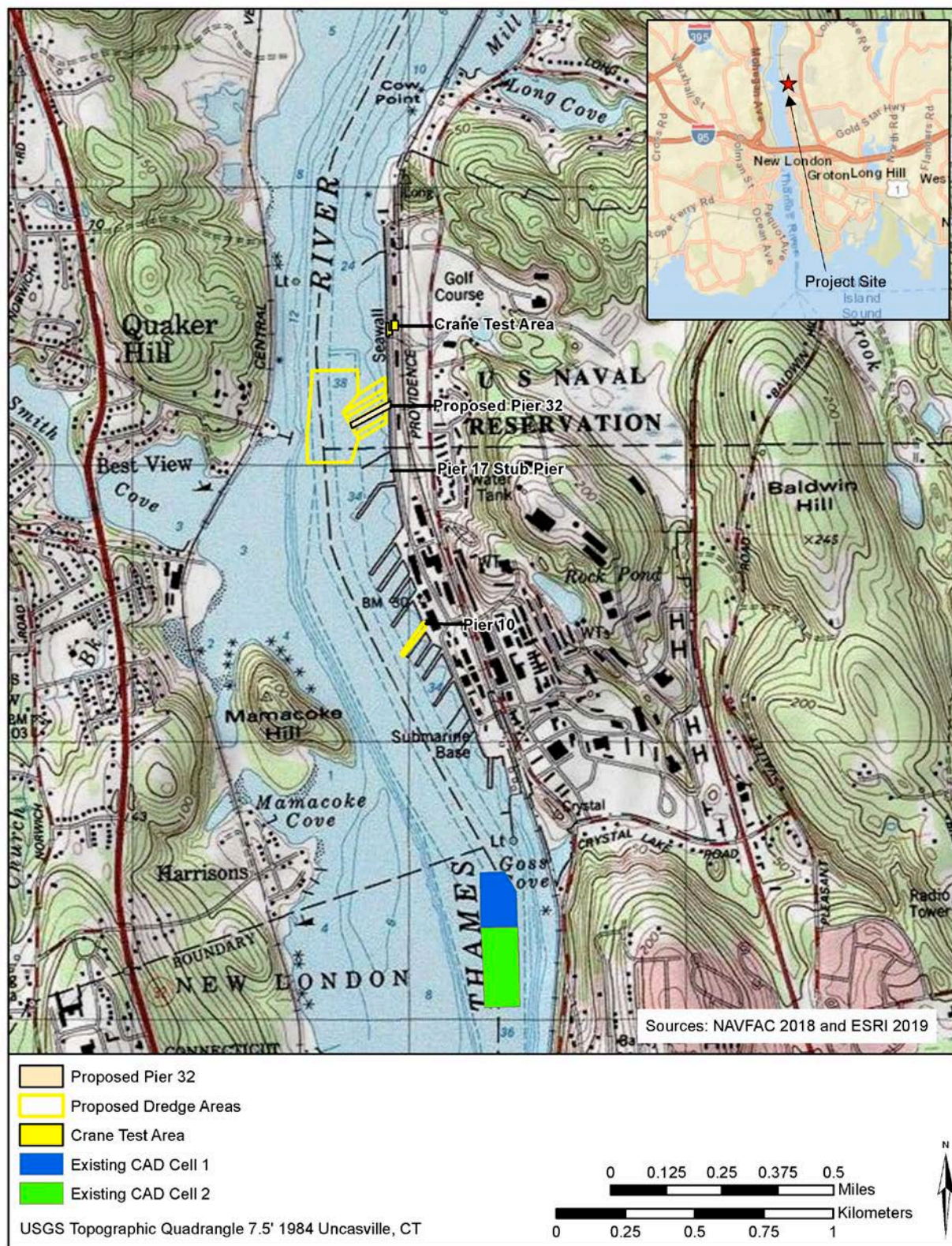


Figure 1-1. Proposed Activities at SUBASE New London



## **1.2 Summary of Activities to be Monitored**

All relevant in-water construction and demolition activities that have the potential to result in Level A or Level B harassment of marine mammals, including installation of piles via vibratory and impact pile driving, as well as rock drilling/socketing, and removal of piles via vibratory hammers, will be monitored.

In-water construction and demolition activities under the LOA must comply with the following General Conditions of the LOA:

- 1) The LOA permit (Appendix A) must be in the possession of the Navy, its designees, and work crew personnel operating under the authority of the LOA.
- 2) Only incidental take of marine mammals by Level A and Level B harassment, as specified in the LOA (Appendix A), is authorized.
- 3) Taking of these species that exceeds the numbers and/or intensity indicated in the LOA, or any taking of other species of marine mammal is prohibited and may result in modification, suspension, or revocation of the LOA.

In-water activities expected to result in incidental takes of marine mammals would occur during approximately 35 non-consecutive months of the project beginning in March 2020 and concluding in February 2025. The estimated duration of vibratory or impact hammer pile installation/extraction and drilling activities is provided in Table 1-1 and in Section 2.2 of the LOA Application for each year of construction and demolition. The durations of proposed pile driving/extraction and drilling activities are primarily derived from information provided by the Naval Facilities Engineering Command (NAVFAC) Mid-Atlantic Public Works Department, Facilities Engineering and Acquisition Department (FEAD) Design Manager and the record of pile driving activities documented during the construction of SUBASE Pier 31 (American Bridge 2010-2011).

Detailed analysis of ZOI and estimated numbers of species takes are contained in the NMFS Final Rule published in the *Federal Register* (83 FR 36773) and the Navy's Request for LOA. The number of takes are discussed in Section 1.3.

## **1.3 Mitigation Measures**

The following mitigation measures, as specified in the NMFS LOA, shall be implemented during pile driving/extraction and drilling activities to minimize marine mammal exposure to Level A injurious noise levels generated and to reduce to the lowest extent practicable exposure to Level B noise levels.

- 1) Time Restriction: In-water construction and demolition work will occur only during daylight hours.
- 2) Establishment of Monitoring and Shutdown Zones:
  - For all relevant in-water construction and demolition activity, designate a Level A acoustic harassment monitoring zone, a Level B behavioral harassment monitoring zone, and physical injury shutdown zone, with radial distances as identified in **Table 1-1**.

- During all in-water construction and demolition activities, a 10-meter (m) (33-foot [ft]) physical shutdown zone around each active pile will be implemented to protect animals from physical injury. For some sound-generating activities, the potential for Level A harassment by acoustic injury is less than 10 m (33 ft) from the source (Table 1-1). For these activities, the 10-m (33-ft) physical injury shutdown zone automatically reduces the potential for Level A acoustic harassment. The maximum distances for Level A and Level B harassment for harbor seals and gray seals from project-related activities are provided in **Table 1-1** (note that the maximum distance may be reached in only one direction, depending on the shape of the ZOI and intersecting landmasses) (refer to Section 2).
  - Pile driving shall only take place when the 10-m (33-ft) physical injury shutdown and Level A acoustic harassment zones are visible and can be adequately monitored. If conditions (e.g., fog) prevent the visual detection of marine mammals, activities with the potential to result in Level A harassment shall not be initiated. If such conditions arise after the activity has begun, pile driving or pile removal activities must be halted if the 10-m shutdown zone is not visible.
- 3) Shutdown Measures (see Section 3 for detailed monitoring protocols for pre-, during, and post-pile driving/extraction/drilling):
- Three protected species observers (PSOs) will be deployed to monitor for seals. One PSO must be located on land and two must be located in a boat to monitor the farther locations. For those monitoring areas that are large, the vessel-based observers will move north and south (back and forth) to capture all areas during in-water pile driving/extraction and drilling activities.
  - Monitoring must take place from 15 minutes prior to initiation of pile driving or removal activity through 30 minutes post-completion of pile driving or removal activity. Pile driving or removal may commence when observers have declared the shutdown zone clear of marine mammals prior to initiation of pile installation or removal. In the event of a delay or shutdown of activity resulting from marine mammals in the shutdown zone, animals must be allowed to remain in the shutdown zone (i.e., must leave of their own volition) and their behavior must be monitored and documented. Monitoring must occur throughout the time required to drive or remove a pile. A determination that the shutdown zone is clear must be made during a period of good visibility (i.e., the entire shutdown zone and surrounding waters must be visible to the naked eye).
  - If a marine mammal approaches or enters the shutdown zone, or if a marine mammal other than harbor seal or gray seal enters the Level B harassment zone, or if the take of a marine mammal species or stock has reached the limits specified in **Table 1-2** and enters the Level B harassment zone, all pile driving or removal activities at that location must be halted. If none of the take numbers have been exceeded, pile driving or removal may commence or resume when either the animal has voluntarily left the shutdown zone, and been visually confirmed beyond the shutdown zone, or 15 minutes have passed without re-detection of the animal.

- 4) Soft Start (impact pile driving only):
  - An initial set of three strikes from the impact hammer at a reduced energy level (40 percent of full power), separated by a 1-minute waiting period, then two subsequent three strike sets will be implemented. Pile driving may commence at full power on the fourth strike.
  - Soft start is required for any impact pile driving, including at the beginning of the day, and at any time following cessation of impact pile driving of 30 minutes or longer.

**Table 1-1. Level A and Level B Harassment and Shutdown Distances for Harbor Seal and Gray Seal during Pile Installation and Removal Activities**

<i>Construction Year</i>	<i>Activity Description</i>	<i>Level B Harassment Distance (m)</i>	<i>Level A Harassment Distance (m)</i>	<i>Physical Injury Avoidance Shutdown Distance (m)</i>
<b>1</b>	New Pier 32: Impact driving 14-inch steel H-pile (work trestle if used) at 1,000 strikes/pile, 4 piles/day	631	536	10*
	New Pier 32: Vibratory & rock drilling/socketing installation of 36-inch concrete-filled steel piles; average of 10 minutes/day	4,642**	10*	10*
	New Pier 32: Impact driving 36-inch concrete-filled steel piles; 1,000 strikes/pile; average 2.5 piles/day	3,415	984	10*
<b>2</b>	New Pier 32: Vibratory installation of 36-inch concrete-filled steel piles; average 6 minutes/day	4,642**	10*	10*
	New Pier 32: Impact pile driving 36-inch concrete-filled steel piles; 1,000 strikes/pile; average 2.5 piles/day	3,415	984	10*
<b>3</b>	New Pier 32: Vibratory installation of 16-inch fiberglass plastic piles; 40 minutes/day	1,584	10*	10*
	New Pier 32: Impact installation of 16-inch fiberglass plastic piles; 1,000 strikes/pile; average 2.5 piles/day	10*	10*	10*
<b>4</b>	Existing Pier 32: Vibratory removal of 14-inch steel H-piles (work trestle, if used); average 100 minutes/day	3,415	10*	10*
	Existing Pier 32: Vibratory removal of 24-inch concrete-filled steel piles; average 190 minutes/day	4,642**	10*	10*
	Existing Pier 32: Vibratory removal of 30-inch concrete-filled steel piles ; average 40 minutes/day	4,642**	10*	10*
	Existing Pier 10: Vibratory removal of 33-inch concrete-filled steel piles; average 40 minutes/day	4,642**	10*	10*

Source: NMFS 2019.

\* The Level A ZOI is < 10 m, but the 10-m shutdown zone will be used to reduce the potential for physical interaction with project-related equipment.

\*\* This is a maximum distance calculated assuming practical spreading loss and unimpeded sound transmission. However, as described in the Navy's Request for LOA and NMFS Final Rule, the dense structures and natural projections along the shore would interfere with sound transmission at various points, resulting in the narrowing of ZOIs for these activities and preventing the maximum distance from being reached. As a result, the monitored distances will be somewhat shorter and will be confined to the ZOIs as mapped (refer to figures in Section 2).

**Table 1-2. Authorized Numbers of Takes**

<i>Year</i>	<i>Species</i>	<i>Level A Harassment</i>	<i>Level B Harassment</i>	<i>Total Authorized Take</i>
1	Harbor seal	6	166	172
	Gray seal	2	55	57
2	Harbor seal	6	177	183
	Gray seal	2	59	61
3	Harbor seal	0	51	51
	Gray seal	0	17	17
4	Harbor seal	0	110	110
	Gray seal	0	37	37

**Note:** If the number of takes (either Level A or Level B) may be exceeded in any year, NMFS must be notified as early as possible of a potential need to modify the authorized takes.

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## **2 MONITORING ZONES**

### **2.1 Level A and Level B Harassment Monitoring and Shutdown Zones**

Level A and Level B harassment monitoring zones are shown in Figures 2-1 through 2-6. These zones are based on maximum potential distances as shown in **Table 1-1**, taking into account the natural and manmade barriers to sound transmission along the shoreline of the Thames River. The Monitoring and Shutdown Zones will be established for each year of in-water construction/demolition. While Level A and B harassment is authorized under the LOA, these actions serve to protect seals in the project area, provide for practical implementation of the Plan, allow maintenance of construction and demolition schedules, and reduce the risk of a take.

### **2.2 Observer Monitoring Locations**

In order to effectively monitor the Level A and Level B Harassment Zones, PSOs will be positioned at the best practicable vantage points, taking into consideration security, safety, and space limitations. At least three PSOs will be required, consisting of two vessel-based monitors and one land-based monitor (Figures 2-1 through 2-6). Two in-water PSO vessel stations are identified on the figures to show the monitoring extent north and south of in-water construction. Only one vessel with two observers will be used, and this vessel will continuously move north and south to capture the monitoring area during pile installation and removal activities.



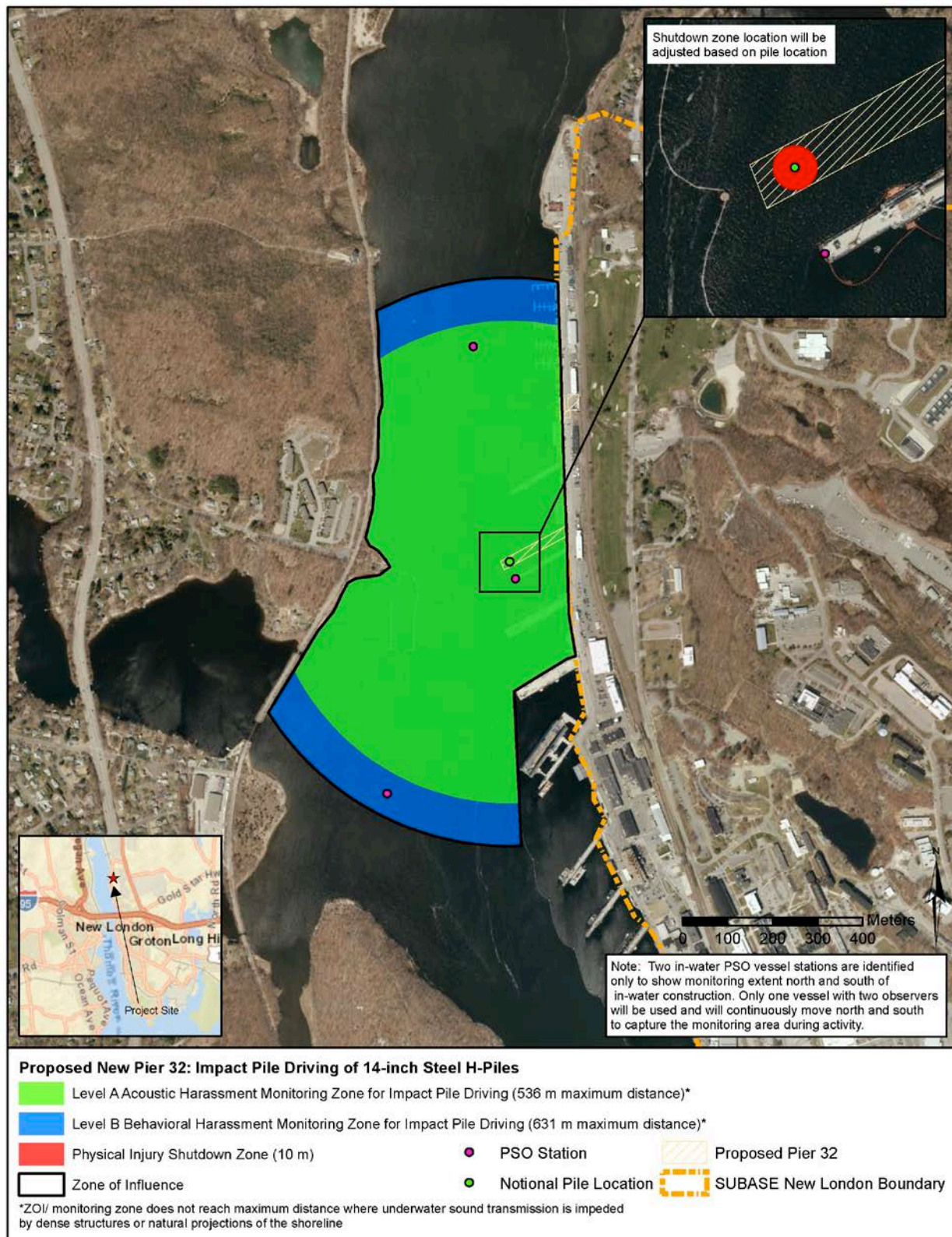


Figure 2-1. Monitoring and Shutdown Zones for Proposed New Pier 32: Impact Pile Driving of 14-inch Steel H-Piles (Work Trestle)





Figure 2-2. Monitoring and Shutdown Zones for Proposed New Pier 32: Vibratory/Rock Drilling/Socketing Pile Driving of 36-inch Concrete-filled Steel Piles



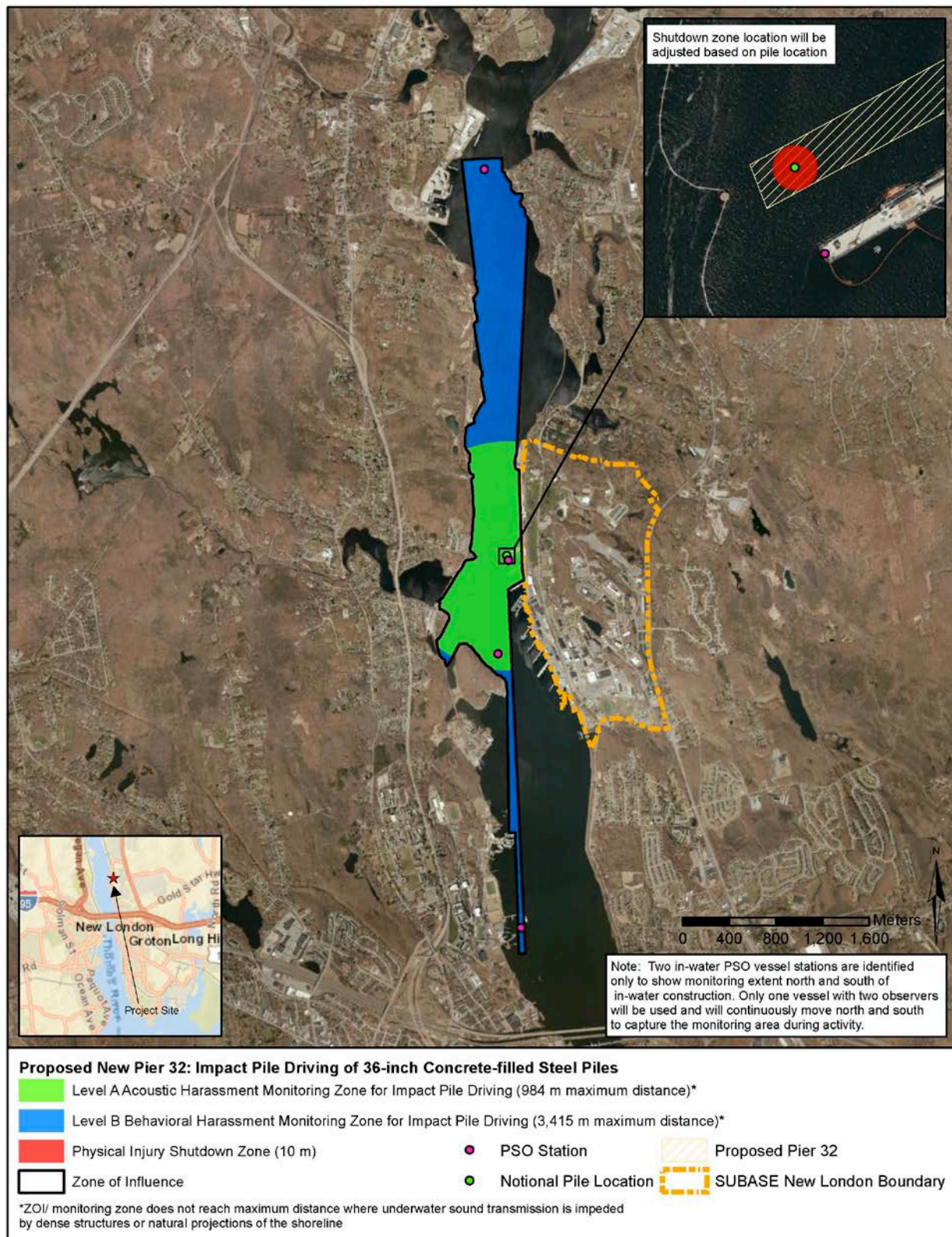


Figure 2-3. Monitoring and Shutdown Zones for Proposed New Pier 32: Impact Pile Driving of 36-inch Concrete-filled Steel Piles



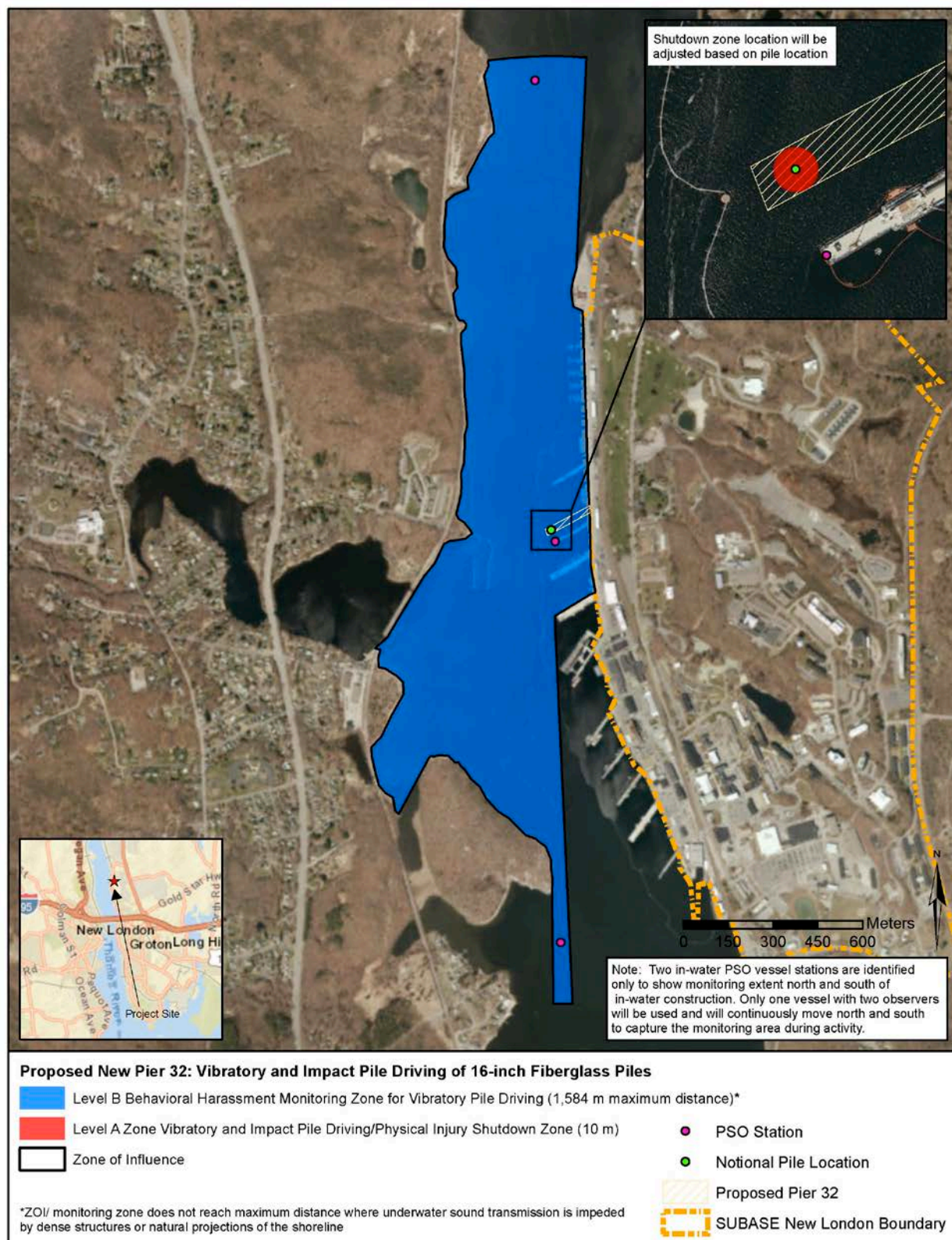


Figure 2-4. Monitoring and Shutdown Zones for Proposed New Pier 32: Vibratory and Impact Pile Driving of 16-inch Fiberglass Piles



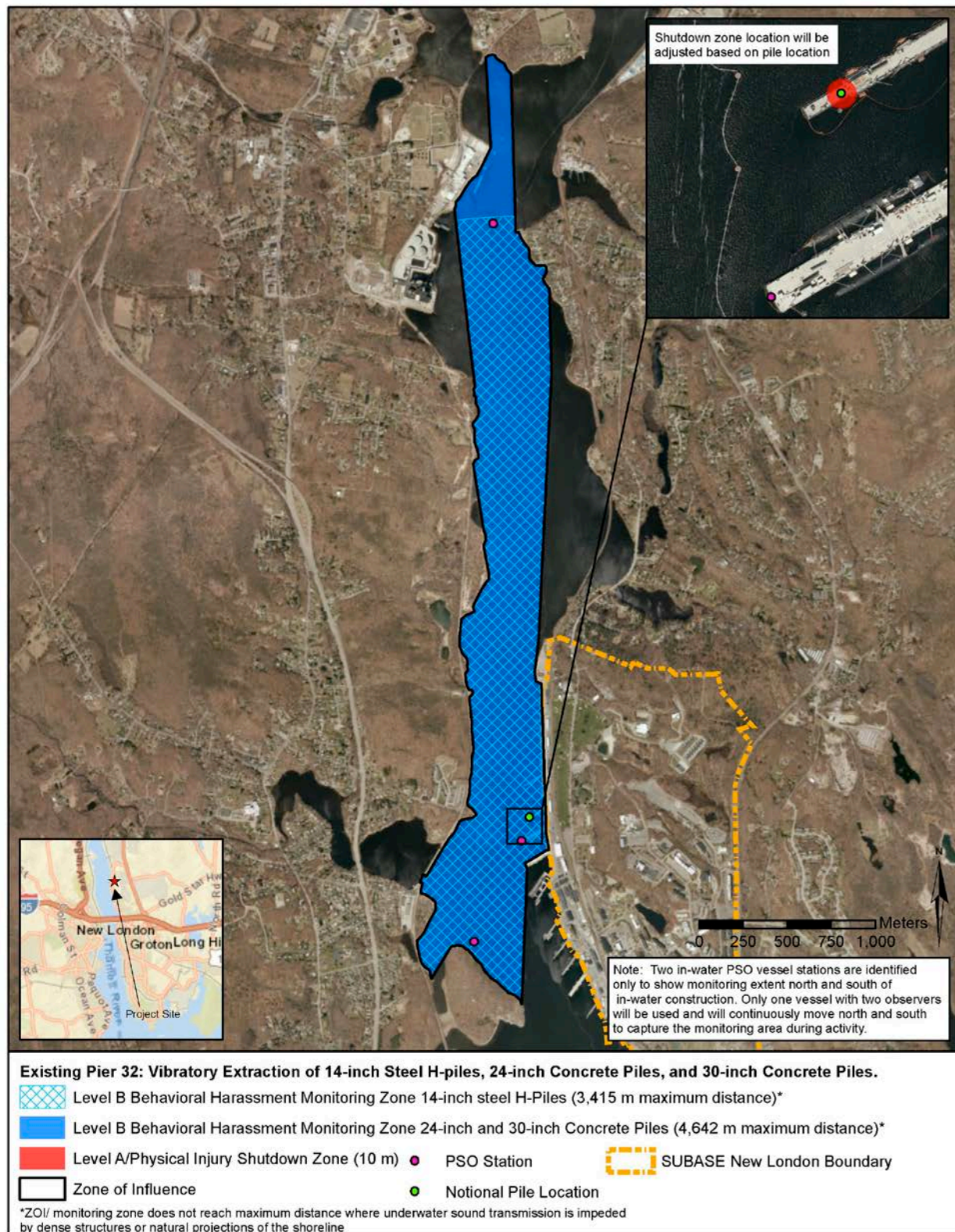


Figure 2-5. Monitoring and Shutdown Zones for Existing Pier 32: Vibratory Extraction of 14-inch Steel H-piles and 24-inch and 30-inch Concrete Piles



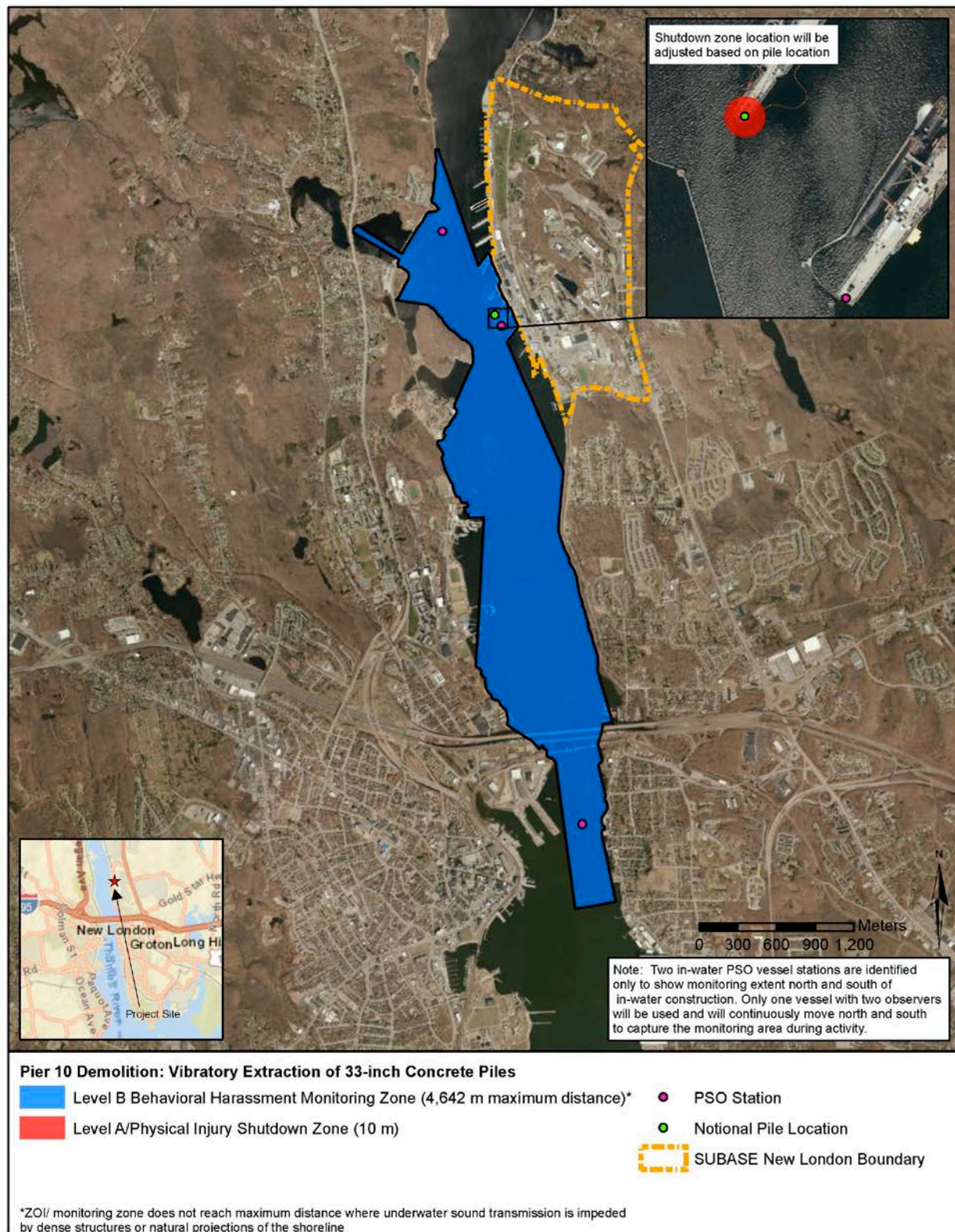


Figure 2-6. Monitoring and Shutdown Zones for Existing Pier 10: Vibratory Extraction of 33-inch Concrete Piles

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### **3 VISUAL MONITORING PROTOCOLS**

The visual monitoring component of this Plan takes into consideration the logistical, environmental, and security requirements for working in the project area. During construction and demolition activities, distances to regulatory thresholds (Appendix A) were based on the latest acoustic threshold guidance for the Level A ZOIs (initially published in 2016 [NMFS 2016] and updated in 2018 [NMFS 2018]). The distances to the ZOI boundaries were used to determine monitoring locations for the construction and demolition activities identified in this Plan.

This project is in the design and permitting phase, and a contractor has not been selected to complete work on the project. The equipment used to remove and install pier piles would be determined by the contractor who is awarded the project. Instead of specifying the type of hammer and exact mitigation measures, the Navy will ensure that in-water noise-producing activities will cease when a marine mammal enters the ZOI where prolonged exposure would lead to Level A acoustic harassment.

The contractor is responsible for implementing all of the mitigation measures listed in Section 1.3, whereas onsite Navy representatives will monitor the contractor's performance and require corrective action or stop work if necessary to ensure the requirements are met.

#### **3.1 Visual Observer Qualifications**

The PSOs may either be biologists with prior training and experience to meet the qualifications in conducting marine mammal monitoring, professional PSOs with certification (i.e., Protected Species Observer) or recognized membership in a professional organization (i.e., Marine Mammal Observer Association), and may also substitute education (undergraduate degree in biological science or related field) or training for experience.

Any of these qualifications will require that the PSOs be independent observers (i.e., not construction personnel) who are trained biologists and have the ability to correctly identify the marine mammal species and accurately describe the relevant species-specific behaviors that may occur in proximity to in-water construction activities.

Additional qualifications and protocols of PSOs include the following:

- Will have the ability to conduct field observations and collect data according to the assigned protocol.
- Where a team of three or more observers are required, one observer will be designated as lead observer or monitoring coordinator and the lead observer will have had prior experience working as an observer.
- All credentials for assigned PSOs will be submitted to the Navy and NMFS in advance for approval.
- All PSOs working in the project area will watch the Navy's Marine Species Awareness Training video in advance of the start of the project.

- Will have experience or training in the field identification of marine mammals, including the identification of behaviors.
- Will have 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.
- Will have sufficient training, orientation, or experience with the construction operation to provide for personal safety during observations.
- Will have 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.
- 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.

### **3.2 Visual Monitoring Equipment**

Based on the requirements identified in the LOA (Appendix A), at least two PSOs shall be stationed on one survey boat, and one PSO will be stationed at a land-based observation location.

#### **3.2.1 Survey Vessels**

The vessel will include the following equipment for the safety of the crew:

- A fixed marine radio for the vessel operator to monitor channels independent of observers communicating on a dedicated channel;
- A depth finder;
- Navigational plotting equipment; and
- Both fixed and handheld Global Positioning System (GPS) units.

The vessel will comply with all Coast Guard regulations and be able to pass a Coast Guard safety inspection.

#### **3.2.2 Equipment**

The following equipment will be required to conduct visual monitoring:

- Laser rangefinders used to measure distances to known objects as reference points for distances to marine mammals observed in the water;
- Portable marine radios for the observers to communicate with the monitoring coordinator, construction contractor, and other observers;
- Hearing protection for all personnel and boat operators near the source. Depending on observer location relative to the source, and the subsequent airborne source levels, a noise-reducing headset with capabilities to connect to a radio may be used;

- Cellular phones (one per boat/observing location), and the contact information for the other observers, and monitoring coordinator;
- Flags (one green, one red per boat/observing location) as backup for radio communication;
- Nautical charts;
- Daily tide tables for the project area within the Thames River;
- Watch or Chronometer;
- High magnification (25X), as well as standard handheld (7X) binoculars;
- Monitoring Plan, LOA, and/or other relevant permit requirement specifications in sealed transparent plastic cover;
- Tablets with software for data collection;
- Notebook with hard copy standardized monitoring Marine Mammal Observation Record forms on waterproof paper (e.g., Rite-in-the Rain);
- Marine mammal identification guides on waterproof paper;
- Clipboard; and
- Pen/Pencil.

### **3.3 Visual Monitoring Methods**

The Navy will conduct briefings between construction supervisors and crews and the PSO team prior to the start of all pile driving/extraction and drilling activities, and when new personnel join the work. These briefings will explain responsibilities, communication procedures, visual monitoring protocols, and operational procedures. All personnel working in the project area will have watched the Navy's Marine Species Awareness Training video.

The PSOs will collect marine mammal sightings data, including behaviors, for the pre-, during, and post-pile driving period. All observations will be logged, regardless of proximity to the Level A or Level B ZOLs, to eliminate potential for bias. An assessment of take will occur only if the animal or group enters the ZOLs during project-related activities that may generate noise levels that exceed the values identified in the Request for LOA (Navy 2018). The efficacy of visual detection depends on several factors including the PSOs ability to detect the animal, the environmental conditions (visibility and sea state), and monitoring platforms. Pre-, during, and post-pile driving/extraction/drilling visual survey protocols are described below.

#### **3.3.1 Visual Survey Protocols**

##### **3.3.1.1 Pre-Activity Monitoring**

The following survey protocols will be implemented prior to the start of pile driving/extracting/drilling:

- For each of the three main activities (construction of new Pier 32, demolition of existing Pier 32, and demolition of Pier 10), PSOs will be placed at the best vantage point(s) practicable (e.g., from a small boat, construction barges, on shore, elevated perch, or any other suitable location).

- The PSOs shall be separated and spread out, looking in opposite directions across the ZOIs.
- Visual surveys of the Level A and Level B Harassment Zones will occur for at least 15 minutes prior to the start of construction.
- The shutdown zone will also be monitored for 15 minutes prior to in-water construction/demolition activities. If a marine mammal is present within 10 m (33 ft) of the shutdown zone, the activity will be delayed until the animal(s) voluntarily leave the shutdown zone. Activity will resume only after the PSO has determined that the animal(s) has moved outside of the shutdown zone. If the animal(s) is observed inside of the shutdown zone, but has not been visually tracked to leave the zone, then the zone will not be cleared until 15 minutes has passed from the last observation of the animal inside the zone. If a marine mammal is observed approaching the shutdown zone, the PSO who sighted that animal will notify all other PSOs of its presence.
- If marine mammal(s) are not detected within the Level A Acoustic Harassment and Shutdown Zones (i.e., the zones are deemed clear of marine mammals), the PSOs will inform the monitoring coordinator/construction contractor that pile driving can begin.
- If marine mammals are present within the Level B Behavioral Harassment Monitoring Zone, pile driving will not need to be delayed, but PSOs will monitor and document, to the extent practical, the behavior of marine mammals that remain in the zone.

#### 3.3.1.2 During Activity Monitoring

The Monitoring and Shutdown Zones will be monitored throughout pile driving. The Level A Acoustic Monitoring Zone for impact pile driving was calculated based on acoustic modeling at a notional pile location. Distances and activity monitoring protocols for these zones are described below:

- The maximum extent of the potential Acoustic Harassment ZOI (Level A Acoustic Harassment Zone) for impact pile driving of 36-inch steel piles is 984 m (3,228 ft) from the source, whereas the maximum extent for impact driving of 14-inch steel H-piles is 536 m (1,758 ft) (**Table 1-1**).
- The 10-m (33-ft) standoff distance would be monitored by a single PSO during all in-water pile installation/extraction and drilling activities as previously described. This distance accounts for in-water heavy machinery work (e.g., standard barges, tug boats) other than pile driving. The activities would be halted if a seal were to approach within this distance. This measure allows for a physical buffer zone between protected marine mammals and construction equipment. The construction PSO will verify required monitoring distance using a GPS device and 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.
- The Level A zones for vibratory and rock drilling/socketing of 36-inch piles, vibratory and impact install of 16-inch fiberglass plastic piles, and vibratory removal of 14-inch and 24-

inch piles will all result in a zone smaller than the 10-m shutdown zone and so the 10-m shutdown zone for those activities will be sufficient to minimize Level A take.

- The Level B Behavioral Harassment Zone shall be monitored during all impact and vibratory pile driving, vibratory pile removal, and rock drilling/socketing.
- On two consecutive days not more than one week prior to the initiation of the demolition or construction activity, and on the first two consecutive days of in-water demolition or construction, two PSOs trained as described above will systematically survey the entirety of the maximum Level B ZOI from a small boat captained by an individual who is not one of the PSOs. Each survey will continue throughout the daylight hours to maximize the possibility of detecting resting or transient animals and of differentiating multiple sightings of the same individual from the occurrence of multiple individuals.
- Shutdown shall occur if a species, for which authorization has not been granted or for which the authorized numbers of takes have been met, approaches or is observed within the Level B Behavioral Harassment Zone. The PSO shall notify the Navy, who will then contact NMFS immediately.
- If a marine mammal is observed entering the Level B Behavioral Harassment Zone (see **Table 1-1** and Figures 2-1 through 2-6), the pile segment being worked on will be completed without cessation, unless the animal enters or approaches the shutdown zone. Regardless of location within the Level B Behavioral Harassment Zone, an initial behavior and the location of the animal(s) will be logged. Behaviors will be continually logged until the animal is either passed off to another PSO, the animal is no longer visible, or it has left the Level B Behavioral Harassment Zone.
- If a marine mammal approaches, or appears to be approaching, the Level A Acoustic Harassment Zone, the Level B Behavioral Harassment PSO who first observed the animal will alert the Shutdown PSO to its presence. The Shutdown PSO will then notify the construction crew of the animal's current status, but all project-related activities will be allowed to continue.
- If the marine mammal enters the shutdown zone, pile driving will cease until the animal(s) voluntarily leave the zone. As the animal enters the shutdown zone, all pile operations will be stopped and the animal(s) will be continually tracked. Once a shutdown has been initiated, pile driving will be delayed until the animal has voluntarily left the shutdown zone and has been visually confirmed beyond the shutdown zone, or 15 minutes have passed without re-detection of the animal (i.e., the zone is deemed clear of marine mammals). The monitoring coordinator will inform the construction contractor that activities can re-commence.
- If shutdown and/or clearance procedures would result in an imminent concern for human safety, then the Navy point of contact prior to re-initiation of project-related activities will be notified.
- The number, species, and locations of all marine mammals seen will be documented using NMFS-approved sighting forms (Appendix B). The results of these monitoring efforts will be used to estimate the average number of individuals occurring per day in

the ZOI during the activity, which will be multiplied by the number of days of in-water sound-generating activities to estimate the total number of harassment takes.

#### 3.3.1.3 Post-Activity Monitoring

Monitoring of all zones will continue for 30 minutes following completion of pile driving/extraction and drilling activities. These surveys will record all marine mammal observations and will focus on observing and reporting unusual or abnormal behaviors. During this monitoring period, if an injured, sick, or dead marine mammal is observed, procedures outlined in Section 5 will be followed.

### 3.4 Data Collection

The following information shall be recorded on all NMFS-approved sighting forms (Appendix B) used by PSOs:

- Date and time that pile driving/extracting or drilling begins or ends.
- Construction activities occurring during each observation period.
- Other human activity in the area.
- Weather parameters (e.g., wind, temperature, percent cloud cover, and visibility).
- Tide and sea state.

If a marine mammal 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 (to estimate number of potential incidental takes).
- Behavior patterns observed, including bearing and direction of travel.
- Location of the PSO, and distance from the animal(s) to the observer.

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

## **4 ACOUSTIC MONITORING PLAN**

This section comprises the hydroacoustic monitoring plan for the SUBASE Pier 32 Demolition/Replacement and Pier 10 Demolition project. In order to protect marine mammals, specifically harbor and gray seals (the only marine mammals expected to occur), the NMFS has stipulated in the LOA for incidental take (Appendix A), that passive acoustic monitoring be conducted for specified noise sources to identify the levels of underwater sound produced by these types of activities and evaluate the range of sound propagation into the surrounding water. Depending on the results and concurrence from NMFS, this information may be used to adjust the ZOI for the specified activities.

### **4.1 Objectives**

The purpose of acoustic monitoring is to empirically verify Level A and Level B ZOIs for specific underwater sound-generating activities by using *in-situ* acoustic data collection on sound source levels, number of pile strikes, and duration of activity; received levels at a range of distances, from which actual rates of transmission loss can be determined; and determining the distances at which the applicable NMFS Level A and Level B thresholds for seals are reached.

### **4.2 Acoustic Measurement Equipment**

Sound data acquisition during pile installation and/or removal will utilize a combination of equipment, including dedicated acoustic survey vessels and specific acoustic data logging equipment. The equipment will be deployed to verify source levels at 10 m (33 ft) and received sound pressure levels across a range of distances (10 m to 500 m) as required by the LOA (Appendix A).

#### **4.2.1 Survey Vessels**

To reduce the potential for conflicting monitoring locations between the visual and acoustic monitors, a dedicated vessel will be used to record acoustic data. This vessel will be free to move to any location needed to record acoustic data and will not interfere with the visual monitoring. To eliminate the potential for bias, the acoustic monitor will not relay any real-time noise levels to the visual monitoring crew.

All vessels will include the following equipment for the safety of the crew:

- A fixed marine radio for the vessel operator to monitor channels independent of observers communicating on a dedicated channel;
- A depth finder;
- Navigational plotting equipment; and
- Both fixed and handheld GPS units.

Vessels will comply with all Coast Guard regulations and be able to pass a Coast Guard safety inspection.



#### 4.2.2 Monitoring Equipment

Examples of acoustic data collection equipment is listed in **Table 4-1**. The Hydro DB real-time Underwater Sound Level Meter (USLM) would be deployed as the primary acoustic monitoring device. DSG-ST Ocean (Loggerhead®) acoustic data loggers may be used as a backup device for hydroacoustic measurements, but data would not be analyzed, unless specifically needed to validate the USLM measurements. The acoustic monitoring equipment will be deployed by Acoustic Technicians (ATs) at the appropriate locations prior to construction activities.

**Table 4-1. Acoustic Monitoring Equipment.**

<i>Item</i>	<i>Make</i>	<i>Model</i>
DSG-Ocean acoustic data logger	Loggerhead	DSG-Ocean
<i>Hydrophone (Loggerhead® DSG-Ocean)</i>	HTI	96-min
Hydro DB USLM	Hydro DB	Custom
<i>Hydrophone (Hydro DB USLM)</i>	HTI	96-min
Sound Level Meter	Larson Davis (LD)	831
<i>Microphone (LD SLM)</i>	PCB	377B02
<i>Preamplifier for microphone (LD SLM)</i>	PCB	PRM 831
Pistonphone, Hi Pressure	ETMC Technologies	42AC

The ATs will conduct real-time monitoring of in-water activities to determine peak and root mean square (rms) sound pressure (SPL) values measured in decibels (dB) referenced to a pressure of 1 microPascal (re 1 $\mu$ Pa), as well as sound exposure level (SEL) re 1 $\mu$ Pa<sup>2</sup>. The USLM will be used to document rms SPLs at both source and far-field locations for impact and vibratory pile driving/drilling events, as well as during demolition activities. When necessary, the USLM will be used to validate the SPL thresholds at the initiation of pile production.

All hydrophones and recording systems will be checked prior to deployment each day to ensure proper operation. All sensors, signal conditioning equipment, and sampling equipment will be calibrated prior to each use to National Institute of Standards and Technology standards. The hydrophone at the source (10 m [33 ft]) will be deployed on a static line from the contractor's pile driving equipment barge to roughly half the water depth, as measured with a weighted tape measure. Far-field monitoring locations will be deployed from a dedicated survey vessel and water depths will be measured with a weighted tape measure or vessel-based depth finder.

#### 4.3 Acoustic Monitoring Methods

The hydrophone will be deployed so as to maximize its distance from flat surfaces or structures that may produce excessive reflections. The hydrophone's location will be marked with a buoy indicating its location to boat operators within the work area. The sediment type at each location will be determined and recorded. If possible, measurements will be made at 10 m (33 ft) from the pile being driven or at a distance of three (3) times the water depth. All underwater sound monitoring systems will deploy hydrophones at mid-water depth. Hydrophone locations close to the pile (less than approximately 300 m [984 ft]) will be checked with a laser rangefinder. At locations farther from the pile being driven (greater than approximately 300 m [948 ft]), acoustic ranges will be computed from the GPS coordinates of the pile and the hydrophone location at the time of the measurement. Pistonphone calibration will be performed at least once per week to maintain consistent measurements.

#### **4.3.1 Sound Source Verification**

- 1) Conduct pile driving sound source verification for the following types and sizes of piles. Sound source measurements of these piles must be conducted at distances approximately 10 m (33 ft) from the source.
  - a) Vibratory and impact installation of at least five (5) 16-inch fiberglass reinforced plastic piles, and
  - b) Rock drilling/socketing of at least three (3) 30-inch and three (3) 16-inch plastic piles.
- 2) For vibratory pile driving/removal source level measurements, reports will include 1-s SEL, source spectrum, duration of recordings used to derive the SEL, and 24-hour cumulative SEL extrapolated from measurements.
- 3) For impact pile driving source level measurements, reports will include peak sound pressure level ( $SPL_{pk}$ ), root mean square SPL ( $SPL_{rms}$ ), calculated single strike SEL ( $SEL_{ss}$ ), integration time for  $SPL_{rms}$ ,  $SEL_{ss}$  spectrum, and 24-hour cumulative SEL extrapolated from measurements.

#### **4.3.2 Level B Harassment Distance Verification**

- 1) Empirically determine the Level B harassment distance by extrapolating from *in-situ* measurements of received SPLs at several points between 10 m and 500 m (33 and 1,640 ft) from the source. It is recommended that measurements be taken at 10 m, 50 m, 250 m, and 500 m from the source, and that the best fit regression equation be used to estimate the Level B harassment distance. Alternatively, the Level B harassment distance can be determined by direct measurements to locate the distance where the received levels reach 120 dB or below, or at the ambient noise level.
- 2) Level B behavioral harassment zones to be empirically verified include:
  - a) Rock drilling/socketing of at least three (3) 30-inch and three (3) 16-inch piles,
  - b) Vibratory installation of at least three (3) 36-inch steel piles, and
  - c) Vibratory removal of at least three (3) 24-inch concrete and three (3) 33-inch concrete piles.
- 3) For extent of Level B harassment distance verification, report the extrapolated distances where the received levels  $SPL_{rms}$  would decay to 120 dB or to the ambient noise level (if such data are available), whichever is higher, as well as integration time for such  $SPL_{rms}$ .

The sound levels reported will be in median and linear average (i.e., taking averages of sound intensity before converting to dB).

The passive acoustic monitoring reports will also include sediment type where measurements are made.

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## **5 INTERAGENCY NOTIFICATION FOR INJURED OR DEAD MARINE MAMMALS**

In the unanticipated event that the construction or demolition activities clearly cause the take of a marine mammal in a prohibited manner, such as an injury, serious injury, or mortality, the PSOs will notify the Construction Manager and the Navy, who will immediately cease all operations and immediately report the incident to NMFS Office of Protected Resources at 301- 427-8401, and the Greater Atlantic Region Stranding Coordinators at 866-755-6622. The report will include the following information:

- Time, date, and location (latitude/longitude) of the incident;
- Description of the incident;
- Status of all sound source use in the 24 hours preceding the incident;
- Environmental conditions (i.e., wind speed and direction, sea state, cloud cover, visibility, and water depth);
- Description of marine mammal observations in the 24 hours preceding the incident;
- Species identification or descriptions of the animal(s) involved;
- The fate of the animal(s); and
- Photographs or video footage of the animal (if equipment is available).

Activities will not resume until NMFS is able to review the circumstances of the prohibited take. NMFS shall work with the Navy to determine what is necessary to minimize the likelihood of further prohibited take and ensure MMPA compliance. The Navy will not resume activities until notified by NMFS via letter, email, or telephone.

In the event that an injured or dead marine mammal is discovered, and the lead PSO determines that the cause of the injury or death is unknown and the death is relatively recent (i.e., in less than a moderate state of decomposition as described in the next paragraph), the PSO will report to the Navy, who will immediately report the incident to the NMFS Office of Protected Resources, NMFS, and the Greater Atlantic Region Stranding Coordinators. The report will include the same information identified above. Per NMFS instruction, activities may continue while the circumstances of the incident are under review. NMFS will work with the Navy to determine whether modification in the activities are appropriate.

In the event that an injured or dead marine mammal is discovered, and the lead PSO determines that the injury or death is not associated with or related to the activities authorized in the LOA (i.e., previously wounded animal, carcass with moderate to advanced decomposition, or scavenger damage), the PSO will report the incident to the Navy, who will report to the NMFS Office of Protected Resources, NMFS, and the Greater Atlantic Regional Stranding Coordinators, within 24 hours of the discovery. The PSOs will provide photographs or video footage (if available) or other documentation of the stranded animal sighting to the Navy for submission to NMFS and the Marine Mammal Stranding Network. Construction operations may continue under such a case.

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## **6 REPORTING**

Monitoring reports will be provided to NMFS in accordance with permit requirements and timelines. The reporting procedures are summarized below.

### **6.1 Annual Reports**

- A draft report must be submitted annually for all visual and acoustic monitoring within 90 days after each activity year, starting in 2020 (for the first annual report) or from the date when the previous annual report ended.
- Annual reports will detail the monitoring protocol, summarize the data recorded during monitoring, and estimate the number of marine mammals that may have been harassed during the period of the report.
- Annual reports will also include results from acoustic monitoring detailed in Section 4 of this plan.
- NMFS will provide comments within 30 days after receiving annual reports, and the Navy will address the comments and submit revisions within 30 days after receiving NMFS comments. If no comment is received from the NMFS within 30 days, the annual report is considered completed.

### **6.2 Final Report**

- The Navy will submit a comprehensive summary report to NMFS not later than 90 days following the conclusion of all years of marine mammal monitoring efforts.
- The final report will synthesize all data recorded during marine mammal monitoring, and estimate the number of marine mammals that may have been harassed through the entire project.
- NMFS will provide comments within 30 days after receiving this report, and the Navy will address the comments and submit revisions within 30 days after receiving NMFS comments. If no comment is received from NMFS within 30 days, the final report is considered as final.

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## **7 LITERATURE CITED**

- American Bridge. 2010-2011. Pile Driving Records for SUBASE Pier 31 construction. American Bridge. 2010-2011.
- NMFS. 2016. Technical Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing, Underwater Acoustic Thresholds for Onset of Permanent and Temporary Threshold Shifts. National Oceanic and Atmospheric Administration Technical Memorandum NMFS-OPR-55. July 2016.
- NMFS. 2018. 2018 Revisions to: Technical Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing, (Version 2.0): Underwater Thresholds for Onset of Permanent and Temporary Threshold Shifts. U.S. Dept. of Commerce, National Oceanic and Atmospheric Administration Technical Memorandum NMFS-OPR-59. April 2018.
- Department of the Navy (Navy). 2018. Request for Letter of Authorization under the Marine Mammal Protection Act for the Demolition/Replacement of Pier 32/Demolition of Pier 10 at Naval Submarine Base New London, Groton, Connecticut. Revised May 2018. In Appendix G, Final Environmental Assessment and Finding of No Significant Impact for Demolition/Replacement of Pier 32/Demolition of Pier 10 Naval Submarine Base New London Groton, Connecticut, October 2018.

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**Appendix A**  
**Letter of Authorization**

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UNITED STATES DEPARTMENT OF COMMERCE  
National Oceanic and Atmospheric Administration  
NATIONAL MARINE FISHERIES SERVICE  
Silver Spring, MD 20910

### Letter of Authorization

The U.S. Navy (Navy) is hereby authorized under section 101(a)(5)(A) of the Marine Mammal Protection Act (MMPA; 16 U.S.C. 1371(a)(5)(A)) to take marine mammals incidental to the demolition and replacement of Pier 32 and demolition of Pier 10 at Naval Submarine Base New London in Groton, Connecticut, subject to the provisions of the MMPA and the Regulations Governing Taking of Marine Mammals Incidental to U.S. Navy's Submarine Base New London Pier Construction (50 CFR Part 217, Subpart J) (Regulations).

1. This Authorization is valid for the period March 1, 2020, through February 28, 2025.
2. This Authorization is valid only for take incidental to the specified waterfront construction activities at Naval Submarine Base New London and described in the preamble to the Regulations.

### 3. General Conditions

- (a) A copy of this LOA must be in the possession of Navy, its designees, and work crew personnel operating under the authority of this LOA.
- (b) Navy is hereby authorized to incidentally take marine mammals, by Level A and Level B harassment only, as specified in Table 1.
- (c) Taking of this species that exceeds the numbers and/or intensity indicated in 3(b) or any taking of any other species of marine mammal is prohibited and may result in the modification, suspension, or revocation of this LOA.

4. Mitigation – The Holder of this Authorization is required to implement the following mitigation measures:

- (a) Time Restriction: In-water construction and demolition work shall occur only during daylight hours.
- (b) Establishment of monitoring and shutdown zones:
  - (1) For all relevant in-water construction and demolition activity, the Navy must designate Level A harassment zones with radial distances as identified in Table 2.



- (2) For all relevant in-water construction and demolition activity, the Navy must designate Level B harassment zones with radial distances as identified in Table 2.
  - (3) For all in-water construction and demolition activity, the Navy must implement a minimum shutdown zone of a 10-m radius around the pile. If a marine mammal comes within or approaches the shutdown zone, such operations must cease.
  - (4) Pile driving must only take place when the shutdown and Level A zones are visible and can be adequately monitored. If conditions (e.g., fog) prevent the visual detection of marine mammals, activities with the potential to result in Level A harassment must not be initiated. If such conditions arise after the activity has begun, pile driving or pile removal activities must be halted if the 10-m shutdown zone is not visible.
- (c) Shutdown Measures:
- (1) The Navy must deploy three protected species observers PSOs shall be posted to monitor marine mammals during in-water pile driving and pile removal. One PSO must be located on land and two must be located in a boat to monitor the farther locations.
  - (2) Monitoring must take place from 15 minutes prior to initiation of pile driving or removal activity through 30 minutes post-completion of pile driving or removal activity. Pre-activity monitoring must be conducted for 15 minutes to ensure that the shutdown zone is clear of marine mammals, and pile driving or removal 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 must be allowed to remain in the shutdown zone (i.e., must leave of their own volition) and their behavior must be monitored and documented. Monitoring must occur throughout the time required to drive or remove a pile. A determination that the shutdown zone is clear must be made during a period of good visibility (i.e., the entire shutdown zone and surrounding waters must be visible to the naked eye).
  - (3) If a marine mammal approaches or enters the shutdown zone, or if a marine mammal not specified in Table 1 enters the Level B harassment zone, or if the take of a marine mammal species or stock has reached the limits specified in Table 1 and enters the Level B harassment zone, all pile driving or removal activities at that location must be halted. If pile driving or removal 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 15 minutes have passed without re-detection of the animal.

- (4) The Navy must implement shutdown measures if the number of authorized takes for any particular species reaches the limits in Table 1 and if such marine mammals are sighted within the vicinity of the project area and are approaching the Level B harassment zone during in-water construction or demolition activities.

(c) Soft Start:

- (1) The Navy must implement soft start techniques for impact pile driving. The Navy must conduct an initial set of three strikes from the impact hammer at 40 percent energy, followed by a 1-minute waiting period, then two subsequent three strike sets.
- (2) Soft start is required for any impact driving, including at the beginning of the day, and at any time following a cessation of impact pile driving of 30 minutes or longer.

5. Monitoring and Reporting – The holder of this Authorization is required to implement the following monitoring and reporting requirements:

(a) Marine Mammal Monitoring:

- (1) The Navy must employ trained protected species observers (PSOs) to conduct marine mammal monitoring. The PSOs must observe and collect data on marine mammals in and around the project area for 15 minutes before, during, and for 30 minutes after all pile removal and pile installation work. PSOs shall have no other assigned tasks during monitoring periods, and must be placed at 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.
- (2) Protected Species Observer Qualifications - NMFS-approved PSOs must meet the following requirements:
  - (i) Independent observers (i.e., not construction personnel) are required;
  - (ii) At least one observer must have prior experience working as an observer;

- (iii) Other observers may substitute education (undergraduate degree in biological science or related field) or training for experience;
  - (iv) Where a team of three or more observers are required, one observer must be designated as lead observer or monitoring coordinator. The lead observer must have prior experience working as an observer; and
  - (v) Submission and approval of observer CVs is required.
- (3) Marine Mammal Monitoring Protocols
- (i) The Navy must conduct briefings between construction supervisors and crews and the PSO team prior to the start of all pile driving activities, and when new personnel join the work, in order to explain responsibilities, communication procedures, marine mammal monitoring protocol, and operational procedures. All personnel working in the project area must watch the Navy's Marine Species Awareness Training video. An informal guide must be included with the monitoring plan to aid in identifying species if they are observed in the vicinity of the project area.
  - (ii) The Navy must monitor the Level A and Level B harassment zones (Table 2) before, during, and after pile driving activities for all in-water constructions. The Marine Mammal Monitoring Plan must include the following procedures:
    - (A) PSOs shall be primarily located on boats, docks, and piers at the best vantage point(s) in order to properly see the entire shutdown zone(s).
    - (B) PSOs shall be located at the best vantage point(s) to observe the zone associated with behavioral impact thresholds.
    - (C) During all observation periods, PSOs shall use high-magnification (25X), as well as standard handheld (7X) binoculars, and the naked eye to search continuously for marine mammals.
    - (D) Monitoring distances shall be measured with range finders. Distances to animals shall be based on the best estimate of the PSO, relative to known distances to objects in the vicinity of the PSO.



- (E) Bearings to animals shall be determined using a compass.
  - (F) Pre-Activity Monitoring:

The shutdown zone must be monitored for 15 minutes prior to in-water construction/demolition activities. If a marine mammal is present within the 10-m shutdown zone, the activity must be delayed until the animal(s) leave the shutdown zone. Activity may resume only after the PSO has determined that, through sighting or by waiting 15 minutes, the animal(s) has moved outside the shutdown zone. If a marine mammal is observed approaching the shutdown zone, the PSO who sighted that animal must notify all other PSOs of its presence.
  - (G) During Activity Monitoring:

If a marine mammal is observed entering the Level A or Level B harassment zones (Table 2) outside the 10-m shutdown zone, the pile segment being worked on may be completed without cessation, unless the animal enters or approaches the shutdown zone, at which point all pile driving activities must be halted. If an animal is observed within the shutdown zone during pile driving, then pile driving must be stopped as soon as it is safe to do so. Pile driving may only resume once the animal has left the shutdown zone of its own volition or has not been re-sighted for a period of 15 minutes.
  - (H) Post-Activity Monitoring:

Monitoring of all zones must continue for 30 minutes following the completion of the activity.
- (b) Passive Acoustic Monitoring:
- (1) Sound Source Verification
    - (i) The Navy must conduct pile driving sound source verification for the following types and sizes of piles:
      - (A) Vibratory and impact installation of at least 5 16-in fiberglass reinforced plastic piles, and
      - (B) Rock socket drilling of at least 3 30-in and 3 16-in piles.
    - (ii) Sound source measurements of these piles sound must be conducted at distances approximately 10 m from the source.

- (iii) For vibratory pile driving/removal source level measurements, reports must include 1-s sound exposure level (SEL), source spectrum, duration of recordings used to derive the SEL, and 24-hour cumulative SEL extrapolated from measurements.
- (iv) For impact pile driving source level measurements, reports must include peak sound pressure level (SPLpk), root-mean-square SPL (SPLrms), single strike SEL (SELss), integration time for SPLrms, SELss spectrum, and 24-hour cumulative SEL extrapolated from measurements.

(2) Level B Harassment Distance Verification

- (i) The Navy must empirically determine the Level B harassment distance either by extrapolating from in situ measurements conducted at several points between 10 and 500 m from the source, or by direct measurements to locate the distance where the received levels reach 120 dB or below, or at the ambient noise level.
- (ii) Level B behavioral harassment zones to be empirically verified include:
  - (A) Rock socket drilling of at least 3 30-in and 3 16-in piles,
  - (B) Vibratory installation of at least 3 36-in steel piles, and
  - (C) Vibratory removal of at least 3 24-in concrete and 3 33-in concrete piles.
- (iii) For extent of Level B harassment zone verification, the Navy must report the measured or extrapolated distances where the received levels SPLrms decay to 120-dB or to the ambient noise level, whichever is higher, as well as integration time for such SPLrms.

(3) The sound levels reported must be in median and linear average (i.e., taking averages of sound intensity before converting to dB).

(4) The passive acoustic monitoring reports shall also include sediment type where measurements are made.

(c) Reporting Measures

(1) Annual Reports

- (i) The Navy must submit an annual report within 90 days after each activity year, starting from March 1, 2020 (for the first annual report) or from the date when the previous annual report ended.
- (ii) Annual reports must detail the monitoring protocol, summarize the data recorded during monitoring, and estimate the number of marine mammals that may have been harassed during the period of the report.
- (iii) Annual reports shall also include results from acoustic monitoring detailed in paragraph (b) of this section.
- (iv) NMFS shall provide comments within 30 days after receiving annual reports, and the Navy must address the comments and submit revisions within 30 days after receiving NMFS comments. If no comment is received from the NMFS within 30 days, the annual report is considered completed.

(2) Final Report

- (i) The Navy must submit a comprehensive summary report to NMFS not later than 90 days following the conclusion of marine mammal monitoring efforts.
- (ii) The final report must synthesize all data recorded during marine mammal monitoring, and estimate the number of marine mammals that may have been harassed through the entire project.
- (iii) NMFS shall provide comments within 30 days after receiving this report, and the Navy must address the comments and submit revisions within 30 days after receiving NMFS comments. If no comment is received from NMFS within 30 days, the final report is considered as final.


(3) Reporting of injured or dead marine mammals:

- (i) In the unanticipated event that the construction or demolition activities clearly cause the take of a marine mammal in a prohibited manner, such as an injury, serious injury, or mortality, the Navy must immediately cease all operations and immediately report the incident to the NMFS Office of Protected Resources, NMFS at 301-427-8401, and the Greater Atlantic Region Stranding Coordinators at 866-755-6622. The report must include the following information:

- (A) Time, date, and location (latitude/longitude) of the incident;
  - (B) Description of the incident;
  - (C) Status of all sound source use in the 24 hours preceding the incident;
  - (D) Environmental conditions (e.g., wind speed and direction, sea state, cloud cover, visibility, and water depth);
  - (E) Description of marine mammal observations in the 24 hours preceding the incident;
  - (F) Species identification or description of the animal(s) involved;
  - (G) The fate of the animal(s); and
  - (H) Photographs or video footage of the animal (if equipment is available).
- (ii) Activities shall not resume until NMFS is able to review the circumstances of the prohibited take. NMFS shall work with the Navy to determine what is necessary to minimize the likelihood of further prohibited take and ensure MMPA compliance. The Navy may not resume their activities until notified by NMFS via letter, email, or telephone.
  - (iii) In the event that the Navy discovers an injured or dead marine mammal, and the lead PSO determines that the cause of the injury or death is unknown and the death is relatively recent (i.e., in less than a moderate state of decomposition as described in the next paragraph), the Navy must immediately report the incident to the NMFS Office of Protected Resources, NMFS, and the Greater Atlantic Regional Stranding Coordinators. The report must include the same information identified in paragraph (c)(3)(i) of this LOA. Activities may continue while NMFS reviews the circumstances of the incident. NMFS will work with the Navy to determine whether modifications in the activities are appropriate.
  - (iv) In the event that the Navy discovers an injured or dead marine mammal, and the lead protected species observer determines that the injury or death is not associated with or related to the activities authorized in the LOA (e.g., previously wounded animal, carcass

with moderate to advanced decomposition, or scavenger damage), the Navy must report the incident to the NMFS Office of Protected Resources, NMFS, and the Greater Atlantic Regional Stranding Coordinators, within 24 hours of the discovery. The Navy must provide photographs or video footage (if available) or other documentation of the stranded animal sighting to NMFS and the Marine Mammal Stranding Network. The Navy can continue its operations under such a case.

6. This Authorization may be modified, suspended, or withdrawn if the Holder fails to abide by the conditions prescribed herein or if NMFS determines that the authorized taking is having more than a negligible impact on the species or stock of affected marine mammals.

  
Donna S. Wieting, Director  
Office of Protected Resources  
National Marine Fisheries Service

OCT 09 2018  
Date

**Table 1. Authorized numbers of take by Level A and Level B harassment.**

Year	Species	Level A harassment	Level B harassment	Total authorized take
1	Harbor seal	6	166	172
	Gray seal	2	55	57
2	Harbor seal	6	177	183
	Gray seal	2	59	61
3	Harbor seal	0	51	51
	Gray seal	0	17	17
4	Harbor seal	0	110	110
	Gray seal	0	37	37

**Table 2. Level A and Level B harassment distances.**

Year	Activity Description	Level A distance (m)	Level B distance (m)
1	Impact driving 14" steel H-pile 1,000 strikes per pile, 4 piles/day	536	631
	Vibratory & rock socket drilling installation of 36" concrete-filled steel piles; average 10 minutes/day	<4	4,642
	Impact driving 36" concrete-filled steel piles; 1,000 strikes per pile; average 2.5 piles per day.	984	3,415
2	Vibratory installation of 36" concrete-filled steel piles; average 6 minutes/day.	<4	4,642
	Impact pile driving 36" concrete-filled steel piles; 1,000 strikes per pile; average 2.5 piles per day.	984	3,415
3	Vibratory installation of 16" fiberglass plastic piles; 40 minutes/day.	0.9	1,584
	Impact installation of 16" fiberglass plastic piles; 1,000 strikes per pile; average 2.5 piles per day.	2.5	1
4	Vibratory removal of 14" steel H-piles; average 100 minutes/day.	<4	3,415
	Vibratory removal of 24" concrete-filled steel piles (Pier 32); average 190 minutes/day	2.7	4,642
	Vibratory removal of 30" concrete-filled steel piles (Pier 32); average 40 minutes/day	5.9	4,642
	Vibratory removal of 33" concrete-filled steel piles (Pier 10); average 40 minutes/day	7.7	4,642

**Appendix B**  
**Marine Mammal Observation Record Form**

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Effort Info				Sighting Info*				
Event	Time of Event (start and end)	Observer*	Visibility Info (e.g. wind, glare, swell)	Species	Distance to Animal (from Observer)	# of Animals Group Size (min/max/best) # of Calves	Animal Movement Relative to Pile Driving Equipment/ Behavior Code	Behavior Change/ Response to Activity/ Other Comments
Start Monitoring – End Monitoring Soft Start – Vibratory – Impact Sighting – Delay – Shutdown	: :				yds	/ /  ___ calves	toward or away parallel none Behavior Code: _____	
Start Monitoring – End Monitoring Soft Start – Vibratory – Impact Sighting – Delay – Shutdown	: :				yds	/ /  ___ calves	toward or away parallel none Behavior Code: _____	
Start Monitoring – End Monitoring Soft Start – Vibratory – Impact Sighting – Delay – Shutdown	: :				yds	/ /  ___ calves	toward or away parallel none Behavior Code: _____	
Start Monitoring – End Monitoring Soft Start – Vibratory – Impact Sighting – Delay – Shutdown	: :				yds	/ /  ___ calves	toward or away parallel none Behavior Code: _____	
Start Monitoring – End Monitoring Soft Start – Vibratory – Impact Sighting – Delay – Shutdown	: :				yds	/ /  ___ calves	toward or away parallel none Behavior Code: _____	
Start Monitoring – End Monitoring Soft Start – Vibratory – Impact Sighting – Delay – Shutdown	: :				yds	/ /  ___ calves	toward or away parallel none Behavior Code: _____	
Start Monitoring – End Monitoring Soft Start – Vibratory – Impact Sighting – Delay – Shutdown	: :				yds	/ /  ___ calves	toward or away parallel none Behavior Code: _____	

\*Note location of observer and any marine mammal sightings with date/time on project map