Request for an Incidental Harassment Authorization

City and Borough of Sitka
O'Connell Bridge Lightering Float Pile Replacement Project

Sitka Sound, Sitka, Alaska

Updated December 2018

Prepared for:
City & Borough of Sitka
Department of Public Works
100 Lincoln Street
Sitka, Alaska 99835

Prepared by:
Solstice Alaska Consulting, Inc.
2607 Fairbanks Street Suite B
Anchorage, Alaska 99503

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ACRONYMS AND ABBREVIATIONS

dB	decibels
CBS	City and Borough of Sitka
DPS	distinct population segment
DTH	down-the-hole
EDPS	eastern distinct population segment
EFH	Essential Fish Habitat
ESA	Endangered Species Act
Hz	hertz
IHA	Incidental Harassment Authorization
kHz	kilohertz
LOA	Letter of Authorization
MMPA	Marine Mammal Protection Act
m	meter
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
PSO	Protected Species Observer
rms	root mean square
PTS	permanent threshold shift
PW	phocids in water

1 DESCRIPTION OF SPECIFIC ACTIVITY

A detailed description of the specific activity or class of activities that can be expected to result in incidental taking of marine mammals.

1.1 OVERVIEW

The City and Borough of Sitka (CBS) proposes to repair the O'Connell Bridge Lightering Float (float) located in Sitka Sound so that it can be used by large vessels.

The repair would include the removal and replacement of six existing 16-inch diameter piles with six 16-inch diameter piles that are more deeply socketed. All pile driving and removal would take place at the existing float and is expected to occur on 3 days. The proposed project would occur in marine waters that support several marine mammal species. Pile driving and pile removal may result in auditory injury (Level A harassment) and behavioral harassment (Level B harassment) of select marine mammal species.

The Marine Mammal Protection Act of 1972 (MMPA) prohibits the taking of marine mammals; take is defined as to "harass, hunt, capture or kill, or attempt to harass, hunt, capture or kill," except under certain situations. Section 101 (a)(5)(D) allows for the issuance of an Incidental Harassment Authorization (IHA), provided an activity results in negligible impacts on marine mammals and would not adversely affect subsistence use of these animals.

The CBS is requesting an IHA for Level B take of five marine mammal species that may occur in the ensonified area during construction. The species for which Level B take is requested are: humpback whale (*Megaptera novaeangliae*), killer whale (*Orcinus orca*), harbor porpoise (*Phocoena phocoena*), harbor seal (*Phoca viutlina*), and Steller sea lion (*Eumetopias jubatus*). No Level A take is requested.

As set out by 50 CFR 216.104, Submission of Requests, the specific items required for this application are provided in Sections 1 through 14 of this application.

1.2 DETAILED DESCRIPTION OF SPECIFIC ACTIVITIES

1.2.1 Location

The O'Connell Bridge Lightering Float is located within the City of Sitka in Southeast Alaska; Township 56 South, Range 63 East, Sections 1 and 2, Copper River Meridian, USGS Quadrangle Sitka A-5; Latitude 57.047558 and Longitude -135.338246 (Figure 1 and Appendix A, Sheet 1). The project is located within Crescent Bay of Sitka Sound (Figure 2). The float is located near the O'Connell Bridge. All repair work would take place within the footprint of the existing float (Figure 3).

Figure 1. Project Location Map (Google Maps)

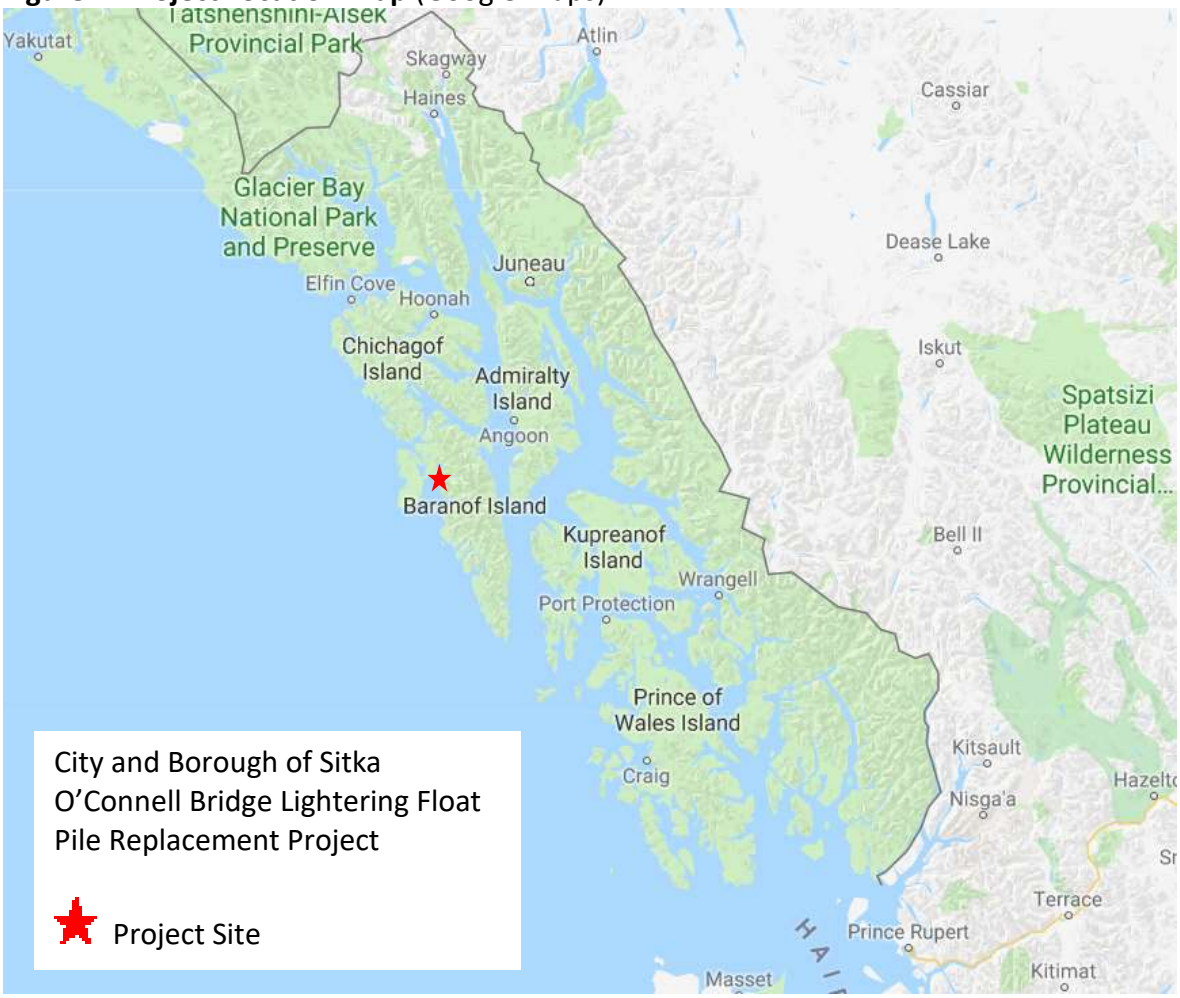


Figure 2. Photo of O'Connell Bridge Lightering Float 2003 (Source: USACE 2014)

Figure 3. The Existing O'Connell Bridge Lightering Float (Source: ShoreZone Mapper)

1.2.2 Purpose and Need

The purpose of this project is to remove existing piles and replace them with piles that are more deeply socketed so that the float can accommodate larger vessels. In the past, the O'Connell Float was used for lightering passengers to and from visiting cruise ships. Because cruise ships now use the Crescent Harbor Lightering Float for lightering passengers and Old Sitka Dock for disembarking passengers, the O'Connell Dock needs to be repurposed. Docking for yachts, fish processors, and research vessels is limited in Sitka; however, O'Connell Float's existing piles are not socketed deep enough to provide proper stability to safely support these vessels. Additionally, the float was damaged during a storm in June of 2017, and the existing piles are now leaning (PND 2017). This project would replace the existing piles with new piles that are socketed deeper into the ocean floor. Once the piles are replaced, O'Connell Bridge Lightering Float will safely accommodate larger vessels.

1.2.3 Anticipated Changes in Vessel Traffic

This project is not expected to increase vessel traffic in Alaskan waters. The purpose of this project is to accommodate existing vessels that need a place to dock for short stays in Sitka.

1.2.4 Proposed Action

The CBS proposes to repurpose and restore O'Connell Dock by removing six piles and replacing them with six more deeply socketed piles. The existing gangways (or transfer ramps) and the lightering float, which are removed during the winter each year, would be placed back on the new piles. No new overwater structures would be installed, no dredging would occur, and no fill would be placed associated with this project. (Appendix A and Figure 4).

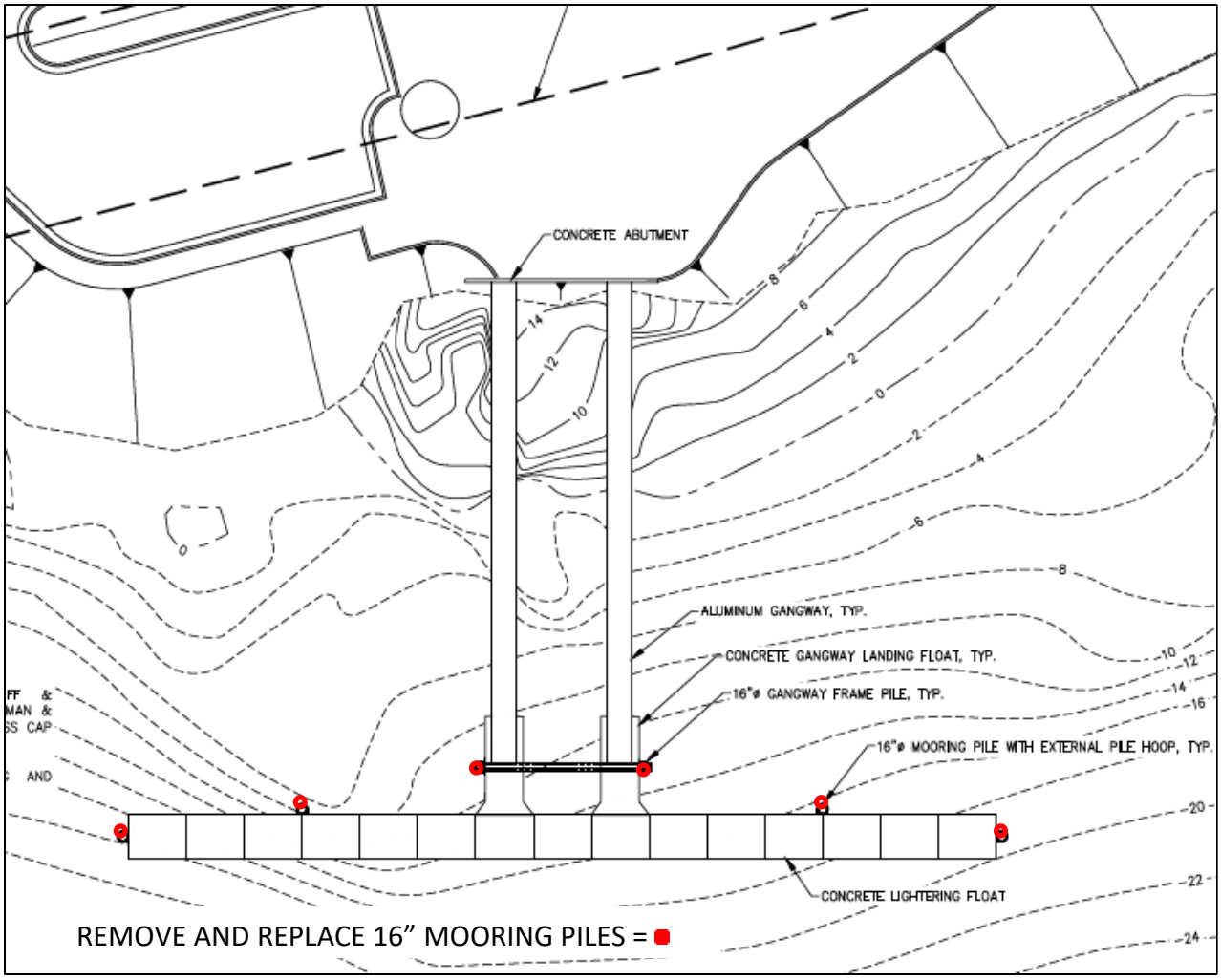
1.2.5 Construction Methods

1.1.1.1 Construction Overview

The CBS plans to remove and replace the six piles that support the O'Connell Bridge Lightering Float. The existing float consists of two 100-foot long by 5-foot wide aluminum gangways and a 180-foot long by 10-foot wide concrete modular float system restrained by six 16-inch diameter steel pipe piles that are socketed 4 feet deep into bedrock. The existing piles would be removed and replaced with six new 16-inch diameter steel piles that would be socketed twelve feet deep into bedrock. Pile installation and removal is expected to occur on three days. Construction includes the following activities over and in Sitka Sound:

- Temporarily remove the existing concrete lightering float and associated aluminum gangways (Note: these components are removed each winter and reinstalled in the summer.);
- Remove six (6) 16-inch diameter steel pipe piles that support the float;
- Install six (6) 16-inch diameter galvanized steel pipe piles (0.5-inch wall);
- Reinstall the floating dock and gangways.

Figure 4. Proposed Site Plan



1.1.1.2 Equipment

The following equipment would be used:

- Vibratory Hammer: ICE 44B/12,450 pounds static weight
- Diesel Impact Hammer: Delmag D46/Max Energy 107,280 ft-pounds
- Drilled shaft drill: Holte 100,000 ft-lb. top drive with down-the-hole (DTH) hammer and bit
- Socket drill: Holte 100,000 ft-lb. top drive with DTH hammer and under-reamer bit

1.1.1.3 Transport of Materials and Equipment

Materials and equipment, including the dock, would be transported to the project site by barge. While work is conducted in the water, anchored barges would be used to stage construction materials and equipment. Twenty-five-foot skiffs with 250 horse power motors would be used to support dock construction.

1.1.1.4 Pile Removal and Installation

First, the existing piles would be removed. To remove the existing piles the contractor would attempt to direct pull the piles with a crane. If the direct pull method is ineffective, the piles would be extracted with a vibratory hammer. In this case, the vibratory hammer would be clamped onto the pile and operated while using a crane to pull the pile upwards.

Next, the new piles would be installed. First the piles would be vertically stabilized by being vibrated into the existing 4-foot deep sockets. Next the piles would be socketed into the underlying bedrock with a down-hole drill and under-reamer bit (the drill will be used first to drill a hole in the bedrock to a depth of approximately 12 feet and then to socket the pile into the bedrock). After the pile is socketed, the contractor may choose to impact proof the piles. In this case, two to five blows of an impact hammer would be used per pile to confirm that piles are set into bedrock.

1.1.1.5 Construction Sequence

As stated above, pile removal and installation are expected to occur on three days. On the first day the existing piles would be removed, and the new piles would be vibrated into position. Over the second and third day, the piles would be socketed into bedrock. At the end of the third day, the piles would be impact proofed, if necessary.

Finally, if necessary, approximately 0.5 cubic yards total of 3/8-inch aggregate may be placed in the annular space between the piles and the bedrock socket for stability.

Table 1 provides a conservative estimate of the amount of time required for pile installation and removal.

Table 1. Pile Driving Construction Summary

Description	Project Component		
	Existing Pile Removal	**Permanent Pile Installation**	**Max Installation/ Removal per Day**
Pile Diameter and Type	16-inch steel	16-inch steel	--
# of Piles	6 piles	6 piles	--
Vibratory Pile Removal/Driving			
Max # of Piles Vibrated Per Day	6 piles	6 piles	12 piles
Vibratory Time Per Pile	5 minutes	5 minutes	--
Vibratory Time per day	30 minutes	30 minutes	60 minutes
Vibratory Time Total	30 minutes	30 minutes	--
Socketing (down-hole drilling)			
Max # of Piles Socketed per Day	0	3 piles	3 piles
Socket Time Per Pile	0	2 hours	--
Socket Time per Day	0	6 hours	6 hours
Socket Time Total	0	12 hours	--
Impact Pile Driving			
Max # of Piles Impacted Per Day	0	6 piles	6 piles
# of Strikes Per Pile	0	2-5 strikes	30 strikes
Impact Time Per Pile	0	30 seconds	--
Impact Time per Day	0	3 minutes	3 minutes
Impact Time Total	0	3 minutes	--

1.3 ACOUSTIC THRESHOLDS AND ESONIFIED AREA

Vibratory pile removal and driving via vibrating, socketing, and impact pile driving would generate in-water and in-air noise that may result in take of marine mammals.

Using the best available science, National Marine Fisheries Service (NMFS) has developed acoustic thresholds that identify the received level of underwater sound above which exposed marine mammals would be reasonably expected to be behaviorally harassed (equated to Level B harassment) or to incur Permanent Threshold Shifts (PTS) of some degree (equated to Level A harassment).

1.3.1 Level A Harassment

NMFS' *Technical Guidance for Assessing the Effects of Anthropogenic Sounds on Marine Mammal Hearing* (2016) identifies dual criteria to assess auditory injury (Level A harassment) to five different marine mammal groups (based on hearing sensitivity) as a result of exposure to noise from two different types of sources (impulsive or non-impulsive) (NMFS 2016). CBS's activity includes the use of both impulsive (impact pile driving) and non-impulsive (vibratory pile driving and removal and socketing) sources. The thresholds for auditory injury are provided in Table 2.

Table 2. Thresholds Identifying the Onset of Permanent Threshold Shift

	PTS Onset Thresholds*(received level)	
Hearing Group	**Impulsive (Impact Pile Driving)**	**Non-impulsive (Vibratory Pile Driving)**
Low-Frequency (LF)Cetaceans	Cell 1 $L_{pk,flat}$: 219 dB $L_{E,LF,24h}$: 183 dB	Cell 2 $L_{E,LF,24h}$: 199 dB
Mid-Frequency (MF) Cetaceans	Cell 3 $L_{pk,flat}$: 230 dB $L_{E,MF,24h}$: 185 dB	Cell 4 $L_{E,MF,24h}$: 198 dB
High-Frequency (HF)Cetaceans	Cell 5 $L_{pk,flat}$: 202 dB $L_{E,HF,24h}$: 155 dB	Cell 6 $L_{E,HF,24h}$: 173 dB
Phocid Pinnipeds (PW) (Underwater)	Cell 7 $L_{pk,flat}$: 218 dB $L_{E,PW,24h}$: 185 dB	Cell 8 $L_{E,PW,24h}$: 201 dB
Otariid Pinnipeds (OW) (Underwater)	Cell 9 $L_{pk,flat}$: 232 dB $L_{E,OW,24h}$: 203 dB	Cell 10 $L_{E,OW,24h}$: 219 dB

Adapted from: NMFS 2016

* Dual metric acoustic thresholds for impulsive sounds: Use whichever results in the largest isopleth for calculating PTS onset. If a non-impulsive sound has the potential of exceeding the peak sound pressure level thresholds associated with impulsive sounds, these thresholds should also be considered.
Note: Peak sound pressure (Lpk) has a reference value of 1 µPa, and cumulative sound exposure level (LE) has a reference value of 1µPa2s. In this Table, thresholds are abbreviated to reflect American National Standards Institute (ANSI) 2013 standards. However, peak sound pressure is defined by ANSI as incorporating frequency weighting, which is not the intent for this Technical Guidance. Hence, the subscript "flat" is being included to indicate peak sound pressure should be flat weighted or unweighted within the generalized hearing range. The subscript associated with cumulative sound exposure level thresholds indicates the designated marine mammal auditory weighting function (LF, MF, and HF cetaceans, and PW and OW pinnipeds) and that the recommended accumulation period is 24 hours. The cumulative sound exposure level thresholds could be exceeded in a multitude of ways (i.e., varying exposure levels and durations, duty cycle). When possible, it is valuable for action proponents to indicate the conditions under which these acoustic thresholds will be exceeded.

1.3.2 Level B Harassment

NMFS predicts that all marine mammals are likely to be behaviorally harassed in a manner that they consider Level B harassment when exposed to underwater anthropogenic noise above received levels of 120 decibels (dB) re 1µPa (rms) for continuous and above 160 dB re 1µPa (rms) for non-explosive impulsive sources.

1.3.3 Calculated Distances to Level A and Level B Thresholds

For this project, distances to the Level A and Level B thresholds were calculated based on source levels from the Naval Base Kitsap at Bangor EHW-1 Pile Replacement Project, in Bangor, Washington (NAVFAC 2012) and the Kodiak Ferry Terminal Project in Kodiak, Alaska (Denes et. al. 2016) for a given activity and pile type (e.g., vibratory removal/installation, socketing, and impact pile driving of 24-inch diameter steel piles) and, for Level A harassment, accounted for the maximum duration of that activity per day using the practical spreading model in the spreadsheet tool developed by NMFS. Calculated distances to thresholds are shown in Table 3 and range from approximately 1 meter to 15 kilometers. Please see Section 11.3 for shutdown and monitoring zones associated with these thresholds.

Table 3. Calculated Distances to NMFS Level A and B Acoustic Thresholds

Activity	Source Level at 10 meters (dB)	Distance (m) to Level A and Level B Thresholds					
		Level A[1]					Level B
		Low-Frequency Cetaceans	Mid-Frequency Cetaceans	High-Frequency Cetaceans	Phocid	Otariid	
Vibratory Pile Driving/Removal							
16-inch steel removal and installation (12 piles) (~1 hour on 1 day)	161 SPL[2]	6.8	0.6	10.1	4.2	0.3	5,412
Socketing Pile Installation							
16-inch steel installation (6 piles) (6 hours per day on 2 days)	167.7 SPL[3]	6.3	0.4	5.6	3.4	0.2	15,136[5]
Impact Pile Driving							
16-inch steel installation (6 piles) (~3 minutes per day on 1 day)	168.2 SEL/ 181.3 SPL[4]	9.9	0.4	11.8	5.3	0.4	263

Distances, in meters, refer to the maximum radius of the zone. Please see acoustic threshold calculation spreadsheets in Appendix B.

[1] The values provided here represent the distance at which an animal may incur PTS if that animal remained at that distance for the entire duration of the activity within a 24-hour period. For example, a humpback whale (low frequency cetacean) would have to remain 2.9 meters from 16-inch piles being removed for 1 hour for PTS to occur.

[2] The vibratory source level is proxy from 24-inch steel piles driven at the Naval Base Kitsap in Bangor, Washington (NAVFAC 2012) and from acoustic modeling of nearshore marine pile driving at Navy installations in Puget Sound (United States Navy 2015). The distance thresholds were calculated based on the removal of 6 piles and installation of 6 piles (5 minutes each = 60 minutes total) in a 24-hour period.

[3] The socketing source level is proxy from mean measured sources levels from drilling of 24-inch diameter piles to construct the Kodiak Ferry Terminal (Denes et al. 2016, Table 72). Distances assuming installation of 3 piles a day (2 hours each=6 hours total) in a 24-hour period.

[4] Sound pressure level root-mean-square (SPL rms) values were used to calculate distance to Level A and B harassment isopleths for impact pile driving. The source levels of 168.2 SEL (for Level A) and 181.3 SPL (for Level B) are the mean measured levels from the Kodiak Ferry Terminal project (Denes et al. 2016, Table 72). Distances to Level A thresholds assume 5 strikes per pile in 24 hours.

[5] These distances represent calculated distances based on the practical spreading model; however, landforms will block sound transmission at closer distances. The farthest distance that sound will transmit from the source is 7.7 kilometers into Camp Coogan Bay before transmission is stopped by Baranof Island.

1.3.4 Action Area

The vicinity of the project area that will be affected directly by the action, referred to as the action area in this document, has been determined by the area of water that will be ensonified above acoustic thresholds in a day. In this case, the action area is the area where received noise levels from socket installation of 16-inch piles (the farthest-reaching noise associated with the project) are expected to decline to 120 dB. As shown in Table 3, this area extends approximately 15,140 kilometers from the source. However, the action area would be truncated where land masses obstruct underwater sound transmission; thus, the action area is largely confined to marine waters within Eastern Channel of Sitka Sound, extending approximately 7.7 kilometers through Crescent Bay, Middle Channel, and into Eastern Channel and encompassing approximately 7.26 square kilometers (Figure 5).

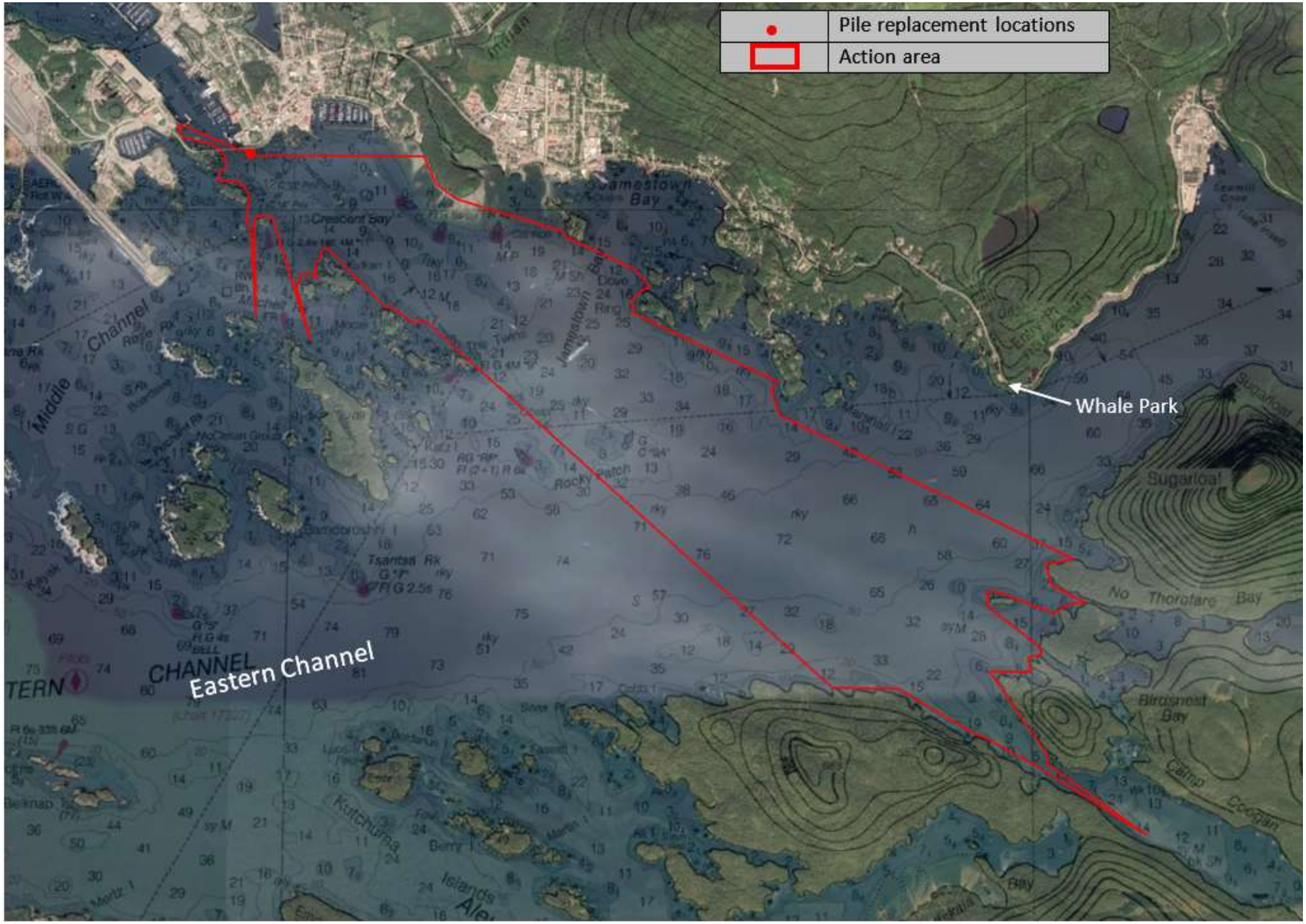
In addition to in-water noise, pinnipeds can be adversely affected by in-air noise. Loud noises can cause hauled-out pinnipeds to flush back into the water, leading to disturbance and possible injury. NMFS has established an in-air noise disturbance threshold of 90 dB rms for harbor seals and 100 dB rms for all other pinnipeds. Pile driving and removal associated with this project will generate in-air noise above ambient levels near the float. The predicted distances to the in-air noise disturbance threshold for hauled-out harbor seals (90 dB) and sea lions (100 dB rms) will not extend more than 53 meters and 17 meters from any type of pile being driven or extracted, respectively. [1]

Pinnipeds are not known to haul out on or near the O'Connell Bridge Lightering Float, and no in-air disturbance to hauled-out individuals is anticipated as a result of this repair project. If a pinniped were to haul out on the float it would likely come from the aquatic action associated with the project; thus, to prevent double counting of pinnipeds, land area is not included in the action area.

To minimize impacts to protected species, shutdowns will be implemented if a species appears likely to enter a shutdown zone, and monitoring of harassment zones will be implemented to protect and document marine mammals in the action area. Please see Table 3 for calculated distances to the Level A and B thresholds; Section 11 for mitigation information and shutdown zones and figures; and the attached Marine Mammal Monitoring and Mitigation Plan (4MP) for more details on mitigation, shutdown, and monitoring procedures (Appendix C).

[1] Predicted distances were based on source levels in Washington and Alaska. At Puget Sound, WA, Laughlin (2010) found in-air measurements averaged 96.5 dB root mean square at 15 meters during vibratory installation of 30-inch steel piles. At the Port of Anchorage, AK, Austin et al. (2016) found source levels of 101 dB @15 meters during impact installation of 48-inch diameter steel piles.

Figure 5. Proposed Action Area



2 DATES, DURATION, AND REGION OF ACTIVITY

The date(s) and duration of such activity and the specific geographical region where it will occur.

2.1 DATES AND DURATION

Pile removal and installation is expected to occur for a total of approximately 13 hours over 3 days. Please see Table 1 for the specific amount of time required to install and remove piles. All in-water work will be completed within 1 month between March and August 2019. The CBS requests an IHA for incidental take of marine mammals described within this application for one year, effective March 1, 2019 (or the issuance date, whichever is later).
The total construction duration accounts for the time required to mobilize materials and resources and construct the project. The duration also accounts for potential delays in material deliveries, equipment maintenance, inclement weather, and shutdowns that may occur to prevent impacts to marine mammals.

2.2 SPECIFIED GEOGRAPHIC REGION

The O'Connell Bridge Lightering Float is located near the prominent O'Connell Bridge within Crescent Bay and adjacent to Sitka Channel (Figures 1, 2, and 3). The float is located in an active marine commercial and industrial area.

2.2.1 Physical Environment

Crescent Bay is bounded by Sitka Channel to the northwest, Middle Channel to the southwest and Eastern Channel to the southeast, and a series of islands to the south. The bay is relatively shallow with a maximum depth of approximately 30 meters (NOAA Chart 2018). The north side of the bay has riprap protected developed areas, including a boat harbor, and undeveloped shorelines on small islands to the south and on the eastern side of the bay. Lower intertidal and shallow subtidal areas are primarily cobbles and boulders with varying amounts of silt (NMFS 2018).

The project footprint is previously disturbed by the existing float and piles which currently supports vessel berthing and the O'Connell Bridge abutment. Offshore, according to a structural analysis performed on the float and associated piles by PND Engineers, Inc. in July 2017, water elevation at the site varies from approximately -10 to -20 feet, with the face of the dock at about -18 feet. The sediment thickness varies from 3 to 30 inches (PND 2017) until bedrock is reached. According to NMFS's ShoreZone Mapper, the float area site has a protected/ anthropomorphic permeable habitat class and permeable man-made structures with sheltered rip rap environmental sensitivity index (Figure 3) (NMFS 2018).

2.3 SEASONAL ISSUES

Marine mammal species are present year-round in the project vicinity. Humpback whales are more common in the area in winter months (Straley 2018). Please see Section 4.2 for more information on humpback whale presence. In winter, daylight is more limited and storms are more frequent than later in the year; therefore, the contractor would like to begin construction in the early spring to take advantage of longer daylight hours and likely better weather.

3 SPECIES AND NUMBERS OF MARINE MAMMALS

The species and numbers of marine mammals likely to be found within the activity area.

The marine waters of Sitka Sound support many species of marine mammals. The species listed by NMFS that may occur in the project vicinity are shown in Table 4, along with their stock or population, their estimated abundance, and their occurrence in the project area.

Table 4. Marine Mammal Species with Ranges Extending into the Project Area.

Species [a]	Stock and Abundance Estimate	ESA Status	MMPA Status	Occurrence in Project Area [b]
Fin Whale (*Balaenoptera physalus*)	Northeast Pacific N/A [c]	Endangered	Strategic, depleted	Rare
Minke Whale (*B. acutorostrata*)	Alaska N/A [c]	Not listed	Not strategic, non-depleted	Rare
N. Pacific Right Whale (*Eubalaena japonica*)	Eastern North Pacific 31 [c]	Endangered	Strategic, depleted	Rare
Humpback Whale (*Megaptera novaeangliae*)	Hawaii DPS 11,398 [d]	Not listed	Strategic, depleted	Frequent
	Mexico DPS 3,264 [d]	Threatened	Strategic, depleted	Frequent
Gray Whale (*Eschrichtius robustus*)	Eastern North Pacific 19,000 [e]	Not listed	Not strategic, non-depleted	Rare
Sperm Whale (*Physeter macrocephalus*)	North Pacific N/A [c]	Endangered	Strategic, depleted	Rare
Cuvier's Beaked Whale (*Ziphius cavirostris*)	Alaska N/A [c]	Not listed	Not strategic, non-depleted	Rare
Killer Whale (*Orcinus orca*)	West Coast Transient 243 [c]	Not listed	Not strategic, non-depleted	Frequent
	Gulf, Aleutian, Bering Transient 587 [c]	Not listed	Not strategic, non-depleted	Frequent
	Northern Resident (BC) 261 [c]	Not listed	Not strategic, non-depleted	Rare
	Alaska Resident 2,347 [c]	Not listed	Not strategic, non-depleted	Rare
Pacific White-Sided Dolphin (*Lagenorhynchus obliquidens*)	North Pacific 26,880 [c]	Not listed	Not strategic, non-depleted	Rare
Dall's Porpoise (*Phocoenoides dalli*)	Alaska 83,400 [c]	Not listed	Not strategic, non-depleted	Rare
Harbor Porpoise (*Phocoena phocoena*)	Southeast Alaska 11,146 [c]	Not listed	Strategic, non-depleted	Infrequent
Harbor Seal (*Phoca vitulina*)	Sitka/Chatham Strait 14,855 [c]	Not listed	Not strategic, non-depleted	Frequent
Northern Fur Seal (*Callorhinus ursinus*)	Eastern Pacific 626,734 [c]	Not listed	Strategic, depleted	Rare
Steller Sea Lion (*Eumatopia jubatus)*	Eastern DPS 41,638 [c]	Not listed	Strategic, depleted	Frequent
	Western DPS 50,983 [c]	Endangered	Strategic, depleted	Infrequent

[a] Species listed with ranges extending into the project area derived from the NOAA online mapper and discussions with NMFS staff and local experts (NMFS 2018a).

[b] Occurrence in project area based on surveys from 1994 to 2002 as reported in Straley et al. 2018 and personal communication with Straley 2017 and 2018. Frequent = seen consistently; Infrequent=not seen consistently or seen more than three times; Rare=seen fewer than three times

[c] Muto et al. 2016.

[d] Wade et al. 2016.

[e] NMFS 2015.

Density data on marine mammals in Crescent Bay, Jamestown Bay, and Sitka Sound's Eastern Channel is limited. Research to determine the species and numbers of marine mammals likely to be found within the action area included:

- Reviewing the NOAA online Mapper.
- Reviewing NMFS' Stock Assessment Reports for stock status and abundance and groups size information;
- Discussing the project with Jan Straley, marine biologist, University of Alaska Southeast Professor of Marine Biology, and longtime Sitka resident to learn about species in the action area.
- Discussing the project with Sitka harbormaster Stan Eliason. He corroborated that the most common species in the project area are sea otters and sea lions (Eliason 2018).
- Corresponding with the Resource Protection Director for the Sitka Tribe of Alaska and the Sitka Marine Mammal Commission.
- Contracting a summary report by Professor Jan Straley summarizing marine mammal occurrence in the project vicinity. Between September and May from 1994 to 2002, Straley's group conducted weekly land-based surveys of marine mammals from Sitka's Whale Park, located on the western edge of Eastern Channel at the entrance to Silver Bay. Straley's group also conducted vessel-based surveys in or near the project vicinity in various months throughout the year from 2000 to present (Straley et al. 2018). This report was used to estimate species occurrence and groups sizes as outlined in Table 5 (Straley et al. 2018);
- Reviewing 21 days of marine mammal observation logs from construction at the GPIP Dock in Silver Bay in October and November of 2017. The logs recorded marine mammal sightings from the north end of Eastern Channel/mouth of Silver Bay to the end of Silver Bay (Turnagain 2017);
- Reviewing the marine mammal observation report from the Petro Marine Dock construction at the south end of Sitka Channel in 2017. The report documented 8 days of monitoring between January 11 and 23, 2017 (Windward 2017);
- Reviewing monthly marine mammal observations reports from the Biorka Dock Replacement Project. The reports documented sightings on 55 days between June and September 2018 (Turnagain 2018); and
- Reviewing daily marine mammal observation notes completed for 15 minutes a day for 8 days in September 2018 within a 400-meter radius of O'Connell Bridge Lightering Float (SolsticeAK 2018).

Some of the marine mammal observation efforts listed above only documented marine mammals in fall and/or winter months. While these reports help to understand species occurrence in the action area, the fall and winter sighting information may be different than occurrence and densities that occur during the proposed March-August work period.

Straley et al.'s summary report, recent marine mammal monitoring reports from the Sitka region, discussions with Straley, and discussions with others who worked near the project area all indicate that humpback whales, harbor seals, and Steller sea lions are frequently sighted in

the project vicinity (Straley 2018, Eliason 2018). According to Straley, transient killer whales can also occur frequently in the project area as they pass through to feed on marine mammals (Straley 2018). Harbor porpoise can also occur in the action area, and Straley's surveys recorded sightings in March and April. Exposure of these species to project impacts is likely, and their take is requested. See Table 5 for the number of individuals sighted during survey from Whale Park.

Although listed on the NMFS Mapper (NMFS 2018a), the other species listed in Table 4 are rare in the project vicinity: Straley et al.'s surveys, marine mammal monitoring during GPIP Dock Construction, and marine mammal monitoring during Petro Marine Dock Replacement did not observe fin whale, North Pacific right whale, sperm whale, Cuvier's beaked whale, minke whale, Dall's porpoise, or northern fur seal. During Straley's eight years of surveys, only three gray whales were observed and only seven Pacific white sided dolphins were observed. Therefore, exposure of these species to project impacts is considered unlikely, and their take is not requested, and they are not discussed in this document.

Table 5. **Total number of Individuals Observed and Minutes of Observation by Month from Whale Park between 1995 and 2002.**

Species	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Humpback whales	73	35	6	3	0	N/A	N/A	N/A	16	66	131	110
Gray whales	0	0	0	0	0	N/A	N/A	N/A	0	0	3	0
Killer whales	0	12	4	0	0	N/A	N/A	N/A	0	12	12	4
Pacific White Sided Dolphins	0	7	0	0	0	N/A	N/A	N/A	0	0	0	0
Harbor Porpoises	0	0	5	5	0	N/A	N/A	N/A	0	7	0	0
Harbor seals	1	4	5	3	0	N/A	N/A	N/A	2	2	3	0
Steller sea lions	287	180	66	8	0	N/A	N/A	N/A	12	18	113	22
Observation effort (mins)	1,127	1,646	1,608	960	258	0	0	0	1,197	1,667	1,807	1,085

Source: Straley et al. 2018

Note: No observations were made between June and August.

This IHA application is limited to humpback whales, killer whales, harbor porpoises, harbor seals, and Steller sea lions and assesses the potential impacts of the project on these five species, which are discussed more fully in Section 4.

4 AFFECTED SPECIES STATUS AND DISTRIBUTION

A description of the status and distribution of each species or stocks or marine mammals likely to be affected by the activity.

4.1 HUMPBACK WHALE

4.1.1 Hearing Ability

Humpback whales are classified by NMFS as low-frequency cetaceans with a generalized hearing range of 7 hertz (Hz) to 35 kilohertz (kHz) (NMFS 2016). However, because of the lack of captive subjects and logistical challenges of bringing experimental subjects into the laboratory, no direct measurements of mysticete hearing are available. Consequently, hearing in mysticetes is estimated based on other means such as vocalizations (Wartzok and Ketten 1999), anatomy (Houser et al. 2001; Ketten 1997), behavioral responses to sound (Edds-Walton 1997), and nominal natural background noise conditions in their likely frequency ranges of hearing (Clark and Ellison 2004). The combined information from these and other sources strongly suggests that mysticetes are likely most sensitive to sound from perhaps tens of hertz to ~10 kHz. However, evidence suggests that humpbacks can hear sounds as low as 7 Hz (Southall et al. 2007) up to 24 kHz, and possibly as high as 30 kHz (Au et al. 2006; Ketten 1997).

4.1.2 Status

Humpback whales worldwide were designated as "endangered" under the Endangered Species Conservation Act in 1970 and were listed under the Endangered Species Act (ESA) at its inception in 1973. Currently, four out of the 14 distinct population segments (DPS) are still protected as endangered, and one is listed as threatened. As of the 2016 stock assessment reports, three humpback whales stocks in U.S waters are designated as depleted under the MMPA (NMFS 2018b).

Based on an analysis of migration between winter mating/calving areas and summer feeding areas using photo-identification, Wade et al. (2016) concluded that whales feeding in Alaskan waters belong primarily to the Hawaii DPS (now recovered), with small contributions of Mexico DPS (threatened) and Western North Pacific DPS (endangered) individuals. The O'Connell Bridge Lightering Float Pile Replacement Project is located within what Wade et al. (2016) classifies as the summer feeding area of Southeast Alaska/Northern British Columbia. The total estimated abundance of humpback whales in this summer feeding area is 6,137. Based on probabilities reported in Wade et al. (2016), in the Southeast Alaska/Northern British Columbia area, Hawaii DPS individuals comprise 93.9 percent and Mexico DPS individuals comprise 6.1 percent of the humpback whales present.

Under the MMPA the Central North Pacific stock is considered depleted (NMFS 2018b). The current estimate of population size for the Central North Pacific stock is 10,103 humpback whales (Muto et al. 2016).

4.1.3 Distribution

Humpback whales are distributed worldwide in all ocean basins and a broad geographical range from tropical to temperate waters in the Northern Hemisphere and from tropical to near-ice-

edge waters in the Southern Hemisphere. The humpback whales that forage throughout British Colombia and Southeast Alaska undertake seasonal migrations from their tropical calving and breeding grounds in winter to their high-latitude feeding grounds in summer. They may be seen at any time of year in Alaska, but most animals winter in temperate or tropical waters near Hawaii. In the spring, the animals migrate back to Alaska where food is abundant.

Within Southeast Alaska, humpback whales are found throughout all major waterways and in a variety of habitats, including open-ocean entrances, open-strait environments, near-shore waters, area with strong tidal currents, and secluded bays and inlets. They tend to concentrate in several areas, including northern Southeast Alaska. Patterns of occurrence likely follow the spatial and temporal changes in prey abundance and distribution with humpback whales adjusting their foraging locations to areas of high prey density (Chenoweth at al. 2017).

4.1.4 Presence in Project Area

Although humpback whales are known to undertake seasonal migrations from their tropical calving and breeding grounds in winter to their high-latitude feeding grounds in summer, humpback whales have been observed in Southeast Alaska in all months of the year. Humpback whales are most common in Sitka Sound's Eastern Channel in November, December, and January (Straley et al. 2018). In late fall and winter, herring sometimes overwinter in deep fjords in Silver Bay and Eastern Channel, and humpback whales aggregate in these areas to feed on them. At some point in the late winter, it is likely that whales migrate south across the North Pacific to their mating and calving grounds in Hawaii and Mexico; however, this likely occurs after herring have moved out of the fjords. Humpback whales have been documented making this migration in under forty days, allowing whales to feed longer in Alaska before they migrate south for mating and calving activities (ASG 1997). In the summer when prey is dispersed throughout Sitka Sound, humpback whales also disperse throughout the Sound and away from the project area (Straley 2017).

During 190 hours of observation from 1994 to 2002 from Sitka's Whale Park, 440 humpback whales were observed (Straley et al. 2018; Table 5). During 21 days of monitoring during the construction of GPIP Dock between October 9 and November 9, 2017, 39 humpback whales were observed (Turnagain 2017). No humpback whales were observed within Sitka Channel and in the vicinity of the O'Connell float during the 8 days of monitoring in January 2017 during the construction of the Sitka Petro Dock (Windward 2017). Near Biorka Island, about 25 kilometers south of the project, 22, 3, 0, and 2 humpback whales were sighted in June, July, and August, and September, 2018, respectively (Turnagain 2018). Humpback whales were not observed during recent monitoring conducted for short periods over 8 days in September 2018 within a 400-meter radius surrounding the O'Connell Bridge Lightering Float (SolsticeAK 2018).

Most humpback whales observed in the area were solitary; however, groups up to 10 individuals were seen during Straley's observation, and the average group size was 2 whales. During work on GPIP Dock, groups of 5 and 10 individuals were seen a few times, but most of the time, single whales were observed near the mouth of Silver Bay (Turnagain 2017). In most cases, humpback whales were feeding when they were observed.

4.2 KILLER WHALE

4.2.1 Hearing Ability

Killer whales are classified by NMFS as mid-frequency cetaceans with a generalized hearing range of 150Hz to 160 KHz (NMFS 2016). The hearing of killer whales is well developed. Szymanski et al. (1999) found that they responded to tones between 1 and 120 kHz, with the most sensitive range between 18 and 42 kHz. Their greatest sensitivity is at 20 kHz, which is lower than many other odontocetes, but it matches peak spectral energy reported for killer whale echolocation clicks.

4.2.2 Status

Based on data regarding association patterns, acoustics, movements, and genetic differences, eight killer whale stocks are now recognized within the Pacific U.S. Exclusive Economic Zone, seven of which occur in Alaska. Three stocks can occur in Southeast Alaska: the Eastern North Pacific Alaska resident stock, the Eastern North Pacific northern resident stock (British Colombia), and the West Coast transient stock (Muto et al. 2016).

At present, NMFS has preliminary genetic information on killer whales in Alaska which indicated that the current stock structure needs to be reassessed (Muto et al. 2016); however, the populations that are known to occur in Southeast Alaska are not strategic or depleted under the MMPA.

4.2.3 Distribution

Killer whales have been observed in all oceans and seas of the world, but the highest densities occur in colder and more productive waters found at high latitudes. Killer whales are found throughout the North Pacific and occur along the entire Alaska coast, in British Columbia and Washington inland waterways, and along the outer coasts of Washington, Oregon, and California (NMFS 2016a).

The Alaska resident stock occurs from southeastern Alaska to the Aleutian Islands and Bering Sea. The Northern resident stock occurs from Washington State through part of southeastern Alaska; and the West Coast transient stock occurs from California through southeastern Alaska (Muto et al. 2016).

4.2.4 Presence in Project Area

Forty-four (44) killer whales were observed during 190 hours of observation from Whale Point between September and May from 1994 to 2002 (Straley et al. 2018). Three killer whales were documented in Sitka Channel on one day in January 2017 during the Petro Marine Dock construction (Windward 2017). Seven killer whales were observed in June, but no killer whales were seen in July, August, or September in 2018 at Biorka Island (Turnagain 2018). No killer whales were observed in October or November 2017 on the western side of Eastern Channel or Silver Bay (Turnagain 2017) or near the O'Connell Bridge Lightering Float in September 2018 (SolsticeAK 2018).

Straley's survey data indicates a typical killer whale group size between 4 and 8 and a maximum group size of 8 whales in the area (Straley et al. 2018). A pod of three killer whales were observed during monitoring for the Petro Marine Dock, and a pod of seven whales were observed on one day near Biorka Island (Windward 2017; Turnagain 2018). In general, killer whales are feeding while in the project area.

Straley (2017) states that transient killer whales, primarily from the West Coast transient stock, occur most frequently in the project area. Less often, whales from the Eastern North Pacific Gulf of Alaska, Aleutian Islands, and Bering Sea transient stock occur in the project area. Because of their transient nature, it is difficult to predict when killer whales will be present in the area. Whales from the Alaska resident stock and the Northern resident stock primarily feed on fish and do occur in Southeast Alaska; however, they are rare in the project area (Straley 2017).

4.3 HARBOR PORPOISE

4.3.1 Hearing Ability

Harbor porpoises are classified by NMFS as high-frequency cetaceans with a generalized hearing range of 275 Hz to 160 KHz (NMFS 2016). Harbor porpoises have the highest upper-frequency limit of all odontocetes investigated. Kastelein et al. (2005) found that the range of best hearing was from 16 to 140 kHz, with a reduced sensitivity around 64 kHz. Maximum sensitivity (about 33 dB 1 µPa) occurred between 100 and 140 kHz. This maximum sensitivity range corresponds with the peak frequency of echolocation pulses produced by harbor porpoises (120–130 kHz).

4.3.2 Status

In Alaska, harbor porpoises are currently divided into three stocks, based primarily on geography: the Bering Sea stock, the Southeast Alaska stock, and the Gulf of Alaska stock. In areas outside of Alaska, studies have shown that stock structure is more finely scaled than is reflected in the Alaska Stock Assessment Reports; however, no data are yet available to define stock structure for harbor porpoises on a finer scale in Alaska (Muto et al. 2016). Only the Southeast Alaska stock is considered in this application because the other stocks occur outside the geographic area under consideration.

The Southeast Alaska stock is currently estimated at 11,146 individuals (Muto et al. 2016). No reliable information is available to determine trends in abundance.

4.3.3 Distribution

In the eastern North Pacific Ocean, harbor porpoises range from Point Barrow, along the Alaska coast, and the west coast of North America to Point Conception, California. The Southeast Alaska stock ranges from Cape Suckling, Alaska to the northern border of British Columbia. Within the inland waters of Southeast Alaska, harbor porpoises' distribution is clustered with greatest densities observed in the Glacier Bay/Icy Strait region and near Zarembo and Wrangell Islands and the adjacent waters of Sumner Strait (Dahlheim et al. 2009).

4.3.4 Presence in Project Area

Harbor porpoises commonly frequent nearshore waters, but are not common in the project vicinity. Monthly tallies from observations from Sitka's Whale Park show harbor porpoises occurring infrequently in or near the action area in March, April, and October between 1994 to 2002 (Straley et al. 2018). Meanwhile, no harbor porpoises have been observed more recently during monitoring. No harbor porpoises were seen during the Petro Marine Dock construction monitoring in January 2017 or during monitoring for the GPIP dock between October of November of 2017 (Windward 2017 and Turnagain 2017). They were also not observed near the O'Connell Bridge Lightering Float in September 2018 or Biorka Island between June through September 2018 (Turnagain 2018).

Survey data indicates a typical group size of 5 porpoises and a maximum group size of 8 porpoises. When they do occur near Sitka, they exhibit feeding behavior (Straley et al. 2018 and Straley 2017).

4.4 HARBOR SEAL

4.4.1 Hearing Ability

Harbor seals are classified by NMFS as phocid pinnipeds with a generalized in-water hearing range of 50 Hz to 86 kHz (NMFS 2016). Harbor seals respond to underwater sounds from approximately 1 to 180 kHz, with the functional high-frequency limit around 60 kHz and peak sensitivity at about 32 kHz. Hearing ability in the air is greatly reduced (by 25 to 30 dB); they respond to sounds from 1 to 22.5 kHz, with a peak sensitivity of 12 kHz (Kastak and Schusterman 1995).

4.4.2 Status

Harbor seals are not listed as depleted under the MMPA or as threatened or endangered under the ESA. The status of all 12 stocks of harbor seals identified in Alaska relative to their Optimum Sustainable Population size is unknown. The Clarence Strait stock of harbor seals, the stock that would be expected in the project vicinity, is not classified as strategic.

The current statewide abundance estimate for Alaskan harbor seals is 205,090 based on aerial survey data collected between 1998 and 2011. The abundance estimate for the Clarence Strait stock is 31,634, with a minimum estimate of 29,093 (Muto et al. 2016).

The current population trend for this stock is greater than 921 seals per year, with a probability that the stock is decreasing of 0.21 (Muto et al. 2016).

4.4.3 Distribution

Harbor seals range from Baja California north along the west coasts of Washington, Oregon, California, British Columbia, and Southeast Alaska; west through the Gulf of Alaska, Prince William Sound, and the Aleutian Islands; and north in the Bering Sea to Cape Newenham and the Pribilof Islands. They haul out on rocks, reefs, beaches, and drifting glacial ice and feed in marine, estuarine, and occasionally fresh waters. Harbor seals are generally non-migratory and,

with local movements associated with such factors as tide, weather, season, food availability and reproduction.

Distribution of the Clarence Strait stock ranges from the east coast of Prince of Wales Island from Cape Chacon north through Clarence Strait to Point Baker and along the east coast of Mitkof and Kupreanof Islands north to Bay Point, including Ernest Sound, Behm Canal, and Pearse Canal (Muto et al. 2016). In 2010, harbor seals in Alaska were partitioned into 12 separate stocks based largely on genetic structure (Allen and Angliss 2010). Only the Clarence Strait stock is considered in this application because other stocks occur outside the action area under consideration.

4.4.4 Presence in Project Area

Harbor seals are common in the inside waters of southeastern Alaska, including in the vicinity of the O'Connell Bridge Lightering Float. The species were seen during most months of monitoring (September through May) from Whale Park between 1994 and 2002, except in December and May (Straley et al. 2018). Harbor seals were seen on 10 out of the 21 days of monitoring for GPIP dock construction between October and November 2017, and 2 out of 8 days of monitoring for the Petro Marine dock in January 2017 (Turnagain 2017 and Windward 2017). During monitoring for the Biorka Dock construction, 70 individuals harbor seals were sighted on 18 of 21 days of monitoring in June 2018; 58 harbor seals were sighted on 15 of the 17 days of in-water work in July 2018; 82 harbor seals were sighted on all 14 days of in-water work in August 2018; and 45 were seen on all 3 days of in water work in September 2018 (Turnagain 2018). During recent observations from the O'Connell Bridge Lightering Float, 3 harbor seals were seen on 2 out of the 7 days.

Straley et al.'s data indicates a typical group size between 1 and 2 harbor seals, a maximum group size of 2 seals. Observations near Sitka Channel recorded only individual seals, and observations for GPIP dock observed mostly individuals, but a few groups with up to 3 seals were seen. Near Biorka Island, recent sightings ranged from 1 individual to a group of 9 (June and September 2018), groups up to 3 (July 2018), and groups up to 8 (August 2018). During observations from the float in September 2018, individual seals were travelling through or milling around a fish cleaning station that is located approximately 500 meters southwest of the float (SolsticeAK 2018). During other local observations, harbor seals typically display feeding behaviors (Straley et al. 2018), but have also been observed travelling, milling, and spyhopping (Turnagain 2018).

Harbor seals haul out of the water periodically to rest, give birth, and nurse their pups. According to the Alaska Fisheries Science Center's list of harbor seal haul-out locations, the closest listed haulout (id 2,933 name CE49A) is located in Sitka Sound approximately 5.5 km west, and beyond Japonski Island, of the project site (AFSC 2018).

4.5 STELLER SEA LION

4.5.1 Hearing Ability

Steller sea lion are classified by NMFS as otariid pinnipeds with a generalized in-water hearing range of 60 Hz to 39 kHz (NMFS 2016). The ability to detect sound and communicate

underwater is important for a variety of Steller sea lion life functions, including reproduction and predator avoidance. Studies of Steller sea lion auditory sensitivities have found that this species detects sounds underwater between 1 to 25 kHz (Kastelein et al. 2005) and in air between 250 Hz and 30 kHz (Muslow and Reichmuth 2010).

4.5.2 Status

The Steller sea lion was listed as a threatened species under the ESA on November 26, 1990 (55 FR 49204). In 1997, NMFS reclassified Steller sea lions as two DPSs based on genetic studies and other information (62 FR 24345; May 7, 1997). At that time, the eastern DPS (which includes animals born east of Cape Suckling, Alaska, at 144°W) was listed as threatened, and the western DPS (which includes animals breeding west of Cape Suckling, both in Alaska and Russia) was listed as endangered. On November 4, 2013, the Eastern DPS was removed from the endangered species list (78 FR 66140).

4.5.3 Distribution

Steller sea lions range along the North Pacific Rim from northern Japan to California, with centers of abundance in the Gulf of Alaska and Aleutian Islands (Loughlin et al. 1984).

Of the two Steller sea lion populations in Alaska, the Eastern DPS includes sea lions born on rookeries from California north through Southeast Alaska and the Western DPS includes those animals born on rookeries from Prince William Sound westward, with an eastern boundary set at 144°W (NMFS 2017b). Steller sea lions are not known to migrate annually, but individuals may widely disperse outside of the breeding season (late-May to early-July) (Jemison et al. 2013; Allen and Angliss 2015).

4.5.4 Presence in Project Area

Steller sea lions are common in the inside waters of southeastern Alaska and are common in the vicinity of the project. Based on recent input from NMFS, Eastern DPS and Western DPS species are thought to be within Sitka Sound.

Steller sea lions were seen during every month of monitoring (September to May) between 1994 and 2002 (Straley et al. 2018). Individual sea lions were seen on 19 of 21 days in Silver Bay and Easter Channel during monitoring for GPIP dock construction between October and November 2017 (Turnagain 2017). Near Biorka Island, sea lions were seen infrequently; 6, 2, 0, and 1 sea lions were sighted mostly individually in June, July, August, and September 2018 (Turnagain 2018). During 8 day of monitoring for the Petro Marine dock in January 2017, individual sea lions were seen on 3 days (Windward 2017). Steller sea lions were observed 5 of 8 days during recent monitoring conducted for 15-minute periods over 8 days in September 2018 within a 400-meter radius surrounding the O'Connell Bridge Lightering Float (SolsticeAK 2018). Anecdotal evidence also indicates that sea lions are common in Sitka Channel near the project footprint.

During Straley's surveys, Steller sea lions were often seen in groups of 2 to 3; however, a group of more than 100 was sighted on at least one occasion (Straley et al. 2018). Steller sea lions in

groups of 1 to 8 individuals were observed around Sitka GPIP dock construction. All Steller sea lions were alone in Sitka Channel during Petro Marine Dock construction monitoring (Windward 2017). SolsticeAK (2018) observed a group of four sea lions on one day; but most sea lions were alone during the September 2018 monitoring at the float.

4.5.5 Steller Sea Lion Critical Habitat

Critical habitat has been defined in Southeast Alaska at major haulouts and major rookeries (50 CFR 226.202). Critical habitat has been defined in Southeast Alaska at major haulouts and major rookeries (50 CFR 226.202).

The project action area does not overlap Steller sea lion critical habitat. The Biorka Island haulout is the closest designated critical habitat and is over 25 kilometers southwest of the project area (NMFS no date; Figure 14). Steller sea lions also haul out on buoys and navigational markers in Sitka Sound and along the rocky shores of Sugarloaf south of the project site. These haulouts are far beyond in-water and in-air noise disturbance threshold for hauled-out pinnipeds as described in Section 1.3.

5 TYPE OF INCIDENTAL TAKE AUTHORIZATION REQUESTED

The type of incidental taking authorization that is being requested (i.e., takes by harassment only; takes by harassment, injury, and/or death) and the method of incidental taking.

The CBS requests the issuance of an IHA pursuant to Section 101(a)(5) of the MMPA for incidental take by Level B harassment of five species (humpback whales, killer whales, , harbor porpoises, harbor seals, and Steller sea lions) that may occur in the O'Connell Bridge Lightering Float Pile Replacement Project harassment zones during pile removal and installation. No Level A take is requested.

The activities outlined in Section 1 have the potential to take marine mammals by exposure to in-water sound. Level B take of the five species listed above will potentially result from noise associated with vibratory pile removal and installation, impact pile installation, and socketing pile installation.

The CBS requests an IHA for incidental take of marine mammals described within this application for 1 year, effective March 1, 2019 (or the issuance date, whichever is later). The CBS is not requesting a Letter of Authorization (LOA) at this time because the activities described herein are expected to be completed within 1 year from the date of authorization and are not expected to rise to the level of serious injury or mortality, which would require a LOA.

6 TAKE ESTIMATES FOR MARINE MAMMAL

The number of marine mammals (by species) that may be taken by each type of taking identified in Section 5, and the number of times such takings by each type of taking are likely to occur.

6.1 ESTIMATED TAKE

Incidental take is estimated for each species considering: 1) Acoustic thresholds above which NMFS believes marine mammals will be behaviorally harassed or incur some degree of permanent hearing impairment; 2) the size of the action area (the area of water that will be ensonified above acoustic thresholds in a day); 3) the density or occurrence of marine mammals in the action area; and, 4) the number of days or hours of pile driving and removal activity.

Because density data are not available for the action area, group sighting are used as an indicator of how often marine mammals may be present in the action area and typical groups size estimates are used as an indicator of how many animals may be present in each group. Level B take calculations are based on typical group size multiplied by the number of days of estimated pile driving.

The estimated species occurrence in the action area and the take calculation is show in Table 6.

> *Estimated take=Number of animals in group x number of groups each day x days animals are expected in action area during pile driving activity by type (Table 6).*

Table 6. Estimated Species Occurrence in Action Area and Take Calculation

Species	Estimated Number of Sightings per Day	Estimated Typical Group Size	Estimated Max Group Size	Level B Take Calculation
Humpback Whale [1]	Daily	1-2	4	2 animals per group x 1 group per day x 3 days=6
Killer Whale [2]	Daily	4-8	8	8 animals per group x 1 group per day x 3 days=24
Harbor Porpoise [3]	Daily	1-5	8	5 animals per group x 1 group per day x 3 days=15
Harbor Seal [4]	Daily	1, 2-3	3	3 animals per group x 2 groups per day x 3 days=18
Steller Sea Lion [5]	Daily	1-8	8	8 animals per group x 1 group per day x 3 days=24

[1] Most humpback whales observed in the area were solitary. Straley's survey data reports a typical group size of 2-4 whales (Straley et al 2018). During work on GPIP Dock, groups of 5 and 10 individuals were seen a few times, but most of the time, single whales were observed near the mouth of Silver Bay (Turnagain 2017).

[2] Straley's survey data indicates a typical killer whale group size between 4 and 8 and a maximum group size of 8 whales in the area (Straley et al. 2018). A pod of three killer whales were observed during monitoring for the Petro Marine Dock, and a pod of seven whales were observed on one day near Biorka Island (Windward 2017; Turnagain 2018).

[3] Straley's survey data indicates a typical group size of 5 harbor porpoises and a maximum group size of 8 harbor porpoises. No harbor porpoises were seen during the Petro Marine Dock construction monitoring in January 2017 or during monitoring for the GPIP dock between October of November of 2017 (Windward 2017 and Turnagain 2017). They were also not observed near the O'Connell Bridge Lightering Float in September 2018 or Biorka Island between June through September 2018 (Turnagain 2018).

[4] Straley et al.'s data indicates a typical group size between 1 and 2 harbor seals, and a maximum group size of 2 seals. Observations near Sitka Channel recorded only individual seals, and observations for GPIP dock observed mostly individuals, however, a few groups with up to 3 seals were observed. Near Biorka Island, recent sightings ranged from 1 individual to a group of 9 (June and September 2018) groups up to 3 (July 2018), and groups up to 8 (August 2018). During observations from the O'Connell float in September 2018, individual seals were travelling through or milling around a fish cleaning station that is located approximately 500 meters southwest of the float (SolsticeAK 2018).

[5] During Straley's surveys, Steller sea lions were often seen in groups of 2 to solitary or in groups of 2; however, a group of more than 100 was sighted on at least one occasion (Straley et al. 2018). During GPIP dock construction, Steller sea lions were observed in groups of 1 to 8 individuals. During Petro Marine Dock construction monitors observed solitary sea lions (Windward 2017). During monitoring at the O'Connell Float SolsticeAK (2018) observed a group of four sea lions on one day; but most sea lions were solitary.

6.1.1 Humpback Whale

Humpback whales frequent the action area and could be encountered during any given day of pile driving/removal activities. In the project vicinity, humpback whales typically occur in groups of 1 to 2 animals, with an estimated maximum group size of 4 animals. CBS conservatively estimates that a group of 2 humpback whales may occur within the Level B harassment zone every day of the 3-day construction window during active pile driving (2 animals in a group x 1 groups each day × 3 days = 6 animals). Therefore, the CBS requests authorization for 6 Level B takes of humpback whales. No Level A take of humpback whales is requested.

Based on Wade et al. (2016; Section 4.1), the probability is that 93.9 percent of the humpback whales taken would be from the Hawaii DPS (not listed under ESA) and 6.1 percent of the humpback whales taken would be from the ESA-listed threatened Mexico DPS.

The CBS's request for 6 Level B takes of humpback whale, has a probability of 5 Level B takes of the Hawaii DPS humpback whale and 1 Level B takes of the Mexico DPS humpback whale.

6.1.2 Killer Whales

Killer whales pass through the action area and could be encountered during any given day of pile removal and installation. In the project vicinity, typical killer whale pod sizes vary from between 4-8 individuals, with an estimated maximum group size of 8 animals (Straley et al 2018). CBS conservatively estimates that a group of 8 killer whales may occur within the Level B harassment zone every day of during active pile driving (8 animals in a group × 1 group each day x 3 days = 24 animals). Therefore, the CBS requests authorization for 24 Level B takes of killer whales. (To clarify, this request is for 24 takes from all stocks combined, not 24 takes from each stock.) No Level A take of killer whales is requested.

6.1.3 Harbor Porpoise

Harbor porpoises are seen infrequently in the action area, but they could be encountered during any given day of pile replacement activities. In the project vicinity, harbor porpoises typically occur in groups of 1-5 animals, with an estimated maximum group size of 8 animals. CBS conservatively estimates that a group of 5 harbor porpoise may occur within the Level B harassment zone once each day during the 3-day construction window during active pile driving (5 animals in a group x 1 group each day × 3 days = 15 animals). Therefore, the CBS conservatively requests authorization for 15 Level B takes of harbor porpoises. No Level A takeof harbor porpoises is requested.

6.1.4 Harbor Seals

Harbor seals are common in the action area and are expected to be encountered during pile replacement activities. In the action area harbor seals typically occur in groups of 1-3 animals, with an estimated maximum group size of 3 animals. Harbor seals can occur in the project's action area every day. CBS conservatively estimates that 2 groups of 3 harbor seals may occur within the Level B harassment zone every day that pile driving occurs, and pile driving is estimated to occur on 3 days (3 animals in a group x 2 groups per day x 3 days = 18 animals). Therefore, the CBS requests authorization for 18 Level B takes of harbor seals. No Level A take of harbor seals is requested.

6.1.5 Steller Sea Lions

Steller sea lions are common in the action area and are expected to be encountered during pile removal and driving. In the project vicinity Steller sea lions typically occur in groups of 1-8 animals (Turnagain 2017 and Windward 2017), with an estimated maximum group size of 100 animals (Straley et al. 2018). Steller sea lions can occur in the action area every day during construction. CBS conservatively estimates that a group of 8 Steller sea lions may occur within the Level B harassment zone every day that pile driving may occur, and pile driving is estimated

to occur on 3 days (8 animals in a group x 1 group x 3 days = 24 animals). Therefore, the CBS requests authorization for 24 Level B takes of Steller sea lions. No Level A take of Steller sea lion is requested.

6.2 All Marine Mammal Takes Requested

This analysis for the O'Connell Bridge Lightering Float Pile Replacement Project predicts 6 potential takes of humpback whales, 30 potential takes of killer whales, 15 potential takes of harbor porpoises, 18 potential takes of harbor seals, and 24 potential takes of Steller sea lions classified as Level B harassment under the MMPA; (Table 6). To mitigate for the large action area and potential periods of limited visibility, the takes requested include extrapolated take. The calculation for extrapolating take is described in Section 11.3.

Table 7. Take Requests for Marine Mammals and Percent of Stock

Species	Stock (NEST) [a]	Level B	Percent of Stock
Humpback Whale	Hawaii DPS (11,398) [c]	5 [b]	0.04
	Mexico DPS (3,264) [c]	1	0.03
Killer Whale	West Coast Transient (243)	24	9.88 [c]
	Alaska Resident (2,347)		1.02 [c]
	Northern Resident (261)		9.20 [c]
Harbor Porpoise	Southeast Alaska (975)	15	1.54
Harbor Seal	Clarence Strait (31,634)	18	0.05
Steller Sea Lion	Eastern DPS (49,497)	24	0.05 [d]
	Western DPS (50,983)		0.05 [d]

[a] Stock estimate from Muto, M. M. et al. 2016. NOAA Technical Memorandum NMFS-AFSC-355 Alaska Marine Mammal Stock Assessments, 2016 http://www.nmfs.noaa.gov/pr/sars/pdf/ak_2016_final_sars_june.pdf and Appendix 2. Stock Summary Table (last revised December 30, 2016). http://www.nmfs.noaa.gov/pr/sars/pdf/ak_2016_sars_appendix_2.pdf

[b] Under the MMPA humpback whales are considered a single stock (Central North Pacific); however, here they are divided to account for DPSs listed under the ESA. Based on calculations in Wade et al. 2016, 93.9% of the humpback whales in Southeast Alaska are expected to be from the Hawaii DPS and 6.1% are expected to be from the Mexico DPS.

[c] These percentages assume all 24 takes come from each individual stock, thus the percentage are inflated if multiple stocks are actually impacted.

[d] These percentages assume all 24 takes come from each individual stock, thus the percentage are inflated if multiple stocks are actually impacted.

7 ANTICIPATED IMPACT OF THE ACTIVITY

The anticipated impact of the activity to the species or stock of marine mammal.

CBS is requesting authorization for Level B take of marine mammals as listed in Table 7 which shows take requests in relation to the overall stock size of each species. Incidental takes of Steller sea lions and harbor seals will likely be multiple takes of individuals, rather than single takes of unique individuals. The stock take calculations in Table 6 and 7 assume takes of individual animals, instead of repeated takes of a smaller number of individuals; therefore, the stock take percentage calculations are conservative.

Incidental Level B take is expected to result primarily in short-term changes in behavior, such as avoidance of the project area, changes in swimming speed or direction, and changes in foraging behavior. Level B exposure could occur on 3 days when pile driving and removal occurs. Because of the limited time that marine mammals could be exposed to Level B harassment, pile replacement activities at O'Connell Bridge Lightering Float would be unlikely to have any impact on stock recruitment or survival, and therefore, would have a negligible impact on the stocks of these species.

8 ANTICIPATED IMPACTS ON SUBSISTENCE USES

The anticipated impact of the activity on the availability of the species or stocks of marine mammals for subsistence uses.

Alaska Natives have traditionally harvested subsistence resources, including sea lions and harbor seals, in Southeast Alaska for hundreds of years. The Alaska Department of Fish and Game reports that in 2012 (the most recent data set available), about 11% of Sitka households used subsistence caught marine mammals. About 7% of households used harbor seals and 0.2% used Steller sea lions and unknown species of whales. Sitka households had an estimated subsistence take of 274 harbor seals and 5 Steller sea lions (ADF&G 2013).

During September 2018, the Alaska Harbor Seal Commission, the Alaska Sea Otter and Steller Sea Lion Commission, and the Sitka Tribe of Alaska were contacted to discuss the project and request comments. The executive director for the Alaska Sea Otter and Steller Sea Lion Commission recommended contacting the Sitka Tribe of Alaska for comment (Jack 2018).

Jeff Feldpausch, Resource Protection Director for the Sitka Tribe of Alaska, was contacted. Mr. Feldpausch relayed questions related to subsistence to the tribe. Specific questions and responses are listed below.

> ***What species of subsistence marine mammals are important to Sitka tribal members within Sitka Sound?***
> Seal, sea lion, and sea otter were identified as the most important subsistence marine mammals.
>
> ***Are there concerns related to the project's impacts on subsistence marine mammals.***
> There were no concerns about the impact on subsistence marine mammals or their harvest by hunters within the area of this project. Unrelated to subsistence species, the Tribe mentioned that their members have observed harbor porpoise and whales near the project area in the past. The Tribe requested that no pile driving occur between March 15 and May 31 to protect herring, as has been the case for past permitting in Sitka Sound.
>
> ***Are there questions regarding the project, particularly related to subsistence marine mammals, that CBS need to address?***
> The Tribe asked whether marine mammal monitors would be utilized construction? If so, the Tribe requested that tribal members be hired to fill those positions.
>
> CBS responded with contactor contact information for monitoring positions and NMFS' requirements for protected species observers.

Based on the above information, the proposed project is not likely to adversely impact the availability of any marine mammal species or stocks that are commonly used for subsistence purposes or to impact subsistence harvest of marine mammals in the region because:

- Construction activities are localized and temporary in the previously developed O'Connell Bridge Lightering Float site;
- Mitigation measures will be implemented to minimize disturbance of marine mammals in the action area; and,
- The project will not result in significant changes to availability of subsistence resources.

9 ANTICIPATED IMPACTS ON HABITAT

The anticipated impact of the activity upon the habitat of the marine mammal populations and the likelihood of restoration of the affected habitat.

9.1 Impacts to Physical Habitat

9.1.1 Project Footprint

The entire O'Connell Bridge Lightering Float Pile Replacement Project footprint would be within previously disturbed area and within an active marine commercial and industrial area.

9.1.2 Turbidity/Sedimentation

During the estimated 13 hours of pile driving, a temporary and localized increase in turbidity near the seafloor would occur in the immediate area surrounding the area where piles are removed and placed. As described in Section 2, lower intertidal and shallow subtidal areas are primarily cobbles and boulders with varying amounts of silt (NMFS 2018). The sediment thickness varies from 3 to 30 inches (PND 2017) until bedrock is reached. These sediments will be disturbed during pile driving; however, suspension will be brief and very localized and is unlikely to measurably affect marine mammals or their prey in the area.

9.2 Effects of Project Activities on Marine Mammal Habitat

9.2.1 Animal Avoidance or Abandonment

All of these species discussed in this application could experience a temporary loss of suitable habitat, depending on the degree that they use the area, within the action area if elevated noise levels associated with in-water construction result in their displacement from the area. However, displacement of species by noise is expected to be temporary and will not result in long-term effects to the local populations.

9.3 Effects of Project Activities on Marine Mammal Prey Habitat

The action area supports marine habitat for prey species including:

- Large populations of anadromous fish including Pacific salmon (five species), cutthroat and steelhead trout, and Dolly Varden (ADF&G 2018; Chenoweth et al. 2017; NMFS No Date);
- Other species of marine fish such as walleye pollock, halibut, lingcod, Pacific cod, Pacific herring, Pacific capelin, eulachon, and rockfish (ADF&G no date; NPS 2016, NMFS 2018c); and,
- euphausiids (krill).

There are no anadromous streams that flow directly into the action area; however, the Alaska Department of Fish and Game Catalog of Waters Important for Spawning, Rearing, or Migration of Anadromous Fishes lists five anadromous streams with mouths near the action area (ADF&G 2018). The location of these streams near the action area indicates that anadromous fish that use them would likely also use the action area. These streams are:

- Indian River (Anadromous Waters Code 113-41-10190), is located approximately 1.6 kilometers southeast of the project site and provides habitat for chum salmon, coho salmon, pink salmon, and steelhead (*O. mykiss*).
- Peterson Creek (Anadromous Waters Code 113-41-10185), is approximately 2.4 kilometers miles northwest of the proposed project (outside the action area) and contains habitat for Coho salmon, pink salmon, and Dolly Varden.
- Thimbleberry Creek (Anadromous Waters Code 113-41-10200) is approximately 4.5 kilometers east of the proposed project and contains habitat for chum salmon, coho salmon, and pink salmon.
- Thumbleberry Creek (Anadromous Waters CODE 113-41-10203) is approximately 5.2 kilometers east of the proposed project and contains habitat for chum salmon, coho salmon, and pink salmon.
- An unnamed creek (Anadromous Waters Code 113-41-10344) at the head of Camp Coogan Bay, is located approximately 8.8 kilometers southeast of the project site and provides habitat for chum salmon and pink salmon.

Because piles would be placed in a previously disturbed industrial area, the project is not likely to adversely affect marine mammal prey habitat.

Fish populations in the project area that serve as marine mammal prey could be affected by noise from in-water pile-driving. High underwater sound pressure levels have been documented to alter behavior, cause hearing loss, and injure or kill individual fish by causing serious internal injury (Hastings and Popper 2005).

In addition, generally, impacts to marine mammal prey species are expected to be minor and temporary. The area impacted by the project is very small compared to the available habitat around Sitka. The most likely impact to prey will be temporary behavioral avoidance of the immediate area. During pile driving it is expected that fish and marine mammals would temporarily move to nearby locations and return to the area following cessation of in-water construction activities. Therefore, indirect effects on marine mammal prey during the construction are not expected to be substantial.

10 ANTICIPATED EFFECTS OF HABITAT IMPACTS ON MARINE MAMMALS

The anticipated impact of the loss or modification of the habitat on the marine mammal populations involved.

The proposed project will occur within the previously disturbed footprint of the existing float and would not result in a significant area of permanent loss or modification of habitat for marine mammals or their food sources. The most likely effects on marine mammal habitat for the proposed project will be temporary, short duration in-water noise, temporary prey (fish) disturbance, and localized, temporary water quality effects. The direct loss of habitat available to marine mammals during construction due to noise, water quality impacts, and other construction activity is expected to be short-term and minimal.

10.1 Loss of Marine Mammal Habitat Due to Noise

One potential impact on marine mammals associated with the project could be a temporary loss of habitat because of elevated noise levels. Displacement of marine mammals by noise would not be permanent and would not have long-term effects. The proposed project is not expected to have any habitat-related effects that could cause significant or long-term consequences for individual marine mammals or their populations, because pile driving and other noise sources will be temporary and intermittent.

10.2 Loss of Marine Mammal Habitat Due to Turbidity

Another potential impact on marine mammals associated with the project could be temporary sediment suspension and increased turbidity associated with pile driving and removal in Crescent Bay. The temporary and localized turbidity associated with the repair project is unlikely to measurably affect marine mammals or their prey in the area.

10.3 Disturbance or Loss of Prey Species

As stated in Section 9, fish populations in the project area that serve as marine mammal prey could be affected by noise from in-water pile-driving. It is expected that most fish will be able to move away from the proposed activity to avoid harm and will still be available to marine mammals as a food source. The quantity, quality, and availability of adequate food resources are therefore not likely to be reduced (due to the small area affected, mobility of fish, anticipated recolonization, and the temporary nature of the project).

11 MITIGATION MEASURES

The availability and feasibility (economic and technological) of equipment, methods, and manner of conducting such activity or other means of effecting the least practicable adverse impact upon the affected species or stocks, their habitat, and their availability for subsistence uses, paying particular attention to rookeries, mating grounds, and areas of similar significance.

Mitigation measures and construction techniques will be employed to minimize effects to marine mammal species and habitat. These measures are described below and presented in detail in the CBS O'Connell Bridge Lightering Float Pile Replacement Project 4MP (Appendix C).

11.1 Mitigation Measures Designed to Reduce Project Impacts

- The project replaces failing piles with the same size piles, driven in the same location.
- The project uses a design that does not require dredging, blasting, or fill.
- Noise associated with in-water pile driving would be localized and short-term. In-water pile driving would occur for 13 hours over a 3-day period. Vibratory driving would occur for approximately 1 hour, socketing (down-hole drilling) would occur for approximately 12 hours, and impact pile driving would occur for approximately 3 minutes.
- Plans for avoiding, minimizing, and responding to releases of sediments, contaminants, fuels, oil, and other pollutants will be developed and implemented.
- Spill response equipment will be kept on-site during construction.
- Floats or barges will not be grounded at any tidal stage.

11.2 Pile Driving and Removal Mitigation Measures

- Pile cushion—A softening material (e.g., high-density polyethylene or ultra-high-molecular weight polyethylene) will be used on all templates to eliminate steel on steel noise generation during impact pile driving.
- Soft start for impact pile driving—Impact pile driving will begin with an initial set of 3 strikes from the impact hammer at 40 percent energy, followed by a one-minute waiting period, then two subsequent 3-strike sets. This soft-start will be applied prior to beginning pile driving activities each day or when impact pile driving hammers have been idle for more than 30 minutes.
- All piles will be driven with a vibratory hammer or socketed until a desired depth is achieved or refusal prior to using an impact hammer.
- To minimize construction noise levels as much as possible, the contractor will first attempt to direct pull the existing piles; if those efforts prove to be ineffective, they will proceed with a vibratory hammer.
- To reduce noise production, the vibratory hammer will be operated at a reduced energy setting (30 to 50 percent of its rated energy).
- When the impact hammer is used, a pile cushion will be placed inside the drive cap to reduce noise.
- The impact hammer will be operated at reduced fuel setting as long as is practicable.

11.3 Mitigation Measures Designed to Reduce Impacts to Marine Mammals

- Qualified Protected Species Observers (PSOs) with stop work authority will be onsite monitoring the project's shutdown and monitoring zones before, during, and after all in-water construction activity (shutdown and monitoring zones are outlined in Tables 7 and 8).
- Two PSOs will be onsite to view the shutdown and monitoring zones.
- If marine mammals are observed within their Level B monitoring zones, the sighting will be appropriately documented as a Level B take.
- If Level B take is not authorized for a species, and it is observed approaching the Level B zone, shutdown procedures will be implemented to prevent take.
- If a species is observed approaching its Level A shutdown zone, shutdown procedures will be implemented to prevent exposure.
- If Level A take occurs, or if the number of species observed within the Level B zones during noise-producing project activities approaches the number of takes authorized in the Incidental Take Statement, the CBS will notify NMFS.
- Because of the large size of some of the Level B monitoring zones, Level B take may be extrapolated. PSOs may observe a smaller area than the entire Level B zone and extrapolate project take from that area. For example, if the PSOs could confidently monitor 50 percent of the Level B zone, and 10 seals were observed during pile driving, then the total extrapolated number of takes would be 20.The CBS has developed a 4MP as a part of this IHA application. The 4MP is presented in its entirety in Appendix C.

11.4 Shutdown and Monitoring Zones

11.4.1 Level A Shutdown Zones

The CBS proposes the following shutdown zones as outlined in Table 7 and Figure 6. These zones will be thoroughly monitored, and, as indicated in the 4MP for this project (Appendix C), shutdown procedures will be implemented (construction activities suspended) if a marine mammal is observed likely to enter a shutdown zone.

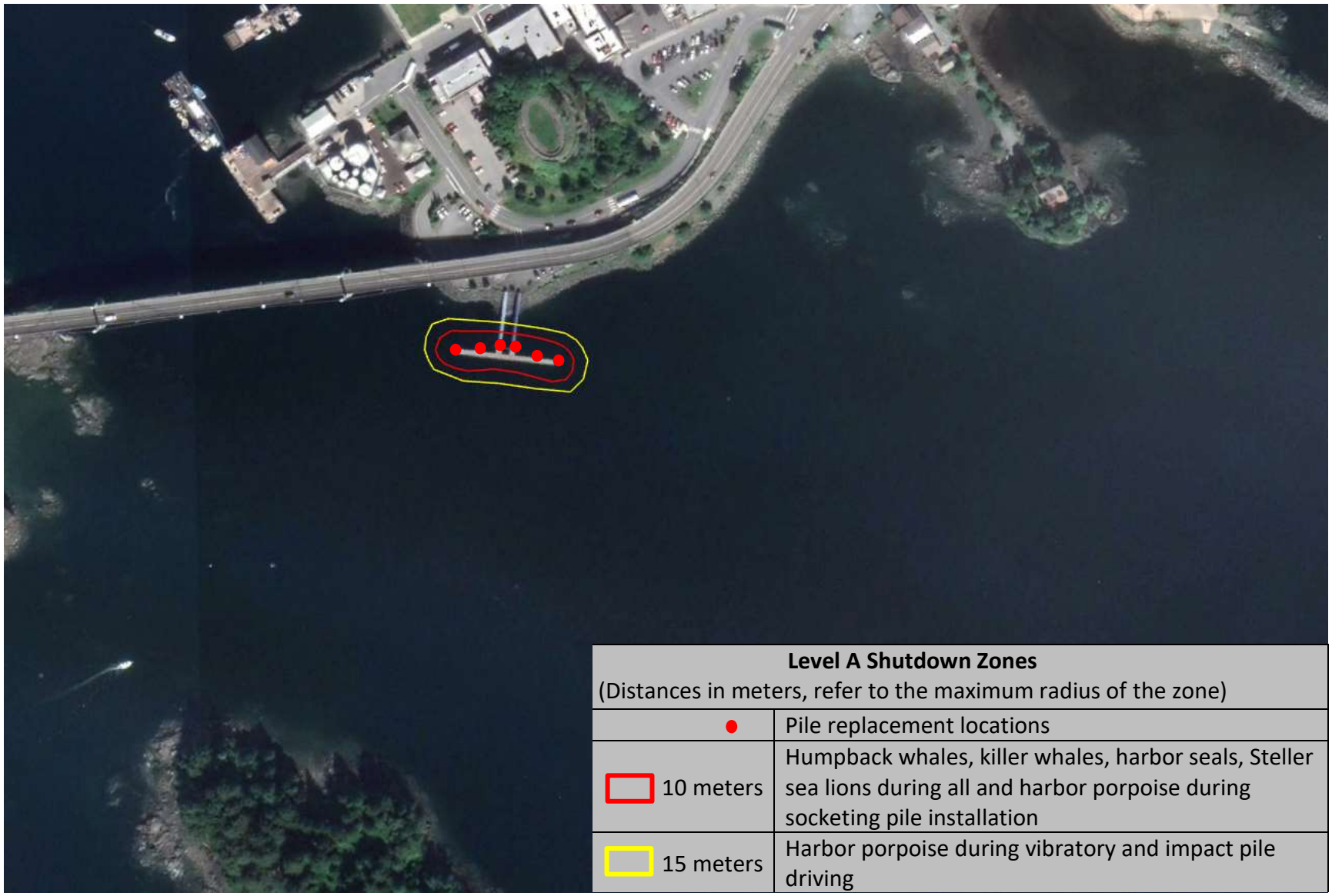
Table 7. Level A Shutdown Zones

Noise Source	Shutdown Zones in meters [1]				
	Low-Frequency Cetaceans (humpback whale)	Mid-Frequency Cetaceans (killer whale)	High-Frequency Cetaceans (harbor porpoise)	Phocid (harbor seal)	Otariid (sea lion)
In-Water Construction Activities					
Barge movements, pile positioning, deadpulling, sound attenuation placement [2]	10	10	10	10	10
Vibratory Pile Driving/Removal					
16-inch steel removal and installation (12 piles) (~1 hour on 1 day)	10	10	15	10	10
Socketing Pile Installation					
16-inch steel installation (6 piles) (6 hours per day on 2 days	10	10	10	10	10
Impact Pile Driving					
16-inch steel installation (6 piles) (~3 minutes on 1 day)	10	10	15	10	10

[1] Shutdown zone distances refer to the maximum radius of the zone and are rounded (see Table 3 for calculated distances).

[2] Although acoustic injury is not the primary concern with these activities, shutdowns will be implemented to avoid impacts to species.

Figure 6. Level A Shutdown Zones



Level A Shutdown Zones (Distances in meters, refer to the maximum radius of the zone)	
●	Pile replacement locations
10 meters	Humpback whales, killer whales, harbor seals, Steller sea lions during all and harbor porpoise during socketing pile installation
15 meters	Harbor porpoise during vibratory and impact pile driving

11.4.2 Level B Shutdown and Monitoring Zones

The CBS is requesting Level B take of humpback whale, killer whale, harbor porpoise, harbor seal, and Steller sea lion incidental to constructing the pile replacement project. Construction shut downs associated with Level B harassment of these species are not proposed. The monitoring zones associated with Level B harassment are outlined in Table 8 and Figure 7.

In the unlikely event that another marine mammal species, other than those listed to occur and discussed in this document, were to enter the action area, pile driving would be shut down as summarized in Table 9 and Figure 7 to avoid unauthorized Level B take.

Table 8. Level B Monitoring Zones

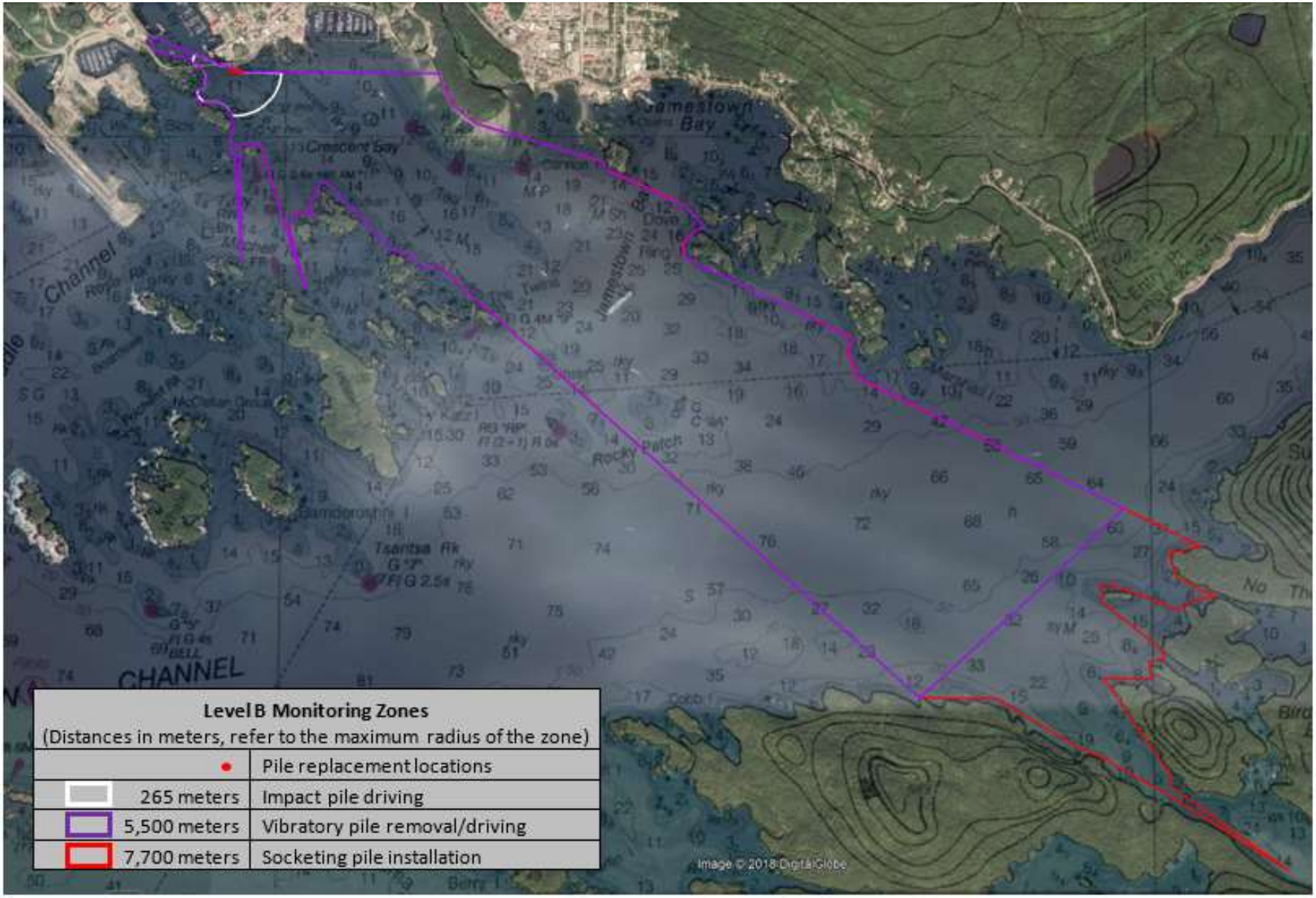
Pile Driving Noise Source	**Monitoring Zones for Level B Take (meters)** [1, 2]
Vibratory Pile Driving	
16-inch steel removal and installation (12 piles) (~1 hour on 1 day)	5,500
Socketing Pile Installation	
16-inch steel installation (6 piles) (6 hours per day on 2 days)	7,700 [3]
Impact Pile Driving	
16-inch steel installation (6 piles) (~3 minutes per day on 1 day)	265

[1] Numbers rounded up to nearest 10 meters; see Table 3 for actual isopleth distances.

[2] CBS is not proposing shutdowns associated with Level B disturbance.

[3] Level B isopleth distance calculated to 15,136 meters but would be truncated by landforms in project area to a maximum distance of 7,700 meters.

Figure 7. Level B Monitoring Zones



12 ARCTIC PLAN OF COORDINATION

Where the proposed activity would take place in or near a traditional Arctic subsistence hunting area and/or may affect the availability of a species or stock of marine mammal for Arctic subsistence uses, submit either a plan of cooperation or information that identifies what measures have been taken and/or will be taken to minimize any adverse effects on the availability of marine mammals for subsistence uses. (This requirement is applicable only for activities that occur in Alaskan waters north of 60° North latitude.)

Although the action area is located south of 60° North, the latitude NMFS regulations consider Arctic waters, and no activities will take place in or near traditional Arctic subsistence hunting areas, there are subsistence uses of marine mammals in Southeast Alaska and in the community of Sitka. Alaska Natives have traditionally harvested subsistence resources, including sea lions and harbor seals, in Southeast Alaska for hundreds of years.

Section 8 details subsistence information and consultations with subsistence users in the project vicinity.

13 MONITORING AND REPORTING

The suggested means of accomplishing the necessary monitoring and reporting that will result in increased knowledge of the species, the level of taking or impacts on populations of marine mammals that are expected to be present while conducting activities and suggested means of minimizing burdens by coordinating such reporting requirements with other schemes already applicable to persons conducting such activity. Monitoring plans should include a description of the survey techniques that would be used to determine the movement and activity of marine mammals near the activity site(s) including migration and other habitat uses, such as feeding.

To minimize impacts of project activities on marine mammals, PSOs will be present in the action area during all vibratory pile removal and vibratory, impact, and socketing pile installation. PSOs will search for, monitor, document, and track marine mammals within the Level A and B harassment zones (Figures 6 and 7), and, shut downs will be implemented if a marine mammal is likely to enter a specified shutdown zone (Section 11.3).

If Level A were to occur, or if the number species exposed to Level B harassment approaches the number of takes allowed by the IHA, the CBS will notify NMFS and seek further consultation.

13.1 Monitoring Plan

Monitoring measures that will document and or reduce take of marine mammals are outlined in Section 11 and detailed in the 4MP (Appendix C).

13.2 Monitoring Report

Procedures for reporting are detailed in the 4MP and summarized below.

The CBS will submit a draft report to NMFS not later than 90 days following the end of construction activities or 60 days prior to the issuance of any subsequent IHA for the project. CBS will provide a final report within 30 days following resolution of NMFS' comments on the draft report. Reports will contain, at minimum, the following:

- Date and time that monitored activity begins and ends for each day conducted (monitoring period);
- Construction activities occurring during each daily observation period, including how many and what type of piles driven;
- Deviation from initial proposal in pile numbers, pile types, average driving times, etc.
- Weather parameters in each monitoring period (e.g., wind speed, percent cloud cover, visibility);
- Water conditions in each monitoring period (e.g., sea state, tide state);
- For each marine mammal sighting:
    - Species, numbers, and, if possible, sex and age class of marine mammals;
    - Description of any observable marine mammal behavior patterns, including bearing and direction of travel and distance from pile driving activity;
    - Location and distance from pile driving activities to marine mammals and distance from the marine mammals to the observation point;

    - Estimated amount of time that the animals remained in the Level A or B zone.
- Description of implementation of mitigation measures within each monitoring period (e.g., shutdown or delay);
- Other human activity in the area within each monitoring period;
- A summary of the following:
    - Total number of individuals of each species detected within the Level B Zone, and estimated as taken if correction factor appropriate.
    - Total number of individuals of each species detected within the Level A Zone and the average amount of time that they remained in that zone.
    - Daily average number of individuals of each species detected within the Level B Zone, and estimated as taken, if appropriate.

The CBS will also immediately report injured or dead marine mammals to NMFS, and, if the specified activity clearly causes the take of marine mammals in a manner prohibited by the IHA (e.g. serious injury or mortality), CBS will immediately cease pile activities and report the incident to NMFS.

14 SUGGESTED MEANS OF COORDINATION

Suggested means of learning of, encouraging, and coordinating research opportunities, plans, and activities relating to reducing such incidental taking and evaluating its effects.

In-water and in-air noise generated by vibratory pile driving, socketing (down-hole drilling), and impact pile driving at the CBS's O'Connell Bridge Lightering Float Pile Replacement Project is the primary issue of concern to local marine mammals during this project. Potential impacts on marine mammals have been studied, with the results used to establish the noise criteria for evaluating take.

The data recorded during marine mammal monitoring for the proposed project will be provided to NMFS in the monitoring report (Section 13.2). The report will provide information on marine mammals use of Sitka Sound, including numbers before, during, and after pile driving activities. The monitoring data may also inform NMFS and future permit applicants generally about the behavior of marine mammals during pile installation and removal for future projects of a similar nature.

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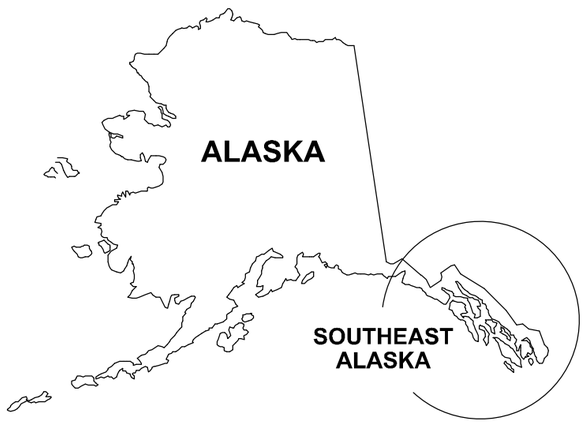
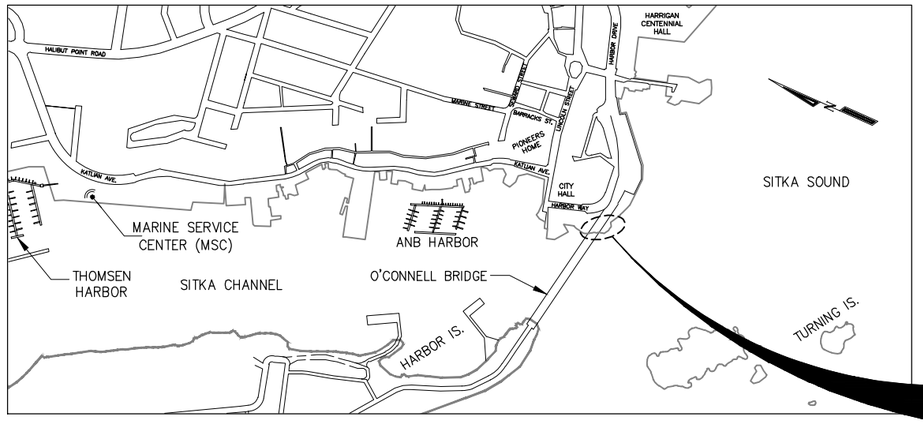
Appendix A.
Permit Drawings

CITY AND BOROUGH OF SITKA
O'CONNELL BRIDGE LIGHTERING FACILITY
PILE REPLACEMENT



LOCATION MAP

SOUTHEAST ALASKA



VICINITY MAP

SCALE (FEET)
0 500 1000

PROJECT SCHEDULE	
DESCRIPTION	SCHEDULE
1. SUBSTANTIAL COMPLETION	MAY 31, 2019
2. PHYSICAL COMPLETION	30 DAYS AFTER SUBSTANTIAL
3. FINAL COMPLETION	30 DAYS AFTER PHYSICAL

NOTE:
CONTRACTOR'S SCHEDULE SHALL ACCOUNT FOR ANY/ALL IN WATER WORK RESTRICTIONS ESTABLISHED BY LOCAL AUTHORITIES AND DICTATED BY PERMITS OBTAINED FOR THIS PROJECT.

DRAWING INDEX

DWG. NO.	SHEET NO.	TITLE
1.01	1 OF 4	TITLE SHEET, VICINITY MAP AND DRAWING INDEX
1.02	2 OF 4	OVERALL EXISTING SITE PLAN
1.03	3 OF 4	FACILITY PLAN AND ELEVATION
1.04	4 OF 4	PILE DETAILS

REVISIONS

REV.	DATE	DESCRIPTION	DWN.	CKD.	APP.

P N D ENGINEERS, INC.
9360 Glacier Highway Ste 100
Juneau, Alaska 99801
Phone: 907-586-2093
Fax: 907-586-2099
www.pndengineers.com

DESIGN: MS CHECKED: JLD
DRAWN: WRB APPROVED: JLD
SCALE:

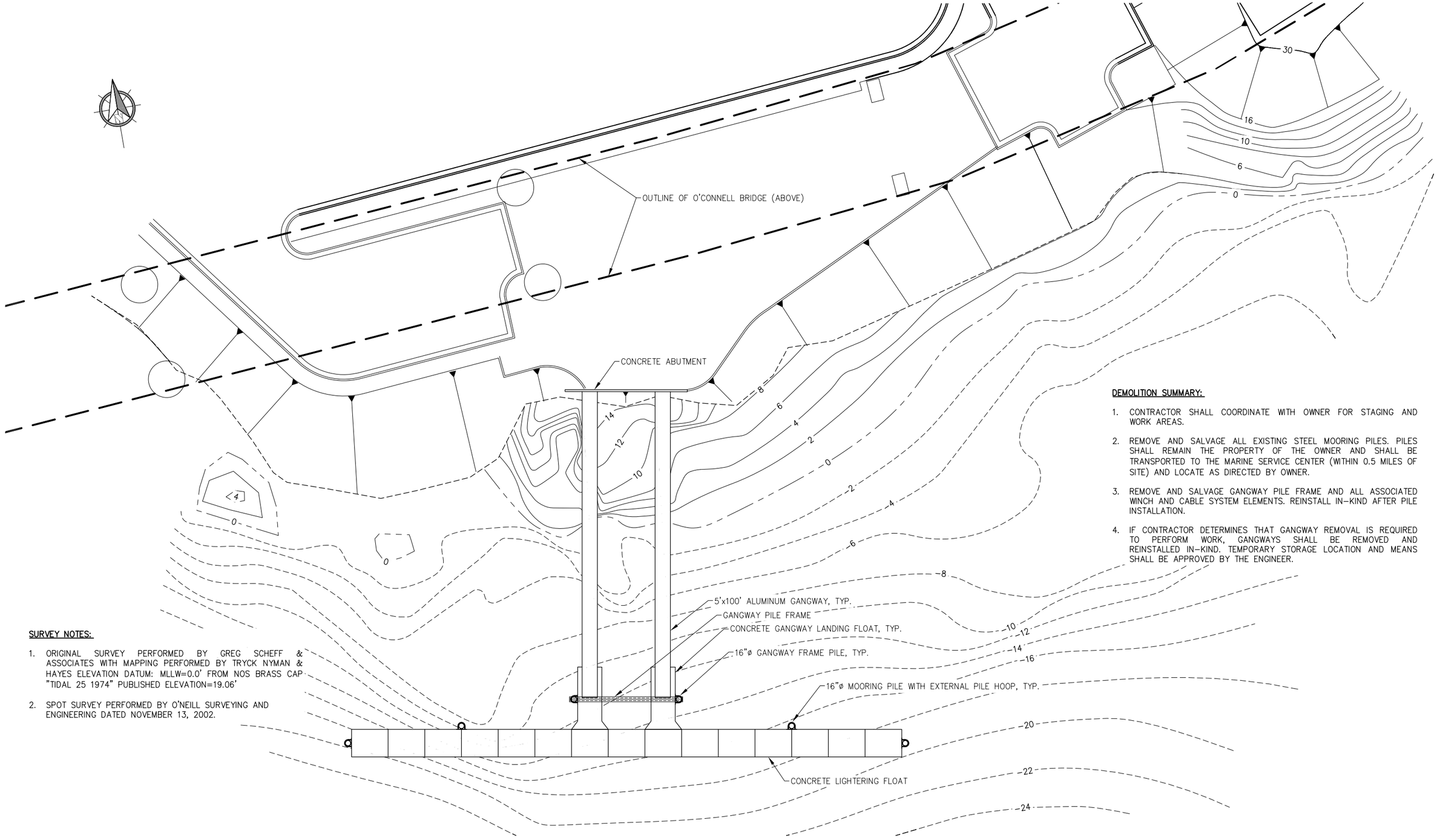
STATE OF ALASKA 49TH
John L. DeMuth CE-8847 REGISTERED PROFESSIONAL ENGINEER
DATE: 3/5/2018

CITY AND BOROUGH OF SITKA
O'CONNELL BRIDGE LIGHTERING FACILITY
PILE REPLACEMENT

SHEET TITLE:
TITLE SHEET, VICINITY MAP AND DRAWING INDEX

PND PROJECT NO.: 172065

1.01
SHEET 1 OF 4



DEMOLITION SUMMARY:

1. CONTRACTOR SHALL COORDINATE WITH OWNER FOR STAGING AND WORK AREAS.
2. REMOVE AND SALVAGE ALL EXISTING STEEL MOORING PILES. PILES SHALL REMAIN THE PROPERTY OF THE OWNER AND SHALL BE TRANSPORTED TO THE MARINE SERVICE CENTER (WITHIN 0.5 MILES OF SITE) AND LOCATE AS DIRECTED BY OWNER.
3. REMOVE AND SALVAGE GANGWAY PILE FRAME AND ALL ASSOCIATED WINCH AND CABLE SYSTEM ELEMENTS. REINSTALL IN-KIND AFTER PILE INSTALLATION.
4. IF CONTRACTOR DETERMINES THAT GANGWAY REMOVAL IS REQUIRED TO PERFORM WORK, GANGWAYS SHALL BE REMOVED AND REINSTALLED IN-KIND. TEMPORARY STORAGE LOCATION AND MEANS SHALL BE APPROVED BY THE ENGINEER.

SURVEY NOTES:

1. ORIGINAL SURVEY PERFORMED BY GREG SCHEFF & ASSOCIATES WITH MAPPING PERFORMED BY TRYCK NYMAN & HAYES ELEVATION DATUM: MLLW=0.0' FROM NOS BRASS CAP "TIDAL 25 1974" PUBLISHED ELEVATION=19.06'
2. SPOT SURVEY PERFORMED BY O'NEILL SURVEYING AND ENGINEERING DATED NOVEMBER 13, 2002.

CITY AND BOROUGH OF SITKA — DECEMBER 2, 1974

REVISIONS

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PND ENGINEERS, INC.
9360 Glacier Highway Ste 100
Juneau, Alaska 99801
Phone: 907-586-2093
Fax: 907-586-2099
www.pndengineers.com

DESIGN: MS CHECKED: JLD
DRAWN: WRB APPROVED: JLD
SCALE: SCALE IN FEET 0 15 30 FT.

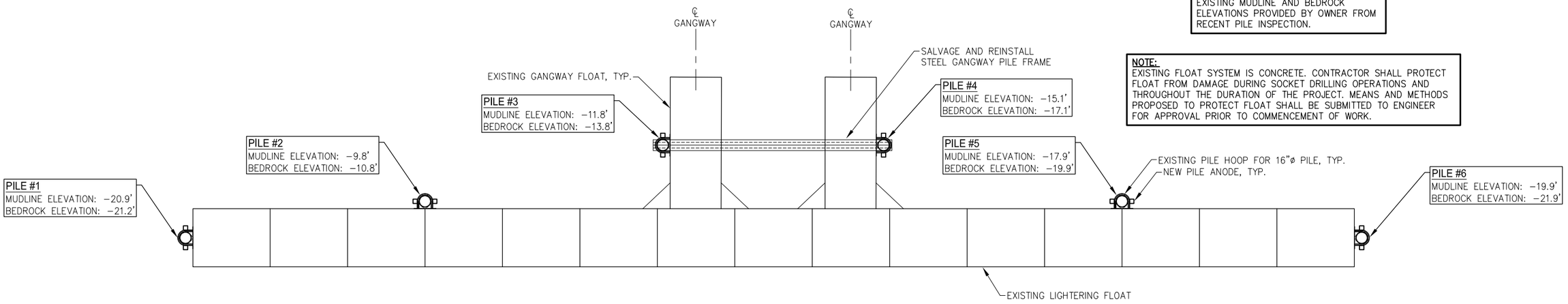
STATE OF ALASKA — 49TH — John L. DeMuth CE-8847 — REGISTERED PROFESSIONAL ENGINEER
DATE: 3/5/2018

CITY AND BOROUGH OF SITKA
O'CONNELL BRIDGE LIGHTERING FACILITY PILE REPLACEMENT

SHEET TITLE:
OVERALL EXISTING SITE PLAN

PND PROJECT NO.: 172065

1.02
SHEET 2 OF 4

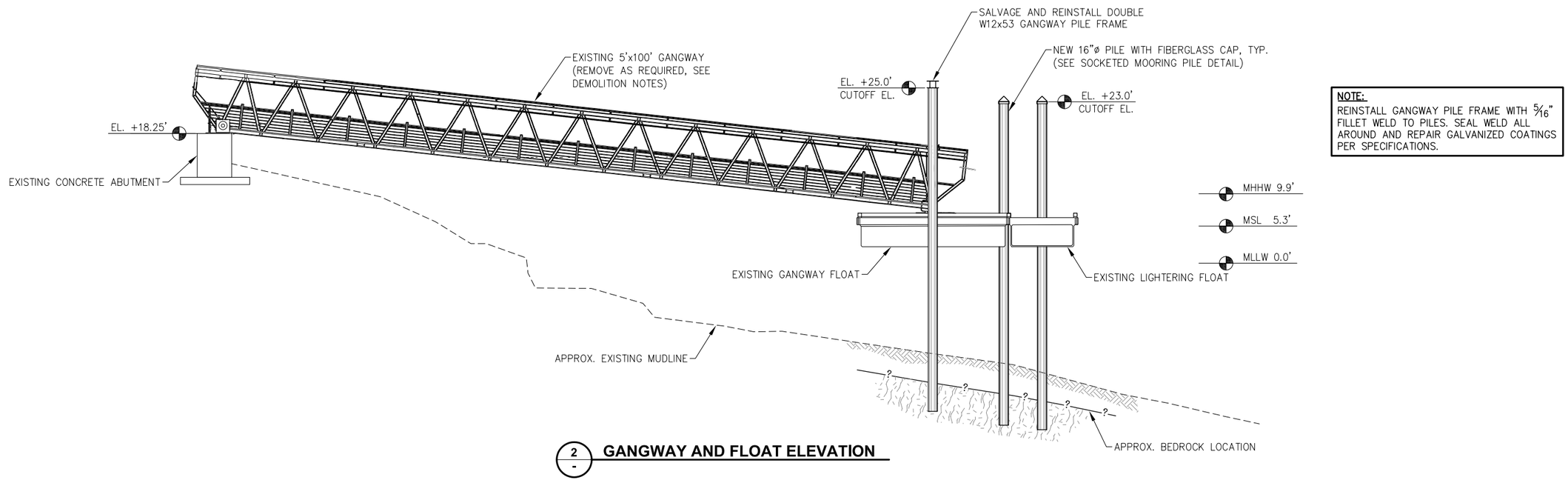


NOTE:
EXISTING MUDLINE AND BEDROCK ELEVATIONS PROVIDED BY OWNER FROM RECENT PILE INSPECTION.

NOTE:
EXISTING FLOAT SYSTEM IS CONCRETE. CONTRACTOR SHALL PROTECT FLOAT FROM DAMAGE DURING SOCKET DRILLING OPERATIONS AND THROUGHOUT THE DURATION OF THE PROJECT. MEANS AND METHODS PROPOSED TO PROTECT FLOAT SHALL BE SUBMITTED TO ENGINEER FOR APPROVAL PRIOR TO COMMENCEMENT OF WORK.

1 - FLOAT PLAN

NOTE: GANGWAYS NOT SHOWN THIS VIEW FOR CLARITY



NOTE:
REINSTALL GANGWAY PILE FRAME WITH 5/16" FILLET WELD TO PILES. SEAL WELD ALL AROUND AND REPAIR GALVANIZED COATINGS PER SPECIFICATIONS.

2 - GANGWAY AND FLOAT ELEVATION

REVISIONS

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P N D ENGINEERS, INC.
9360 Glacier Highway Ste 100
Juneau, Alaska 99801
Phone: 907-586-2093
Fax: 907-586-2099
www.pndengineers.com

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DRAWN: WRB APPROVED: JLD
SCALE: NTS
DATE: 3/5/2018

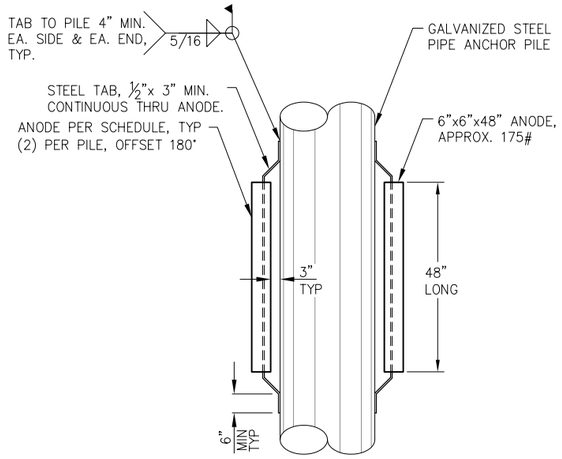
STATE OF ALASKA 49TH — John L. DeMuth CE-8847 — REGISTERED PROFESSIONAL ENGINEER

CITY AND BOROUGH OF SITKA
O'CONNELL BRIDGE LIGHTERING FACILITY PILE REPLACEMENT

SHEET TITLE:
FACILITY PLAN AND ELEVATION

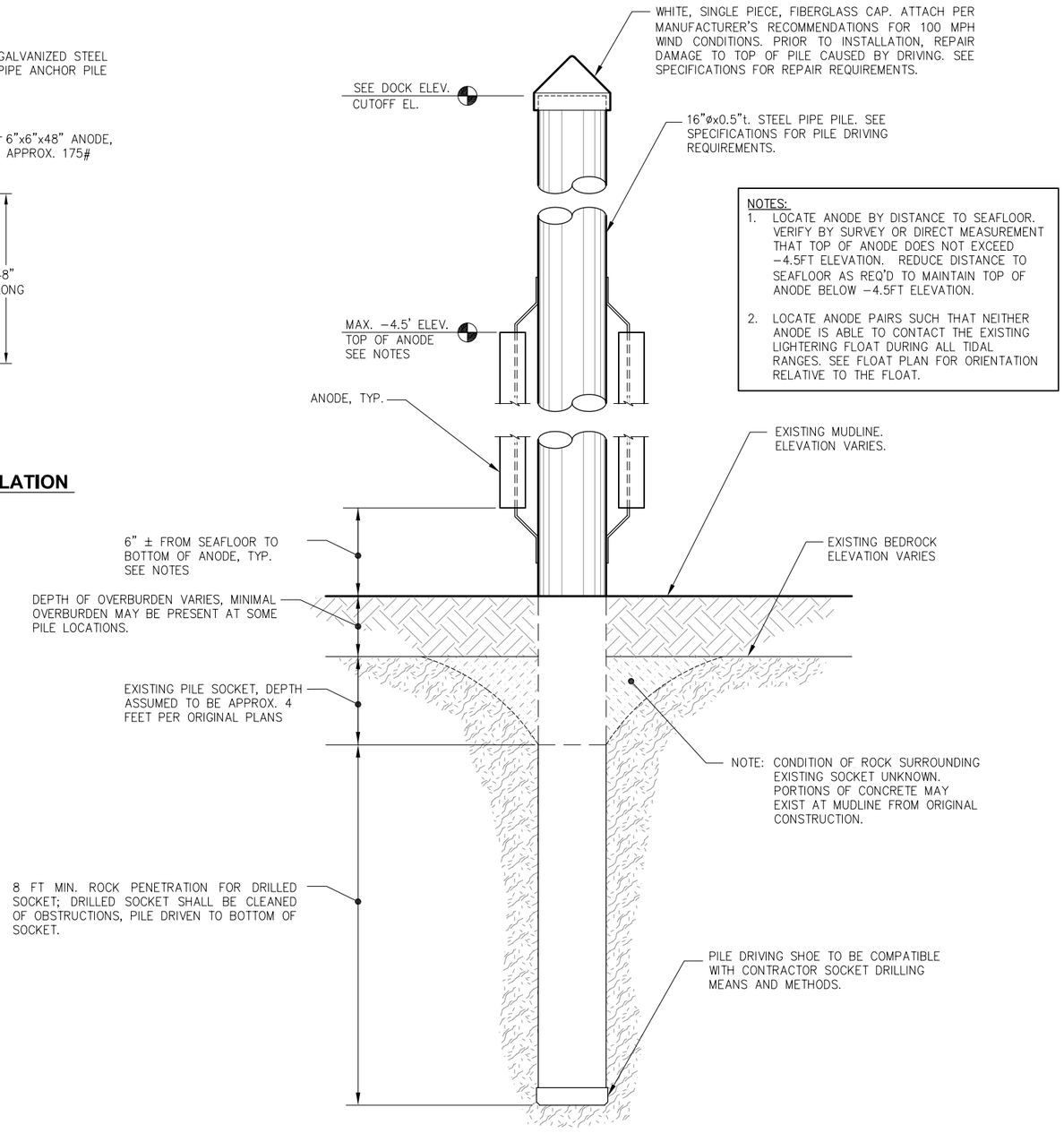
PND PROJECT NO.: 172065

1.03
SHEET 3 OF 4



TYPICAL ANODE INSTALLATION

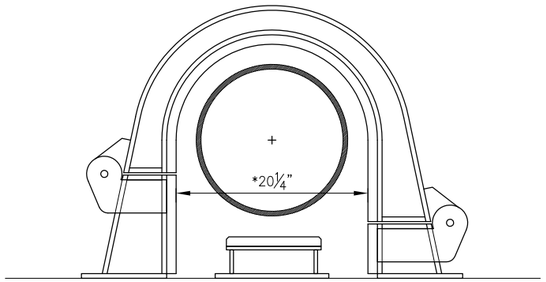
(TYPICAL FOR ALL PILES)



NOTES:

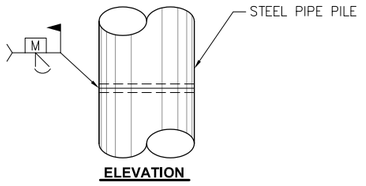
1. LOCATE ANODE BY DISTANCE TO SEAFLOOR. VERIFY BY SURVEY OR DIRECT MEASUREMENT THAT TOP OF ANODE DOES NOT EXCEED −4.5FT ELEVATION. REDUCE DISTANCE TO SEAFLOOR AS REQ'D TO MAINTAIN TOP OF ANODE BELOW −4.5FT ELEVATION.
2. LOCATE ANODE PAIRS SUCH THAT NEITHER ANODE IS ABLE TO CONTACT THE EXISTING LIGHTERING FLOAT DURING ALL TIDAL RANGES. SEE FLOAT PLAN FOR ORIENTATION RELATIVE TO THE FLOAT.

SOCKETED MOORING PILE

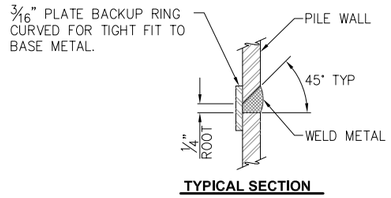


EXISTING PILE HOOP

(NOT TO SCALE)



ELEVATION



TYPICAL SECTION

TYPICAL PILE SPLICE WELD

(TYPICAL FOR ALL PIPE PILE SPLICES)

CITY AND BOROUGH OF SITKA — DECEMBER 2, 1971

REVISIONS

REV.	DATE	DESCRIPTION	DWN.	CKD.	APP.

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Phone: 907-586-2093
Fax: 907-586-2099
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SCALE: NTS

STATE OF ALASKA — 49TH — John L. DeMuth CE-8847 — REGISTERED PROFESSIONAL ENGINEER
DATE: 3/5/2018

CITY AND BOROUGH OF SITKA
O'CONNELL BRIDGE LIGHTERING FACILITY
PILE REPLACEMENT

SHEET TITLE: PILE DETAILS

PND PROJECT NO.: 172065

1.04
SHEET 4 OF 4

Appendix B.
Acoustic Threshold Calculation Spreadsheets

A.1: Vibratory Pile Driving (STATIONARY SOURCE: Non-Impulsive, Continuous)

VERSION 2.0: 2018

KEY

	User Provided Information
	NMFS Provided Information (Technical Guidance)
	Resultant Isopleth

STEP 1: GENERAL PROJECT INFORMATION

PROJECT TITLE	City and Borough of Sitka, O'Connell Bridge Lightering Float Pile Replacement Project, IHA Application
PROJECT/SOURCE INFORMATION	The vibratory source level is of 161 SPL is proxy from 24-inch steel piles driven at the Naval Base Kitsap in Bangor, Washington (NAVFAC 2012) and from acoustic modeling of nearshore marine pile driving at Navy installations in Puget Sound (United States Navy 2015).

Please include any assumptions

PROJECT CONTACT	Robin Reich, Solstice Alaska Consulting, Inc. robin@solsticeak.com

STEP 2: WEIGHTING FACTOR ADJUSTMENT

		Specify if relying on source-specific WFA, alternative weighting/dB adjustment, or if using default value
Weighting Factor Adjustment (kHz)¥	2.5	

¥ Broadband: 95% frequency contour percentile (kHz) OR Narrowband: frequency (kHz); For appropriate default WFA: See INTRODUCTION tab

† If a user relies on alternative weighting/dB adjustment rather than relying upon the WFA (source-specific or default), they may override the Adjustment (dB) (row 48), and enter the new value directly. However, they must provide additional support and documentation supporting this modification.

*** BROADBAND Sources: Cannot use WFA higher than maximum applicable frequency (See GRAY tab for more information on WFA applicable frequencies)**

STEP 3: SOURCE-SPECIFIC INFORMATION

Source Level (RMS SPL)	161
Number of piles within 24-h period	12
Duration to drive a single pile (minutes)	5
Duration of Sound Production within 24-h period (seconds)	3600
10 Log (duration of sound production)	35.56
Propagation (xLogR)	15
Distance from source level measurement (meters)*	10

*Unless otherwise specified, source levels are referenced 1 m from the source.

NOTE: The User Spreadsheet tool provides a means to estimates distances associated with the Technical Guidance's PTS onset thresholds. Mitigation and monitoring requirements associated with a Marine Mammal Protection Act (MMPA) authorization or an Endangered Species Act (ESA) consultation or permit are independent management decisions made in the context of the proposed activity and comprehensive effects analysis, and are beyond the scope of the Technical Guidance and the User Spreadsheet tool.

RESULTANT ISOPLETHS

Hearing Group	Low-Frequency Cetaceans	Mid-Frequency Cetaceans	High-Frequency Cetaceans	Phocid Pinnipeds	Otariid Pinnipeds
SEL_{cum} Threshold	199	198	173	201	219
PTS Isopleth to threshold (meters)	**6.8**	**0.6**	**10.1**	**4.2**	**0.3**

WEIGHTING FUNCTION CALCULATIONS

Weighting Function Parameters	Low-Frequency Cetaceans	Mid-Frequency Cetaceans	High-Frequency Cetaceans	Phocid Pinnipeds	Otariid Pinnipeds
a	1	1.6	1.8	1	2
b	2	2	2	2	2
f_1	0.2	8.8	12	1.9	0.94
f_2	19	110	140	30	25
C	0.13	1.2	1.36	0.75	0.64
Adjustment (dB)†	**-0.05**	**-16.83**	**-23.50**	**-1.29**	**-0.60**

$$W(f) = C + 10\log_{10}\left\{\frac{(f/f_1)^{2a}}{[1+(f/f_1)^2]^a[1+(f/f_2)^2]^b}\right\}$$

A: STATIONARY SOURCE: Non-Impulsive, Continuous

VERSION 2.0: 2018

KEY

	User Provided Information
	NMFS Provided Information (Technical Guidance)
	Resultant Isopleth

STEP 1: GENERAL PROJECT INFORMATION

PROJECT TITLE	City and Borough of Sitka, O'Connell Bridge Lightering Float Pile Replacement Project, IHA Application
PROJECT/SOURCE INFORMATION	The drilling (socketing) source level of 167.7 SPL is proxy from mean measured sources levels from drilling of 24-inch diameter piles to construct the Kodiak Ferry Terminal (Denes et al. 2016, Table 72).
Please include any assumptions	
PROJECT CONTACT	Robin Reich, Solstice Alaska Consulting, Inc. robin@solsticeak.com

STEP 2: WEIGHTING FACTOR ADJUSTMENT

Specify if relying on source-specific WFA, alternative weighting/dB adjustment, or if using default value.

Weighting Factor Adjustment (kHz)¥	2

¥ Broadband: 95% frequency contour percentile (kHz) OR Narrowband: frequency (kHz); For appropriate default WFA: See INTRODUCTION tab

† If a user relies on alternative weighting/dB adjustment rather than relying upon the WFA (source-specific or default), they may override the Adjustment (dB) (row 47), and enter the new value directly. However, they must provide additional support and documentation supporting this modification.

*** BROADBAND Sources: Cannot use WFA higher than maximum applicable frequency (See GRAY tab for more information on WFA applicable frequencies)**

STEP 3: SOURCE-SPECIFIC INFORMATION

Source Level (RMS SPL)	167.7
Duration of Sound Production (hours) within 24-h period	6
Duration of Sound Production (seconds)	21600
10 Log (duration of sound production)	43.34
Propagation (xLogR)	15

NOTE: The User Spreadsheet tool provides a means to estimates distances associated with the Technical Guidance's PTS onset thresholds. Mitigation and monitoring requirements associated with a Marine Mammal Protection Act (MMPA) authorization or an Endangered Species Act (ESA) consultation or permit are independent management decisions made in the context of the proposed activity and comprehensive effects analysis, and are beyond the scope of the Technical Guidance and the User Spreadsheet tool.

RESULTANT ISOPLETHS

Hearing Group	Low-Frequency Cetaceans	Mid-Frequency Cetaceans	High-Frequency Cetaceans	Phocid Pinnipeds	Otariid Pinnipeds
SEL_{cum} Threshold	199	198	173	201	219
PTS Isopleth to threshold (meters)	**6.3**	**0.4**	**5.6**	**3.4**	**0.2**

WEIGHTING FUNCTION CALCULATIONS

Weighting Function Parameters	Low-Frequency Cetaceans	Mid-Frequency Cetaceans	High-Frequency Cetaceans	Phocid Pinnipeds	Otariid Pinnipeds
a	1	1.6	1.8	1	2
b	2	2	2	2	2
f_1	0.2	8.8	12	1.9	0.94
f_2	19	110	140	30	25
C	0.13	1.2	1.36	0.75	0.64
Adjustment (dB)†	**-0.01**	**-19.74**	**-26.87**	**-2.08**	**-1.15**

$$W(f) = C + 10\log_{10}\left\{\frac{(f/f_1)^{2a}}{[1+(f/f_1)^2]^a\,[1+(f/f_2)^2]^b}\right\}$$

E.1: IMPACT PILE DRIVING (STATIONARY SOURCE: Impulsive, Intermittent)

VERSION 2.0: 2018

KEY

	User Provided Information
	NMFS Provided Information (Technical Guidance)
	Resultant Isopleth

STEP 1: GENERAL PROJECT INFORMATION

PROJECT TITLE	City and Borough of Sitka, O'Connell Bridge Lightering Float Pile Replacement Project, IHA Application
PROJECT/SOURCE INFORMATION	The impact source level of 168.2 SEL is proxy from mean measured sources levels from drilling of 24-inch diameter piles to construct the Kodiak Ferry Terminal (Denes et al. 2016, Table 72).

Please include any assumptions

PROJECT CONTACT	Robin Reich, Solstice Alaska Consulting, Inc. robin@solsticeak.com

STEP 2: WEIGHTING FACTOR ADJUSTMENT

Specify if relying on source-specific WFA, alternative weighting/dB adjustment, or if using default value

Weighting Factor Adjustment (kHz)¥	2	

¥ Broadband: 95% frequency contour percentile (kHz) OR Narrowband: frequency (kHz); For appropriate default WFA: See INTRODUCTION tab

† If a user relies on alternative weighting/dB adjustment rather than relying upon the WFA (source-specific or default), they may override the Adjustment (dB) (row 75), and enter the new value directly. However, they must provide additional support and documentation supporting this modification.

*** BROADBAND Sources: Cannot use WFA higher than maximum applicable frequency (See GRAY tab for more information on WFA applicable frequencies)**

STEP 3: SOURCE-SPECIFIC INFORMATION

NOTE: Choose either E1-1 OR E.1-2 method to calculate isopleths (not required to fill in sage boxes for both)

E 1 1: METHOD TO CALCULATE PK AND SEL (USING RMS SPL SOURCE LEVEL)

SEL_{cum}

Source Level (RMS SPL)	
Number of piles per day	
Strike Duration^ (seconds)	
Number of strikes per pile	
Duration of Sound Production (seconds)	0
10 Log (duration of sound production)	#NUM!
Propagation (xLogR)	
Distance of source level measurement (meters)*	

^Window that makes up 90% of total cumulative energy (5%-95%) based on Madsen 2005

*Unless otherwise specified, source levels are referenced 1 m from the source.

PK

Source Level (PK SPL)	
Distance of source level measurement (meters)*	
Source level at 1 meter	#NUM!

*Unless otherwise specified, source levels are referenced 1 m from the source.

NOTE: The User Spreadsheet tool provides a means to estimates distances associated with the Technical Guidance's PTS onset thresholds. Mitigation and monitoring requirements associated with a Marine Mammal Protection Act (MMPA) authorization or an Endangered Species Act (ESA) consultation or permit are independent management decisions made in the context of the proposed activity and comprehensive effects analysis, and are beyond the scope of the Technical Guidance and the User Spreadsheet tool.

RESULTANT ISOPLETHS*

*Impulsive sounds have dual metric thresholds (SELcum & PK). Metric producing largest isopleth should be used.

Hearing Group	Low-Frequency Cetaceans	Mid-Frequency Cetaceans	High-Frequency Cetaceans	Phocid Pinnipeds	Otariid Pinnipeds
SEL_{cum} Threshold	183	185	155	185	203
PTS isopleth to threshold (meters)	**#NUM!**	**#NUM!**	**#NUM!**	**#NUM!**	**#NUM!**
PK Threshold	219	230	202	218	232
PTS PK isopleth to threshold (meters)	**#NUM!**	**#NUM!**	**#NUM!**	**#NUM!**	**#NUM!**

E 1 2: ALTERNAT VE METHOD TO CALCULATE PK AND SEL (SINGLE STRIKE EQU VALENT)

Unweighted $SEL_{cum\ (at\ measured\ distance)}$ = SEL_{ss} + 10 Log (# strikes)	**183.0**

SEL_{cum}

Source Level (Single Strike SEL)	168.2
Number of strikes per pile	5
Number of piles per day	6
Propagation (xLogR)	15
Distance of single strike SEL measurement (meters)*	10

*Unless otherwise specified, source levels are referenced 1 m from the source.

PK

Source Level (PK SPL)	193.3
Distance of source level measurement (meters)*	10
Source level at 1 meter	208.3

*Unless otherwise specified, source levels are referenced 1 m from the source.

RESULTANT ISOPLETHS*

*Impulsive sounds have dual metric thresholds (SELcum & PK). Metric producing largest isopleth should be used.

Hearing Group	Low-Frequency Cetaceans	Mid-Frequency Cetaceans	High-Frequency Cetaceans	Phocid Pinnipeds	Otariid Pinnipeds
SEL_{cum} Threshold	183	185	155	185	203
PTS isopleth to threshold (meters)	**9.9**	**0.4**	**11.8**	**5.3**	**0.4**
PK Threshold	219	230	202	218	232
PTS PK isopleth to threshold (meters)	**NA**	**NA**	**2.6**	**NA**	**NA**

WEIGHTING FUNCT ON CALCULAT ONS

Weighting Function Parameters	Low-Frequency Cetaceans	Mid-Frequency Cetaceans	High-Frequency Cetaceans	Phocid Pinnipeds	Otariid Pinnipeds
a	1	1.6	1.8	1	2
b	2	2	2	2	2
f_1	0.2	8.8	12	1.9	0.94
f_2	19	110	140	30	25
C	0.13	1.2	1.36	0.75	0.64
Adjustment (dB)†	**-0.01**	**-19.74**	**-26.87**	**-2.08**	**-1.15**

$$W(f) = C + 10\log_{10}\left\{\frac{(f/f_1)^{2a}}{[1+(f/f_1)^2]^a[1+(f/f_2)^2]^b}\right\}$$

Fill in SPL and distances for peak and rms pressures, and read distance to threshold for appropriate model

VIBRATORY DRILLING

Measured pressure	Peak	RMS
SPL =	0	161
Distance =	0	10

The vibratory source level is proxy from 24-inch steel piles driven at the Naval Base Kitsap in Bangor, Washington (NAVFAC 2012) and from acoustic modeling of nearshore marine pile driving at Navy installations in Puget Sound (United States Navy 2015).

	Fish Meters to Threshold		Spreading Model	MarMam Meters to Threshold
Spreading Model	Peak(180 dB)	RMS (150 dB)		RMS 120 dB
Spherical spreading	0	35	dB = 20*log(R1/R2)	1122
Cylindrical spreading	0	126	dB = 10*log(R1/R2)	125893
Practical spreading	0	54	dB = 15*log(R1/R2)	5412

Fill in SPL and distances for peak and rms pressures, and read distance to threshold for appropriate model

SOCKETTING

Measured pressure	Peak	RMS
SPL =	0	167.7
Distance =	0	10

The socketing source level is proxy from mean measured sources levels from drilling of 24-inch diameter piles to construct the Kodiak Ferry Terminal (Denes et al. 2016, Table 72).

	Fish Meters to Threshold		Spreading Model	MarMam Meters to Threshold
Spreading Model	Peak(180 dB)	RMS (150 dB)		RMS 120 dB
Spherical spreading	0	77	dB = 20*log(R1/R2)	2427
Cylindrical spreading	0	589	dB = 10*log(R1/R2)	588844
Practical spreading	0	151	dB = 15*log(R1/R2)	15136

Fill in SPL and distances for peak and rms pressures, and read distance to threshold for appropriate model

IMPACT DRIVING

Measured pressure	Peak	RMS
SPL =	0	181.3
Distance =	0	10

The source levels of 181.3 SPL (for Level B) are the mean measured levels from the Kodiak Ferry Terminal project (Denes et al. 2016, Table 72).

Spreading Model	Fish Meters to Threshold Peak(180 c	RMS (150 dB)	Spreading Model	MarMam Meters to Threshold RMS 160 dB
Spherical spreading	0	367	dB = 20*log(R1/R2)	116
Cylindrical spreading	0	13490	dB = 10*log(R1/R2)	1349
Practical spreading	0	1221	dB = 15*log(R1/R2)	263

Appendix C.
Marine Mammal Monitoring and Mitigation Plan

Marine Mammal Monitoring and Mitigation Plan

City and Borough of Sitka
O'Connell Bridge Lightering Float Pile Replacement Project
Sitka Sound, Sitka, Alaska

Updated December 2018

Prepared for:
City & Borough of Sitka
Department of Public Works
100 Lincoln Street
Sitka, Alaska 99835

Prepared by:
Solstice Alaska Consulting, Inc.
2607 Fairbanks Street Suite B
Anchorage, Alaska 99503

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ACRONYMS AND ABBREVIATIONS

4MP	Marine Mammal Monitoring and Mitigation Plan
CBS	City and Borough of Sitka
DA	Department of the Army
ESA	Endangered Species Act
IHA	Incidental Harassment Authorization
ITS	Incidental Take Statement
MMPA	Marine Mammal Protection Act
NMFS	National Marine Fisheries Service
OPR	National Marine Fisheries Service Office of Protected Resources
PSO	Protected Species Observer
USACE	U.S. Army Corp of Engineers
USFWS	U.S. Fish and Wildlife Service

1 INTRODUCTION

The City and Borough of Sitka (CBS) proposes the following Marine Mammal Monitoring and Mitigation Plan (4MP) for use during in-water construction to repair the O'Connell Bridge Lightering Float in Crescent Bay adjacent to downtown Sitka, Alaska.

The project is in Waters of the U.S, within the range of Endangered Species Act (ESA) and Marine Mammal Protection Act (MMPA) listed marine mammals and has the potential to generate noise that could exceed Level A and B harassment thresholds established by the National Marine Fisheries Service (NMFS) and U.S. Fish and Wildlife Service (USFWS).

The purpose of this plan is to minimize impacts to marine mammals by prescribing how mitigation measures and construction techniques will be employed, outlining the duties of the Protected Species Observers (PSOs), and summarizing reporting requirements. The plan uses of a combination of marine mammal monitoring, soft-starts, shutdowns (if needed), and species data collection and reporting to comply with the permits and authorizations required to construct this project.

Figure 1. Project Location within Sitka Sound (Source: USACE 2014)

2 PERMITS AND AUTHORIZATIONS

A number of permits and authorizations are required for this project. The project shall comply with the terms and conditions outlined in the following requested permits and authorizations:

- U.S Army of Engineers (USACE) Permit (DA Permit) POA-2017-474, O'Connell Lightering Float Pile Replacement Project for activities is Waters of the U.S. (requested);
- NMFS Office of Protected Resources (OPR) Incidental Harassment Authorization (IHA) (requested);
- USFWS Marine Mammal Management (MMM) IHA (requested);
- NMFS Alaska Region Protect Resources Division Endangered Species Act (ESA) Section 7(a)(2) Biological Opinion and Incidental Take Statement (ITS) (requested); and

3 EXPECTED SPECIES AND TAKE REQUESTED

The species that are most common in the project area are listed in Table 1. A NNMFS IHA and a USFWS IHA have been requested for this project and the species for which Level B take has been requested, and the number and type of take are shown in Table 1. No Level A take has been requested.

Table 1. Species Most Likely to Occur in Project Area and Requested Take Numbers, by Species and Manner of Take.

Species Most Likely to Occur	Level B Take
Humpback Whale (*Megaptera novaeangliae*)	6
Killer Whale (*Orcinus orca*)	24
Harbor Porpoise (*Phocoena phocoena*)	15
Harbor Seal (*Phoca vitulina*)	18
Steller Sea Lion (*Eumatopia jubatus*	24
Northern Sea Otter (*Enhydra lutris*)	12

4 METHODS SUMMARY

The CBS, the contractor, and qualified PSOs will work together to carry out construction methods that minimize impacts to marine mammals, marine mammal monitoring, and reporting.

The contractor will employ construction mitigation measures including attempting to direct pull existing piles, operating the vibratory hammer at reduced energy settings, driving all piles with a vibratory hammer to the maximum extent possible prior to using an impact hammer, operating the impact hammer at reduced energy settings, and using soft-starts and pile caps for pile driving.

Land based PSOs will be employed for marine mammal monitoring and will be present during all in-water work. PSOs will be onsite before, during, and after all in-water construction activities. The PSO(s) will perform monitoring and data collection and will relay data to the contractor and CBS for reporting.

PSO(s) will be located at sites that allow them to view the Level A and B harassment zones. PSOs will continuously scan the Level A and B monitoring zones and ensure shutdown zones are clear of marine mammals prior to in-water construction. PSOs will collect data including environmental conditions, marine mammal sightings and behavior, construction activity at the time of sightings, and take. If a marine mammal is observed approaching a shutdown zone the PSOs will contact the contractor to shutdown construction activity.

Because of the large size of some of the Level B monitoring zones, Level B take may be extrapolated. PSOs may observe a smaller area than the entire Level B zone and extrapolate project take from that area. For example, if the PSOs could confidently monitor 50 percent of the Level B zone, and 10 seals were observed during pile driving, then the total extrapolated number of takes would be 20.

PSOs will maintain verbal communication with construction personnel to implement appropriate mitigation measures (detailed in Section 5). If the number of species observed within the B zones during noise-producing project activities approaches the number of takes authorized in the ITS, the CBS will notify NMFS and USFWS and reinitiate consultation.

The CBS will be responsible for preparing and submitting marine mammal monitoring reports. The following sections of this plan describe mitigation, monitoring protocols, monitoring and shutdown zones, and reporting in detail.

5 MITIGATION MEASURES

A number of proposed mitigation measures and construction techniques will be employed to minimize effects to marine mammal species. Mitigation measures for the project include general construction mitigation measures, mitigation measures during pile removal and installation, and marine mammal shutdown zones. These measures are detailed below.

5.1 General Construction Mitigation Measures

- The project uses the most compact design possible, while meeting the demands of the vessels that would use the facility.
- Wood that has been surface or pressure-treated with creosote or treated with pentachlorophenol will not be used. If treated wood must be used, any wood that comes in contact with water will be treated with waterborne preservatives in accordance with Best Management Practices developed by the Western Wood Preservers Institute. Treated wood will be inspected before installation to ensure that no superficial deposits of preservative material remain on the wood.
- The project uses a design that does not require dredging, blasting, or fill.
- Plans for avoiding, minimizing, and responding to releases of sediments, contaminants, fuels, oil, and other pollutants will be developed and implemented.
- Spill response equipment will be kept on-site during construction and operation.
- Floats or barges will not be grounded at any tidal stage.

5.2 Pile Driving and Removal Mitigation Measures

- To minimize construction noise levels as much as possible, the contractor will first attempt to direct pull old, abandoned piles; if those efforts prove to be ineffective, they will proceed with a vibratory hammer.
- Pile driving softening material will be used to minimize noise during vibratory and impact pile driving. Much of the noise generated during pile installation comes from contact between the pile being driven and the steel template used to hold the pile in place. The contractor will use high-density polyethylene (HDPE) or ultra-high-molecular-weight polyethylene (UHMW) softening material on all templates to eliminate steel on steel noise generation.
- Soft start procedures will be used prior to pile removal and installation, to allow marine mammals to leave the area prior to exposure to maximum noise levels. For vibratory hammers and down hole drills, the soft-start technique will initiate noise from the hammer for 15 seconds at a reduced energy level, followed by a 1-minute waiting period and will repeat the procedure 2 additional times. For impact hammers, the soft-start technique will initiate 3 strikes at a reduced energy level, followed by a 30-second waiting period. This procedure would also be repeated two additional times.

5.3 Protected Species Observers

Qualified PSOs will be employed for marine mammal monitoring and will be present during all in-water work. PSOs will maintain verbal communication with the construction personnel to implement the appropriate mitigation measures listed below.

5.4 PSO Qualifications

As prescribed by NMFS, PSOs must meet the following criteria:

- All PSOs must be pre-approved by NMFS and USFWS. Resumes must be submitted to NMFS and USFWS for review.
- 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;
- Advanced education in biological science or related field (undergraduate degree or higher required);
- Experience and ability to conduct field observations and collect data according to assigned protocols (this may include academic experience);
- Experience or training in the field identification of marine mammals, including the identification of behaviors;
- Sufficient training, orientation, or experience with the construction operation to provide for personal safety during observations;
- Writing skills sufficient to prepare a report of observations including but not limited to the number and species of marine mammals observed; dates and times when in-water construction activities were conducted; dates and times when in-water construction activities were suspended to avoid potential incidental injury from construction sound

of marine mammals observed within a defined shutdown zone; and marine mammal behavior; and

- Ability to communicate orally, by radio or in person, with project personnel to provide real-time information on marine mammals observed in the area as necessary.

5.5 Marine Mammal Monitoring Protocols

The following marine mammal monitoring protocols will be implemented during pile driving and removal activities to help prevent and document acoustic effects on marine mammals.

1. The PSO will have no other primary duties than watching for and reporting on events related to marine mammals.
2. The PSO will have the tools necessary to aid in determining the location of observed listed species, to take action if listed species are likely to enter a shutdown zone, and to record these events. These tools may include:
    a. Binoculars
    b. spotting scope
    c. range finder
    d. GPS
    e. Compass
    f. two-way radio communication with construction foreman/superintendent
    g. log book of all activities, which will be made available to U.S. Army Corps of Engineers and NMFS upon request
3. Prior to in-water pile driving and removal, monitoring and shutdown zones will be field verified.
4. Pile driving and removal will not be conducted when weather conditions or darkness restrict clear, visible observation of all waters within and surrounding the shutdown zone.
5. Each day prior to commencing in-water work the PSO will conduct a radio check with the construction foreman or superintendent. The PSO will brief the foreman or supervisor as to the shutdown procedures if any of the listed species are observed likely to enter or within a shutdown zone, and will have the foreman brief the crew, requesting that the crew notify the PSO when a listed species is spotted.
6. The PSO will work in shifts lasting no longer than 4 hours with at least a 1-hour break between shifts, and will not perform duties as an PSO for more than 12 hours in a 24-hr period (to reduce PSO fatigue).
7. The PSO will remain onsite during in-water pile driving/removal.
8. Two land-based PSOs will be used to monitor the area. One PSO will monitor from the O'Connell Bridge during all in-water construction. This observation site has been chosen because of its high vantage point with unobstructed views of, and close proximity to, the project site. A second monitor will be stationed east of the construction site, likely off Islander Drive.
9. The PSO will scan the monitoring zone for the presence of listed species for 30 minutes before any pile driving or removal activities take place, or if pile driving has not occurred for over one hour, specifically to ensure the monitoring zone are clear before construction begins.

10. Throughout all pile-driving activity, the PSO will continuously scan the shutdown and monitoring zone that apply to the construction methods being used to ensure that listed species do not enter them.
    a. If any listed species enter, or appear likely to enter, the shutdown zone during pile-driving activities, all driving activity will cease immediately. Pile -driving may resume when the animal(s) has been observed leaving the area on its own accord. If the animal(s) is not observed leaving the area, pile-driving activity may begin 15 min (for pinnipeds and sea otters) or 30 min (for cetaceans) after the animal is last observed in the area.
11. Once the shutdown zone has been cleared, ramp-up procedures will be applied prior to beginning pile driving activities each day and/or when pile driving hammers have been idle for more than 30 min:
    a. For impact pile-driving, contractors will be required to provide an initial set of three strikes from the hammer at 40 percent energy, followed by a 30-sec waiting period. This procedure will be repeated two additional times.
12. A data sheet will be used to record the species, behavior, date, and time of any marine mammal sightings. This data will be used to prepare a PSO report.

6 MONITORING AND SHUTDOWN ZONES

Because species are impacted by noise in different ways, species-specific monitoring and shutdown zone have been calculated for this project. These monitoring and shutdown zones are listed in Tables 1, 2, and 3 and summarized in Table 4. The zones are shown in Figures 2, 3, and 4. The zones shown in Figures 2 and 3 apply to all species other than sea otters. The zones shown in Figure 4 apply to sea otters.

Further, there will be a nominal 10-meter shutdown zone for all species during construction-related activity where acoustic injury is not the primary concern. This type of work could include (but is not limited to) the following activities: (1) movement of the barge to the pile location; (2) positioning of the pile on the substrate via a crane (i.e., stabbing the pile); (3) removal of the pile from the water column/substrate via a crane (i.e., deadpull). For these activities, monitoring would take place from 15 minutes prior to initiation until the action is complete.

6.1 Level B Monitoring and Shutdown Zones

If a marine mammal species for which Level B take is authorized (humpback whale, killer whale, harbor porpoise, harbor seal, Steller sea lion, or northern sea otter) is observed within the Level B monitoring zones outlined in Table 2 during the activity specified, presence in that zone would be considered a Level B take. If a marine mammal species for which take has not been requested were to approach the action area, in-water construction would be shutdown.

Table 2. Level B Monitoring Zones

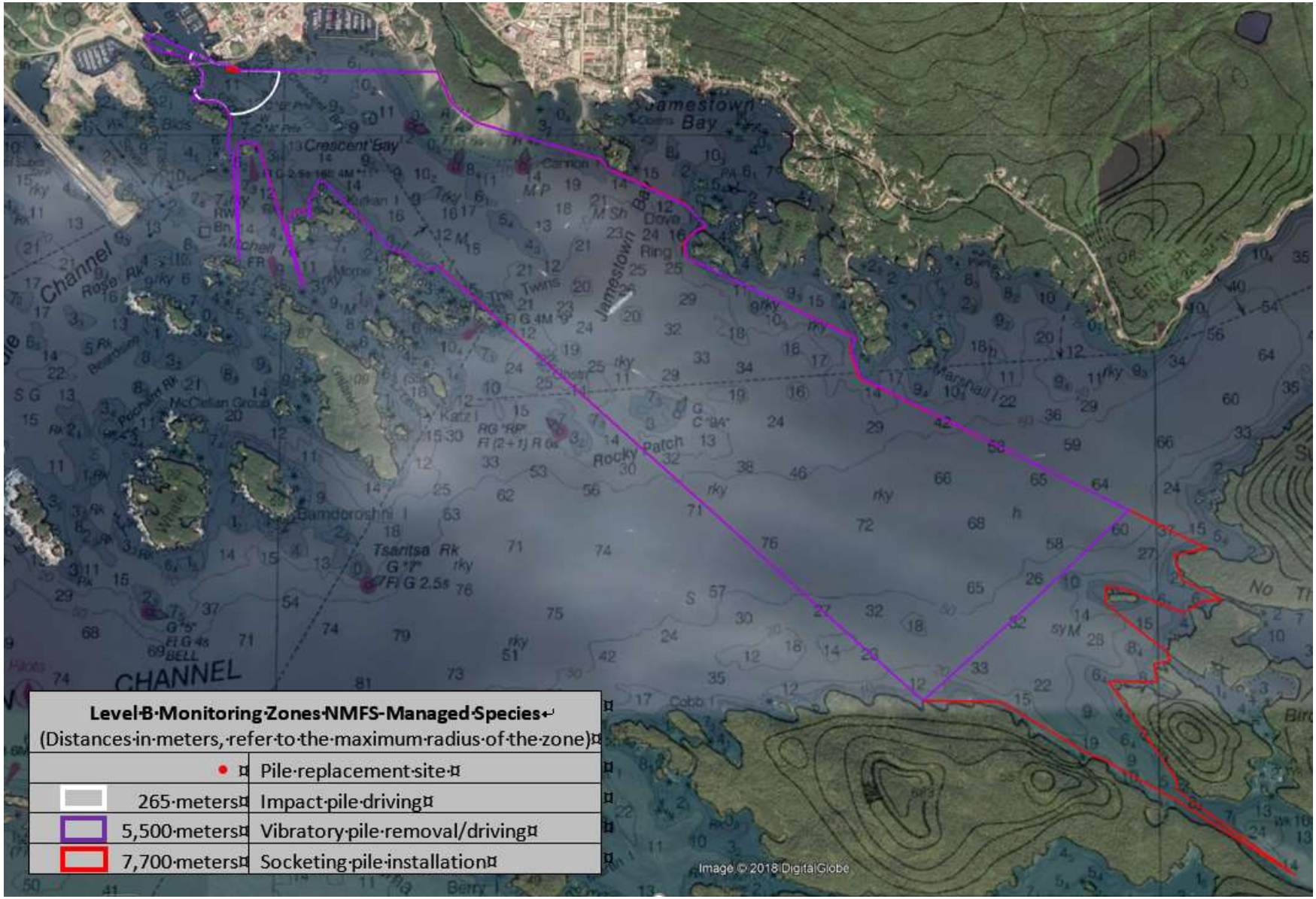
Pile Driving Noise Source	Sea Otter Monitoring Zone for Level B Take (meters)	NMFS-Managed Species Monitoring Zone for Level B Take (meters) [1, 2]
Vibratory Pile Driving		
16-inch steel removal and installation (12 piles) (~1 hour on 1 day)	15	5,500
Socketing Pile Installation		
16-inch steel installation (6 piles) (6 hours per day on 2 days)	35	7,700 [3]
Impact Pile Driving		
16-inch steel installation (6 piles) (~3 minutes per day on 1 day)	265	265

[1] Numbers rounded up to nearest 10 meters; see Table 3 for actual isopleth distances.

[2] CBS has requested Level B take of humpback whale, killer whale, , harbor porpoise, harbor seal, and Steller sea lion and is not proposing shutdowns associated with Level B disturbance of these species.

[3] Level B isopleth distance calculated to 15,136 meters but would be truncated by landforms in project area to a maximum distance of 7,700 meters.

Figure 2. NMFS-Managed Species Level B Monitoring Zones



6.2 Level A Shutdown Zones

If a specified marine mammal is observed within the shutdown zones outlined in Table 3 during the activity specified, presence in that zone would be considered a Level A take. To prevent Level A take, shutdowns will be employed if a species approaches or is present within the following shutdown zones.

Table 3. Level A Shutdown Zones

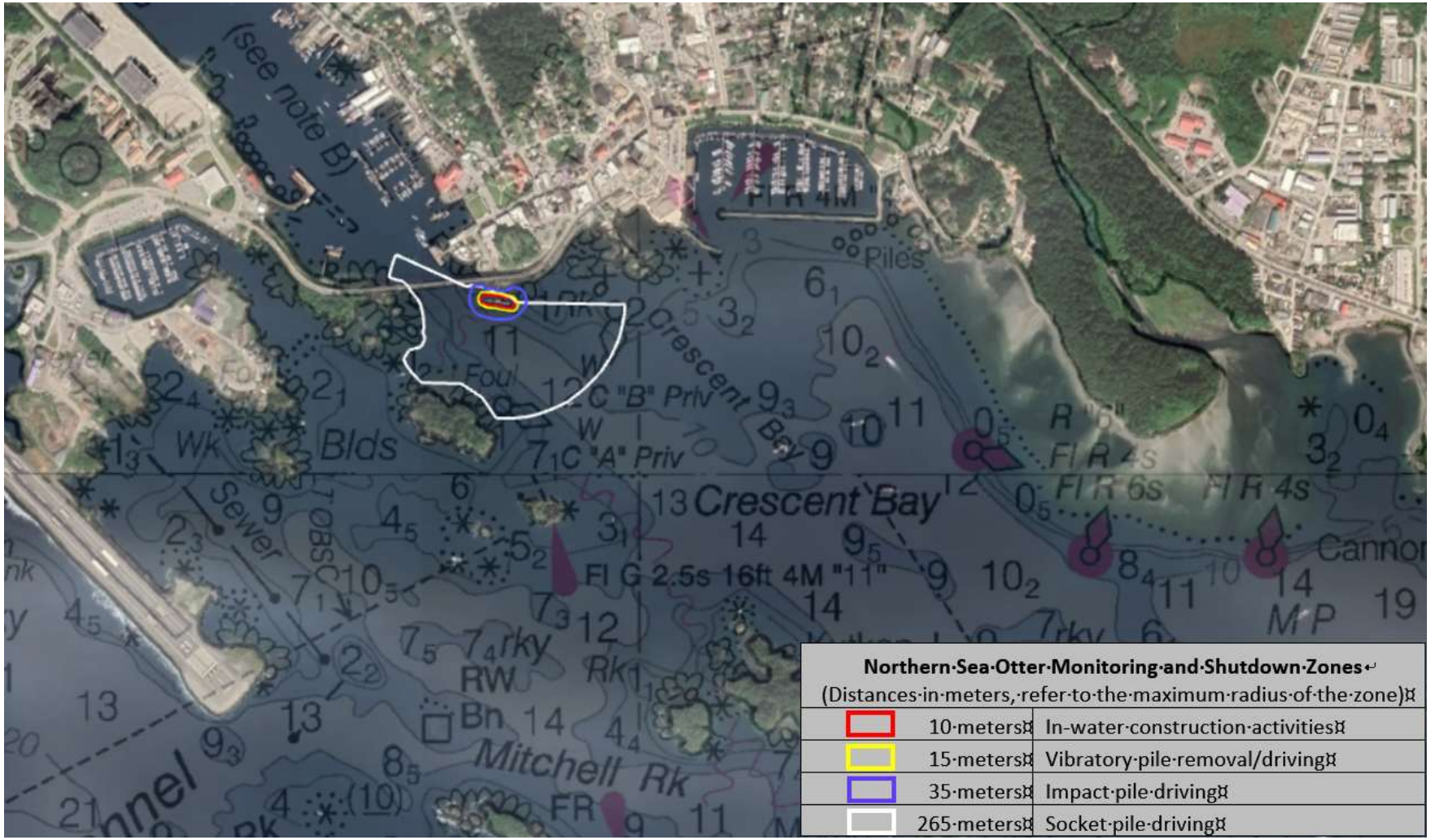
Noise Source	Shutdown Zones in meters [1]					
	Low-Frequency Cetaceans (humpback whale)	Mid-Frequency Cetaceans (killer whale)	High-Frequency Cetaceans (harbor porpoise)	Phocid (harbor seal)	Otariid (sea lion)	Northern sea otter
In-Water Construction Activities [2]						
Barge movements, pile positioning, deadpulling, sound attenuation placement [2, 3]	10	10	10	10	10	10
Vibratory Pile Driving/Removal						
16-inch steel removal and installation	10	10	15	10	10	10
Socketing Pile Installation						
16-inch steel installation (6 piles) (6 hours per day on 2 days	10	10	10	10	10	10
Impact Pile Driving						
16-inch steel installation (6 piles) (~3 minutes on 1 day)	10	10	15	10	10	10

[1] Shutdown zone distances refer to the maximum radius of the zone and are rounded.

[2] Although acoustic injury is not the primary concern with these activities, shutdowns will be implemented to avoid impacts to species.

Figure 3. Level A Shutdown Zones

Figure 4. Northern Sea Otter Shutdown and Monitoring Zones



6.3 Monitoring and Shutdown Summary

All monitoring and shutdown zones are summarized in Table 4.

Table 4. Shutdown and Monitoring Zone Summary Table

Noise Source	Shutdown Zones, Shutdown zones for Level A take, Monitoring Zones for Level A take, and Monitoring Zones for Level B take (m)					
	Humpback whale	**Killer whale, Pacific white-sided dolphin**	**Harbor porpoise**	**Harbor seal**	**Sea lion**	**Sea otter**
In-Water Construction Activities [1]						
Barge movements, pile positioning, deadpulling	shutdown 10	shutdown 10	shutdown 10	shutdown 10	shutdown 10	shutdown 10
Vibratory Pile Driving/Removal						
16-inch steel removal and installation (12 piles) (~1 hour on 1 day)	A shutdown 10 B monitoring 5,500	A shutdown 10 B monitoring 5,500	A shutdown 15 B monitoring 5,500	A shutdown 10 B monitoring 5,500	A shutdown 10 B monitoring 5,500	A shutdown 10 B monitoring 15
Socketing Pile Installation						
16-inch steel installation (6 piles) (6 hours per day on 2 days)	A shutdown 10 B monitoring 7,700	A shutdown 10 B monitoring 7,700	A shutdown 10 B monitoring 7,700	A shutdown 10 B monitoring 7,700	A shutdown 10 B monitoring 7,700	A shutdown 10 B monitoring 35
Impact Pile Driving						
16-inch steel installation (6 piles) (~3 minutes on 1 day)	A shutdown 10 B monitoring 265	A shutdown 10 B monitoring 265	A shutdown 15 B monitoring 265	A shutdown 10 B monitoring 265	A shutdown 10 B monitoring 265	A shutdown 10 B monitoring 265

Shutdown zone distances refer to the maximum radius of the zone and are rounded (see Table 3 for calculated distances).

[1] Although acoustic injury is not the primary concern with these activities, shutdowns will be implemented to avoid impacts to species.

7 REPORTING

A compliance certification form is due to the USACE after project completion, and comprehensive marine mammal reports are due to USFWS MMM regarding sea otters and to NMFS AK and NMFS OPR regarding all marine mammals. The sections below provide an overview of reporting requirements for this project. Refer to the requested DA Permit, the requested NMFS and USFWS IHAs and NMFS BO for detailed terms and conditions.

7.1 USACE

Within 60 days of completion of the work authorized by this permit, the CBS shall complete the "Self-Certification Statement of Compliance" form (attached to the DA Permit) and submit it to the USACE.

7.2 USFWS

All observation records will be made available to the USFWS at the end of each calendar month and a summary report will be provided to the USFWS by December 1 each year. The contact for these reports is Kimberly Klein at Kimberly_Klein@fws.gov.

7.3 NMFS AK

A final monitoring report will be provided to NMFS Alaska Region within 90 days of completion of pile driving. The contact for this project is Suzie Teerlink at suzie.teerlink@noaa.gov.
In general, reporting may include:

- Numbers of days of observations.
- Lengths of observation periods.
- Locations of observation stations and dates used.
- Numbers, species, dates, group sizes, and locations of marine mammals observed.
- Descriptions of work activities, categorized by type of work taking place while marine mammals were being observed.
- Distances to marine mammal sightings, including closest approach to construction activities.
- Descriptions of any observable marine mammal behavior in the Level A and Level B harassment zones.
- Actions performed to minimize impacts to marine mammals.
- Times of shutdown events including when work was stopped and resumed due to the presence of marine mammals or other reasons.
- Refined take estimates based on the numbers of humpback whales, killer whales, Pacific white-sided dolphin, harbor porpoises, harbor seals, and Steller sea lions observed during the course of pile installation and removal activities.
- Descriptions of the type and duration of any noise-generating work occurring and ramp-up procedures used while marine mammals were being observed.
- Details of all shutdown events, and whether they were due to presence of marine mammals, inability to clear the hazard area due to low visibility, or other reasons.
- Tables, text, and maps to clarify observations.

- Full documentation of monitoring methods, an electronic copy of the data spreadsheets, and a summary of results will also be included in the report.
- Final reports and reports of unauthorized take will be submitted to: NMFS Alaska Protected Resources Division and NMFS Office of Protected Resources.

7.4 NMFS OPR

Submit a draft report to NMFS (robert.pauline@noaa.gov) on all monitoring conducted under the requested IHA within ninety calendar days of the completion of marine mammal monitoring. A final report shall be prepared and submitted within thirty days following resolution of comments on the draft report from NMFS. This report must contain the informational elements below:

- Detailed information about any implementation of shutdowns, including the distance of animals to pile driving and removal and description of specific actions that ensued and resulting behavior of the animal, if any.
- Description of attempts to distinguish between the number of individual animals taken and the number of incidences of take (i.e., multiple exposures of the same animal).

7.5 Reporting of Injured or Dead Marine Mammals

In the unanticipated event that the specified activity clearly causes the take of a marine mammal in a manner prohibited by this IHA, such as serious injury or mortality, CBS shall immediately cease the specified activities and report the incident to:

- The Office of Protected Resources 301-427-8408 (NMFS OPR) or robert.pauline@noaa.gov, and
- The NMFS Alaska Protected Resources Division 907-586-7638 and/or Jon.Kurland@noaa.gov, suzie.teerlink@noaa.gov, or Mandy.Migura@noaa.gov, the NMFS Alaska Region Stranding Coordinator at 907-271-1332.
- For sea otters: Kimberly Klein, Kimberly_Klein@fws.gov, at 786-3621

The report must include the following information:

- Time and date of the incident;
- Description of the incident;
- Environmental conditions (e.g., wind speed and direction, Beaufort sea state, cloud cover, and visibility);
- Description of all marine mammal observations and active sound source use in the 24 hours preceding the incident;
- Species identification or description of the animal(s) involved;
- Fate of the animal(s); and
- Photographs or video footage of the animal(s).

Activities shall not resume until NMFS or USFWS (sea otters) is able to review the circumstances of the prohibited take. NMFS or USFWS will work with CBS to determine what measures are necessary to minimize the likelihood of further prohibited take and ensure MMPA compliance. CBS may not resume their activities until notified by NMFS or USFWS.

In the event that CBS discovers an injured or dead marine mammal, and the lead observer determines that the cause of the injury or death is unknown and the death is relatively recent (e.g., in less than a moderate state of decomposition), CBS shall immediately report the incident to the Office of Protected Resources, NMFS, and the Alaska Region Stranding Coordinator, NMFS or Marine Mammal Management Office, USFWS.

The report must include the same information identified above and in 6(b)(i) of the requested IHA. Activities may continue while NMFS or USFWS reviews the circumstances of the incident. NMFS or USFWS will work with CBS to determine whether additional mitigation measures or modifications to the activities are appropriate.

In the event that CBS discovers an injured or dead marine mammal, and the lead observer determines that the injury or death is not associated with or related to the activities authorized in the requested IHA (e.g., previously wounded animal, carcass with moderate to advanced decomposition, or scavenger damage), CBS shall report the incident to the Office of Protected Resources, NMFS, and the Alaska Region Stranding Coordinator, NMFS, or Marine Mammal Management Office, USFWS within 24 hours of the discovery. CBS shall provide photographs or video footage or other documentation of the stranded animal sighting to NMFS or USFWS.

7.6 Reporting of Take of ESA-Listed Species

If take of humpback whales or Steller sea lions approaches the number of takes authorized in the ITS, the CBS will notify NMFS AK representative Suzie Teerlink at suzie.teerlink@noaa.gov and NMFS PR1 representative Robert Pauline at robert.pauline@noaa.gov.

Appendix A.
Marine Mammal Sighting Forms

Marine Mammal Sighting Form

Project: **Location:** **Sighting #:**
(1st sighting of the day is Sighting#: 1)

Date: **Observer(s):**

Time *(military)*		**Species** *(circle)*	**Distance** *(animal to activity)*		**Number of Animals**		**Number of Animals in Each Class**			
Initial Sighting Time		Steller Sea Lion	Initial Distance		Min Count		Adults		Calves/ Pups	
Final Sighting Time		Harbor Seal	Closest Distance		Max Count		Juveniles		Unkn. Age	
Time Entered H-Zone B		Harbor Porpoise	Final Distance		Best Count					
Time Exited H-Zone B		Killer Whale					Male		Female	
Time Entered H-Zone A		Sea Otter								
Time Exited H-Zone A		other: _____					Unknown Sex			

Behavior of Marine Mammal check all observed behaviors; place a **1** next to primary, 2 next to secondary activity):
Indicate any changes in behavior in the Additional Information section

__ Travel __ Fight __ Mill Other:_____
__ Disoriented __ Play __ Dive
__ Slap __ Spyhop __ Unknown
__ Feeding Observed __ Swimming Toward Site __ Swimming Away from Site

Group Cohesion (Orientation of animals within the group and the approx. distance between animals) :

Project Activities and Harassment Zone

Entered Harassment Zone A? Y or N **Entered Harassment Zone B?** Y or N

In-Water Work was occuring at initial sighting? Y or N **List In-water Activites:**_____

SHUT DOWN or **DELAYED** from _____ to _____ (time)

NO SHUT DOWN, *EXPLANATION REQUIRED*:

Describe Commerical Activities (# and type of vessels offloading at sea food processing dock, traveling by, refueling at dock):

Additional Information (include more detailed information on behavior):

Draw locations on hardcopy map

Daily Environmental Conditions, Construction, and Communication Activity Log

Page _____ of _____

Project:_____ Location:_____ Observer(s):_____ Date: _____

Environmental Conditions (Recorded every 30 minutes or as conditions change)									Construction and Communication Activities *(Include all start up and shut-down activities and all communication to construction crew)*		
Time	Weather Conditions	Wind Speed	Wind Direction	Beaufort Sea State	Glare (%)	Visibility (m)	Cloud Cover (%)	Comments	Time	Type of Construction Activity *(Ramp up, Startup, shutdown, type of pile driving)*	Communication/Comments

Weather Conditions: (S) Sunny, (PC) Partly Cloudy, (L) Light Rain, (R) Steady Rain, (F) Fog, (OC)Overcast, (LS) Light Snow, (SN) Snow
Beaufort Scale: (0) Calm (1) ripples- up to 4 in (2) small wavelets- up to 8 in (3) large wavelets- up to 2 ft, (4) small waves- up to 3 ft (5) moderate waves- up to 6 ft (6) large waves- up to 9 ft

Marine Mammal Sighting Form Version 2

Marine Mammal Sightings During Pile Driving

Date: _____ **Observer:** _____

General Weather AM _____ **Daily Start Time:** _____

PM _____ **Daily End Time:** _____

Was the Entire Exclusion Zone Visible During Pile Driving Operations (Y/N)? _____

If No, Please Explain _____

	Time of initial observation	Species Code	No. of Indiv. HO	No. of Indiv. Water	Age Class	Sex	Within Exclusion Zone (Y/N)	Resight (Y/N/UNK)	Beh. 1°	Beh. 2°	Pile Number	Activity Type	Notes/Abnormal Behaviors/Other
1													
2													
3													
4													
5													
6													
7													
8													
9													
10													
11													
12													
13													
14													
15													
16													
17													
18													
19													
20													

Sheet _____ **of** _____

Data Codes

Species Code

Steller Sea Lion = **SSL**
Ringed Seal = **RS**
Bearded Seal = **BS**
Spotted Seal = **SS**
Harbor Seal= **HS**
Fur Seal = **FS**
Bowhead Whale = **BW**
Beluga Whale = **BE**
Humpback Whale = **HW**
Fin Whale = **FW**
Killer Whale = **KW**
Gray Whale = **GW**
Unidentified Phocid = **PH**
Unidentified Pinniped = **UP**
Unidentified Whale = **UW**

Age Classifications

Unknown Age = **UA**
Adults
Juveniles
Calves/Pups

Sex

Female = **F**
Male = **M**
Mixed
Unknown = **U**

Primary Behavior Codes

Dive = **DV**
Travelling = **TR**
Mating Suspected = **MS**
Milling = **MI**
Resting = **RE**
Feeding = **FE**
Tail Slap = **TS**
Enter Water = **EN**
Exit Water = **EX**
Hauled Out = **HO**
Look = **LO**

Secondary Behavior Codes

Directional Change = **DC**
Increased Breathing Rate = **IB**
Increased Swimming Rate = **IS**
Surface Active = **SA**
Flush = **FL**

Activity Type

No Activity = 0
Soft start = 1
Impact Pile Driving = 2
Vibratory Pile Driving = 3
Shutdown = 4