Application for Marine Mammal Protection Act Incidental Harassment Authorization

Auke Bay East Terminal Improvements Project

State Project #: SAMHS00419

Submitted to:
National Marine Fisheries Service
Office of Protected Resources
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The environmental review, consultation, and other actions required by applicable Federal environmental laws for this project are being, or have been, carried out by DOT&PF pursuant to 23 U.S.C. 327 and a Memorandum of Understanding dated November 3, 2017 and executed by FHWA and DOT&PF.

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Acronyms and Abbreviations

ADF&G	Alaska Department of Fish and Game
AMHS	Alaska Marine Highway System
dB	decibels
dBA	A-weighted decibels
DOT&PF	Alaska Department of Transportation and Public Facilities
DPS	Distinct Population Segment
eDPS	eastern Distinct Population Segment
EFH	Essential Fish Habitat
ESA	Endangered Species Act
FR	*Federal Register*
Hz	Hertz
IHA	Incidental Harassment Authorization
kHz	kilohertz
LOA	Letter of Authorization
µPa	microPascals
MMO	Marine Mammal Observer
MMPA	Marine Mammal Protection Act
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
Pa	Pascals
PTS	permanent threshold shift
rms	root mean square
SEL	sound exposure level
SEL_{cum}	cumulative Single Strike Equivalent
SPL	sound pressure level
SSL	sound source level
TL	transmission loss
TTS	temporary threshold shift
wDPS	western Distinct Population Segment

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1 DESCRIPTION OF SPECIFIED ACTIVITY

1.1 Introduction

The Alaska Department of Transportation and Public Facilities (DOT&PF) is proposing maintenance improvements to the existing Alaska Marine Highway System (AMHS) Auke Bay East Berth marine terminal as part of the Auke Bay East Terminal Improvements Project (Project). The in-water portion of the Project includes removal of 47 existing steel pipe piles and installation of 32 permanent steel pipe piles to support replacement of the dock structure. Up to 32 temporary steel pipe piles will be installed to support permanent pile installation and will be removed following completion of permanent pile installation. In addition, above-water construction will include replacement of the catwalk access gangway, refurbishment of the catwalks, lighting upgrades along dolphins and catwalk, removal and replacement of electrical components as needed to perform dolphin replacement work, and installation of cathodic protection anodes on all piles.

The National Oceanic and Atmospheric Administration (NOAA) National Marine Fisheries Service (NMFS) regulations governing the issuance of Incidental Harassment Authorizations (IHAs) and Letters of Authorization (LOAs) permitting the incidental take of marine mammals under certain circumstances are codified in 50 Code of Federal Regulations Part 216, Subpart I (Sections 216.101–216.108). The Marine Mammal Protection Act (MMPA) defines “take” to mean “to harass, hunt, capture, or kill, or attempt to harass, hunt, capture, or kill any marine mammal” (16 United States Code Chapter 31, Section 1362(13)). Section 216.104 sets out 14 specific items that must be addressed in requests for rulemaking and renewal of regulations pursuant to Section 101(a)(5) of the MMPA, which include the following:

1. Description of Specified Activity
2. Dates, Duration, and Specified Geographic Region
3. Species and Numbers of Marine Mammals
4. Affected Species Status and Distribution
5. Type of Incidental Taking Authorization Requested
6. Take Estimates for Marine Mammals
7. Anticipated Impacts of the Activity
8. Anticipated Impacts on Subsistence Uses
9. Anticipated Impacts on Habitat
10. Anticipated Effects of Habitat Impacts on Marine Mammals
11. Mitigation Measures to Protect Marine Mammals and Their Habitat
12. Mitigation Measures to Protect Subsistence Uses
13. Monitoring and Reporting
14. Suggested Means of Coordination

1.2 Project Purpose and Need

Auke Bay is located 18 kilometers (11 miles) north-northwest of Juneau, in Southeast Alaska (Figure 1-1). The Auke Bay Ferry Terminal is located along the north shore of Auke Bay (Figure 1-2) and is a major hub of the Southeast and Gulf of Alaska routes of the AMHS. The purpose of the Project is to restore the service life of the AMHS Auke Bay East Berth ferry terminal, which was originally built in 1982. The dolphins have undergone several repair projects and are currently in need of full replacement to keep that facility safe and usable for the AMHS vessels that frequent the facility. The berthing dolphin piles are severely corroded and in some locations the piles have open holes or are completely severed as a result of section loss. The timber fendering system on each of the dolphins are also severely rotted and beginning to loosen. This facility is one of the most highly-utilized terminals in the AMHS ferry system. Large, cross-gulf vessels like the M/V Kennicott and M/V Matanuska utilize this berth. The proposed improvements to the Auke Bay East Terminal will allow the important services of the AMHS to continue into the future. Due to the deteriorating current terminal, timely completion of this project is critical.

The following project description and engineering plan drawings (see Appendix A) are preliminary and may change as engineering and design progress. Actual numbers and sizes of piles, installation times, numbers of impact strikes, and other design and construction details and methods may vary slightly from the estimates outlined in this document. Descriptions of design and construction in this document are as accurate as possible at this stage of the Project but may vary slightly as design and construction advance. It is not anticipated that the Project will change such that potential impacts on marine mammals will change or vary from those described below. If substantial changes to design and construction occur, the DOT&PF will inform NMFS of those changes.

Figure 1-1. Site Location and Vicinity

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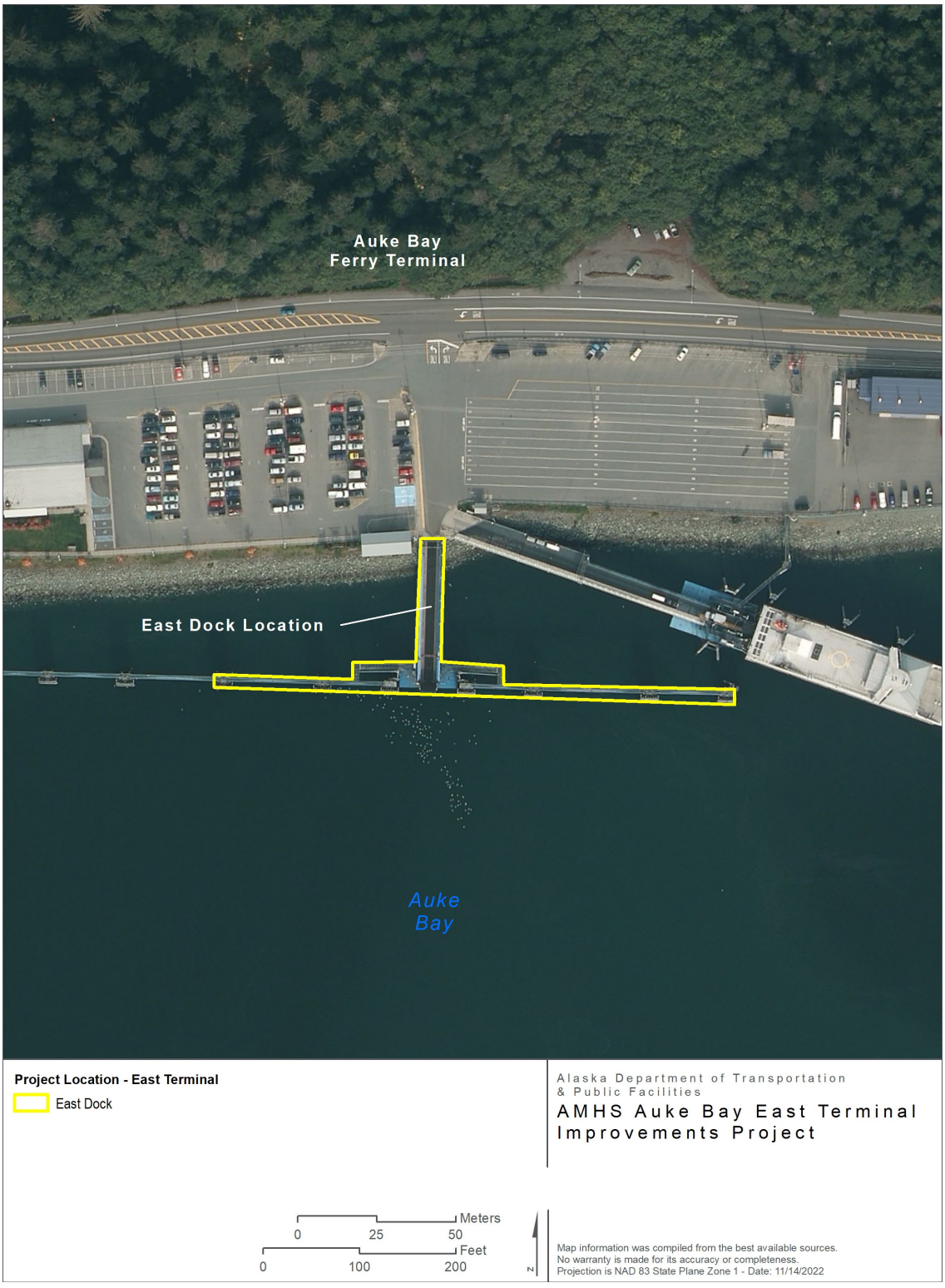

Figure 1-2. Location of East Terminal Upgrades in Auke Bay, Alaska

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1.3 Project Activities

Proposed activities included as part of the Project with potential to affect marine mammals include the noise generated by vibratory removal and vibratory and impact installation of steel pipe piles. Such in-water activities could result in harassment to marine mammals as defined under the MMPA of 1972, as amended in 2007 (16 United States Code 31). The proposed pile installation and removal are described in detail in the following section.

1.3.1 Pile Removal and Installation

The Project will involve the removal of 47 existing steel pipe piles (18-inch diameter) that support the existing dock structure (Table 1-1). Up to 20 new steel pipe piles (30-inch diameter; 10 plumb, 10 battered) will be installed as berthing dolphins. Eight new steel pipe piles (24-inch diameter; four plumb, four battered) will be installed as float restraints. Four new steel pipe piles (18-inch diameter) will be installed as gangway and platform support. Up to 32 temporary 24-inch steel pipe piles will be installed to support pile installation and will be removed following completion of construction. Cathodic protection anodes will be installed on all piles. No use of down-the-hole methods are anticipated due to the seafloor conditions.

Pile removal will be conducted using a vibratory hammer. Pile installation will be conducted using both a vibratory and an impact hammer. Piles may be proofed using an impact hammer so that the structural capacity of the pile embedment can be verified. The pile installation methods used will depend on sediment depth and conditions at each pile location. Pile installation and removal will occur in waters 15 – 18 meters (50 – 60 feet) in depth. Plan drawings of all Project components are provided in Appendix A.

1.3.2 Above-water Activities

Above-water construction will include replacement of the catwalk access gangway, refurbishment of the catwalks, lighting upgrades along dolphins and catwalk, and removal and replacement of electrical components as needed to perform dolphin replacement work. No impacts on marine mammals are anticipated from above-water activities, and therefore no potential exposures are anticipated and no take is requested for above-water activities.

Table 1-1. Numbers and Types of Piles to be Installed and Removed for each Project Component

Pile Diameter and Type	Number of Piles	Impact Strikes per Pile (duration in minutes)	Vibratory Duration per Pile (duration in minutes)	Total Duration of Activity per Pile (hours)	Production Rate Piles per Day (Range)	Days of Installation or Removal
Pile Installation						
30" Steel Plumb Piles (Permanent; Berthing Dolphins)	10	1,000 (120)	60	3.0	1.5 (1-2)	7
30" Steel Batter Piles (Permanent; Berthing Dolphins)	10	1,000 (120)	60	3.0	1.5 (1-2)	7
24" Steel Plumb Piles (Permanent; Float Restraint)	4	1,000 (120)	60	3.0	1.5 (1-2)	3
24" Steel Batter Piles (Permanent; Float Restraint)	4	1,000 (120)	60	3.0	1.5 (1-2)	3
18" Steel Plumb Piles (Permanent; Gangway/Platform Support)	4	800 (100)	60	2.67	1.5 (1-2)	3
24" Steel Piles (Temporary)	32	500 (60)	30	1.5	3 (2-4)	11
Pile Removal						
18" Steel Plumb Piles (Existing)	47	NA	30	0.5	3 (2-4)	16
24" Steel Piles (Temporary)	32	NA	30	0.5	3 (2-4)	11
TOTALS	**143**					**61**

Note: NA = not applicable

1.4 Applicable Permits/Authorizations

The following permits/authorizations are applicable to in-water work addressed by this application:

- U.S. Army Corps of Engineers Section 10 of the Rivers and Harbors Act of 1899
- Magnuson-Stephens Fishery Conservation and Management Act Essential Fish Habitat Consultation
- Section 404 of the Clean Water Act
- Section 401 of the Clean Water Act
- NMFS Endangered Species Act (ESA) Section 7 Consultation
- MMPA Incidental Harassment Authorization

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2 DATES, DURATION, AND SPECIFIED GEOGRAPHIC REGION

2.1 Dates and Durations of Activities

Construction of the Project is anticipated to occur over approximately 4 months beginning as early as Fall 2023. Pile installation and removal will be intermittent during this period, depending on weather, construction and mechanical delays, protected species shutdowns, and other potential delays and logistical constraints. Pile installation will occur intermittently during the work period for durations of minutes to hours at a time. Pile installation and removal will occur over 61 non-consecutive days within the 4-month construction window. DOT&PF is requesting the permit in hand by **May 15, 2023,** in order to bid the project which requires the permit to be included as part of the contract package that potential contractors bid upon.

The IHA is requested for 1 year for work anticipated to occur **October 1, 2023, through September 30, 2024**.

2.2 Geographical Setting

The project site is located within Section 21, Township 40 South, Range 65 East of the Copper River Meridian; United States Geological Survey Quad Map Juneau B-2; Latitude 58° 22' 55.7" North, 134° 41' 11.4" West; City and Borough of Juneau Tax Parcel ID 4B3001020030, Legal Description A.T.S. LT 1526; in the City and Borough of Juneau, Alaska.

2.2.1 Physical Environment

Auke Bay is an estuary at the southern end of Lynn Canal, located approximately 18 kilometers north-northwest of downtown Juneau, and roughly 130 kilometers inland from the Gulf of Alaska. The bay is one of many that lead to a larger system of glacial fjords connecting various channels with the open ocean via Lynn Canal, Icy Strait, Chatham Strait, Stephens Passage, and Frederick Sound. Auke Bay contains several small islands and reefs within the 11-square-kilometer embayment (Wing et al. 2006). While most of the bay is relatively shallow, reaching depths of 40 to 60 meters, depths of more than 100 meters have been found near Coghlan Island.

Auke Bay is generally characterized by semidiurnal tides with mean tidal ranges of more than 6 meters. Three main creeks drain into Auke Bay, including Auke Creek, Auke Nu Creek, and Waydelich Creek, as well as several smaller unnamed creeks. Auke Creek is an outlet stream from Auke Lake, located 4 kilometers to the east of the Project area. The Mendenhall River and Lemon Creek drain into Gastineau Channel and Fritz Cove to the south, eventually circulating glacier silt into Auke Bay (Sturdevant and Landingham 1993).

The bathymetry of Auke Bay is generally sloping, with occasional mounts and rises throughout. Substrate in the bay ranges in particle size, including crushed shell, pebbles, sand, and silt (Loher and Armstrong 1999). Eelgrass is occasionally found throughout the estuary, mostly in sheltered, near-shore sand or silt beaches such as within Auke Nu Cove (Harris et al. 2012). Benthic sediments in this area are already subject to disturbance and impacted by activities related to nearby harbor operations, vessel fueling, and dredging.

2.2.2 Acoustic Environment

Ongoing vessel activities throughout Auke Bay and nearby Statter Harbor, as well as land-based industrial and commercial activities, result in elevated in-air and underwater sound conditions in the Project area that likely increase with proximity to the Project site. Background sound levels likely vary seasonally, with elevated levels during summer when the tourism and fishing industries are at their peaks.

3 SPECIES AND NUMBERS OF MARINE MAMMALS

The following ten species could occur in the Project area: Steller sea lion (*Eumetopias jubatus*), California sea lion (*Zalophus californianus*), harbor seal (*Phoca vitulina*), Northern elephant seal (*Mirounga angustirostris*), harbor porpoise (*Phocoena phocoena*), Dall's porpoise (*Phocoenoides dalli*), Pacific white-sided dolphin (*Lagenorhynchus obliquidens*), killer whale (*Orcinus orca*), humpback whale (*Megaptera novaeangliae*), and minke whale (*Balaenoptera acutorostrata*; Table 3-1). The Alaska Protected Resources Division of NMFS provides an online interactive mapping tool to identify species protected by the MMPA based on broadly generalized species ranges (NOAA 2022). This tool identified seven of the species listed above, as well as gray whales (*Eschrichtius robustus*). Northern elephant seals have been observed more regularly within Southeast Alaska in recent years (see Section 4.4.2) and are therefore included in these analyses. Additionally, at least one California sea lion has been present near the project area for extended periods of time in the past and therefore they are included in these analyses (see Section 4.2.2).

When available, peer-reviewed scientific publications are used to quantitatively estimate marine mammal abundance in the Project area. However, scientific surveys and resulting data such as population estimates, densities, and other quantitative information are lacking for most marine mammal populations in Southeast Alaska. Therefore, qualitative information was gathered from discussions with knowledgeable local people in the Auke Bay community, including individuals familiar with marine mammals in the Project area. Information from the Auke Bay Ferry Terminal Modifications and Improvements Project issued IHA (84 *Federal Register* [FR] 56767) as well as the final protected species monitoring report (DOT&PF 2021) and from the Statter Harbor Improvement Project (84 FR 11066; 85 FR 4278) were used for animal group sizes and abundance due to similarities between the projects and locations.

A description of each species and its presence in the Project area is provided in Section 4.

Table 3-1. Marine Mammals Known to Occur in or near the Project Area

Species	Abundance (Population/Stock)		MMPA Designation	ESA Listing	Occurrence in Project Area
Steller sea lion	43,201[a] (Eastern DPS)		Protected	None	Common
	52,932[a] (Western DPS)		Depleted & Strategic	Endangered	Uncommon
California sea lion	257,606 (US Stock)		Protected	None	Rare
Harbor seal	13,388 (Lynn Canal/Stephens Passage Stock)		Protected	None	Common
Northern elephant seal	187,386 (California Breeding Stock)		Protected	None	Rare
Harbor porpoise	1,302 (Southeast Alaska Inland Waters Stock)		Strategic	None	Uncommon
Dall's porpoise	83,400 (Alaska Stock)		Protected	None	Uncommon
Pacific white-sided dolphin	26,880 (North Pacific Stock)		Protected	None	Rare
Killer whale (Orca)	2,347[a] (Eastern North Pacific Alaska Resident Stock)		Protected	None	Rare
	302[a] (Eastern North Pacific Northern Resident Stock)		Protected	None	Rare
	349[a] (West Coast Transient Stock)		Protected	None	Rare
Gray whale	26,960 (Eastern North Pacific Stock)		Protected	None	Unlikely[b]
Humpback whale	10,103 (Central North Pacific Stock)	11,540 (Hawaii DPS)	Depleted & Strategic	None	Common
		2,913 (Mexico DPS)	Depleted & Strategic	Threatened	Uncommon
Minke whale	Unknown (Alaska Stock)		Protected	None	Rare

Sources: Humpback whale DPS abundance estimates: Wade 2021. California sea lion, Northern elephant seal, and Gray whale abundance estimates: Carretta et al. 2022. All other abundance estimates: Muto et al. 2022.

Note: DPS = Distinct Population Segment; ESA = Endangered Species Act; MMPA = Marine Mammal Protection Act.

[a] Minimum population estimate (Nmin) and estimated population (Nest)

[b] Excluded from further discussion in this IHA Application.

4 AFFECTED SPECIES STATUS AND DISTRIBUTION

4.1 Steller Sea Lion

4.1.1 Status and Distribution

Steller sea lions are found throughout the northern Pacific Ocean, including coastal and inland waters from Russia (Kuril Islands and the Sea of Okhotsk), east to Alaska, and south to central California (Año Nuevo Island). Steller sea lions were listed as threatened range-wide under the ESA on November 26, 1990 (55 FR 49204); they were subsequently partitioned into the western and eastern Distinct Population Segments (wDPS and eDPS, respectively) in 1997 (Allen and Angliss 2010). The eDPS remained classified as threatened (62 FR 24345) until it was delisted in November 2013, while the wDPS (those individuals west of 144˚ W longitude or Cape Suckling, Alaska) was upgraded to endangered status following separation of the stocks, and it remains listed as endangered.

The majority of Steller sea lions that inhabit Southeast Alaska are part of the eDPS; however, branded individuals from the wDPS make regular movements across the 144° longitude boundary to the northern "mixing zone" haulouts and rookeries within southeast Alaska (Jemison et al. 2013). While haulouts and rookeries in the northern portion of Southeast Alaska may be important areas for wDPS animals, there continues to be little evidence that their regular range extends to the southern haulouts and rookeries in Southeast Alaska (Jemison et al. 2018). However, genetic data analyzed in Hastings et al. (2020) indicated that up to 1.4 percent of Steller sea lions near the Project area may be members of the wDPS, which NMFS recommends using in their 2020 guidance (NMFS 2020).

The current minimum abundance estimate for the eDPS of Steller sea lions is 43,201 individuals (Muto et al. 2022). NMFS estimates that the eDPS stock increased in population at a rate of 4.25 percent per year between 1989 and 2017 based on pup counts in Southeast Alaska, British Columbia, Oregon, and California (Muto et al. 2022).

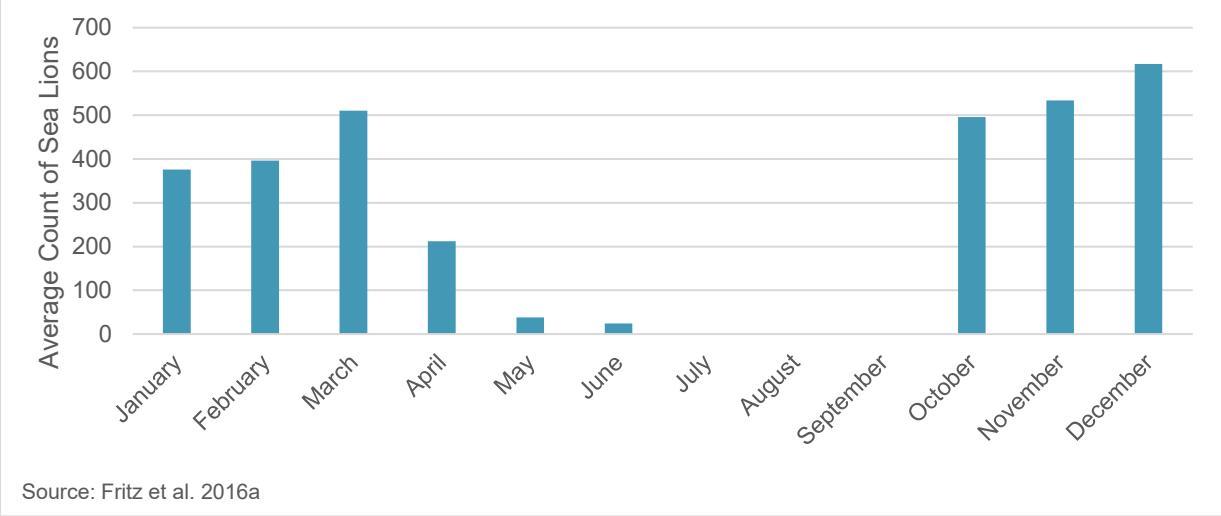
The current minimum abundance estimate for the wDPS of Steller sea lions is 52,932 individuals (Muto et al. 2022). NMFS estimates that between 2002 and 2019, the wDPS stock increased at a rate of 1.63 percent per year for pup counts and 1.82 percent per year for non-pup counts (Sweeney et al. 2019) with variation between regions with a general positive trend in the Gulf of Alaska and eastern Aleutian Islands regions (Muto et al. 2022).

The Project area is not located in or near designated critical habitat for the wDPS of Steller sea lions. In Southeast Alaska, critical habitat for the wDPS of Steller sea lions includes a terrestrial zone, an aquatic zone, and an in-air zone that extends 3,000 feet (0.9 kilometer) landward, seaward, and above, respectively, any designated major rookery and major haulout. The nearest designated major haulout is located at Benjamin Island (50 Code of Federal Regulations 226.202), 23 kilometers (12.4 nautical miles) Euclidean (i.e., straight-line) distance north-northwest of Auke Bay.

4.1.2 Presence in Project Area

Steller sea lions are common within the project area; however, systematic counts or surveys have not been completed. The species generally occurs in Auke Bay only during winter. Most individuals that frequent Auke Bay haul out at Benjamin Island in Lynn Canal. Several other haulouts are located within 20–30 kilometers of the Project area (Fritz et al. 2016b; Figure 4-1

and Figure 4-2). The most-used of these sites are Little Island and Rocky Island, with counts ranging between 0 and 805 animals between August and May from 2001 through 2004 (Fritz et al. 2016a). The Auke Bay boating community observes Steller sea lions transiting between Auke Bay and the Benjamin Island haulout regularly during winter (83 FR 52394) and provides anecdotal reports of Steller sea lions utilizing Fritz Cove in winter months. Satellite tagged individuals from this haulout were observed in the vicinity of Auke Bay between November and January (Fadely 2011). Surveys of the Benjamin Island haulout have been conducted intermittently since 1982, and monthly surveys were conducted from March 2002 to May 2004. Non-pup counts conducted between October and April from 2001 to 2015 averaged 447 individuals and ranged from 49 to 803 individuals (Fritz et al. 2016a). A total of 11 Alaska Department of Fish and Game (ADF&G) surveys were conducted at Benjamin Island between January and July 2017, with counts ranging from 0 to 768 individuals (L.A. Jemison, pers. comm. as cited in 83 FR 52394). Based on the results of 2 years of monthly surveys, Steller sea lion abundance at the Benjamin Island haulout is highest from October through April, and abundance is lowest between May and September (Figure 4-1).



Source: Fritz et al. 2016a

Figure 4-1. Average Monthly Abundance of Steller Sea Lions at the Benjamin Island Haulout between March 2002 and May 2004

Steller sea lions have been observed in Auke Bay in groups as large as 121 individuals. Sea lions do not generally haul out in or near Auke Bay, but large rafts of 20–50 sea lions have been observed in Auke Bay between foraging bouts. During winter 2015–2016, Steller sea lions were observed foraging on walleye pollock for more than 20 consecutive days. Observations of Steller sea lions during the 2021 Auke Bay Ferry Terminal Modification & Improvements project were most common during the months of January, February, and March with minimal sightings in April through June (AKDOT&PF 2021). The estimate of 121 Steller sea lions per day is in agreement with incidental take numbers proposed by NMFS for a project in Statter Harbor, which is within Auke Bay (83 FR 52394).

Members of the wDPS of Steller sea lions may occur in Auke Bay, although none have been documented. Only three branded wDPS individuals have been observed at Benjamin Island, and these observations occurred more than 15 years ago. Surveys conducted between 2007 and 2016 by ADF&G did not record any branded wDPS individuals at Benjamin Island. However, genetic data analyzed in Hastings et al. (2020) indicated that up to 1.4 percent of Steller sea lions near the Project area may be members of the wDPS, which NMFS

recommends using in their 2020 guidance (NMFS 2020). For the purposes of this Project, the DOT&PF will adopt this conservative estimate, as discussed further in Section 4.1.1.

4.1.3 Life History

Steller sea lions are opportunistic predators, feeding primarily on a wide variety of fishes and cephalopods, including Pacific herring (*Clupea pallasi*), walleye pollock (*Gadus chalcogramma*), capelin (*Mallotus villosus*), Pacific sand lance (*Ammodytes hexapterus*), Pacific cod (*Gadus macrocephalus*), salmon (*Oncorhynchus* spp.), and squid (*Teuthida* spp.; Jefferson et al. 2008; Wynne et al. 2011). Steller sea lions do not generally eat every day, but tend to forage every 1–2 days and return to haulouts to rest between foraging trips (Merrick and Loughlin 1997; Rehberg et al. 2009).

4.1.4 Hearing Ability

Steller sea lions' hearing ability is comparable to that of other otariids. Steller sea lions use both in-air and underwater vocalizations during mating, competition for territory, and rearing of pups (Kastelein et al. 2005). Steller sea lion in-air hearing ability ranges from approximately 0.25 to 30 kilohertz (kHz); however, empirical studies have shown that the hearing of one individual was found to be most sensitive from 5 to 14.1 kHz. Underwater, Steller sea lions' most sensitive hearing range has been measured from 1 to 16 kHz in males and at 25 kHz in females (Muslow and Reichmuth 2010).

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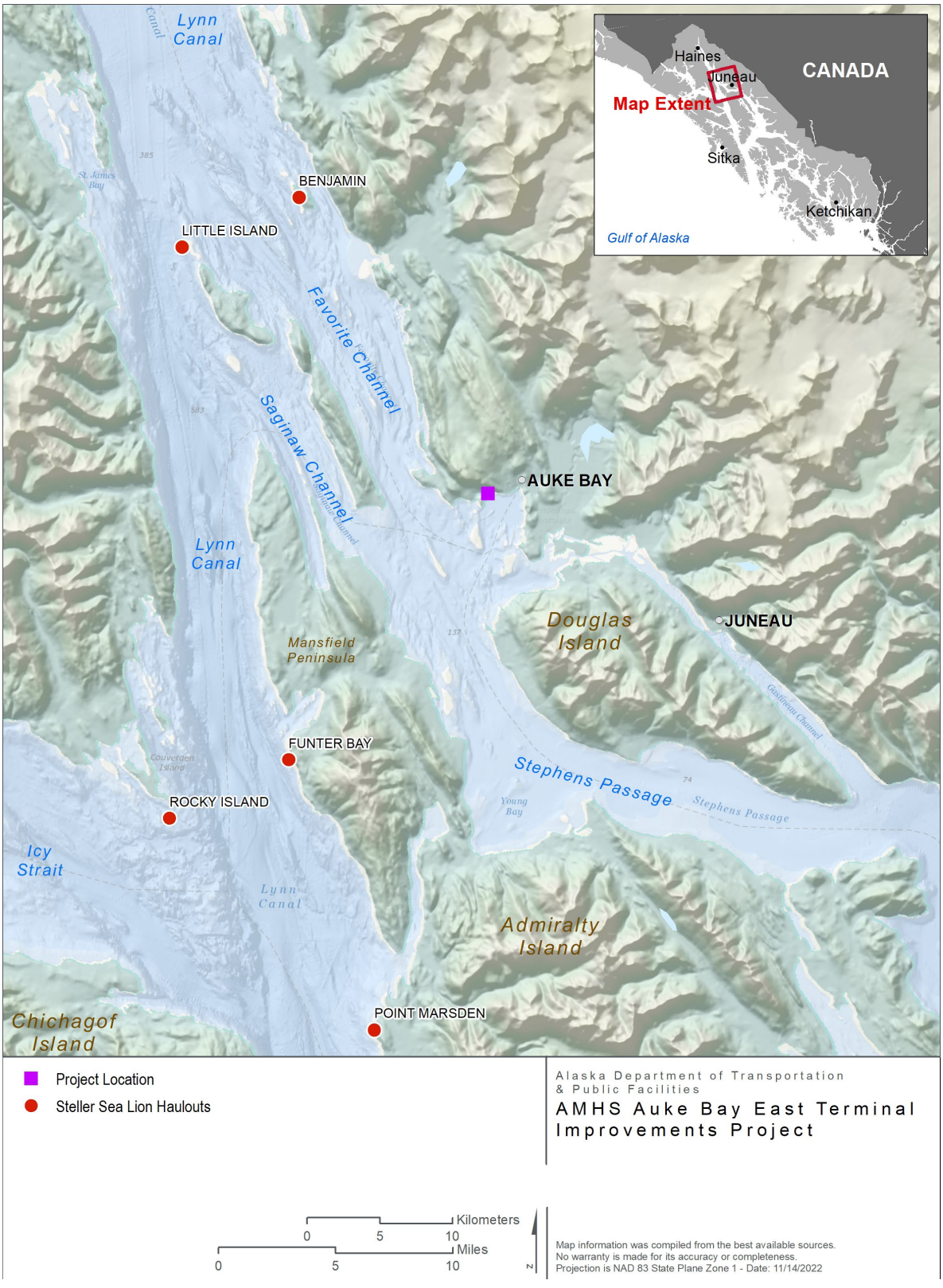

Figure 4-2. Steller Sea Lion Haulouts Located Nearest to the Project Area

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4.2 California Sea Lion

4.2.1 Status and Distribution

California Sea lions have been separated into five genetically distinct stocks, with the U.S. Stock also known as the Pacific Temperate Stock (Carretta et al. 2022). Male California sea lions disperse widely from their breeding rookeries in southern California to forage as far north as Canada (Carretta et al. 2022), with some individuals observed dispersing farther north.

The U.S. Stock estimate is 257,606 based on a 1975–2014 time series of pup counts (Lowry et al. 2017). Laake et al. (2018) estimated a productivity rate of 7 percent for the U.S. Stock; however, NMFS uses the default maximum net productivity rate for pinnipeds of 12 percent per year (Wade and Angliss 1997) for the population.

California sea lions are not designated as strategic or depleted under the MMPA and are not listed under the ESA, but like all other marine mammals, they are protected under the MMPA.

4.2.2 Presence in Project Area

One lone California sea lion was present near the Project area before being hazed by NMFS personnel in 2017 (NOAA 2017). Based on this sighting, the Statter Harbor Improvements Project (Year 2; 85 FR 4278) was authorized take of a small number of California sea lions. No additional sightings in the vicinity of Auke Bay have been documented since 2017, including during the 2021 DOT&PF project in Auke Bay (AKDOT&PF 2021).

4.2.3 Life History

California sea lions breed on the Channel Islands off southern California and along western Baja California and the Gulf of California; however, births may occur as far north as the Farallon Islands off of San Francisco Bay (Heath and Perrin 2009). Female California sea lions and juveniles forage mainly near breeding rookeries year-round, whereas males may be observed as far north as Prince William Sound, Alaska, after breeding season (Heath and Perrin 2009).

4.2.4 Hearing Ability

California sea lions' hearing ability is comparable to that of other otariids. Underwater, California sea lions' most sensitive hearing has been measured to be at around 16 kHz in males (Schusterman et al. 1972, Reichmuth and Southall 2011) with the range of hearing from 0.4 – 32 kHz (Reichmuth and Southall 2011).

4.3 Harbor Seal

4.3.1 Status and Distribution

Harbor seals range from Baja California north along the west coasts of California, Oregon, Washington, 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. In 2010, harbor seals in Alaska were partitioned into 12 separate stocks based largely on genetic structure (Allen and Angliss 2010). Harbor seals are not designated as strategic or depleted under the MMPA and are not listed under the ESA, but like all other marine mammals, they are protected under the MMPA. The status of all 12 stocks of harbor seals identified in Alaska relative to their optimum sustainable population size is unknown. The current

statewide abundance estimate for Alaska harbor seals is 243,938, based on aerial survey data collected during 1996–2018 (Boveng et al. 2019).

The Lynn Canal/Stephens Passage Stock of harbor seals is present in the Project area. The most recent population estimate for this stock is 13,388 individuals (Muto et al. 2022). No other stocks of harbor seals are present in the Project area, so only the Lynn Canal/Stephens Passage stock is considered in this application.

4.3.2 Presence in Project Area

Harbor seals are commonly sighted in the waters of the inside passages throughout Southeast Alaska. They occur year-round within the Project area and are regularly sighted in Auke Bay, including Statter Harbor. NOAA aerial survey data indicate that groups ranging from 10 to 52 seals could be present within the Project area during summer at haulouts on the western side of Coghlan Island, as well as on Battleship Island (E. Richmond, pers. comm., n.d.). Harbor seals were observed in all months of DOT&PF's 2021 project in Auke Bay (AKDOT&PF 2021). Harbor seals are known to be curious and may approach novel activity and could enter the Project area during pile installation and removal.

Based on recent authorizations including the Statter Harbor Year 2 issued IHA (85 FR 4278), DOT&PF agrees that up to 122 harbor seals per day could be in the Project vicinity.

4.3.3 Life History

Harbor seals forage on fish and invertebrates (Orr et al. 2004) including capelin, eulachon (*Thaleichthys pacificus*), cod, pollock, flatfish, shrimp, octopus, and squid (Wynne 2012). They are opportunistic feeders that forage in marine, estuarine, and occasionally freshwater habitat, adjusting their foraging behavior to take advantage of prey that are locally and seasonally abundant (Payne and Selzer 1989). Research has demonstrated that harbor seals conduct both shallow and deep dives while foraging (Tollit et al. 1997), depending on prey availability. Harbor seals usually give birth to a single pup between May and mid-July; birthing locations are dispersed over several haulout sites and not confined to major rookeries (Klinkhart et al. 2008). Harbor seals haul out on rocks, reefs, beaches, and drifting glacial ice. They are non-migratory; their local movements are associated with tides, weather, season, food availability, and reproduction, as well as sex and age class (Swain et al. 1996; Lowry et al. 2001; Boveng et al. 2012).

4.3.4 Hearing Ability

In general, phocids have a functional hearing range between approximately 50 Hertz (Hz) and 86 kHz, although it is most acute below 60 kHz (Møhl 1968). Harbor seals produce social calls at 0.5 to 3.5 kHz and clicks from 8 to 150 kHz (Richardson et al. 1995). Recent research by Kastelein et al. (2018) suggests that harbor seals may experience a temporary threshold shift (TTS) when exposed to broadband pile-driving noise, but that hearing is recovered within 60 minutes post-exposure.

4.4 Northern Elephant Seal

4.4.1 Status and Distribution

Northern elephant seals are wide-ranging throughout the North Pacific, spending as much as 80 percent of their time at sea (Hindell and Perrin 2009). Northern elephant seals have been undergoing a large population increase, estimated at 3.8 percent annually from 1988 to 2010 (Lowry et al. 2014). The most recent minimum population estimate of the California breeding stock, based on the count of pups observed in the 2010 survey, is 81,368 seals (Lowry et al. 2014), and the estimate for the total population is as high as 187,386 seals (Carretta et al. 2022).

Northern elephant seals are not designated as strategic or depleted under the MMPA and are not listed under the ESA, but like all other marine mammals, they are protected under the MMPA.

4.4.2 Presence in Project Area

There is a low probability that northern elephant seals would occur in the Project area. No sightings of elephant seals have been documented near Auke Bay; however, Marine Mammal Observers (MMOs) at a DOT&PF project site in Ketchikan (460 kilometers south of Auke Bay) reported sightings of a northern elephant seal on multiple days (C. Gentemann, pers. comm., April 8, 2022). Additional sightings of northern elephant seals around the state concurrent with the Ketchikan sighting were reported in Seward, King Cove, and Kodiak (L. Davis, pers. comm., April 14, 2022).

Auke Bay is an unlikely area for an occurrence, as northern elephant seals generally feed along the continental shelf break (Le Boeuf et al. 2000) and are not expected to spend time in shallow areas; but given the recent increase in sightings, including sightings in Southeast Alaska, it is assumed that small numbers of northern elephant seals could be present in Auke Bay during construction of the Project.

4.4.3 Life History

Northern elephant seals breed and give birth in California and Baja Mexico in winter months (Stewart et al. 1994) before dispersing widely across the North Pacific (Le Boeuf et al. 2000). Females migrate to deep-water locations in the North Pacific, feeding on pelagic prey, whereas male seals migrate as far north as the Aleutian Islands and other continental-fringe, shallow areas where they feed on benthic prey (Le Boeuf et al. 2000). Gestation in elephant seals lasts 11 months, with births taking place onshore when seals are at the breeding colony (Stewart et al. 1994).

4.4.4 Hearing Ability

Phocids in general have a functional hearing range between approximately 50 Hz and 86 kHz, although it is most acute below 60 kHz (Møhl 1968). Elephant seal underwater hearing sensitivity is best between 3.2 and 45 kHz, with an upper cutoff of 55 kHz and the greatest sensitivity of 6.4 kHz (Kastak and Schusterman 1999).

4.5 Harbor Porpoise

4.5.1 Status and Distribution

In the eastern North Pacific Ocean, the harbor porpoise ranges from Point Barrow, along the Alaska coast, and down the west coast of North America to Point Conception, California. 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. The Southeast Alaska stock ranges from Cape Suckling to the Canada boundary (Muto et al. 2022). Only the Southeast Alaska stock is considered in this application because the other stocks occur outside the geographic area under consideration. Harbor porpoises frequent primarily coastal waters in Southeast Alaska (Dahlheim et al. 2009) and occur most frequently in waters less than 100 meters deep (Hobbs and Waite 2010).

Harbor porpoises are neither designated as depleted under the MMPA nor listed under the ESA, but the Southeast Alaska stock is denoted as "strategic" under the MMPA. The strategic designation indicates that the stock is declining or that human-caused mortality exceeds the potential biological removal level. The previous estimate for harbor porpoises in the Southeast Alaska stock was 11,146 individuals, based on aerial survey estimates completed in 1997 (Hobbs and Waite 2010). Based on shipboard surveys completed in 2019 that took place throughout Southeast Alaska inland waters, the abundance estimate for the Southeast Alaska stock of harbor porpoise is 1,302 animals (Muto et al. 2022) with a minimum estimate of 1,057 animals. No reliable information is available to determine trends in abundance.

4.5.2 Presence in Project Area

Although there have been no systematic studies or observations of harbor porpoises specific to Auke Bay, there is potential for them to occur in the Project area. Abundance data for harbor porpoises in Southeast Alaska were collected during 18 seasonal surveys spanning 22 years, from 1991 to 2012 (Dahlheim et al. 2015).

During that study, a total of 398 harbor porpoises were observed in the northern inland waters of Southeast Alaska, including Lynn Canal. The average density estimate for all survey years in Chatham Strait was 0.013 harbor porpoises per square kilometer (Dahlheim et al. 2015). For other projects in Auke Bay, NMFS has estimated that one pair of harbor porpoises per day could be present in the Project area (83 FR 52394, 85 FR 4278).

Their small overall size, lack of a visible blow, low dorsal fins and overall low profile, and short surfacing time make harbor porpoises difficult to spot (Dahlheim et al. 2015), likely reducing identification and reporting of this species, and these estimates therefore may be low. Only six individual harbor porpoises were observed during the 2021 project at Auke Bay (AKDOT&PF 2021).

4.5.3 Life History

Harbor porpoises forage in waters less than 200 meters deep on small pelagic schooling fishes such as herring, cod, pollock, octopus, smelt, and bottom-dwelling fish, occasionally feeding on squid and crustaceans (Bjørge and Tolley 2009; Wynne et al. 2011).

Calving occurs from May to August; however, this can vary by region. According to aerial surveys of harbor porpoise abundance in Southeast Alaska conducted in 1991–1993, mean group size was calculated to be 1.2 animals (Dahlheim et al. 2000).

4.5.4 Hearing Ability

Harbor porpoise echolocation clicks and buzzes have been measured at peak frequencies between 130 and 140 kHz, with a bandwidth of 6–26 kHz (Villadsgaard et al. 2007). Similar to other toothed whales, their hearing sensitivity improves with increasing frequency and is best between 10 and 120 kHz (Au and Hastings 2008). Unlike most odontocetes, harbor porpoises do not produce whistles. Recent data suggest that harbor porpoises communicate using clicks and buzzes that, despite being in the lower end of their frequency range, are of a frequency sufficiently high so as to attenuate very rapidly, thereby not alerting predators at longer distances (Sørensen et al. 2018).

4.6 Dall's Porpoise

4.6.1 Status and Distribution

Dall's porpoises are found throughout the North Pacific, from southern Japan to southern California and north to the Bering Sea. All Dall's porpoises in Alaska are members of the Alaska stock, and those off California, Oregon, and Washington are part of a separate stock. This species can be found in offshore, inshore, and nearshore habitat, but prefers waters more than 183 meters deep (Dahlheim et al. 2009; Jefferson 2009).

Dall's porpoises are protected under the MMPA like all marine mammals but are not listed under the ESA. Insufficient data are available to estimate current population trends, but the species is considered reasonably abundant. The current population estimate for the species is 1.2 million, and the Alaska stock was last estimated at 83,400 individuals in 1993 (Muto et al. 2022).

4.6.2 Presence in Project Area

No systematic studies of Dall's porpoise abundance or distribution have occurred in Auke Bay; however, Dall's porpoises have been consistently observed in Lynn Canal, Stephens Passage, upper Chatham Strait, Frederick Sound, and Clarence Strait (Dalheim et al. 2000). The species is generally found in waters in excess of 600 feet (183 meters) deep, which do not occur in Auke Bay. Despite generalized water depth preferences, Dall's porpoises may occur in shallower waters. Moran et al. (2018a) recently mapped Dall's porpoise distributions in bays, shallow water, and nearshore areas of Prince William Sound, habitats not typically utilized by this species. If Dall's porpoises occur in the Project area, they will likely be present in March or April, given strong seasonal patterns observed in nearby areas of Southeast Alaska (Dalheim et al. 2009). One lone Dall's porpoise was sighted during DOT&PF's 2021 project during the month of March, with the report noting that sightings of a single individual are rare for this species (AKDOT&PF 2021). This species has a tendency to bow-ride with vessels and may occur in the Project area incidentally a few times per year. In a recent authorization at nearby Statter Harbor (85 FR 4278), NMFS estimated that one pod of up to 20 individuals per month could be present in the vicinity of the Project area and DOT&PF concurs.

4.6.3 Life History

Dall's porpoises generally occur in groups of 2 to 20 individuals but have also been recorded in groups numbering in the hundreds. In Alaska, the average group size ranges from 2.7 to 3.7 individuals (Wade et al. 2003). Common prey include a variety of small, schooling fishes (such as herrings and mackerels) and cephalopods. Dall's porpoises may migrate between inshore and offshore areas and make latitudinal movements or short seasonal migrations, but these movements are generally not consistent (Jefferson 2009).

4.6.4 Hearing Ability

Similar to other porpoises, Dall's porpoises produce echolocation clicks at high frequencies from 135 to 149 kHz but can also produce relatively low-frequency communication clicks ranging from 0.04 to 12 kHz (Richardson et al. 1995). Dall's porpoise vocalizations have not been widely studied; however, recent research from wild porpoise recordings showed that echolocation click frequencies were centered between 117 and 141 kHz, with some as high as 198 kHz (Bassett et al. 2009). Spectral banding patterns have also been observed in this species, similar to Risso's and Pacific white-sided dolphins, which may assist with population classification for Dall's porpoises across geographic regions.

4.7 Pacific White-Sided Dolphin

4.7.1 Status and Distribution

Pacific white-sided dolphins are a pelagic species inhabiting temperate waters of the North Pacific Ocean and along the coasts of California, Oregon, Washington, and Alaska (Muto et al. 2022). Despite their distribution mostly in deep, offshore waters, they may also be found over the continental shelf and in nearshore waters, including inland waters of Southeast Alaska (Ferrero and Walker 1996).

Pacific white-sided dolphins are not listed as threatened or endangered under the ESA but are protected under the MMPA. They are managed as two distinct stocks: the California/Oregon/ Washington stock and the North Pacific stock (north of 45° N, including Alaska).

The most complete population abundance estimate, based on line-transect surveys conducted from 1987 to 1990, is 931,000 animals and most likely reflects a range-wide estimate (Buckland et al. 1993). This estimate does not take into account the two management stocks; thus, according to Muto et al. (2022), a more reasonable estimate of the North Pacific stock is approximately 26,880 individuals. Currently, there is no reliable information on trends in the abundance of Pacific white-sided dolphins.

4.7.2 Presence in Project Area

Scientific studies and data are lacking relative to the presence or abundance of Pacific white-sided dolphins in or near Auke Bay. When Pacific white-sided dolphins have been observed, sighting rates were highest in spring and decreased throughout summer and fall (Dahlheim et al. 2009).

Most observations of Pacific white-sided dolphins occur off the outer coast or in inland waterways near entrances to the open ocean. According to NOAA (Muto et al. 2022), aerial surveys in 1997 sighted one group of 164 Pacific white-sided dolphins in the Dixon Entrance to the south of Auke Bay. These observational data, combined with anecdotal information, indicate that there is a small potential for Pacific white-sided dolphins to occur in the Project area. In a recent authorization in Metlakatla, NMFS estimated that one group of Pacific white-sided dolphins (median between 20 and 164 individuals) may occur in that location (86 FR 43190). Therefore, the Project is estimating that one pod of up to 92 individuals may occur in the Project area during the 61 days of construction.

4.7.3 Life History

Pacific white-sided dolphins prey on squid and small schooling fish such as capelin, sardines, and herring (Morton 2006). They are known to work in groups to herd schools of fish and can

dive underwater for up to 6 minutes to feed (Morton 2006). Group sizes have been reported to range from 40 to more than 1,000 animals, but groups of between 10 and 100 individuals (Stacey and Baird 1991) occur most commonly. Seasonal movements of Pacific white-sided dolphins are not well understood, but there is evidence of both north-south seasonal movement (Leatherwood et al. 1984) and inshore-offshore seasonal movement (Stacey and Baird 1991).

4.7.4 Hearing Ability

NMFS classifies Pacific white-sided dolphins as mid-frequency hearing cetaceans, having hearing sensitivity that is best between 2 and 128 kHz (Tremel et al. 1998). They produce echolocation clicks that range in frequency from 20 Hz to more than 100 kHz (Soldevilla et al. 2008) and also produce burst pulses and buzzes (Lammers et al. 2006). However, there is ongoing debate regarding whether Pacific white-sided dolphins produce whistles (Rankin et al. 2007).

4.8 Killer Whale

4.8.1 Status and Distribution

Killer whales have been observed in all the world's oceans, but the highest densities occur in colder and more productive waters found at high latitudes (NMFS 2016a). Killer whales 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).

There are three distinct ecotypes, or forms, of killer whales recognized: resident, transient, and offshore. The three ecotypes differ morphologically, ecologically, behaviorally, and genetically. 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. This application considers only the Eastern North Pacific Alaska Resident Stock (Alaska Resident Stock), Eastern North Pacific Northern Resident Stock (Northern Resident Stock), and West Coast Transient Stock, because all other stocks occur outside the geographic area under consideration (Muto et al. 2022). None of these three stocks of killer whales are designated as depleted or strategic under the MMPA or listed as threatened or endangered under the ESA.

The Alaska Resident stock occurs from Southeast Alaska to the Aleutian Islands and Bering Sea. Photo-identification studies between 2005 and 2009 identified 2,347 individuals in this stock, including approximately 121 in Southeast Alaska (Muto et al. 2022). The Northern Resident stock occurs from Washington north through part of Southeast Alaska and consists of 261 individuals. The West Coast Transient Stock occurs from California north through Southeast Alaska. Between 1975 and 2012, surveys identified 521 individual West Coast Transient killer whales. In the most recent stock assessment (Muto et al. 2022), the minimum population for the transient stock is estimated to be 349 individuals based on photo identification of individuals in Canada (Towers et al. 2019). Towers et al. (2019) noted a 4.1 percent mean annual increase rate in west coast transient killer whales documented in Canada since 2012, although Dahlheim et al. (2009) noted a 5.2 percent annual decline in transient killer whales observed in Southeast Alaska between 1991 and 2007.

Surveys between 1991 and 2007 encountered resident killer whales during all seasons throughout Southeast Alaska. Both residents and transients were common in a variety of habitats and all major waterways, including protected bays and inlets. There does not appear to be strong seasonal variation in abundance or distribution of killer whales, but there was substantial variability among years during this study (Dahlheim et al. 2009).

4.8.2 Presence in Project Area

No systematic studies of killer whales have been conducted in or around Auke Bay. Killer whales were observed infrequently (on 11 of 135 days) during monitoring nearby in Hoonah, 54 km west of Auke Bay, and most were recorded in deeper, offshore waters (Berger ABAM 2016). Dalheim et al. (2009) observed transient killer whales within Lynn Canal, Icy Strait, Stephens Passage, Frederick Sound, and upper Chatham Strait. Transient killer whales tend to transit through Lynn Canal and occasionally enter Auke Bay to target local harbor seal, harbor porpoise, or Steller sea lion populations, but do not linger in the Project area (K. Savage, pers. comm., n.d.). Two pods of 5 and 6 individuals (or possibly the same pod of 6) were observed during the 2021 DOT&PF project in Auke Bay during the month of February (AKDOT&PF 2021).

In a recent authorization in nearby Statter Harbor (85 FR 4278), it was estimated that over the length of that project, up to one resident pod (41 individuals average) and one transient pod (14 individuals average) may be present. DOT&PF concurs with this estimate for this Project.

4.8.3 Life History

Transient killer whales hunt and feed primarily on marine mammals, while residents forage primarily on fish. Transient killer whales feed primarily on harbor seals, Dall's porpoises, harbor porpoises, and sea lions. Resident killer whale populations in the eastern North Pacific feed mainly on salmonids, showing a strong preference for Chinook salmon (NMFS 2016a).

Transient killer whales are often found in long-term stable social units (pods) of 1 to 16 whales. Average pod sizes in Southeast Alaska were six in spring, five in summer, and four in fall (Dahlheim et al. 2009). Pod sizes of transient whales are generally smaller than those of resident social groups. Resident killer whales occur in pods ranging from 7 to 70 whales that are seen in association with one another more than 50 percent of the time (Dahlheim et al. 2009; NMFS 2016b). In Southeast Alaska, resident killer whale mean pod size was approximately 21.5 in spring, 32.3 in summer, and 19.3 in fall (Dahlheim et al. 2009).

4.8.4 Hearing Ability

Killer whales are categorized as mid-frequency hearing cetaceans, although they hear best at the higher end of that spectrum, between 80 and 120 kHz (Richardson et al. 1995). The ability to hear most acutely in this frequency range is related to their use of high-frequency sound for echolocation. Killer whale vocalizations include clicks and whistles but are most often high-energy rapid pulsed sounds in the 500-Hz to 25-kHz range, with pulse duration varying between echolocation clicks and other pulsed calls (Ford and Fisher 1982). North Pacific killer whales are known to produce whistles from 1 to 18 kHz (Thomsen et al. 2001).

4.9 Humpback Whale

4.9.1 Status and Distribution

Humpback whales worldwide were designated as "endangered" under the Endangered Species Conservation Act in 1970 and had been listed as a species under the ESA since its inception in 1973. On September 8, 2016, NMFS published a final decision that changed the status of humpback whales under the ESA (81 FR 62259), effective October 11, 2016. The decision recognized the existence of 14 DPSs based on distinct breeding areas in tropical and temperate waters. Five of the 14 DPSs were classified under the ESA (4 endangered and 1 threatened), while the other 9 DPSs were delisted. Humpback whales found in the Project area are predominantly members of the Hawaii DPS, which is not listed under the ESA. However, based

on a comprehensive photo-identification study, members of the Mexico DPS, which is listed as threatened, are known to occur in Southeast Alaska. Members of different DPSs are known to intermix on feeding grounds; therefore, all waters off the coast of Alaska should be considered to have ESA-listed humpback whales. Approximately 2.4 percent of all humpback whales in Southeast Alaska and northern British Columbia are members of the Mexico DPS, while all others are members of the Hawaii DPS (Wade 2021).

The DPSs of humpback whales that were identified through the ESA listing process do not necessarily equate to the existing MMPA stocks. The stock delineations of humpback whales under the MMPA are currently under review. Until this review is complete, NMFS considers humpback whales in Southeast Alaska to be part of the Central North Pacific stock, with a status of endangered under the ESA and designations of strategic and depleted under the MMPA (Muto et al. 2022). The current estimate of population size for the Central North Pacific stock is 10,103 humpback whales (Muto et al. 2022).

Humpback whales experienced large population declines in the early twentieth century due to commercial whaling operations. Barlow (2003) estimated the population of humpback whales at approximately 1,200 animals in 1966. The population in the North Pacific grew to between 6,000 and 8,000 by the mid-1990s. Current threats to humpback whales include vessel strikes, spills, climate change, and commercial fishing operations (Muto et al. 2022).

Humpback whales are found throughout Southeast Alaska in a variety of marine environments, including open ocean, nearshore waters, and areas with strong tidal currents (Dahlheim et al. 2009). Most humpback whales are migratory and spend winters in the breeding grounds off either Hawaii or Mexico. Humpback whales generally arrive in Southeast Alaska in March and return to their wintering grounds in November. Some humpback whales depart late or arrive early to feeding grounds, and therefore the species occurs in Southeast Alaska year-round (Straley 1990; Straley et al. 2018). Across the region, there have been no recent estimates of humpback whale density.

4.9.2 Presence in Project Area

Humpback whales migrate to Southeast Alaska in spring to feed after months of fasting in equatorial breeding grounds such as Hawaii and Mexico. Peak abundance of humpback whales in Southeast Alaska typically occurs during late summer to early fall. Most humpback whales begin returning to southern breeding grounds in fall or winter. However, due to temporal overlap between whales departing and returning, humpbacks can be found in Alaska feeding grounds in every month of the year (Baker et al. 1985; Straley 1990; Wynne and Witteveen 2009). It is also common for some humpback whales to overwinter in areas of Southeast Alaska, such as Tenakee Springs (83 FR 29749) and Lynn Canal (83 FR 52394). It is thought that those humpbacks that remain in Southeast Alaska do so in response to the availability of winter schools of fish prey, such as herring (Straley 1990).

Humpback whales' utilization of Auke Bay is intermittent and irregular year-round. Specific micro-habitat features of Auke Bay attract forage fish, specifically herring, and are frequented by humpback whales (83 FR 52394). Although abundance is generally higher in the summer, the presence of prey fish is a greater determinant of the presence of humpback whales. In 2021, humpback whales were observed by MMOs in January, April, and May (AKDOT&PF 2021). Teerlink (2017) identified 179 individual humpback whales in the Juneau area based on fluke identification. Between Juneau and Glacier Bay, 189 unique individuals were identified by Krieger and Wing (1986). During winter, researchers have documented 1 to 19 individual humpback whales per month in waters close to the Project area, including Lynn Canal (Moran et

al. 2018b; Straley et al. 2018). Recent authorizations (85 FR 4278) have estimated that up to four humpback whales per day may be present in the vicinity of the Project, the number that DOT&PF proposes to use for this Project.

4.9.3 Life History

Southeast Alaska is considered a biologically important area for feeding humpback whales between March and May (Ellison et al. 2012). Most humpback whales migrate to other regions during winter to breed, but over-wintering (non-breeding) humpback whales have been noted and may be increasingly common (Straley 1990). In Alaska, humpback whales filter feed on tiny crustaceans, plankton, and small fish such as walleye pollock, Pacific sand lance, herring, eulachon, and capelin (Witteveen et al. 2012). It is common to observe groups of humpback whales cooperatively bubble feeding. Group sizes in Southeast Alaska generally range from one to four individuals (Dahlheim et al. 2009).

4.9.4 Hearing Ability

Humpbacks are classified in the low-frequency cetacean functional hearing group, able to perceive frequencies between 7 Hz and 35 kHz (Richardson et al.1995). Humpback whales create several types of vocalizations ranging from 20 Hz to 10 kHz in order to forage for prey, organize collaborative feeding efforts, facilitate mother-calf communication, and select and attract potential mates (Winn et al. 1970; Au et al. 2006; Vu et al. 2012). Anthropogenic noise has the potential to result in social disturbance, physical discomfort or trauma, and masking of communication with conspecifics. Underwater activities such as pile driving, vessel traffic, and seismic surveys may cause humpbacks to modify their acoustic behavior in the more complex sound-scape (Fleming and Jackson 2011; Blair et al. 2016; Dunlop et al. 2016; Fournet et al. 2018).

4.10 Minke Whale

4.10.1 Status and Distribution

Minke whales, like all other marine mammals, are protected under the MMPA but are not listed under the ESA. The population status of minke whales is considered stable throughout most of their range. Historically, commercial whaling reduced the population size of this species, but given their small size, they were never a primary target of whaling and did not experience the severe population declines that larger cetaceans did. Minke whales are found throughout the northern hemisphere in polar, temperate, and tropical waters (Jefferson et al. 2008).

The International Whaling Commission has identified three minke whale stocks in the North Pacific: one near the Sea of Japan, a second in the rest of the western Pacific (west of 180° W), and a third, less concentrated, stock throughout the eastern Pacific. NOAA further splits this third stock between Alaska whales and resident whales of California, Oregon, and Washington (Muto et al. 2022). Minke whales in Southeast Alaska are part of the Alaska stock (Muto et al. 2022). Minke whales are found in all Alaska waters, although there are no population estimates for minke whales in Southeast Alaska. Surveys in Southeast Alaska have consistently identified individuals throughout inland waters in low numbers (Dahlheim et al. 2009). No population estimate or minimum population estimate is available for minke whales (Muto et al. 2022).

4.10.2 Presence in Project Area

Minke whales in Southeast Alaska are part of the Alaska stock (Muto et al. 2022). Dedicated surveys for cetaceans in Southeast Alaska found that minke whales were scattered throughout

inland waters from Glacier Bay and Icy Strait to Clarence Strait, with small concentrations near the entrance of Glacier Bay (Dahlheim et al. 2009). All sightings were of single minke whales, except for a single sighting of multiple minke whales. Surveys took place in spring, summer, and fall, and minke whales were present in low numbers in all seasons and years. No information appears to be available on the winter occurrence of minke whales in Southeast Alaska. Anecdotal observations suggest that minke whales do not enter Auke Bay and so are expected to rarely occur in the Project area, estimated at up to one animal per month of the Project duration (85 FR 4278).

4.10.3 Life History

In Alaska, the minke whale diet consists primarily of euphausiids and walleye pollock. Minke whales are generally found in shallow, coastal waters within 200 meters of shore (Zerbini et al. 2006) and are almost always solitary or in small groups of two to three. Rarely, loose aggregations of up to 400 animals have been associated with feeding areas in Arctic latitudes.

4.10.4 Hearing Ability

Similar to other baleen whales, minke whale hearing is optimized in the low frequencies, ranging from 7 Hz to 35 kHz. Recent research by Yamato et al. (2012) exploring minke whale auditory physiology has shown that minke whales may be able to hear more acutely at higher frequencies than previously thought, perhaps as a defense mechanism to hear predatory killer whale vocalizations.

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5 TYPE OF INCIDENTAL TAKING AUTHORIZATION REQUESTED

5.1 Incidental Harassment Authorization

Under Section 101(a)(5)(D) of the MMPA, the DOT&PF requests an IHA for the take of small numbers of marine mammals incidental to installation and removal of steel piles associated with the Auke Bay East Terminal Improvements Project in Auke Bay, Alaska. The IHA is requested to be issued by May 15, 2023 and valid from October 1, 2023 through September 30, 2024. The DOT&PF is not requesting an LOA at this time because the Project will not occur for more than 1 calendar year, and the impacts described herein are not expected to rise to the level of serious injury or mortality, which would require an LOA.

5.2 Take Authorization Request

The DOT&PF requests the issuance of an IHA for Level B take (behavioral harassment) of small numbers of Steller sea lions, California sea lions, harbor seals, northern elephant seals, harbor porpoises, Dall's porpoises, Pacific white-sided dolphins, killer whales, humpback whales, and minke whales that may occur incidentally during the Project. In addition, the DOT&PF requests small numbers of Level A take of harbor seals and harbor porpoises that may occur incidentally during the Project. Level A take is not anticipated, and shutdown protocols are intended to prevent cumulative exposure to sound that could result in Level A take. However, Level A take is requested to ensure compliance in the unlikely event that a harbor seal or harbor porpoise enters a Level A harassment zone undetected. Several of the species for which take is requested are uncommon in the Project area. The request for a small number of takes for each species that is rarely or occasionally observed in the Project area reduces the risk of the Project being shut down if one of these species enters the Level B harassment zone during pile installation or removal. It is unlikely, however, that take of these species will occur.

The methodology described in Section 6 estimates potential noise exposures of marine mammals resulting from pile installation and removal in the marine environment. Potential exposures tend to be overestimated because all animals are assumed to be available to exposure while piles are being installed and removed, and the formulas used to estimate transmission loss use idealized parameters. Additionally, this approach assumes that all exposed individuals are "taken," contributing to an overestimation of "take."

The analysis for the Project predicts 15,345 potential exposures to Level B harassment and predicts 152 potential exposures to Level A harassment (15,497 total exposures) during pile installation and removal. DOT&PF mitigation measures for the Project (Section 11) include monitoring of Level B and Level A harassment zones prior to the initiation of pile installation and removal, and "soft starts" or ramp-up procedures designed for impact installation to allow marine mammals to leave the Project area before noise levels reach the threshold for harassment. In addition, "shutdown zones" have been established for pile installation and removal to avoid injury to marine mammals. These mitigation measures decrease the likelihood that marine mammals will be exposed to sound pressure levels that will cause harassment or harm, although the amount of that decrease cannot be quantified.

The DOT&PF does not expect that all potential exposures to Level B and Level A harassment will result from Project activities. However, to allow for uncertainty regarding the exact

mechanisms of the physical and behavioral effects, and as a conservative approach, the DOT&PF is requesting authorization for incidental harassment of marine mammals during Project activities.

It is expected that the majority of potential takes, especially of harbor seals and Steller sea lions, may result from repeated exposures of a small number of resident animals. Near Auke Bay, up to 121 harbor seals have been sighted within the Statter Harbor area within a day and are discussed as being resident animals (85 FR 4278). These animals may be subjected to repeated exposures during some pile installation and removal when elevated sound levels (discussed in Section 6.4.1) extend into Auke Bay and the entrance to the Statter Harbor area. The Project expects the percent of population taken (estimated in Section 6.5) for these species to be much lower than calculated because of the potential for repeated exposures of resident animals.

5.3 Method of Incidental Taking

Pile installation and removal as outlined in Section 1 have the potential to disturb or displace small numbers of marine mammals. Specifically, the proposed activities may result in take in the form of Level B harassment from underwater sounds generated from vibratory pile installation, impact pile installation, and vibratory pile removal. In addition, harbor seals and harbor porpoises may be incidentally exposed to Project-related underwater noise levels that exceed species-specific thresholds for Level A harassment. Section 11 provides details on the impact minimization and reduction measures proposed.

Detectable effects of the Project on marine mammal habitat will be minor (Section 9). Indirect effects to prey will be insignificant and discountable due to recolonization and the temporary nature of the activity and are expected to be undetectable. The Project is not expected to lead to increases in marine vessel traffic in the region; therefore, ship strikes were not evaluated.

6 TAKE ESTIMATES FOR MARINE MAMMALS

The NMFS application for IHAs requires applicants to determine the number and species of marine mammals that are expected to be incidentally harassed by an action and the nature of the harassment (Level A or Level B). Project construction as outlined earlier has the potential to take marine mammals during pile installation and removal. Other activities are not expected to result in take as defined under the MMPA. In-water pile installation and removal will temporarily increase the local underwater and in-air noise environment in the Project area. Research suggests that increased noise may impact marine mammals in several ways and that the likelihood of impacts depends on many factors (Section 7).

6.1 In-Air and Underwater Sound Descriptors

Sound is a physical phenomenon consisting of minute vibrations that travel through a medium such as air or water. Sound is generally characterized by several variables, including frequency and intensity. Frequency describes the sound's pitch and is measured in Hertz (Hz), while intensity describes the sound's loudness and is measured in decibels (dB). Decibels are measured using a logarithmic scale.

Underwater sounds are described by a number of common terms that are specific to this field of study (Table 6-1). Two common descriptors are the instantaneous peak sound pressure level (SPL) and the root-mean-square SPL (dB rms) during the pulse or over a defined averaging period. The peak sound pressure is the instantaneous maximum or minimum overpressure observed during each pulse or sound event and is presented in Pascals (Pa) or dB referenced to a pressure of 1 microPascal (dB re 1 µPa). The rms level is the square root of the energy divided by a defined time period. All in-water sound levels throughout this report are presented in dB re 1 µPa rms unless otherwise specified.

Transmission loss is the accumulated decrease in acoustic intensity as an acoustic pressure wave propagates outward from a source such as a pile during installation. The intensity of the sound at its source is reduced because it spreads as it moves away from the source. Cylindrical spreading occurs when sound energy spreads outward in a cylindrical fashion, bounded by the bottom sediment and water surface, such as in shallow water, resulting in a 3-dB reduction per doubling of distance. Spherical spreading occurs when the source encounters little to no refraction or reflection from boundaries (e.g., bottom or surface) and propagates away from a source uniformly in all directions, such as in deep water, resulting in a 6-dB reduction per doubling of distance. NMFS generally assumes that spreading loss in nearshore coastal areas is between these two models, and refers to that model as "practical" spreading loss.

Table 6-1. Definitions of Some Common Acoustical Terms

Term	Definition
Decibel, dB	A decibel is a unit describing the amplitude of sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure of the sound measured to the reference pressure. The reference pressure for water is 1 microPascal (µPa) and for air is 20 µPa (approximate threshold of human audibility).
Sound Pressure Level, SPL	Sound pressure is the force per unit area, usually expressed in microPascals (or 20 microNewtons per square meter [m^2]), where 1 Pascal is the pressure resulting from a force of 1 Newton exerted over an area of 1 m^2. The SPL is expressed in decibels as 20 times the logarithm to the base 10 of the ratio of the pressure exerted by the sound to a reference sound pressure. SPL is the quantity that is directly measured by a sound level meter.
Frequency, Hz	Frequency is expressed in terms of oscillations, or cycles, per second. Cycles per second are commonly referred to as Hertz (Hz). Typical human hearing ranges from 20 to 20,000 Hz.
Peak Sound Pressure (unweighted), dB re 1 µPa	Peak sound pressure level is based on the largest absolute value of the instantaneous sound pressure over the frequency range from 20 to 20,000 Hz. This pressure is expressed in this report as dB re 1 µPa.
Root-Mean-Square (rms), dB re 1 µPa	The rms level is the square root of the energy divided by a defined time period. For pulses, the rms has been defined as the average of the squared pressures over the time that comprises that portion of waveform containing 90 percent of the sound energy for one impact pile installation impulse.
Ambient Noise Level	The ambient noise level is the background sound level, which is a composite of noise from all sources near and far. The normal or existing level of environmental noise at a given location.
Transmission Loss, TL	TL underwater is the accumulated decrease in acoustic intensity as an acoustic pressure wave propagates out from a source. TL parameters vary with frequency, temperature, sea conditions, current, source and receiver depth, water chemistry, water depth, bottom composition and topography, and underwater objects in the area.

6.2 Applicable Noise Criteria

NMFS published updated *Technical Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing* (Technical Guidance) in April 2018 that identifies the received levels, or thresholds, above which individual marine mammals are predicted to experience changes in their hearing sensitivity (either temporary or permanent) for underwater anthropogenic noise sources (i.e., Level A harassment; NMFS 2018). The 2018 Technical Guidance contains the same criteria included in the 2016 guidance (NMFS 2016b). To assess Level B harassment levels, NMFS continues to use its interim criteria.

Level A harassment is defined as “any act of pursuit, torment, or annoyance which has the potential to *injure* a marine mammal or marine mammal stock in the wild.” Level B harassment is defined as “any act of pursuit, torment, or annoyance which has the potential to *disturb* a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including but not limited to migration, breathing, nursing, breeding, feeding or

sheltering, but which *does not* have the potential to injure a marine mammal or marine mammal stock in the wild."

6.2.1 Level A Harassment

For underwater noise exposure, this IHA application uses the NMFS Technical Guidance (revised 2018). Received levels, or thresholds, above which individual marine mammals are predicted to experience permanent changes in their hearing sensitivity (or a permanent threshold shift [PTS]) due to underwater anthropogenic sound sources have been weighted by functional hearing groups as defined in the Technical Guidance (Table 6-2; NMFS 2018). Under the Technical Guidance, these levels are considered thresholds for Level A (injury) harassment. Calculation of Level A harassment isopleth distances based on PTS onset acoustic thresholds requires information on characteristics of the sound and the local environment.

Table 6-2. Summary of Permanent Threshold Shift Onset Acoustic Thresholds for Assessing Level A Harassment of Marine Mammals from Exposure to Noise from Continuous and Pulsed Underwater Sound Sources

Functional Hearing Group Frequency Range Species Groups	Impulsive (Impact Hammer)	Non-Impulsive (Vibratory Hammer)
Low-Frequency (LF) Cetaceans *7 Hz to 35 kHz* Humpback whales, minke whales, other baleen whales	$L_{pk,flat}$: 219 dB $L_{E, LF, 24h}$: 183 dB	$L_{E, LF, 24h}$: 199 dB
Mid-Frequency (MF) Cetaceans *150 Hz to 160 kHz* Dolphins, beluga whales, killer whales, beaked whales	$L_{pk,flat}$: 230 dB $L_{E, MF, 24h}$: 185 dB	$L_{E, MF, 24h}$: 198 dB
High-Frequency (HF) Cetaceans *275 Hz to 160 kHz* Dall's porpoises, harbor porpoises, Pacific white-sided dolphins	$L_{pk,flat}$: 202 dB $L_{E, HF, 24h}$: 155 dB	$L_{E, HF, 24h}$: 173 dB
Phocid Pinnipeds (PW) Underwater *50 Hz to 86 kHz* Harbor seals, other true seals	$L_{pk,flat}$: 218 dB $L_{E, PW, 24h}$: 185 dB	$L_{E, PW, 24h}$: 201 dB
Otariid Pinnipeds (OW) Underwater *60 Hz to 39 kHz* Sea lions, fur seals	$L_{pk,flat}$: 232 dB $L_{E, OW, 24h}$: 203 dB	$L_{E, OW, 24h}$: 219 dB

Source: NMFS 2018.

Note: dB = decibels; Hz = Hertz; kHz = kilohertz; $L_{pk,flat}$ = peak sound pressure level (unweighted); $L_{E,24h}$ = sound exposure level, cumulative 24 hours

6.2.2 Level B Harassment

To assess Level B harassment levels, this document uses the NMFS interim criteria for exposure of marine mammals to various underwater sound sources. For impulsive noise (e.g., impact pile installation), the Level B harassment threshold is set at an SPL value of 160 dB re 1 µPa rms. For non-pulsed and continuous noise (e.g., vibratory pile installation), the Level B harassment threshold is set at an SPL of 120 dB re 1 µPa rms.

For in-air noise exposure of hauled-out pinnipeds, NMFS uses criteria for Level B harassment of 90 dB re 20 µPa for harbor seals and 100 dB re 20 µPa for all other pinnipeds. These criteria do not differentiate among noise types.

6.3 Description of Noise Sources

The Project will temporarily increase the existing in-air and underwater acoustic levels of Auke Bay, which is an area with frequent marine vessel traffic, seaplane traffic, and associated activities. The soundscape in the vicinity of the Project includes existing ambient sound plus construction noise from the Project. The primary component of the Project that may affect marine mammals is the noise generated by vibratory removal of steel pipe piles, and vibratory and impact installation of steel pipe piles. Refer to Section 1.3 for a description of these pile installation and removal techniques. Other activities associated with the Project (e.g., upland and above-water construction activities, vessel activities) do not produce in-air or underwater noise levels expected to exceed Level A or Level B harassment levels for any marine mammal hearing group.

6.3.1 Ambient Sound

Ambient (or background) sound is composed of sound from many sources and from multiple locations (Richardson et al. 1995). In general, ambient sound levels in the marine environment are variable over time due to a number of biological, physical, and anthropogenic (e.g., man-made) sources. Ambient noise can vary with location, time of day, tide, weather, season, and frequency on scales ranging from a second to a year. Underwater sound types in the Project area include physical noise, biological noise, and anthropogenic noise. Physical noise includes noise from waves at the water surface, rain, and currents; moving rocks, sediment, and silt; and atmospheric noise. Biological sound includes vocalizations and other sounds produced by marine mammals, fishes, seabirds, and invertebrates. Anthropogenic noise includes noise from vessels (small and large), shore-based processing plants, marine fueling facilities, ferry and barge cargo loading/unloading operations, maintenance dredging, aircraft overflights, construction noise, and other sources, which produce varying noise levels and frequency ranges (Table 6-3).

Table 6-3. Representative Noise Levels of Anthropogenic Sources of Noise Commonly Encountered in Marine Environments

Noise Source	Frequency Range (Hz)	Underwater Noise Level (dB rms re 1 µPa)	Reference
Small vessels	250–1,000	151 dB at 1 meter	Richardson et al. (1995)
Tug docking gravel barge	200–1,000	149 dB at 100 meters	Blackwell and Greene (2002)
Container/cruise ship	100–500	180 dB at 1 meter	Richardson et al. (1995)
Dredging operations	50–3,000	120–140 dB at 500 meters; 156.9 dB at 30 meters	URS (2007); SFS (2009)

Note: dB = decibels; Hz = Hertz; rms re 1 µPa = root mean square referenced to 1 microPascal

Ongoing vessel activities throughout Auke Bay, as well as land-based industrial and commercial activities, result in elevated in-air and underwater sound conditions in the Project area that increase with proximity to the Project site. Sound levels likely vary seasonally, with elevated levels during summer, when the tourism and fishing industries are at their peaks. The 120 dB rms ambient sound level is used by NMFS in the absence of empirical data and is the default for regulatory purposes, including incidental take estimation under the MMPA, and will be used for this Project.

6.3.2 Underwater Noise Levels

Pile Installation/Removal Noise Levels

The Project includes vibratory and impact pile installation of steel pipe piles, and vibratory removal of steel pipe piles. Sound source levels (SSLs) for each type of activity were estimated using empirical measurements from similar activities elsewhere in Alaska or outside of Alaska and relied on the best available and most relevant sound source verification studies (Table 6-4). Recently proposed and issued IHAs from Southeast Alaska were also reviewed to identify the most appropriate SSLs for use in this application. The Project used the NMFS default transmission loss of 15Log (practical spreading loss) for acoustic calculations.

Table 6-4. Estimates of Underwater Sound Source Levels Generated during Vibratory and Impact Pile Installation, and Vibratory Pile Removal

Method and Pile Type	Sound Source Level at 10 meters			Literature Source
Vibratory Hammer	**dB rms**			
30-inch steel piles	159			Caltrans 2020
24-inch steel piles	154			Caltrans 2020
18-inch steel piles	158			Caltrans 2020
Impact Hammer	**dB rms**	**dB SEL**	**dB peak**	
30-inch steel piles	190	177	210	Caltrans 2015, 2020
24-inch steel piles	190	177	203	Caltrans 2015, 2020
18-inch steel piles	185	175	200	Caltrans 2015, 2020

Note: It is assumed that noise levels during pile installation and removal are similar. Caltrans = California Department of Transportation; dB = decibels; rms = root mean square; SEL = sound exposure level.

6.3.3 In-Air Noise Levels

The Washington State Department of Transportation recorded in-air noise levels from impact installation of 30-inch piles in December 2015 at the Vashon Ferry Terminal near Seattle, Washington (WSDOT 2018). In-air noise levels during impact installation were 110 A-weighted decibels (dBA) as measured at 50 feet (15.24 meters). This value was chosen as the estimate for impact installation of 30-inch-diameter steel piles for the Project.

6.4 Distances to Sound Thresholds

6.4.1 Underwater Noise

Vibratory and impact pile installation will generate underwater noise that could disturb marine mammals in the Project area. Ambient underwater sound levels were assumed to be 120 dB rms for this evaluation (Section 6.3.1). The SSLs for pile installation were estimated by using the results of measurements from the best available and most relevant sound source verification studies (Table 6-4).

The attenuation of underwater noise (transmission loss [TL]) for impact and vibratory pile installation is estimated using the practical spreading loss model. The formula for transmission loss is:

$$TL = X \log10^{(R/D)}$$

where R is the distance from the source, D is the distance of the known or measured noise level, and X is the TL coefficient. NMFS typically recommends a TL coefficient of 15 dB per tenfold increase in distance when site-specific empirical data are unavailable. This document adopts the default NMFS TL coefficient of 15 log for impact and vibratory pile installation. This model can be rearranged to estimate the propagation of underwater noise as follows:

$$R = D * 10^{(\Delta/TL)}$$

where Δ is the difference between the SSL and the noise level at which behavioral harassment may occur (i.e., approximately 120 dB for vibratory sources or 160 dB for impulsive sources). The SSL and the propagation of underwater noise vary by pile size and installation method (Table 6-4).

Land forms (including causeways, breakwaters, islands, and other land masses) impede the transmission of underwater sound and create shadows behind them where sound from construction is not audible. In Auke Bay, sound from the Project will be blocked by Auke Cape, Coghlan Island, Battleship Island, Suedla Island, Spuhn Island, and Douglas Island (Figure 1-2). The monitoring zone will be inclusive of all areas that may be exposed to noise levels in excess of 120 dB for vibratory sources and 160 dB for impulsive sources.

Level A Harassment

Sound propagation and the distances to the sound isopleths defined by NMFS for Level A harassment of marine mammals under the current Technical Guidance were estimated using the User Spreadsheet developed by NMFS for this purpose (NMFS 2018). The method uses estimates of SPL and duration of the activity to calculate the threshold distances at which a marine mammal exposed to those values would experience a PTS. Differences in hearing abilities among marine mammals are accounted for by use of weighting factor adjustments for the five functional hearing groups (NMFS 2016b). Pulse duration from the sound source verification studies used for source level estimates are unknown. All necessary parameters were available for the cumulative Single Strike Equivalent (SEL_{cum}) method for calculating isopleths. The SEL_{cum} method resulted in isopleths that were larger than those calculated using the peak source level method, and therefore the SEL_{cum} isopleths were selected for the Project.

As described above, NMFS typically recommends a TL coefficient of 15 dB per tenfold increase in distance when site-specific empirical data are unavailable. Site-specific data are unavailable for impact and vibratory piling methods, and therefore this document adopts the default NMFS TL coefficient of 15 for calculation of Level A zone sizes.

To account for potential variations in daily productivity during vibratory installation or removal, harassment zones were calculated based on various durations (Table 6-5) to enable contractor flexibility. For illustration, the vibratory shutdown zones are displayed in Figure 6-1 and the largest shutdown zones based on impact piling are displayed in Figure 6-3 through Figure 6-5, although harassment zones on any given day will likely be smaller if fewer than three piles are anticipated. To avoid potential injury, a 30-meter minimum shutdown zone will be enacted for all installation or removal methods, with shutdown zones increasing in size with activity type and duration (Table 6-5).

Level B Harassment

Sound propagation and distances to the sound isopleths defined by NMFS for Level B harassment of marine mammals were estimated using the practical spreading loss model described above. The source levels for pile installation and removal were estimated using the

results of measurements from the best available and most relevant sound source verification studies (Table 6-4). The Level B harassment zones and areas for the Project are presented in Table 6-5 and shown in Figure 6-2.

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Table 6-5. Calculated Distances to Level A and B Harassment Isopleths and Shutdown Zones during Pile Installation and Removal

Activity	Pile Size	Minutes per Pile or Strikes per Pile	Piles Per Day	Rounded Level A Zones and Minimum Shutdown Zones (m)										Level B Zones (m)
				LF		MF		HF		PW		OW		
				Humpback Whale, Minke Whale		Killer Whale, Pacific White-sided Dolphin		Harbor Porpoise, Dall's Porpoise		Harbor Seal, Northern Elephant Seal		Steller Sea Lion, California Sea Lion		All Species
				No Level A Take		No Level A Take		Level A Take Authorized for Harbor Porpoise Only		Level A Take Authorized for Harbor Seal Only		No Level A Take		
				Shutdown Zone to Avoid Take	Level A Zone	Shutdown Zone to Avoid Take	Level A Zone	Shutdown Zone to Avoid Take	Level A Zone	Shutdown Zone to Avoid Take	Level A Zone	Shutdown Zone to Avoid Take	Level A Zone	
Vibratory Installation	30-inch	60 Minutes	3	30	11	30	1	30	16	30	7	30	1	3,981
	24-inch	60 Minutes	3	30	5	30	1	30	8	30	3	30	1	1,848
		30 Minutes	3	30	4	30	1	30	5	30	2	30	1	
	18-inch	60 Minutes	3	30	9	30	1	30	14	30	6	30	1	
Vibratory Removal	24-inch	30 Minutes	6	30	5	30	1	30	8	30	3	30	1	
	18-inch	30 Minutes	6	30	9	30	1	30	14	30	6	30	1	
Impact Installation	30-inch	1,000 Strikes	4	1100	1002	40	36	1200	1194	540	537	40	39	1,000
			3	830	827	30	30	990	985	450	443	40	33	
			2	640	632	30	23	760	752	340	338	30	25	
			1	400	398	30	15	480	474	220	213	30	16	
	24-inch	1,000 Strikes	4	1100	1002	40	36	1200	1194	540	537	40	39	1,000
			3	830	827	30	30	990	985	450	443	40	33	
			2	640	632	30	23	760	752	340	338	30	25	
			1	400	398	30	15	480	474	220	213	30	16	
		500 Strikes	4	640	632	30	23	760	752	340	338	30	25	
			3	530	521	30	19	630	621	280	279	30	21	
			2	400	398	30	15	480	474	220	213	30	16	
			1	260	251	30	9	300	299	140	134	30	10	
	18-inch	800 strikes	4	640	636	30	23	760	757	340	340	30	25	464
			3	530	525	30	19	630	625	290	281	30	21	
			2	410	401	30	15	480	477	220	215	30	16	
			1	260	252	30	9	310	301	140	135	30	10	

Note: HF = high frequency; in = inches; LF = low frequency; MF = mid-frequency; OW = otariid in water; PW = phocid in water.

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Figure 6-1. Shutdown Zones during Vibratory Pile Installation and Removal at Auke Bay East Ferry Terminal

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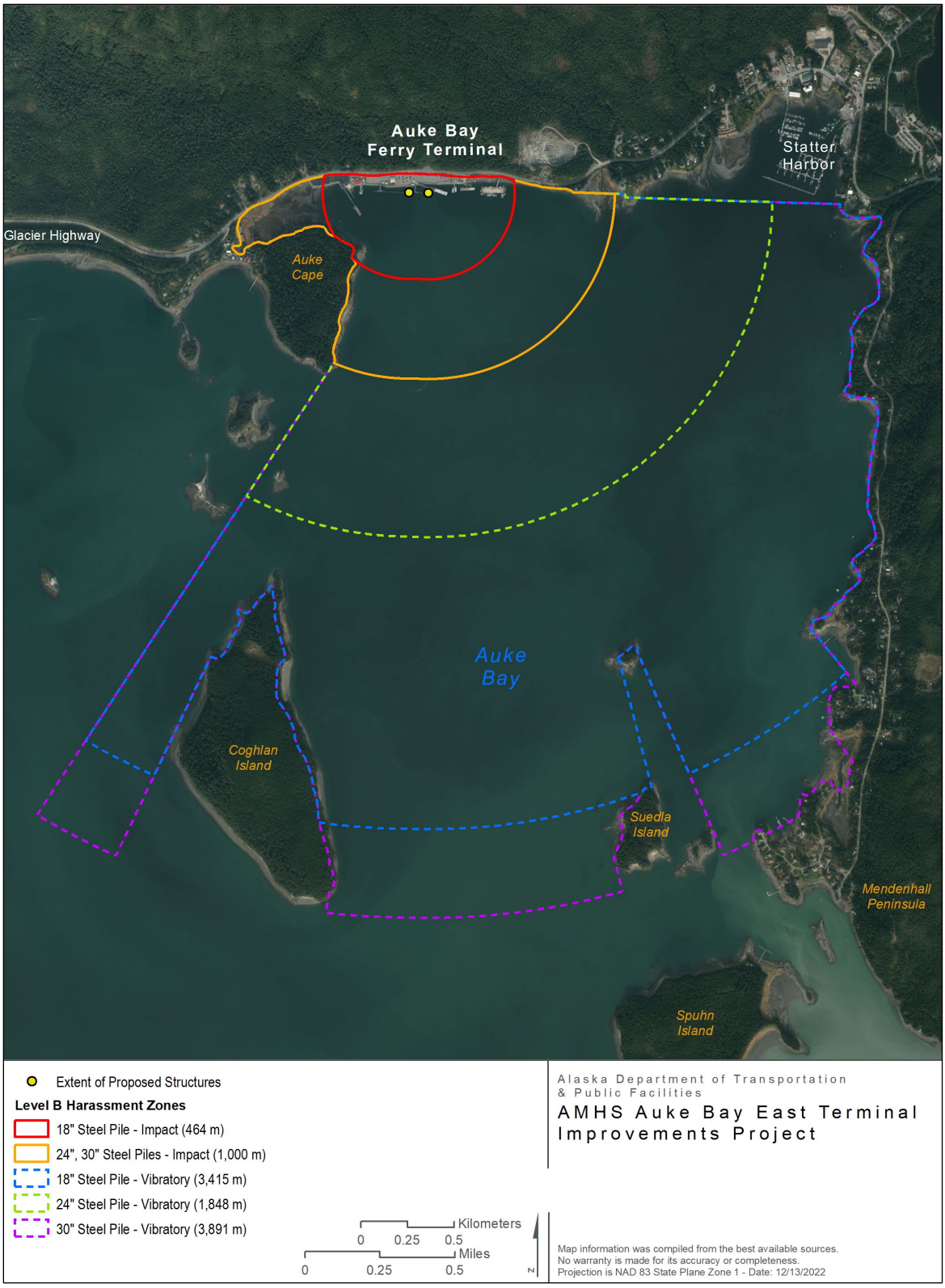

Figure 6-2. Level B Harassment Zones during Pile Installation and Removal at Auke Bay Ferry Terminal

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Figure 6-3. Largest Level A Harassment Areas during Impact Pile Installation of 18-inch Steel Piles (four piles at 800 strikes each)

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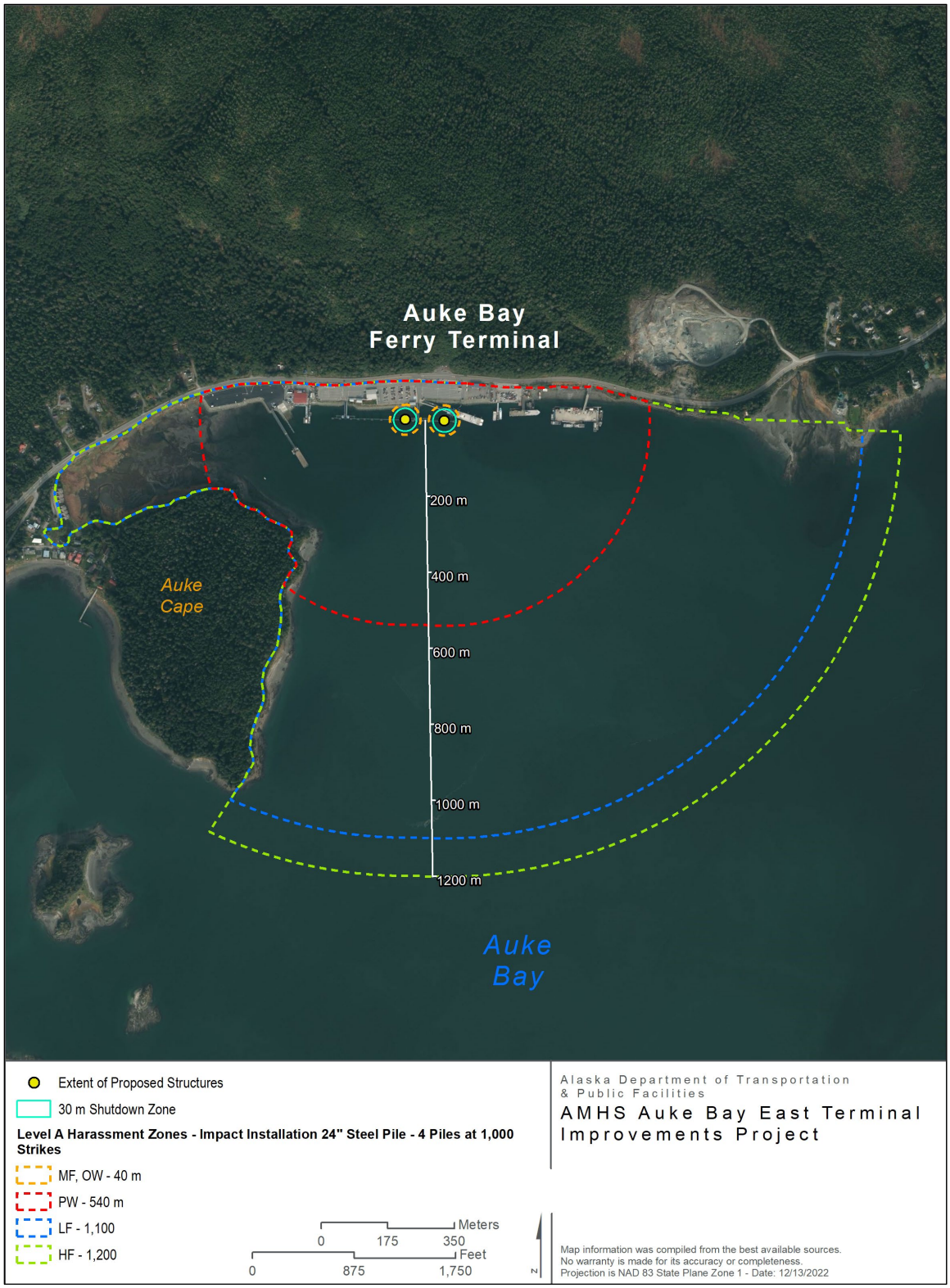

Figure 6-4. Largest Level A Harassment Areas during Impact Pile Installation of 24-inch Steel Piles (four piles at 1,000 strikes each)

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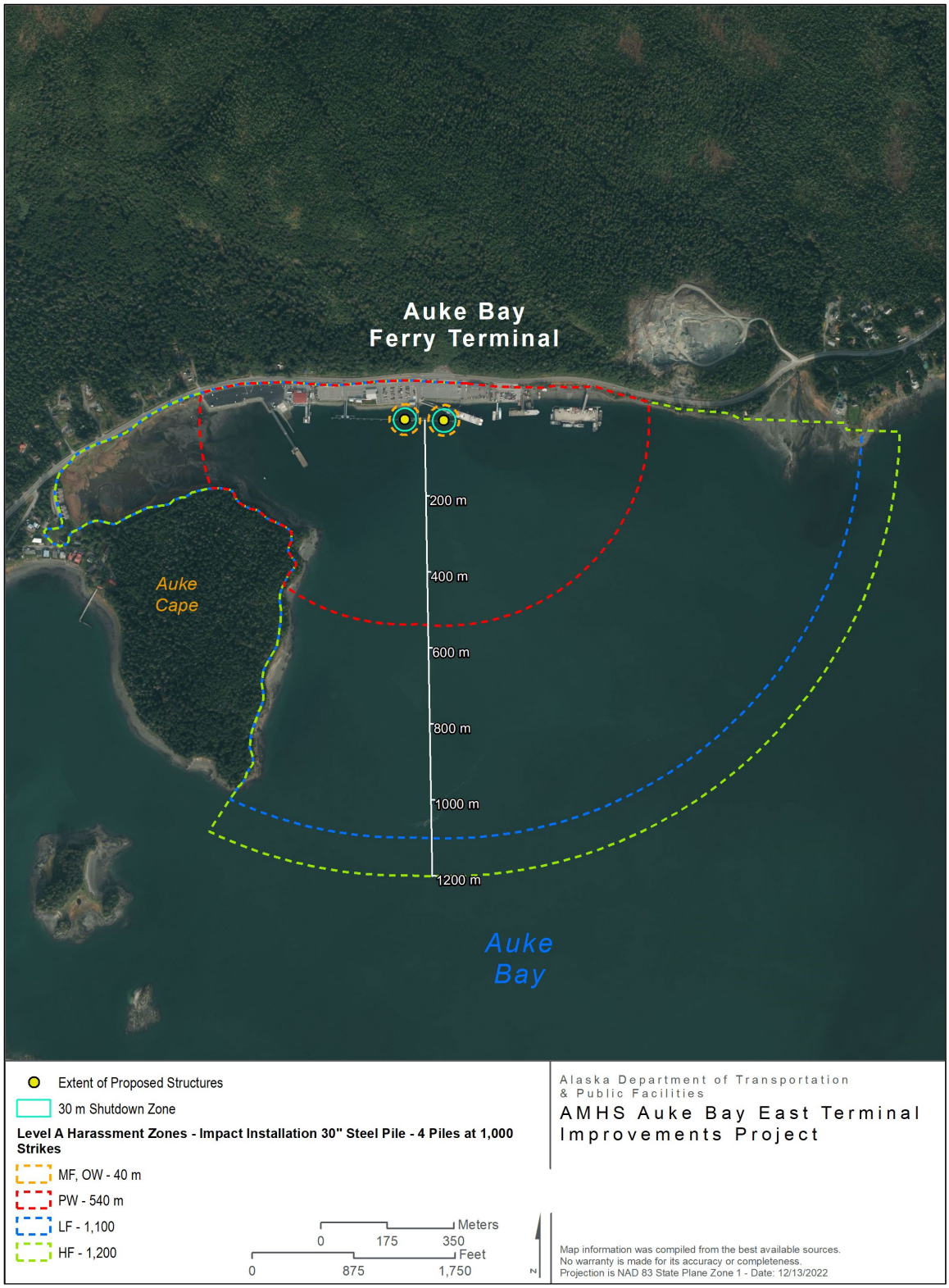

Figure 6-5. Largest Level A Harassment Areas during Impact Pile Installation of 30-inch Steel Piles (four piles at 1,000 strikes each)

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6.4.2 In-Air Noise

Pinnipeds can be affected by in-air noise when they are hauled out. Loud noises can cause hauled-out pinnipeds to panic back into the water, leading to disturbance and possible injury. For in-air sound exposure of hauled-out pinnipeds, NMFS uses criteria for Level B harassment of 90 dB re 20 µPa rms for harbor seals and 100 dB re 20 µPa rms for all other pinnipeds, including Steller sea lions.

The spherical spreading model is used to estimate distances to the noise thresholds from the maximum anticipated in-air noise source level:

$$D = D_o * 10^{((\text{Construction Noise} - \text{Noise Threshold})/\alpha)}$$

Where:

D = the distance from the noise source

D_o = the reference measurement distance (15.24 meters in this case)

α = transmission loss coefficient (20 over water, 25 over land)

For this analysis, hard-site conditions were assumed above the surface of the ocean. Given the conservative source level of 110 dBA chosen for impact pile installation of 30-inch steel piles, the calculated isopleths for in-air noise can be used for all pile sizes and types associated with the Project. Installation of smaller piles is generally assumed to produce lower sound levels than installation of larger piles. The estimated distance to the in-air sound level thresholds from pile installation of all pile types and sizes for the Project is 150 meters for harbor seals and 48 meters for Steller sea lions and other pinnipeds (Table 6-6).

Table 6-6. Distances to which In-air Sound will Attenuate to NMFS Threshold for Level B Harassment

Method, pile type	Harbor Seals (90 dB)	Other Pinnipeds (100 dB)
Impact Hammer		
All Project piles	152.4 meters	48.2 meters

Note: dB = decibels.

The estimates for distances that in-air noise could travel and exceed the harassment threshold for in-air disturbance fall far short of the nearest known pinniped haulout. Therefore, in-air noise is not considered further for the Project, and no incidental take of marine mammals from in-air noise is requested.

6.5 Estimated Takes

Estimated exposure and take of marine mammals associated with the Project is based on presence/absence, distribution, and abundance information presented in Section 4. Although construction is currently planned to begin in fall 2023, unexpected delays associated with construction can occur. To account for this uncertainty, the following exposure estimates assume that construction would occur during the periods of peak abundance for each species, for those species for which abundance varies seasonally.

Estimated exposures are primarily by Level B harassment, as use of the acoustic source (i.e., vibratory or impact pile driving) has the potential to result in disruption of behavioral patterns for individual marine mammals. There is also some potential for auditory injury (Level A

harassment) to result, primarily for low- and high-frequency cetaceans because their predicted auditory injury zones are larger than for mid-frequency species and pinnipeds. Although shutdown zones will be implemented during pile installation and removal (Table 6-5), Level A take will not occur until an individual crosses the Level A harassment isopleth and remains within the ensonified area for the duration (vibratory hammer) or number of strikes (impact hammer) specific to the in-water activity underway (Table 6-5).

6.5.1 Steller Sea Lion

Similar to previously permitted projects in the vicinity, we estimate that up to 121 individual (see Section 4.1.2) Steller sea lions may be exposed to Project-related underwater noise each day during pile installation and removal, for a total of 7,381 exposures (61 days of in-water pile installation and removal * 121 sea lions per day = 7,381). It is expected that the same individuals will be exposed on multiple days; therefore, the total number of individuals exposed by the Project will likely be much fewer than 7,381.

The Project assumes that 1.4 percent of Steller sea lions exposed to Level B harassment may belong to the wDPS (Hastings et al. 2020, as cited in NMFS 2020), which would total 104 Level B takes of sea lions from the wDPS and 7,277 takes of sea lions from the eDPS.

The largest Level A harassment zone for otariid pinnipeds extends 39 meters from the noise source (Table 6-5). It is unlikely that a sea lion will approach the Project this closely (Table 6-5) and remain unobserved for the duration of activity that would be required to meet the Level A threshold; therefore, no Level A take is requested for Steller sea lions.

6.5.2 California Sea Lion

California sea lions are not expected to occur in the project area with regularity (see Section 4.2.2); however, in line with recent authorizations near the Project area, DOT&PF is requesting one Level B harassment per day of a California sea lion during in-water pile installation or removal, or 61 Level B takes of California sea lions (61 days * 1 California sea lion per day = 61).

6.5.3 Harbor Seal

Up to six known harbor seal haulouts are located near the Project site as described in Section 4.3.2. In line with recent authorizations, we estimate that up to 122 harbor seals could be exposed to noise levels in excess of the Level B harassment threshold each day, for a total of 7,442 exposures (61 days * 122 seals per day = 7,442). It is expected that the same resident individuals will be exposed on multiple days throughout the Project; therefore, the total number of individuals exposed by the Project will likely be much fewer than 7,442.

The largest Level A harassment zone for phocid pinnipeds extends 537 meters from the noise source (Table 6-5). There are no haulouts located within the Level A harassment zone, and although it is unlikely that harbor seals will enter this area without detection while underwater activities are underway, it is possible that harbor seals may approach and enter the Level A zone undetected. For this reason, the DOT&PF requests a small number of Level A takes to safeguard against the possibility of MMOs being unable to detect a harbor seal within the Level A harassment zone (Table 6-5), estimated at up to 2 seals per day for a total of 122 exposures (61 days * 2 seals per day = 122). DOT&PF is therefore requesting 122 Level A and 7,320 Level B takes for harbor seals.

6.5.4 Northern Elephant Seal

Northern elephant seals have been sighted with more regularity around Southeast Alaska in recent years (see Section 4.4.2). Therefore, DOT&PF is requesting up to one elephant seal Level B exposure per week of construction, estimated at 16 weeks or 16 Level B takes total (61 days of in-water pile installation or removal over 4 months, or 16 weeks * 1 elephant seal per week = 16).

6.5.5 Harbor Porpoise

Sightings of harbor porpoises in Auke Bay are rare and have not been captured in recent authorizations (Section 4.5.2). As such, we assume that up to two harbor porpoises per day of in-water work could enter the Level B harassment zone, and therefore we estimate 122 exposures over the course of the Project (61 days * 2 porpoises per day = 122).

The largest Level A harassment zone for harbor porpoises extends 1,194 meters from the noise source (Table 6-5). Harbor porpoises are an inconspicuous species and are challenging for MMOs to sight, making any approach to a monitoring zone potentially difficult to detect. Because harbor porpoises move quickly and elusively, it is possible that harbor porpoises may enter the Level A harassment zone (Table 6-5) without detection due to the larger HF zone sizes. As such, the DOT&PF requests a small number of Level A take for harbor porpoises during the Project equivalent to 25 percent of the Level B take due to the large Level A harassment zones, estimated at 30 Level A takes total (122 Level B takes * 25% = 30.5 rounded down to 30).Therefore, DOT&PF is requesting 30 Level A and 92 Level B takes of harbor porpoise.

6.5.6 Pacific White-Sided Dolphin

Pacific white-sided dolphins are not expected to occur near the project area with regularity (see Section 4.7.2). However, large pods do occur sporadically in Southeast Alaska and, due to the length of the project, one pod of up to 92 individuals may enter the Level B harassment zone over the life of the Project. Because of the very large pod sizes, no Level A take is being requested.

6.5.7 Killer Whale

Killer whales are observed occasionally during summer throughout Lynn Canal (see Section 4.8.2), but their presence in Auke Bay is unlikely. As a precaution, because Level B harassment zones extend beyond Auke Bay, the DOT&PF requests Level B take for one killer whale resident pod and one transient pod. Based on 85 FR 4278, a transient pod is estimated at 14 animals and a resident pod at up to 41 animals, or a total of 55 Level B takes requested.

Marine mammal monitoring will minimize the potential for Level A harassment of killer whales, which are generally conspicuous. All pile installation/removal will be shut down prior to a killer whale entering the Level A harassment zone specific to the pile size and installation/removal method underway. No Level A take is requested for killer whales.

6.5.8 Humpback Whale

Use of Auke Bay by humpback whales is common but intermittent and dependent on the presence of prey fish. Based on the available information synthesized in Section 4.9.2, the DOT&PF predicts that two groups of two whales may be exposed to Project-related underwater noise each day during the 61 days of the Project, for a total of 244 individuals (4 per day * 61

days = 244 humpback whales). It is likely that some individuals will be exposed more than once during the Project, so the total number of individual whales exposed is likely to be less than 244.

Wade (2021) estimated that approximately 2.4 percent of humpback whales in Southeast Alaska are members of the Mexico DPS, while all others are members of the Hawaii DPS. Therefore, we predict that six of the exposures (244 whales x 0.024 = 5.86 rounded up to 6) will be of Mexico DPS individuals and 238 exposures will be of Hawaii DPS individuals.

The largest Level A shutdown zone for humpback whales extends 1,002 meters from the noise source (Table 6-5). All pile installation/removal will be shut down prior to a humpback whale entering the Level A zone specific to the in-water activity underway at the time (Table 6-5). No Level A take is requested for humpback whales.

6.5.9 Minke Whales

Minke whale abundance throughout Southeast Alaska is low, and anecdotal reports have not included minke whales near the Project area. However, minke whales are distributed throughout a wide variety of habitats and have been observed elsewhere in Southeast Alaska; therefore, this species could occur near the Project area. On previous projects near the Project area, up to one minke whale per month has been estimated for Auke Bay, so DOT&PF is requesting up to four Level B takes.

6.6 All Marine Mammal Takes Requested

The analysis of marine mammal take predicts 15,345 potential exposures of marine mammals to Level B harassment and 152 potential exposures of marine mammals to Level A harassment (Table 6-7). Estimated Level A takes were subtracted from Level B takes to get the total number of unique Level B takes that do not double-count the Level A takes.

Table 6-7. Summary of the Estimated Numbers of Marine Mammals Potentially Exposed to Level A and B Harassment Sound Levels

Species	DPS/Stock	Estimated Number of Exposures to Level B Harassment	Estimated Number of Exposures to Level A Harassment	Total Estimated Exposures (Level A and Level B)	Stock Abundance	Percent of Population
Steller sea lion	Eastern DPS	7,277	0	7,277	43,201	16.84
	Western DPS	104	0	104	52,932	0.20
California sea lion	U.S. Stock	61	0	61	257,606	0.02
Harbor seal	Lynn Canal / Stephens Passage Stock	7,320	122	7,442	13,388	55.59
Northern elephant seal	California Breeding Stock	16	0	16	187,386	<0.01
Harbor porpoise	Southeast Alaska Inland Waters	92	30	122	1,302	9.37
Dall's porpoise	Alaska	80	0	80	83,400	0.10
Pacific white-sided dolphin	North Pacific	92	0	92	26,880	0.34
Killer whale	West Coast Transient	14	0	55	349	4.01
	Alaska Resident	41	0		2,347	1.75
	Northern Resident	0	0		302	0
Humpback whale	Hawaii DPS	238	0	238	11,540	2.06
	Mexico DPS	6	0	6	2,913	0.21 [a]
Minke whale	Alaska	4	0	4	Unknown	--
Total	**N/A**	**15,345**	**152**	**15,497**	**N/A**	**N/A**

Note: DPS = Distinct Population Segment; N/A = not applicable.

[a] Assumes that 2.4 percent of humpback whales exposed are members of the Mexico DPS (Wade 2021).

7 ANTICIPATED IMPACTS OF THE ACTIVITY

The ability to hear and transmit sound (echolocation/vocalization) is vital for marine mammals to perform several life functions. Marine mammals use sound to gather and understand information about their current environment, including detecting prey and predators. They also use sound to communicate with one another. The distance a sound travels through the water depends highly on existing environmental conditions (sea floor topography and ambient noise levels) and characteristics of the sound (source levels and frequency; Richardson et al. 1995). Impacts on marine mammals can vary among species, based on their sensitivity to sound and their ability to hear different frequencies. The Project may impact marine mammals behaviorally and physiologically from temporary increases in underwater and in-air sound during construction activities. The level of impact on marine mammals from construction activities will vary depending on the species of marine mammal, the distance between the marine mammal and the construction activity, the intensity and duration of the construction activity, and the environmental conditions.

7.1 Assessment of Potential Acoustic Impacts

Behavioral and physiological impacts from noise exposure differ among species. Differences in responses have also been documented between age and sex classes. Young animals are often more sensitive to noise disturbance, and noise can therefore have a greater effect on them (NRC 2003).

Behavioral and physiological changes that may result from increased noise levels include changes in tolerance levels, masking of natural sounds, behavioral disturbances, and temporary or permanent hearing impairment or non-auditory physical effects (Richardson et al. 1995). Richardson et al. (1995) have suggested four zones (described below) to assess the potential effects of noise on marine mammals.

7.1.1 Zone of Hearing Loss, Discomfort, or Injury

This is the area within which the received sound level is high enough to cause discomfort or tissue damage to auditory or other systems. Temporary or permanent reduction in hearing sensitivity may result from high levels of received sound. An animal may experience TTS when hearing loss is temporary or PTS when partial or full hearing loss is permanent. The level of hearing loss depends on the sound frequency, intensity, and duration (see Section 6.2.1). Marine mammals exposed to high received sound levels may also experience non-auditory physiological effects such as increased stress, neurological effects, bubble formation, resonance effects, and other types of organ or tissue damage. PTS and TTS may reduce an animal's ability to avoid predators, communicate with others, or forage effectively. TTS is not considered injurious and constitutes a Level B take.

Kastak and Schusterman (1995) tested in-air auditory thresholds by exposing a harbor seal inadvertently to broadband construction noise for 6 days, with intermittent exposure averaging 6 to 7 hours per day. When the harbor seal was tested immediately upon cessation of the noise, a TTS of 8 dB at 100 Hz was evident. Following 1 week of recovery, the harbor seal's hearing threshold was within 2 dB of its original level.

Pure-tone sound detection thresholds were obtained in water for harbor seals before and immediately following exposure to octave-band noise (Kastak et al. 1999). Test frequencies ranged from 100 Hz to 2 kHz, and octave-band sound exposure levels (SELs) were

approximately 60 to 75 dB. Each harbor seal was trained to dive into a noise field and remain stationed underwater during a noise-exposure period that lasted a total of 20 to 22 minutes. The average threshold shift relative to baseline thresholds for the harbor seals following noise exposure was 4.8 dB, and the average shift following the recovery period was 20.8 dB (Kastak et al. 1999).

Given the short duration and intermittent nature of potentially injurious sound, PTS and TTS are not expected to occur in any marine mammal species as a result of the Project. Furthermore, implementation of mitigation measures will help avoid the potential for close approaches of animals to activities that could result in Level A takes (i.e., injury/mortality) and will limit the time an animal is exposed to that level of sound.

7.1.2 Zone of Masking

This is the area within which noise is strong enough to interfere with the detection of other sounds, including communication calls, prey or predator sounds, and other environmental sounds. Masking is considered Level B harassment and is usually considered 160 dB for impact noise and 120 dB for continuous noise.

Marine mammal signals may be masked by increased noise levels or overlapping frequencies. Research has indicated that the majority of vibratory activity falls within 400 to 2,500 Hz (Blackwell 2005; URS 2007). The frequency range of Steller sea lions' vocalization is unknown; however, Steller sea lions have been documented producing low-frequency vocalizations (Kastelein et al. 2005). Harbor seals produce social calls at 500 to 3,500 Hz and clicks from 8 to 150 kHz (reviewed in Richardson et al. 1995). Harbor porpoises produce acoustic signals in a very broad frequency range, from less than 100 Hz to 160 kHz (Verboom and Kastelein 2004). Killer whales produce whistles between 1.5 and 18 kHz and pulsed calls between 500 Hz and 25 kHz. Echolocation clicks are far above the frequency range of the sounds produced by vibratory pile installation.

The Project is located in an area with regular vessel activity, including recreational craft, commercial fishing vessels, and industry vessels in addition to regular seaplane traffic. It is likely that marine mammals in the Project area have become habituated to increased noise levels. In general, pinnipeds seem to habituate more readily to disruptive underwater sounds than cetaceans do (Southall et al. 2007). Implementation of the proposed mitigation measures (Section 11) will reduce impacts on marine mammals, with any minor masking occurring near the sound source, if at all.

7.1.3 Zone of Responsiveness

This is the area within which marine mammals react behaviorally or physiologically from exposure to increased noise levels. The level of effect is dependent on the acoustical characteristics of the noise, current physical and behavioral state of the animals, ambient noise levels and environmental conditions, and context of the sound (e.g., if it sounds similar to a predator; Richardson et al. 1995; Southall et al. 2007). Behavioral effects that are temporary may indicate that the animal has simply heard a sound, and the effect may not be long-term (Southall et al. 2007). Behavioral and physiological effects described here are considered Level B harassment.

Responses from marine mammals in the presence of pile installation and removal might include a reduction of acoustic activity, a reduction in the number of individuals in the area, and avoidance of the area. Of these, temporary avoidance of the noise-impacted area is the most common response. Avoidance responses may be initially strong if the marine mammals move

rapidly away from the source, or weak if movement is only slightly deflected away from the source. Noise from pile installation could displace marine mammals from the immediate area of the activity; however, they will likely return after pile installation is completed, as demonstrated by a variety of studies on temporary displacement of marine mammals by industrial activity (reviewed in Richardson et al. 1995). Any masking events that could possibly rise to Level B harassment under the MMPA will occur concurrently within the zones of behavioral harassment already estimated for vibratory and impact pile installation and have already been taken into account in the exposure analysis.

7.1.4 Zone of Audibility

This is the area within which the animal might hear the noise; it is the most extensive of the four zones. Marine mammals as a group have functional hearing ranges of 10 Hz to 180 kHz, with thresholds of best hearing near 40 dB (Southall et al. 2007). Marine mammals can typically be divided into three groups that have consistent patterns of hearing sensitivity: small odontocetes (e.g., harbor porpoises), medium-sized odontocetes (e.g., killer whales), and pinnipeds (e.g., Steller sea lions and harbor seals). Difficulties in human ability to determine the audibility of a particular noise for other species has so far precluded development of applicable criteria for the zone of audibility. This zone does not fall in the sound range of a take as defined by NMFS.

Repeated or sustained disruption of important behaviors (e.g., feeding, resting, traveling, and socializing) is more likely to have a demonstrable impact than a single exposure (Southall et al. 2007). However, it is likely that marine mammals exposed to repetitious construction sounds will become habituated, desensitized, and tolerant after initial exposure to these sounds. Marine mammals residing in and transiting this area are routinely exposed to sounds louder than the ambient 120-dB sound level and continue to use this area; therefore, they do not appear to be harassed by these sounds, or they have become habituated.

7.2 Conclusions Regarding Impacts to Species or Stocks

Incidental take is expected to result in only short-term changes in behavior, such as avoidance of the Project area, changes in swimming speed or direction, and changes in foraging behavior. Such impacts are unlikely to have any effect on recruitment or survival and, therefore, will have a negligible impact on the affected stocks of Steller sea lions, California sea lions, harbor seals, Northern elephant seals, harbor porpoises, Dall's porpoises, Pacific white-sided dolphins, killer whales, humpback whales, and minke whales. Implementation of the mitigation measures proposed in Section 11 is likely to minimize most potential adverse impacts on individual marine mammals from pile installation or removal. Impacts on individual Steller sea lions, California sea lions, harbor seals, Northern elephant seals, harbor porpoises, Dall's porpoises, Pacific white-sided dolphins, killer whales, humpback whales, and minke whales are expected to be small and of short duration. Nevertheless, some level of disturbance impact is unavoidable. The expected level of unavoidable impact (defined as an acoustic or harassment take) is defined in Section 6.

Requested Level B take of marine mammals will likely include multiple (estimated as daily) takes of the same individual(s), resulting in estimates of take (as percentage of the DPS/stock) that are high compared to actual take.

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8 ANTICIPATED IMPACTS ON SUBSISTENCE USES

Alaska Natives have traditionally harvested subsistence resources in Southeast Alaska for many hundreds of years, particularly large terrestrial mammals, marine mammals, salmon, and other fish (ADF&G 1997). There are no subsistence activities that target humpback whales, and subsistence hunters rarely target Steller sea lions within the Project area; however, harbor seals are regularly harvested for subsistence near Auke Bay (Wolfe et al. 2013). Local Haida and Tlingit Native communities harvest harbor seals for meat, oil, blubber, and skins within the areas of Icy Strait, Glacier Bay, and local waters adjacent to Auke Bay (ADF&G 2009a, b).

No long-term impact on Steller sea lion populations or their habitat resulting from Project activities is anticipated. Since subsistence hunters rarely target sea lions in the Auke Bay/Juneau area, temporary displacement of animals from the Project area is expected to have no effect on availability of Steller sea lions for subsistence purposes.

The proposed action is not likely to adversely impact individual harbor seals or the local population beyond short-term, noise-induced harassment. Temporary displacement from preferred haulout or foraging areas in Auke Bay may make harbor seals less accessible to local subsistence hunters in the immediate area; however, this is considered a negligible impact on harbor seal subsistence hunting in the overall Auke Bay/Juneau area.

Changes to availability of subsistence resources will be negligible or non-existent as a result of Project activities.

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9 ANTICIPATED IMPACTS ON HABITAT

9.1 Effects of Project Activities on Marine Mammal Habitat

The Project will occur within the same footprint as existing marine infrastructure. The nearshore and intertidal habitat where the Project will occur is an area of relatively high marine vessel traffic. Most marine mammals do not generally use the area within the footprint of the Project area. Temporary, intermittent, and short-term habitat alteration may result from increased noise levels within the Level A and Level B harassment zones. Effects on marine mammals, as described above, will be limited to temporary displacement from pile installation and removal noise, and effects on prey species (Section 9.2).

Habitat quality can play a significant role in behavioral response to noise exposure; less avoidance by marine mammals may be displayed when habitat value is higher (Hastie et al. 2021). Although Southeast Alaska in its entirety is listed as a Biologically Important Area for humpback whales, the Project area does not contain particularly high-value habitat and is not unusually important for the species. Furthermore, mitigation measures (Section 11) such as marine mammal monitoring would limit the number of humpback whales exposed to underwater noise as a result of the Project. Avoidance of the Project area by humpback whales is possible but would be temporary and intermittent in duration.

9.2 Effects of Project Activities on Marine Mammal Prey Habitat

Essential Fish Habitat (EFH) has been designated in the Project area for all five species of salmon (i.e., chum, pink, coho, sockeye, and Chinook salmon; NMFS 2022), which are common prey of marine mammals. Auke Creek, an outlet stream of Auke Lake, is the only salmon spawning stream in Auke Bay; however, adverse effects on EFH in this area are not expected. Fish populations in the Project area that serve as marine mammal prey could be temporarily affected by noise from pile installation and removal. The frequency range in which fish generally perceive underwater sounds is 50 to 2,000 Hz, with peak sensitivities below 800 Hz (Popper and Hastings 2009). Fish behavior or distribution may change, especially with strong and/or intermittent sounds that could harm fish. High underwater SPLs have been documented to alter behavior, cause hearing loss, and injure or kill individual fish by causing serious internal injury (Hastings and Popper 2005).

Pile installation and pile removal may result in a small increase in sedimentation within a few feet of the piles. A small amount of sediment may be deposited in proximity to each pile. Minor and temporary increases in turbidity may result from this process, but the effects on fish and marine mammal prey will be negligible. Indirect effects on prey will be insignificant and discountable due to the temporary nature of the activity and are expected to be undetectable to marine mammals.

In general, impacts on marine mammal prey species are expected to be minor and temporary. The area likely impacted by the Project is relatively small compared to the available habitat in Auke Bay and throughout Southeast Alaska. The most likely impact on fish from the Project will be temporary behavioral avoidance of the immediate area, although any behavioral avoidance of the disturbed area will still leave significantly large areas of fish and marine mammal foraging habitat. Therefore, the impact on marine mammal prey during the Project is expected to be negligible.

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10 ANTICIPATED EFFECTS OF HABITAT IMPACTS ON MARINE MAMMALS

The potential impacts of the Project on marine mammal habitat are discussed in Section 9. The effects of the Project on marine mammal habitat are expected to be short-term and minor. Permanent loss of habitat is limited to the footprint of the piles only. 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 will not be permanent and will not have long-term effects. The 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 installation and removal will be temporary and intermittent.

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11 MITIGATION MEASURES TO PROTECT MARINE MAMMALS AND THEIR HABITAT

The estimates outlined in Section 6 represent the maximum potential numbers of marine mammals exposed to Project-related noise, including multiple takes of the same resident individuals that could be exposed to acoustic sources reaching Level B harassment levels. The DOTP&F proposes to employ a number of mitigation measures to minimize the number of marine mammals affected. Mitigation measures will include those that address all phases of construction in general, those that are specific to physical pile installation/removal, those that pertain to Level A and Level B harassment zones, and those that involve observation of marine mammals in the Project area. Marine mammal monitoring and mitigation methods are described in more detail in the Marine Mammal Monitoring Plan (Appendix B).

11.1 Pile Installation and Associated Activities

Pile installation mitigation measures include:

- MMOs will be employed as described in Section 13 and the Marine Mammal Monitoring Plan (Appendix B).
- Prior to the beginning of pile installation/removal, MMOs will visually inspect the Level A and Level B harassment zones from strategic locations for the presence of marine mammals.
    - The Level A and Level B harassment zone sizes will vary based on the size of pile and installation method.
    - If a marine mammal is observed, it will be monitored until it has departed the Level A and Level B harassment zones.
- MMOs will begin observing for marine mammals within the Level A and Level B harassment zones for at least 30 minutes before “soft-start” or in-water pile installation or removal begins
- Soft-start or ramp-up procedures may be initiated while the marine mammal is within the Level B harassment zone. As long as the marine mammal does not approach the construction site in such a way that injury or harm is possible, and assuming that take has not exceeded the number authorized, pile installation and removal may continue while the marine mammal is within the Level B harassment zone (each individual will be considered a potential Level B take as allowed under the IHA to be issued by NMFS).
- In order to prevent harm or injury to marine mammals, the Contractor will implement shutdown zones for marine mammals during pile installation and removal (Table 6-5). All shutdown zones are larger than the corresponding Level A harassment zone calculated for the species group and pile installation/removal method (Table 6-5). A 30-meter minimum shutdown zone will be enacted for all species for all pile sizes and installation/removal methods.
    - If a marine mammal for which Level A take is not authorized approaches the shutdown zone specific to the species group and pile installation/removal method underway, the activity will cease until the marine mammal has voluntarily left the

shutdown zone or 15 minutes (30 minutes for humpback whales, killer whales, and minke whales) have passed without subsequent detections.

- Ongoing in-water pile installation/removal will be stopped during periods when conditions such as low light, darkness, high sea state, fog, ice, rain, glare, or other conditions prevent effective marine mammal monitoring within the shutdown zones described above.
- Before impact pile installation occurs, the Contractor will employ a ramp-up procedure to minimize impacts. The following guidelines will be employed by the Contractor:
    - When the impact hammer is used, operators will provide an initial set of three strikes from the impact hammer at reduced energy, followed by a 30-second waiting period and then two subsequent three-strike sets.
    - If a marine mammal is present within the Level A harassment zone, ramping up will be delayed until the animal(s) leaves the Level A harassment zone. Activity will begin only after the MMO has determined, through sighting, that the animal(s) has moved outside the Level A harassment zone.
    - If a marine mammal is present in the Level B harassment zone, ramping up may begin and a Level B take will be recorded. Ramping up may occur when these species are in the Level B harassment zone, whether they enter the Level B zone from the Level A zone or from outside the Project area.
    - If a marine mammal is present in the Level B harassment zone, the Contractor may elect to delay ramping up to avoid a Level B take. To avoid a Level B take, ramping up will begin only after the MMO has determined, through sighting, that the animal(s) has moved outside the Level B harassment zone or 15 minutes have elapsed without resighting the marine mammal.
    - No vibratory ramping up is required.

11.2 Harassment Zones

Modeling results for Level A and Level B harassment zones discussed in Section 6 were used to develop mitigation measures for pile installation and removal. During pile installation and removal, the shutdown zone will include all areas where the underwater SPLs have the potential to equal or exceed the Level A (injury) harassment criteria (see Table 6-5).

For those marine mammals for which Level B take has not been requested, in-water pile installation/removal will shut down immediately when an animal is sighted and before the animal has entered the Level B harassment zone. In-water pile installation and removal will remain shut down until marine mammals for which no take has been authorized have left the harassment zone per the procedures described in Section 11.1. If a marine mammal authorized for Level B take is present in the Level B harassment zone, in-water pile installation and removal may continue, and a Level B take will be recorded. Pile installation and removal may occur when these species are in the Level B harassment zone, whether they entered the Level B zone from the Level A zone (if relevant) or from outside the Project area. If Level B take reaches the authorized limit, pile installation will be stopped as these species approach to avoid additional take of these species.

12 MITIGATION MEASURES TO PROTECT SUBSISTENCE USES

The Project is not known to occur in an important subsistence hunting area. The Project area is a developed area with regular marine vessel traffic. However, the DOT&PF plans to provide advance public notice of construction activities to reduce construction impacts on local residents, adjacent businesses, and other users of Auke Bay and nearby areas. This will include notification to nearby Alaska Native tribes that may have members who hunt marine mammals for subsistence. Of the marine mammals considered in this IHA application, harbor seals are known to be used for subsistence in the region; however, recent harvest data indicate that harbor seal subsistence use has decreased in recent years (Wolfe et al. 2013). Harvest of Steller sea lions in Juneau and elsewhere in southeast Alaska remains uncommon (Wolfe et al. 2013). It is unlikely that the Project will interrupt any subsistence activity. If any tribes express concerns regarding Project impacts on subsistence hunting of marine mammals, further communication with the DOT&PF will take place, including provision of any Project information and clarification of any mitigation and minimization measures that may reduce potential impacts on marine mammals used for subsistence.

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13 MONITORING AND REPORTING

Monitoring measures will be implemented along with mitigation measures (Section 11) to avoid and minimize impacts on marine mammals during the Project, as discussed in detail in the Marine Mammal Monitoring Plan (Appendix B).

Two or more trained MMOs will collect sighting data and behavioral responses to pile installation and removal for all marine mammals observed within the harassment zones during these activities. MMOs will meet with the Contractor and DOT&PF to determine the most appropriate observation location(s) for monitoring during pile installation and removal.

Trained or experienced MMOs will be present during all pile installation and removal using impact and vibratory methods. MMOs must be able to positively identify the marine mammals in the area and have prior training or expertise in monitoring and surveying marine mammals, with CVs available for review by NMFS. MMOs must maintain verbal contact with construction personnel to immediately call for a halt of pile installation and removal to avoid exposures to noise, as described in Section 11.2.

The Contractor, MMOs, and DOT&PF (or DOT&PF's designee) will conduct a briefing prior to the start of in-water construction, or when new staff join the work, in order to explain responsibilities, communication procedures, the marine mammal monitoring protocol, and operational procedures.

13.1 MMO Qualifications

Marine mammal monitoring will be conducted by two or more MMOs (depending on the activity) who meet or exceed the minimum qualifications identified by NMFS in the final IHA. These include the following:

- MMOs will be independent observers (i.e., not construction personnel).
- One MMO will be designated as the lead MMO or monitoring coordinator. The lead MMO must have prior experience working as an observer.
- Other observers may substitute education (undergraduate degree in biological science or related field) or training for experience.
- MMOs must have:
    - The ability to conduct field observations and collect data according to assigned protocols.
    - Experience or training in the field identification of marine mammals, including the identification of behaviors.
    - Sufficient training, orientation, or experience with construction operations to provide for personal safety during observations.
    - Lead MMOs must have writing skills sufficient to prepare a report of observations, including, but not limited to:
        - The number, species, and behavior of marine mammals observed
        - Dates and times when in-water pile installation and removal were conducted

        - Dates and times when in-water pile installation and removal were suspended to avoid potential harassment of marine mammals observed within the harassment zones
    - The ability to communicate orally, by radio, or in person with Project personnel to provide real-time information on marine mammals observed in the area.

13.2 Observations

MMOs will be positioned at the best practical vantage point(s). Locations from which MMOs will be able to monitor for marine mammals are readily available from publicly accessible shoreside areas at the Auke Bay Ferry Terminal and, if necessary, other public and private points along the Glacier and Douglas highways. Monitoring locations will be selected by the Contractor during pre-construction. MMOs will monitor for marine mammals entering the Level B harassment zones; the position(s) may vary based on construction activity and location of piles or equipment. At least one of the monitoring locations will have the following characteristics:

- An unobstructed view of the pile being driven, and
- An unobstructed view of the Level A harassment zones.

This central position will generally be staffed by the lead MMO, who will monitor the shutdown zones and communicate with construction personnel about shutdowns and management of take. Walking or otherwise moving around the general construction site may be helpful for monitoring the shutdown zones in their entirety. The other MMO(s) will watch for marine mammals entering and leaving the Level B zone(s) and will alert the lead MMO of the number and species sighted so that no unexpected marine mammals will approach the construction site. This will avoid and minimize Level A take of all species.

The MMOs will begin observations 30 minutes prior to the start of pile installation/removal and 30 minutes following completion each day. Pile installation/removal may commence when MMOs have declared the shutdown zone clear of marine mammals. In the event of a delay or shutdown resulting from marine mammals in the shutdown zone, their behavior must be monitored and documented until they leave of their own volition, at which point pile installation or removal may begin.

At least two MMOs will be available during impact installation, and at least three MMOs will be available during vibratory installation or removal, to observe during rotating shifts of no more than 4 hours without a break and no more than 12 hours each day to prevent fatigue. While the 4-hour time limit is required by NMFS, pile driving is intermittent in nature, and it is expected that MMOs on watch will be able to take frequent breaks as needed while still being able to maintain sufficient coverage of the Project area.

MMOs will have no other construction-related tasks or responsibilities while monitoring for marine mammals. MMOs will understand their roles and responsibilities before beginning observations. Each MMO will be trained and provided with reference materials to ensure standardized and accurate observations and data collection. A clear authorization and communication system will be in place to ensure that MMOs and construction crew members understand their respective roles and responsibilities.

Specific aspects and protocols of observations will also include the following:

- If waters exceed a sea-state that restricts the MMO's ability to make observations within the Level A harassment zone of pile driving (e.g., if there is excessive wind or fog), pile installation and removal will be halted. Pile driving will not be initiated until the entire Level A harassment zone is visible.
- If any marine mammal species not authorized for take is encountered during pile installation or removal and is likely to be exposed to Level B harassment, in-water pile installation or removal will be halted. If take occurs, the observations will be reported to NMFS' Office of Protected Resources.
- When a marine mammal is observed, its location will be determined using tools to verify distance and heading (e.g., rangefinder, reticle binoculars, GPS, compass).
- The MMOs will record any authorized cetacean or pinniped present during monitoring and the harassment zone within which it is located, if applicable. The harassment zones are described in Table 6-5 and shown on Figure 6-3 through Figure 6-5.
- Ongoing in-water pile installation/removal may be continued during periods when conditions such as low light, high sea state, fog, ice, rain, or glare prevent effective marine mammal monitoring of the entire Level B harassment zone. MMOs will continue to monitor the visible portion of the Level B harassment zone throughout pile installation and removal.

13.3 Data Collection

NMFS requires that MMOs use NMFS-approved sighting forms (see Appendix B) that contain the following information:

- Date and time that pile installation begins or ends
- Construction activities occurring during each observation period
- Weather (e.g., wind, precipitation, fog)
- Tide state and water currents
- Visibility
- Species, numbers, and, if possible, sex and age class of marine mammals
- Marine mammal behavior patterns observed, including bearing and direction of travel, and, if possible, the correlation to SPLs
- Distance from pile installation site to marine mammals, if pile installation is occurring during marine mammal observations
- Other human activity in the area

13.4 Reporting

A draft report will be submitted to NMFS within 90 calendar days of the completion of marine mammal monitoring. A final report will be prepared and submitted to NMFS within 30 days following receipt of comments on the draft report from NMFS. To the extent practicable, the

MMOs will record behavioral observations that may make it possible to determine if the same or different individuals are being taken as a result of Project activities over the course of a day.

In general, reporting will include:

- Descriptions of any observable marine mammal behavior in the Level A and Level B harassment zones
- Descriptions of in-water and in-air construction activities occurring at the time of the observable behavior
- Actions performed to minimize impacts on marine mammals (e.g., shutdowns)
- Times when work was stopped and resumed due to the presence of marine mammals
- Results, which include the detections of marine mammals, species and numbers observed, sighting rates and distances, and behavioral reactions within the Level A and Level B harassment zones
- A refined take estimate based on the number of marine mammals observed during the course of construction

See the Marine Mammal Monitoring Plan (Appendix B) for more detail.

14 SUGGESTED MEANS OF COORDINATION

To minimize the likelihood that impacts will occur to the species, stocks, and subsistence use of marine mammals, all Project activities will be conducted in accordance with federal, state, and local regulations. To further minimize potential impacts from the planned Project, the DOT&PF will continue to cooperate with NMFS and other appropriate federal agencies (e.g., U.S. Fish and Wildlife Service, U.S. Army Corps of Engineers), and the State of Alaska.

The DOT&PF will cooperate with any other marine mammal monitoring and research programs in Southeast Alaska that may take place in the Auke Bay area. The DOT&PF will also assess mitigation measures that can be implemented to eliminate or minimize impacts from these activities.

The DOT&PF will make available its field data and behavioral observations on marine mammals that occur in the Project area. The draft summary report described in Section 13.4 documents the results of monitoring efforts and will be provided to NMFS within 90 calendar days of the conclusion of monitoring. This information will be made available to regional, state, and federal resource agencies, universities, and other interested private parties upon written request to NMFS.

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Appendix A
Project Site Plan Drawings

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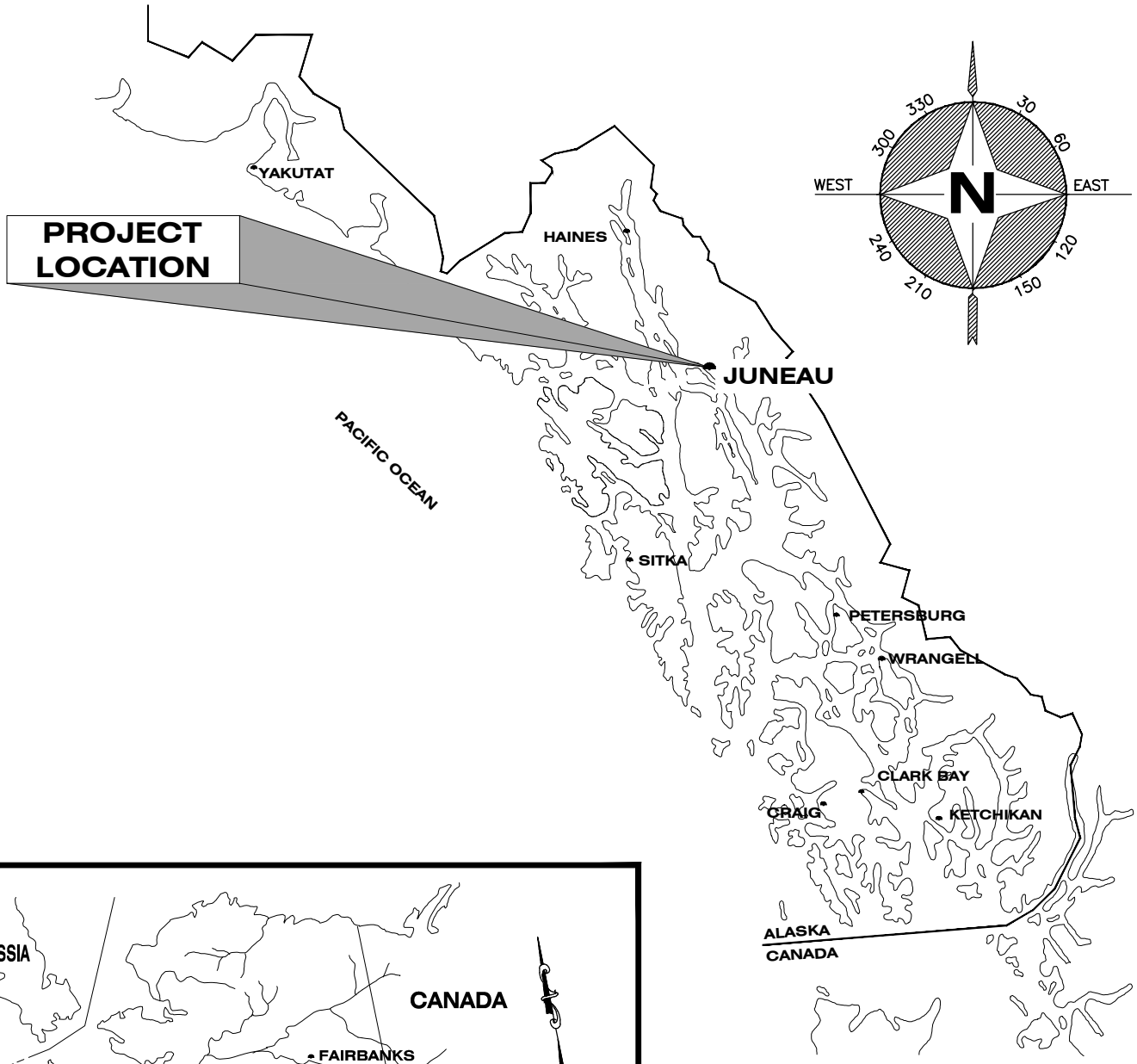
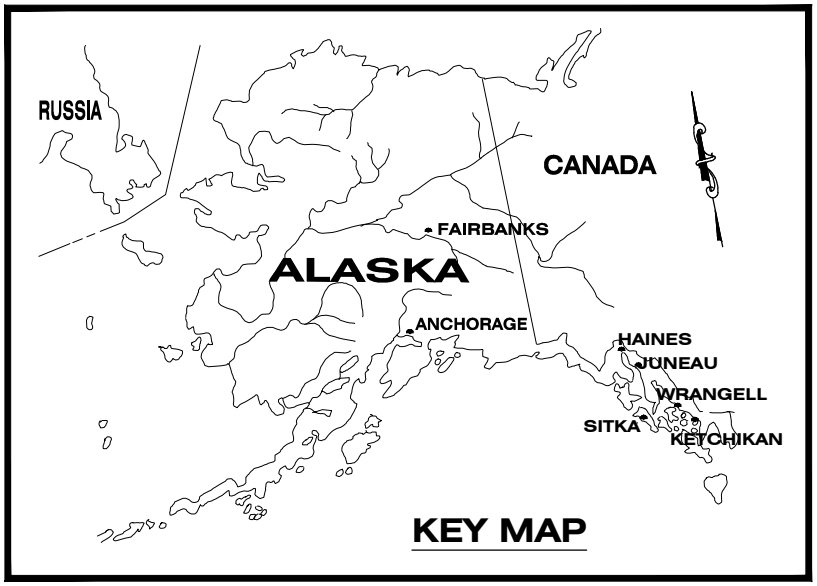


REGIONAL MAP



KEY MAP

TIDAL DATA	
EHW	+25.0
HTL	+20.6'
MHW	+15.3'
MLLW	0.0'
ELW	−5.7'

PROJECT PURPOSE:
FERRY TERMINAL IMPROVEMENTS

ADJACENT PROPERTY OWNER(S):
STATE OF ALASKA DNR
CBJ DOCKS & HARBORS – GITKOF LEASE
AK GLACIER SEAFOODS
CITY & BOROUGH OF JUNEAU

KEY & REGIONAL MAPS

APPLICATION BY:
STATE OF ALASKA
DEPT. OF TRANSPORTATION & PUBLIC FACILITIES
SOUTHCOAST REGION

AUKE BAY EAST BERTH -
FERRY TERMINAL IMPROVEMENTS
PROJECT NO. SAMHS00419

AT: AUKE BAY – JUNEAU, ALASKA
LOCATED IN: S21 T40S R65E CRM
LAT. 58° 22' 53.4" N
LONG. 134° 41' 6.5" W

DATE: APRIL 2022 SHEET 1 OF 8

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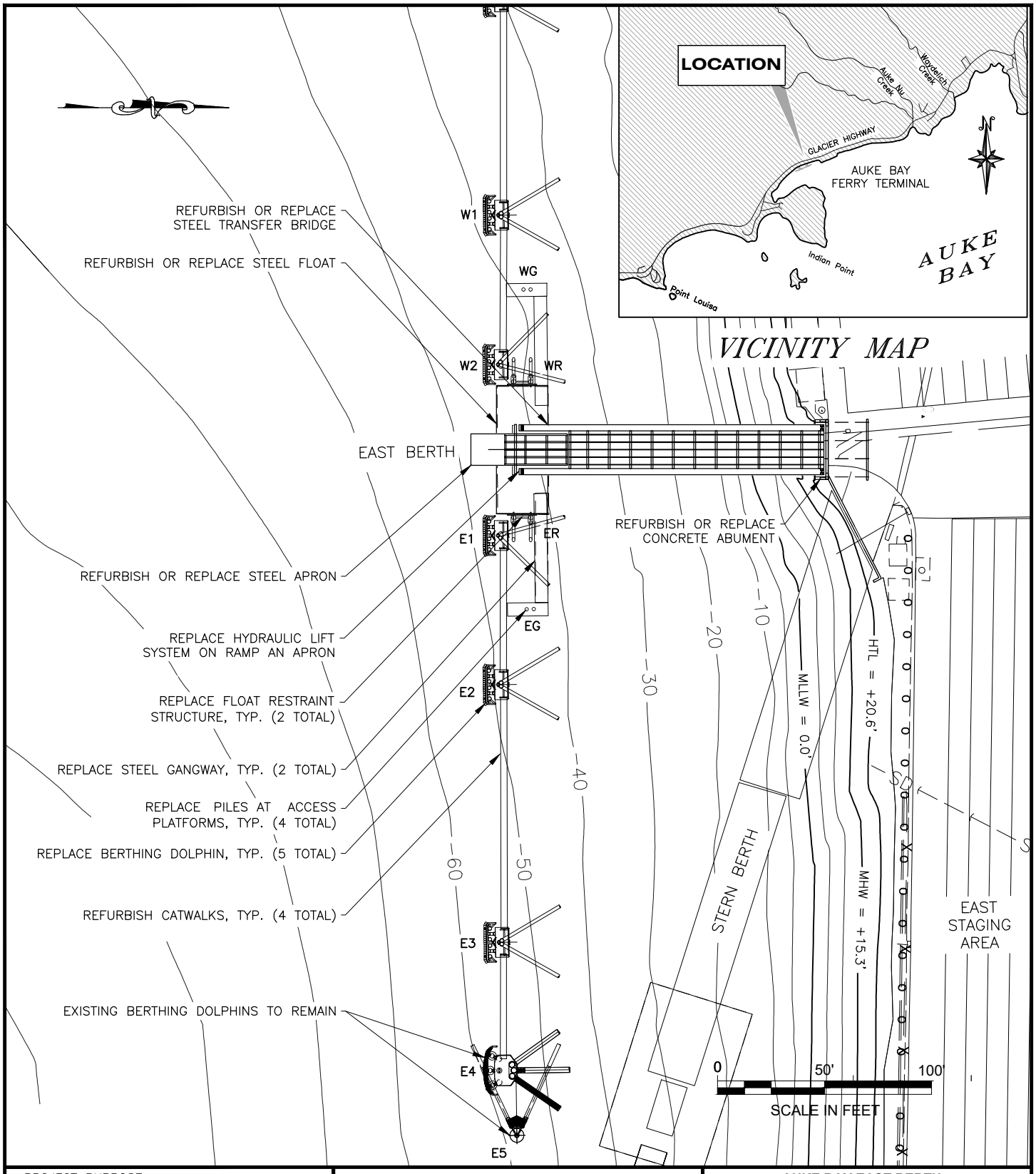

PROJECT PURPOSE:
FERRY TERMINAL IMPROVEMENTS

ADJACENT PROPERTY OWNER(S):
STATE OF ALASKA DNR
CBJ DOCKS & HARBORS – GITKOF LEASE
AK GLACIER SEAFOODS
CITY & BOROUGH OF JUNEAU

EXISTING SITE PLAN

APPLICATION BY:
STATE OF ALASKA
DEPT. OF TRANSPORTATION & PUBLIC FACILITIES
SOUTHCOAST REGION

AUKE BAY EAST BERTH -
FERRY TERMINAL IMPROVEMENTS
PROJECT NO. SAMHS00419

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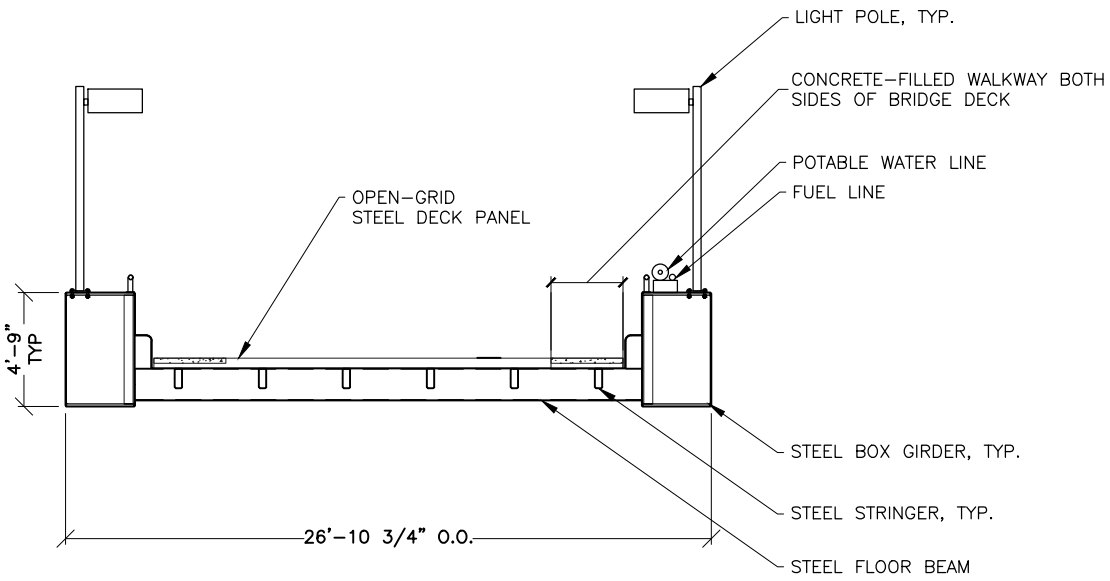

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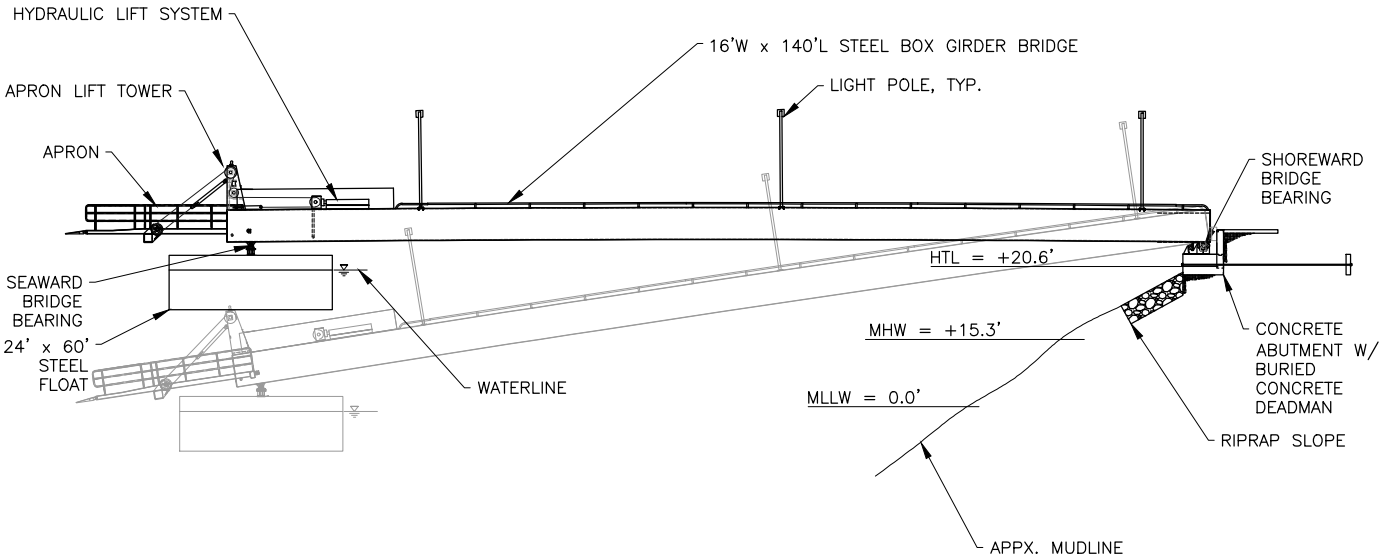

ELEVATION

PROJECT PURPOSE:
FERRY TERMINAL IMPROVEMENTS

ADJACENT PROPERTY OWNER(S):
STATE OF ALASKA DNR
CBJ DOCKS & HARBORS – GITKOF LEASE
AK GLACIER SEAFOODS
CITY & BOROUGH OF JUNEAU

BRIDGE ELEVATION

APPLICATION BY:
STATE OF ALASKA
DEPT. OF TRANSPORTATION & PUBLIC FACILITIES
SOUTHCOAST REGION

AUKE BAY EAST BERTH -
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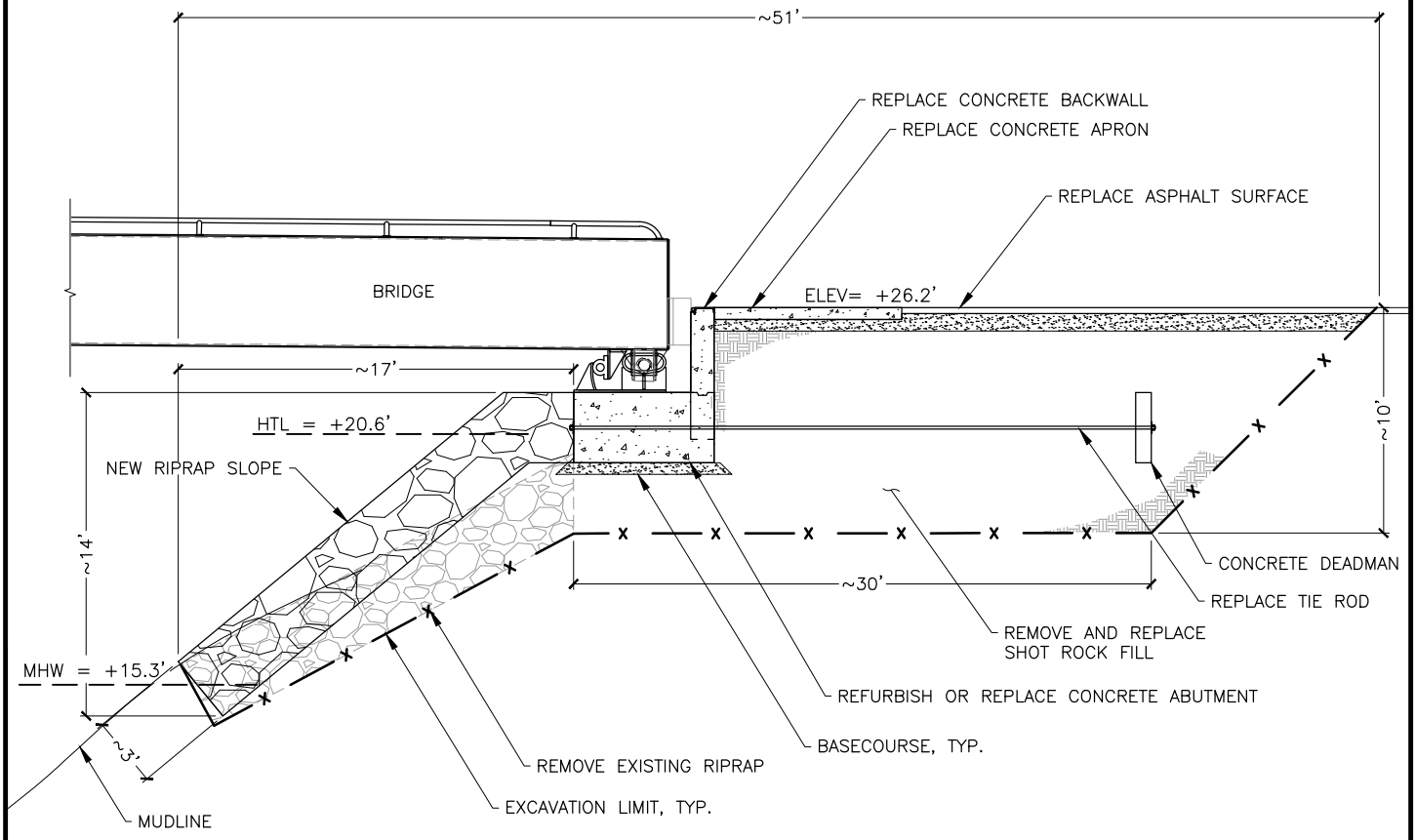
MATERIAL SCHEDULE FOR ABUTMENT			
DESCRIPTION	TOTAL QTY	QTY BELOW HTL	QTY BELOW MHW
TOTAL DISTURBED SURFACE	0.058 ACRES	0.053 ACRES	0.005ACRES
REMOVE PAVED SURFACE	0.026 ACRES	-	-
NEW PAVED SURFACE	0.026 ACRES	-	-
REMOVE RIPRAP SLOPE SURFACE	0.020 ACRES	0.020 ACRES	0.005 ACRES
NEW RIPRAP SLOPE SURFACE	0.020 ACRES	0.020 ACRES	0.005 ACRES
FILL VOLUME TO BE REMOVED AND REPLACED	372 CY	173 CY	-
NEW FILL VOLUME	100 CY	89 CY	-
REMOVE RIPRAP VOLUME	82 CY	82 CY	3 CY
NEW RIPRAP VOLUME	90 CY	79 CY	3 CY



SECTION

PROJECT PURPOSE:
FERRY TERMINAL IMPROVEMENTS

ADJACENT PROPERTY OWNER(S):
STATE OF ALASKA DNR
CBJ DOCKS & HARBORS – GITKOF LEASE
AK GLACIER SEAFOODS
CITY & BOROUGH OF JUNEAU

BRIDGE ABUTMENT

APPLICATION BY:
STATE OF ALASKA
DEPT. OF TRANSPORTATION & PUBLIC FACILITIES
SOUTHCOAST REGION

AUKE BAY EAST BERTH -
FERRY TERMINAL IMPROVEMENTS
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DATE: APRIL 2022 SHEET 4 OF 8

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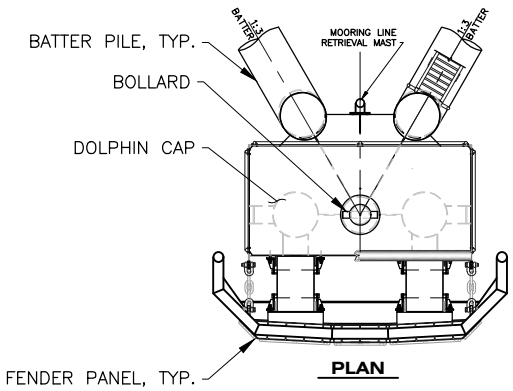
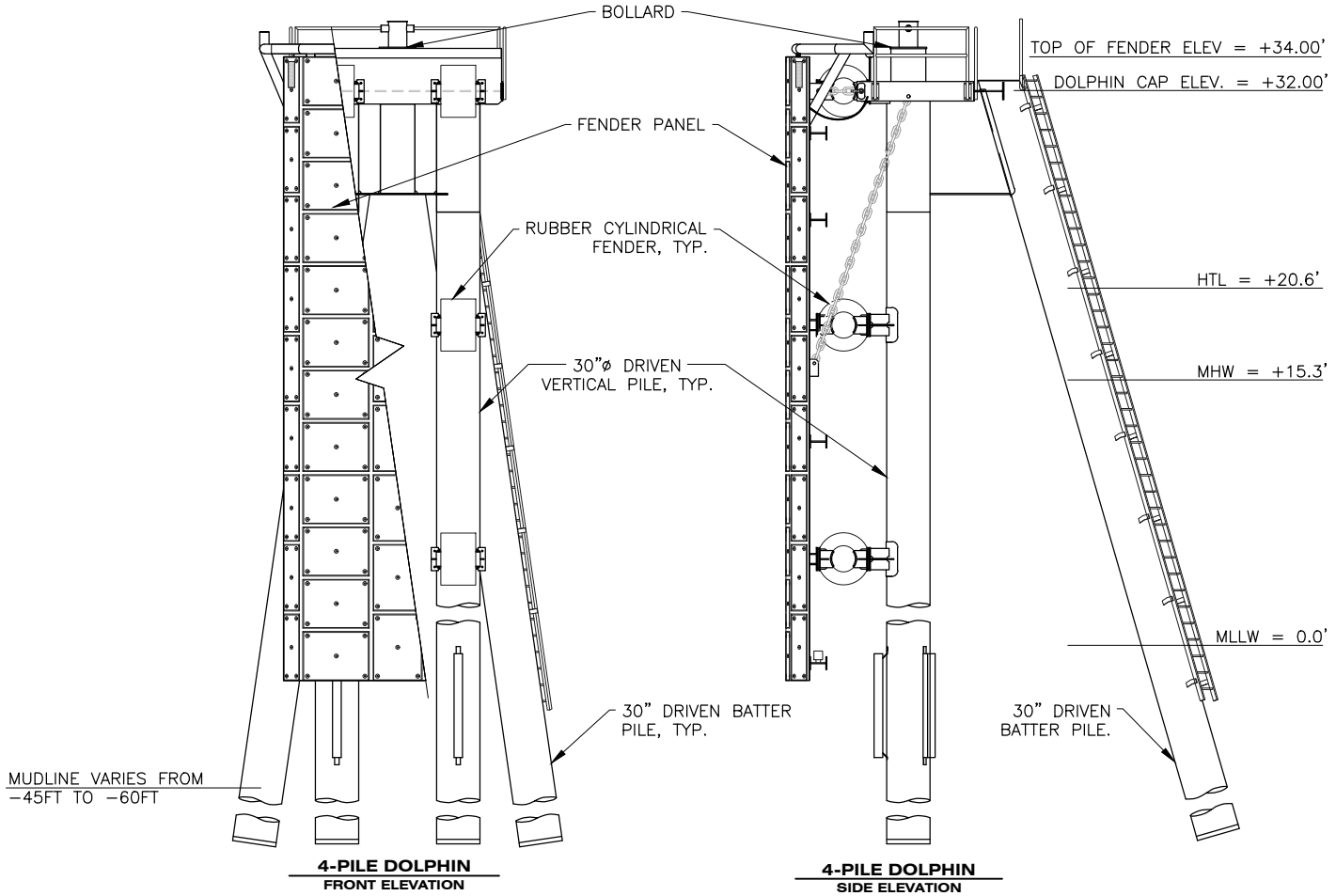


PLAN

PILE INFORMATION						
STRUCTURE	REMOVE EXISTING PILE	QTY	NEW PILE SIZE & LOCATION	QTY	DRILLED SOIL ANCHORS	ESTIMATED PILE EMBEDMENT (FT)
W1	18" FENDER PILE	4	N/A	-	-	-
	18" VERTICAL PILE	1	30" VERTICAL PILE	2	0	125
	18" BATTER PILE	2	30" BATTER PILE	2	0	140
W2	18" FENDER PILE	4	N/A	-	-	-
	18" VERTICAL PILE	1	30" VERTICAL PILE	2	0	125
	18" BATTER PILE	2	30" BATTER PILE	2	0	140
E1	18" FENDER PILE	4	N/A	-	-	-
	18" VERTICAL PILE	1	30" VERTICAL PILE	2	0	125
	18" BATTER PILE	2	30" BATTER PILE	2	0	140
E2	18" FENDER PILE	4	N/A	-	-	-
	18" VERTICAL PILE	1	30" VERTICAL PILE	2	0	125
	18" BATTER PILE	2	30" BATTER PILE	2	0	140
E3	18" FENDER PILE	4	N/A	-	-	-
	18" VERTICAL PILE	1	30" VERTICAL PILE	2	0	125
	18" BATTER PILE	2	30" BATTER PILE	2	0	140



4-PILE DOLPHIN
FRONT ELEVATION

4-PILE DOLPHIN
SIDE ELEVATION

PROJECT PURPOSE:
FERRY TERMINAL IMPROVEMENTS

ADJACENT PROPERTY OWNER(S):
STATE OF ALASKA DNR
CBJ DOCKS & HARBORS – GITKOF LEASE
AK GLACIER SEAFOODS
CITY & BOROUGH OF JUNEAU

NEW BERTHING DOLPHINS

APPLICATION BY:
STATE OF ALASKA
DEPT. OF TRANSPORTATION & PUBLIC FACILITIES
SOUTHCOAST REGION

AUKE BAY EAST BERTH -
FERRY TERMINAL IMPROVEMENTS
PROJECT NO. SAMHS00419

AT: AUKE BAY – JUNEAU, ALASKA
LOCATED IN: S21 T40S R65E CRM
LAT. 58° 22' 53.4" N
LONG. 134° 41' 6.5" W

DATE: APRIL 2022 SHEET 5 OF 8

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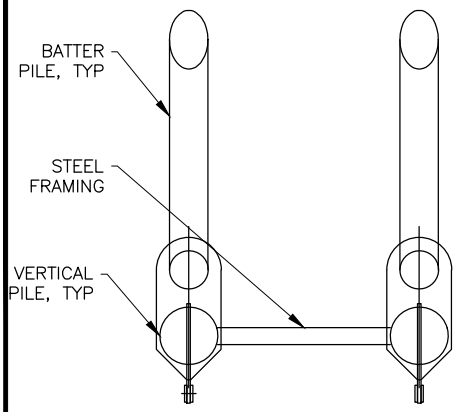
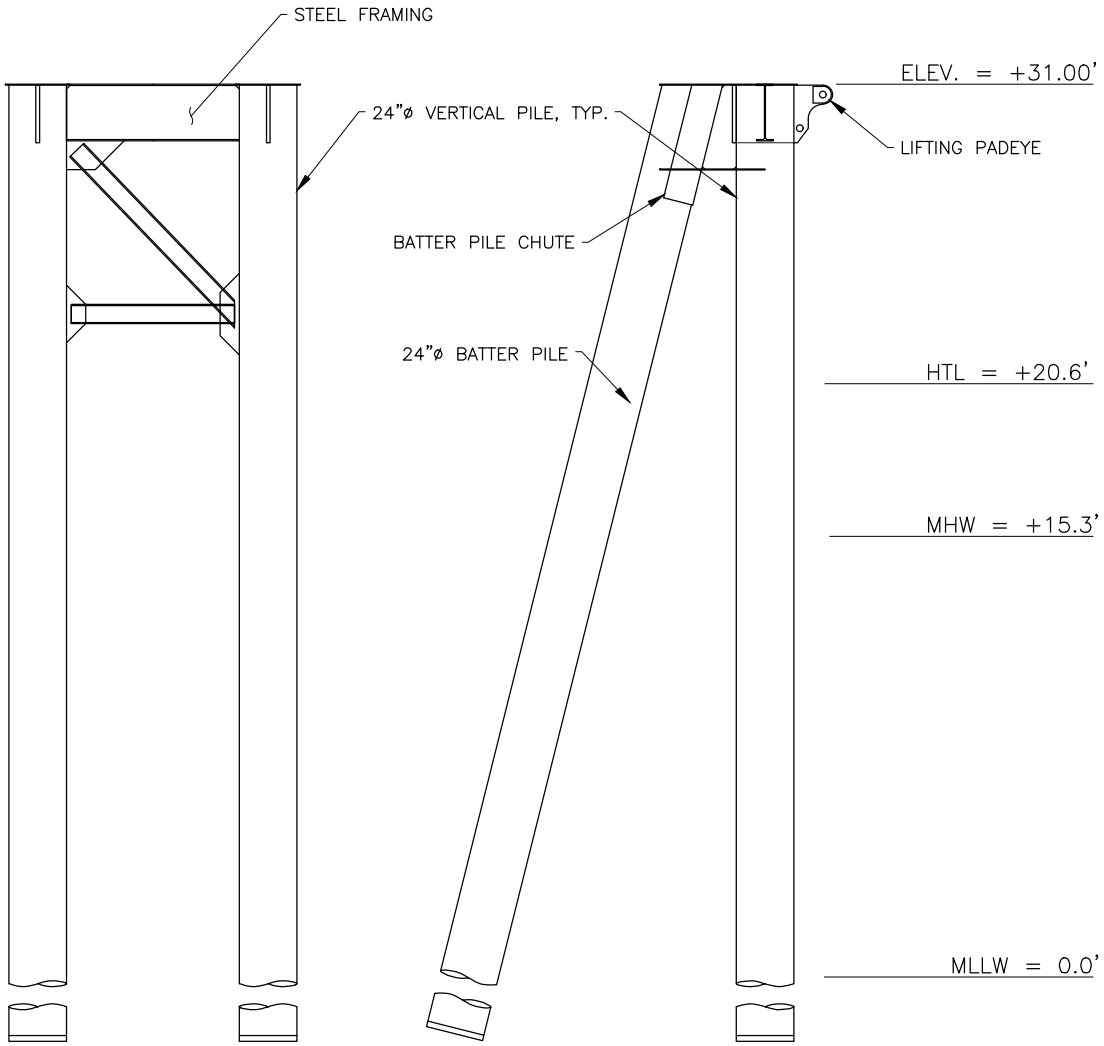


PLAN

PILE INFORMATION						
STRUCTURE	REMOVE EXISTING PILE	NO REQD	NEW PILES	NO REQD	DRILLED SOIL ANCHORS	ESTIMATED PILE EMBEDMENT (FT)
ER	18" VERTICAL PILE	2	24" VERTICAL PILE	2	2	125
	18" BATTER PILE	2	24" BATTER PILE	2	2	140
WR	18" VERTICAL PILE	2	24" VERTICAL PILE	2	2	125
	18" BATTER PILE	2	24" BATTER PILE	2	2	140
EG	18" VERTICAL PILE	2	18" VERTICAL PILE	2	0	100
WG	18" VERTICAL PILE	2	18" VERTICAL PILE	2	0	100
TEMPORARY PILES	N/A	-	UP TO 24" VERTICAL	32	0	60

ER & WR = FLOAT RESTRAINT PILES.
EG & WG = ACCESS PLATFORM PILES.
MUDLINE IS ESTIMATED TO BE BETWEEN −40FT TO −50FT.



4-PILE RESTRAINT
FRONT ELEVATION

4-PILE RESTRAINT
SIDE ELEVATION

PROJECT PURPOSE:
FERRY TERMINAL IMPROVEMENTS

ADJACENT PROPERTY OWNER(S):
STATE OF ALASKA DNR
CBJ DOCKS & HARBORS – GITKOF LEASE
AK GLACIER SEAFOODS
CITY & BOROUGH OF JUNEAU

NEW FLOAT RESTRAINTS

APPLICATION BY:
STATE OF ALASKA
DEPT. OF TRANSPORTATION & PUBLIC FACILITIES
SOUTHCOAST REGION

AUKE BAY EAST BERTH -
FERRY TERMINAL IMPROVEMENTS
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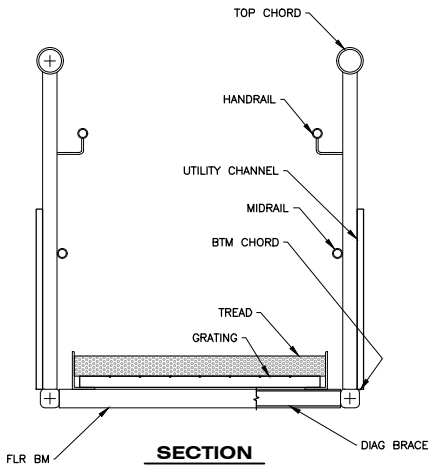

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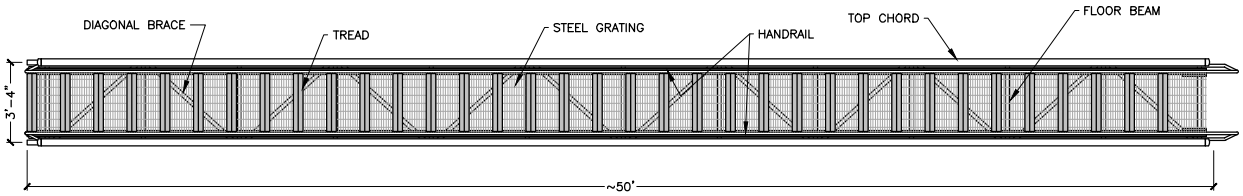
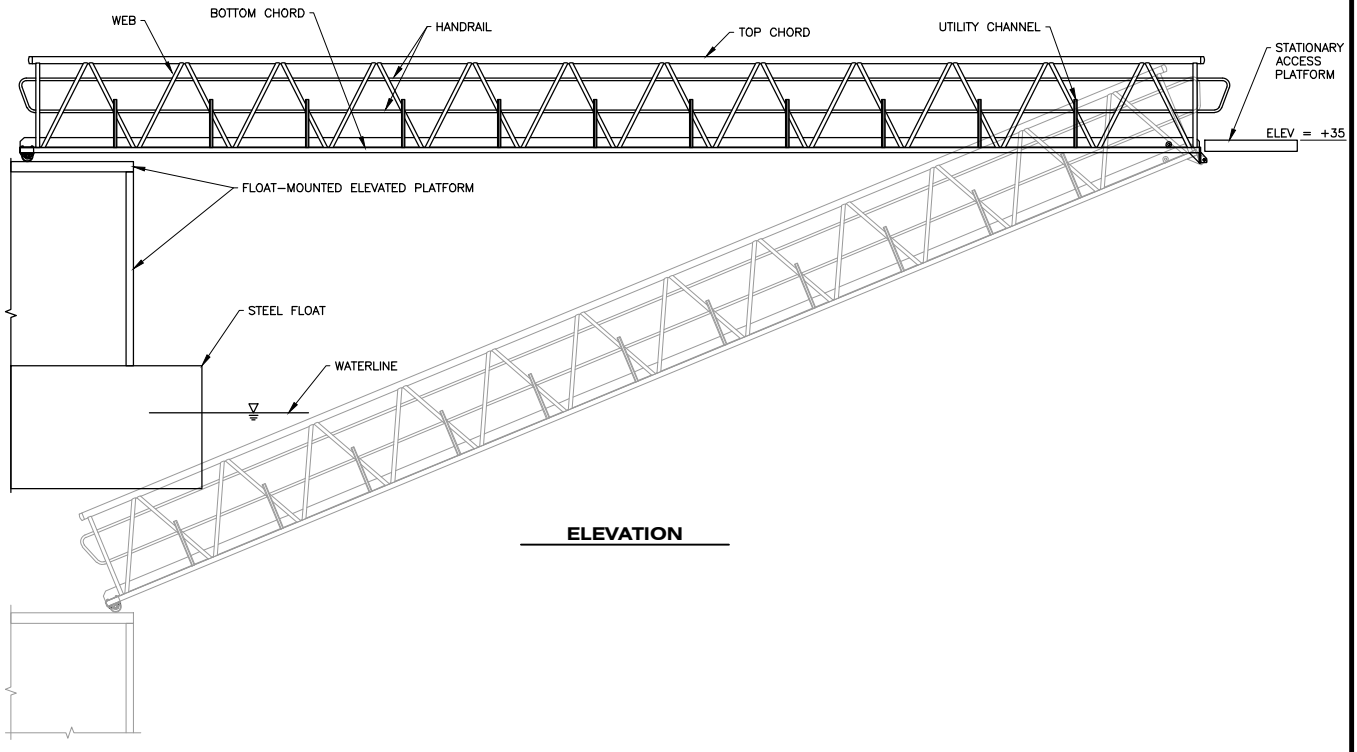


PLAN



ELEVATION

PROJECT PURPOSE:
FERRY TERMINAL IMPROVEMENTS

ADJACENT PROPERTY OWNER(S):
STATE OF ALASKA DNR
CBJ DOCKS & HARBORS – GITKOF LEASE
AK GLACIER SEAFOODS
CITY & BOROUGH OF JUNEAU

NEW GANGWAY

APPLICATION BY:
STATE OF ALASKA
DEPT. OF TRANSPORTATION & PUBLIC FACILITIES
SOUTHCOAST REGION

AUKE BAY EAST BERTH -
FERRY TERMINAL IMPROVEMENTS
PROJECT NO. SAMHS00419

AT: AUKE BAY – JUNEAU, ALASKA
LOCATED IN: S21 T40S R65E CRM
LAT. 58° 22' 53.4" N
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DATE: APRIL 2022 SHEET 7 OF 8

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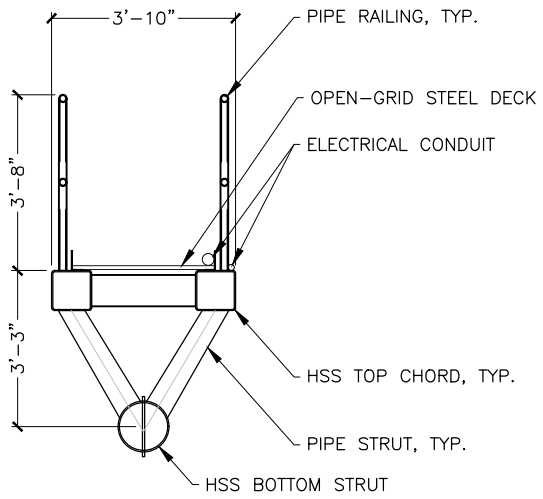

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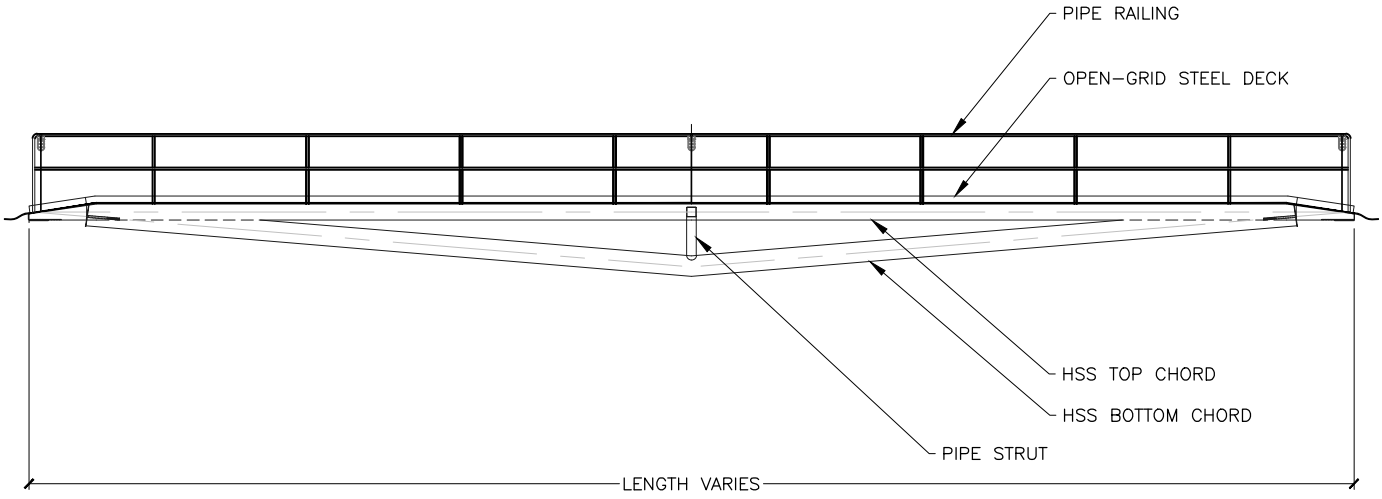

ELEVATION

PROJECT PURPOSE:
FERRY TERMINAL IMPROVEMENTS

ADJACENT PROPERTY OWNER(S):
STATE OF ALASKA DNR
CBJ DOCKS & HARBORS – GITKOF LEASE
AK GLACIER SEAFOODS
CITY & BOROUGH OF JUNEAU

TYPICAL CATWALK

APPLICATION BY:
STATE OF ALASKA
DEPT. OF TRANSPORTATION & PUBLIC FACILITIES
SOUTHCOAST REGION

AUKE BAY EAST BERTH -
FERRY TERMINAL IMPROVEMENTS
PROJECT NO. SAMHS00419

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Appendix B
Marine Mammal Monitoring and Mitigation Plan

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Marine Mammal Monitoring and Mitigation Plan

Auke Bay East Terminal Improvements Project

State Project #: SAMHS00419

Prepared for:
Alaska Department of Transportation & Public Facilities
6860 Glacier Highway
Juneau, Alaska 99801

Prepared by:
HDR
582 E 36th Ave, Suite 500
Anchorage, AK 99503

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CONTENTS

Tables

Figures

Attachments

Attachment 1: Example Data Forms

Acronyms and Abbreviations

BiOp	Biological Opinion
DOT&PF	Alaska Department of Transportation & Public Facilities
DPS	Distinct Population Segment
DTH	Down-the-Hole
ESA	Endangered Species Act
IHA	Incidental Harassment Authorization
MMO	Marine Mammal Observer
MMPA	Marine Mammal Protection Act
NMFS	National Marine Fisheries Service
PSO	Protected Species Observer
QA	Quality Assurance
QC	Quality Control

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1 INTRODUCTION

The purpose of this Marine Mammal Monitoring and Mitigation Plan is to describe monitoring procedures for affected marine species and mitigation actions that will be implemented by the Alaska Department of Transportation & Public Facilities (DOT&PF) during pile installation and removal associated with the Auke Bay East Terminal Improvements Project (Project; see Figure 1-1 and Figure 1-2). This Marine Mammal Monitoring and Mitigation Plan was prepared as part of the application for an Incidental Harassment Authorization (IHA) under the Marine Mammal Protection Act (MMPA) and in support of formal consultation with the National Marine Fisheries Service (NMFS) under Section 7 of the Endangered Species Act (ESA).

The overall goal of the Marine Mammal Monitoring and Mitigation Plan is to comply with the Project IHA and Biological Opinion (BiOp) during in-water pile installation and removal by monitoring the Project area and documenting all marine mammals potentially exposed to noise at or above established thresholds; minimizing impacts on marine mammals through mitigation measures; and collecting data pertaining to marine mammal exposures (takes), occurrence, and behavior of marine mammals in the Project area.

1.1 Project Description

The in-water portion of the Project includes removal of 47 existing steel pipe piles (18-inch diameter) and installation of 32 permanent steel pipe piles to support replacement of the dock structure. Up to 32 temporary steel pipe piles will be installed to support permanent pile installation and will be removed following completion of permanent pile installation. In addition, above-water construction will include replacement of the catwalk access gangway, refurbishment of the catwalks, lighting upgrades along dolphins and catwalk, and removal and replacement of electrical components as needed to perform dolphin replacement work. The marine construction associated with the Project will occur during a 4-month period in fall 2023; however, to avoid unexpected delays, a 1-year authorization is requested to be issued by 15 May 2023 for one year of work to begin on 01 October 2023. See the Project IHA application for further design and construction details.

The Project has the potential to generate elevated levels of underwater noise that could exceed Level A (injury) and Level B (disturbance) harassment thresholds established by NMFS under the revised Technical Guidance (NMFS 2018) and the interim criteria (70 *Federal Register [FR]* 1871–1875), respectively. Level A harassment means any act of pursuit, torment, or annoyance that has the potential to injure a marine mammal or marine mammal stock in the wild. Level B harassment means any act of pursuit, torment, or annoyance that has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering, but that does not have the potential to injure a marine mammal or marine mammal stock in the wild.

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Figure 1-1. Site Location and Vicinity

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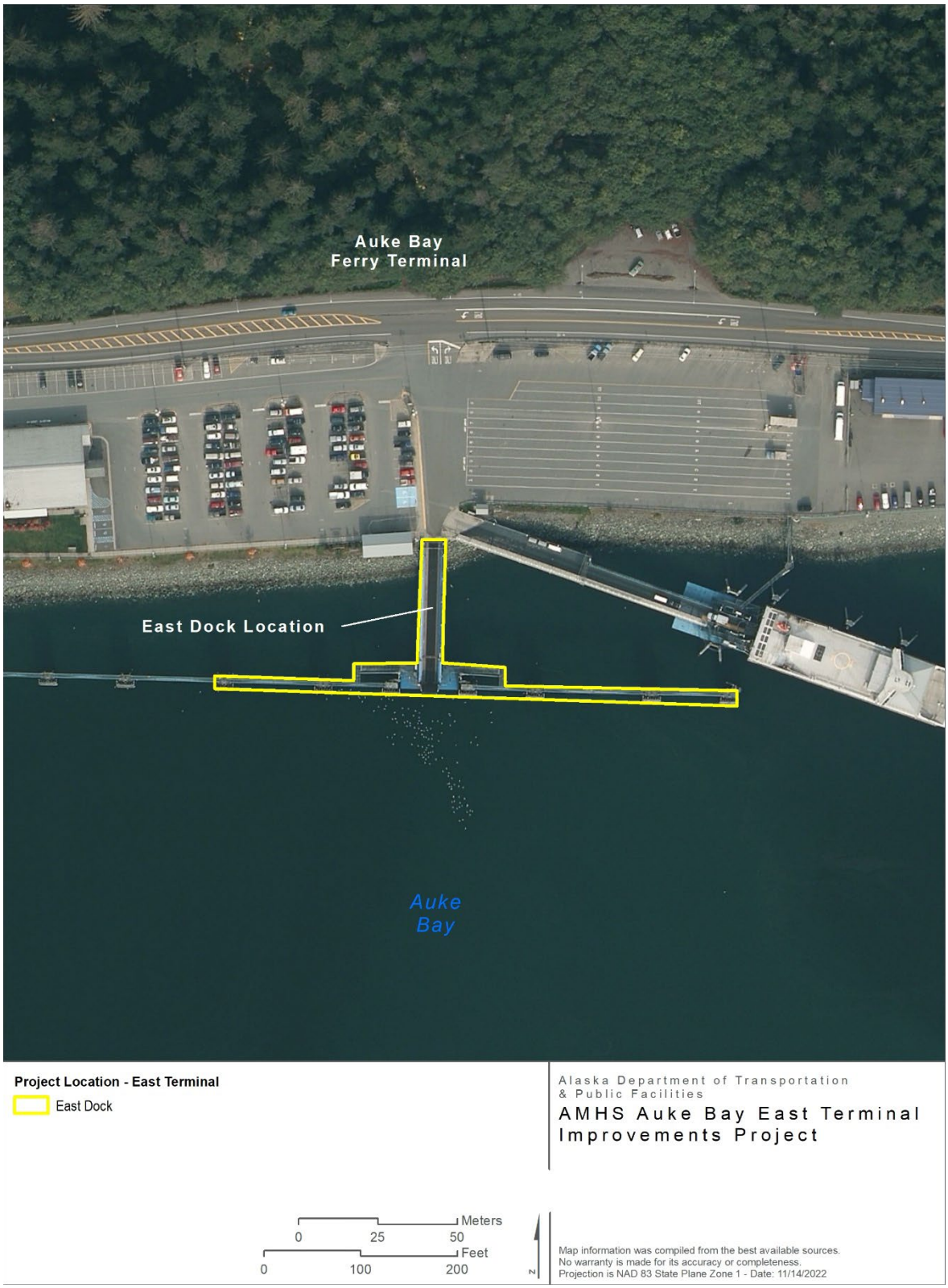

Figure 1-2. Location of East Terminal Updates in Auke Bay, Alaska

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1.2 Protected Marine Mammals

Steller sea lion (*Eumetopias jubatus*), California sea lion (*Zalophus californianus*), harbor seal (*Phoca vitulina*), Northern elephant seal (*Mirounga angustirostris*), harbor porpoise (*Phocoena phocoena*), Dall's porpoise (*Phocoenoides dalli*), Pacific white-sided dolphin (*Lagenorhynchus obliquidens*), killer whale (*Orcinus orca*), minke whale (*Balaenoptera acutorostrata)*, and humpback whale (*Megaptera novaeangliae*), including the ESA-listed Mexico Distinct Population Segment (DPS) of humpback whales and western DPS (wDPS) of Steller sea lions, may occur in the Project area; a number of Level B exposures was authorized for these marine mammal species under the MMPA (see Project IHA, NMFS 2022a). Additionally, a small number of Level A exposures was authorized for harbor seals and harbor porpoises under the MMPA (NMFS 2022a). Authorization for a small number of Level B exposures of the ESA-listed Mexico DPS of humpback whales and wDPS of Steller sea lions was also granted in the Project BiOp and Incidental Take Statement (NMFS 2022b).

The analysis of marine mammal exposures for the Project predicts 15,345 potential exposures of marine mammals to Level B harassment and 152 potential exposures of marine mammals to Level A harassment, for a total of 15,497 potential exposures (Table 1-1).

Table 1-1. Summary of the Numbers of Marine Mammal Level A and B Takes Authorized by NMFS

Species	DPS/Stock	Estimated Number of Exposures to Level B Harassment	Estimated Number of Exposures to Level A Harassment	Total Estimated Exposures (Level A and Level B)	Stock Abundance	Percent of Population
Steller sea lion	Eastern DPS	7,277	0	7,277	43,201	16.84
	Western DPS	104	0	104	52,932	0.20
California sea lion	U.S. Stock	61	0	61	257,606	0.02
Harbor seal	Lynn Canal / Stephens Passage Stock	7,320	122	7,442	13,388	55.59
Northern elephant seal	California Breeding Stock	16	0	16	187,386	<0.01
Harbor porpoise	Southeast Alaska Inland Waters	92	30	122	1,302	9.37
Dall's porpoise	Alaska	80	0	80	83,400	0.10
Pacific white-sided dolphin	North Pacific	92	0	92	26,880	0.34
Killer whale	West Coast Transient	14	0	55	349	4.01
	Alaska Resident	41	0		2,347	1.75
	Northern Resident	0	0		302	0
Humpback whale	Hawaii DPS	238	0	238	11,540	2.06
	Mexico DPS	6	0	6	2,913	0.21 [a]
Minke whale	Alaska	4	0	4	Unknown	--
Total	**N/A**	**15,345**	**152**	**15,497**	**N/A**	**N/A**

Note: DPS = Distinct Population Segment; N/A = not applicable.

[a] Assumes that 2.4 percent of humpback whales exposed are members of the Mexico DPS (Wade 2021).

2 MARINE MAMMAL MONITORING AND MITIGATION MEASURES

The complete list of required avoidance, minimization, and mitigation measures can be found in the Project IHA (NMFS 2022a) and BiOp (NMFS 2022b). Avoidance and minimization measures described here include establishment of Level A and Level B harassment zones, marine mammal monitoring, and specific mitigation measures that will be implemented during in-water pile installation and removal.

2.1 Shutdown Zones

During in-water pile installation or removal, the Contractor will monitor for all marine mammals within or approaching the Level A and Level B harassment zones. Monitoring all harassment zones, including the outer margins, enables trained Marine Mammal Observers (MMOs; also known as Protected Species Observers or PSOs) to be aware of and communicate the presence of marine mammals in the Project area and thus prepare for potential shutdown of activity and documentation of potential exposures (takes).

Distances to the Level A and Level B harassment thresholds, as defined by sound isopleths, vary by marine mammal functional hearing group, pile size, duration of installation, and pile-installation method (Table 2-1). Figures illustrating the maximum anticipated Level A and anticipated Level B harassment zones for the different numbers and types of piles, as well as installation methods, are provided in Figure 2-1 through Figure 2-7.

Note that the actual pile installation and removal durations may be longer or shorter than the numbers used for calculations in Table 2-1. Estimated duration of pile installation and removal methods are used to predict harassment zone sizes and are not intended to be caps or limits on these activities. It is anticipated that the actual durations will be determined based on the engineering specifications for the Project as determined by the contractor.

For those marine mammal species for which Level B exposures have not been requested, in-water pile installation and removal will shut down immediately when the animals are sighted approaching or within the Level B zone. If a marine mammal authorized for Level B exposure is present in the Level B harassment zone, in-water pile installation and removal may continue, and a potential Level B exposure will be recorded. Pile installation by vibratory and impact methods may occur when marine mammals for which Level B exposure has been authorized are in the Level B harassment zone, whether they entered the Level B zone from the Level A zone (if relevant) or from outside the Project area. If the number of potential Level B exposures reaches the authorized limit, pile installation will be stopped as these species approach the relevant isopleths to avoid additional exposures of these species. Additionally, MMOs will alert the Project Engineer and DOT&PF if Level A or B exposures reaches 80% of the authorized limit.

A 30-meter shutdown zone will be implemented for all species and all pile installation and removal methods to prevent direct contact and injury of marine mammals with construction equipment (Table 2-1). Shutdown zones shown in Table 2-1 have been rounded up to simplify management of monitoring.

Table 2-1. Calculated Distances to Level A and B Harassment Isopleths and Shutdown Zones during Pile Installation and Removal

Activity	Pile Size	Minutes per Pile or Strikes per Pile	Piles Per Day	Rounded Level A Zones and Minimum Shutdown Zones (m)								Level B Zones (m)
				LF		MF		HF		PW		OW		
				Humpback Whale, Minke Whale		Killer Whale, Pacific White-sided Dolphin		Harbor Porpoise, Dall's Porpoise		Harbor Seal, Northern Elephant Seal		Steller Sea Lion, California Sea Lion		All Species
				No Level A Take		No Level A Take		Level A Take Authorized for Harbor Porpoise Only		Level A Take Authorized for Harbor Seal Only		No Level A Take		
				Shutdown Zone to Avoid Take	Level A Zone	Shutdown Zone to Avoid Take	Level A Zone	Shutdown Zone to Avoid Take	Level A Zone	Shutdown Zone to Avoid Take	Level A Zone	Shutdown Zone to Avoid Take	Level A Zone	
Vibratory Installation	30-inch	60 Minutes	3	30	11	30	1	30	16	30	7	30	1	3,981
	24-inch	60 Minutes	3	30	5	30	1	30	8	30	3	30	1	1,848
		30 Minutes	3	30	4	30	1	30	5	30	2	30	1	
	18-inch	60 Minutes	3	30	9	30	1	30	14	30	6	30	1	
Vibratory Removal	24-inch	30 Minutes	6	30	5	30	1	30	8	30	3	30	1	
	18-inch	30 Minutes	6	30	9	30	1	30	14	30	6	30	1	
Impact Installation	30-inch	1,000 Strikes	4	1100	1002	40	36	1200	1194	540	537	40	39	1,000
			3	830	827	30	30	990	985	450	443	40	33	
			2	640	632	30	23	760	752	340	338	30	25	
			1	400	398	30	15	480	474	220	213	30	16	
	24-inch	1,000 Strikes	4	1100	1002	40	36	1200	1194	540	537	40	39	1,000
			3	830	827	30	30	990	985	450	443	40	33	
			2	640	632	30	23	760	752	340	338	30	25	
			1	400	398	30	15	480	474	220	213	30	16	
		500 Strikes	4	640	632	30	23	760	752	340	338	30	25	
			3	530	521	30	19	630	621	280	279	30	21	
			2	400	398	30	15	480	474	220	213	30	16	
			1	260	251	30	9	300	299	140	134	30	10	
	18-inch	800 strikes	4	640	636	30	23	760	757	340	340	30	25	464
			3	530	525	30	19	630	625	290	281	30	21	
			2	410	401	30	15	480	477	220	215	30	16	
			1	260	252	30	9	310	301	140	135	30	10	

Note: Actual pile installation and removal durations may be longer or shorter. Estimated duration of pile installation and removal methods are not intended to be caps or limits on these activities. It is anticipated that the actual durations will be determined based on the engineering specifications for the Project as determined by the contractor. HF = high frequency; LF = low frequency; MF = mid-frequency; OW = otariid in water; PW = phocid in water

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Figure 2-1. Shutdown Zones during Vibratory Pile Installation and Removal at Auke Bay East Ferry Terminal

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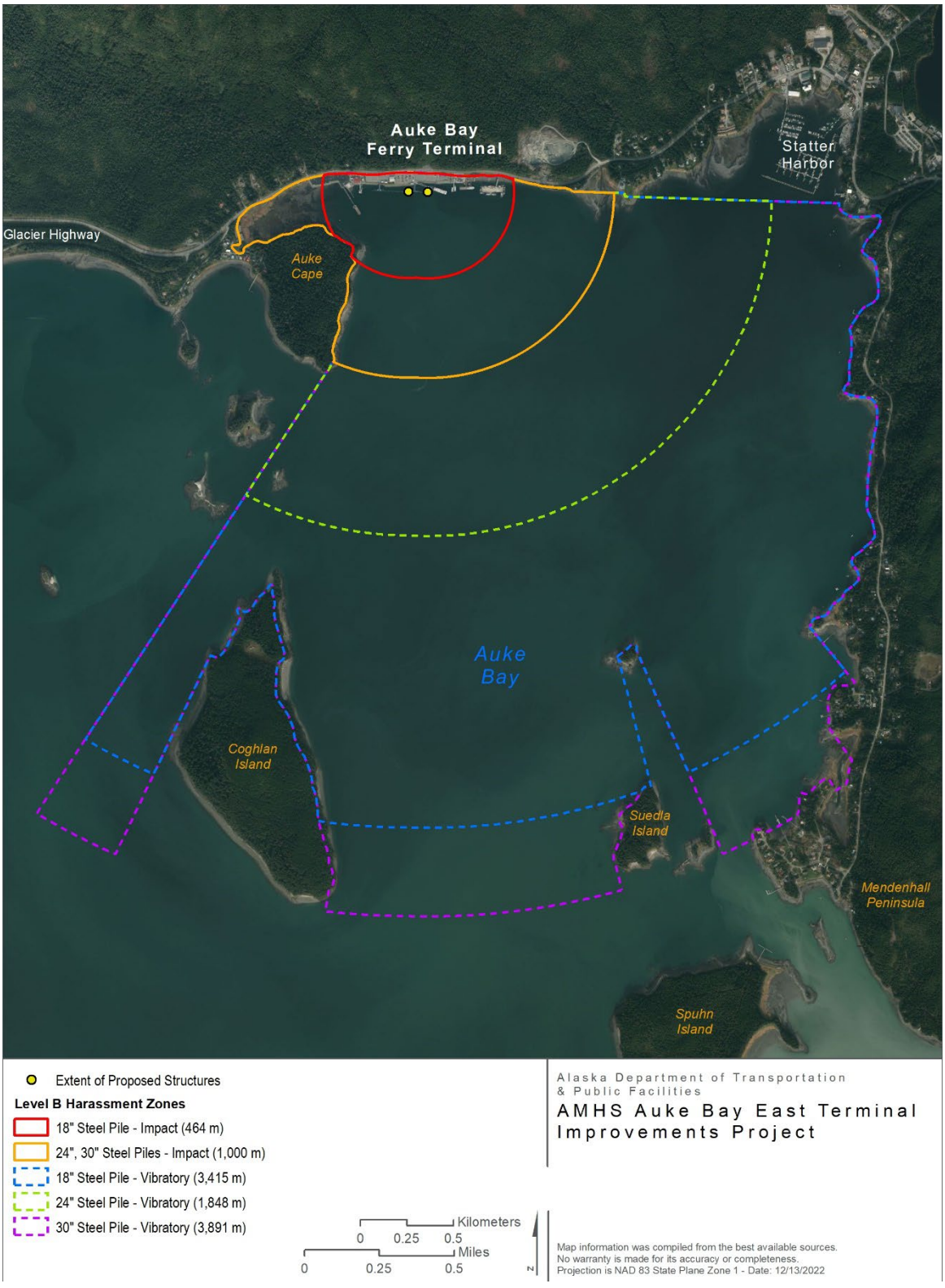

Figure 2-2. Level B Harassment Zones during Pile Installation and Removal at Auke Bay Ferry Terminal

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Figure 2-3. Largest Level A Harassment Zones during Impact Installation of 18-inch Steel Piles (four piles at 800 strikes each)

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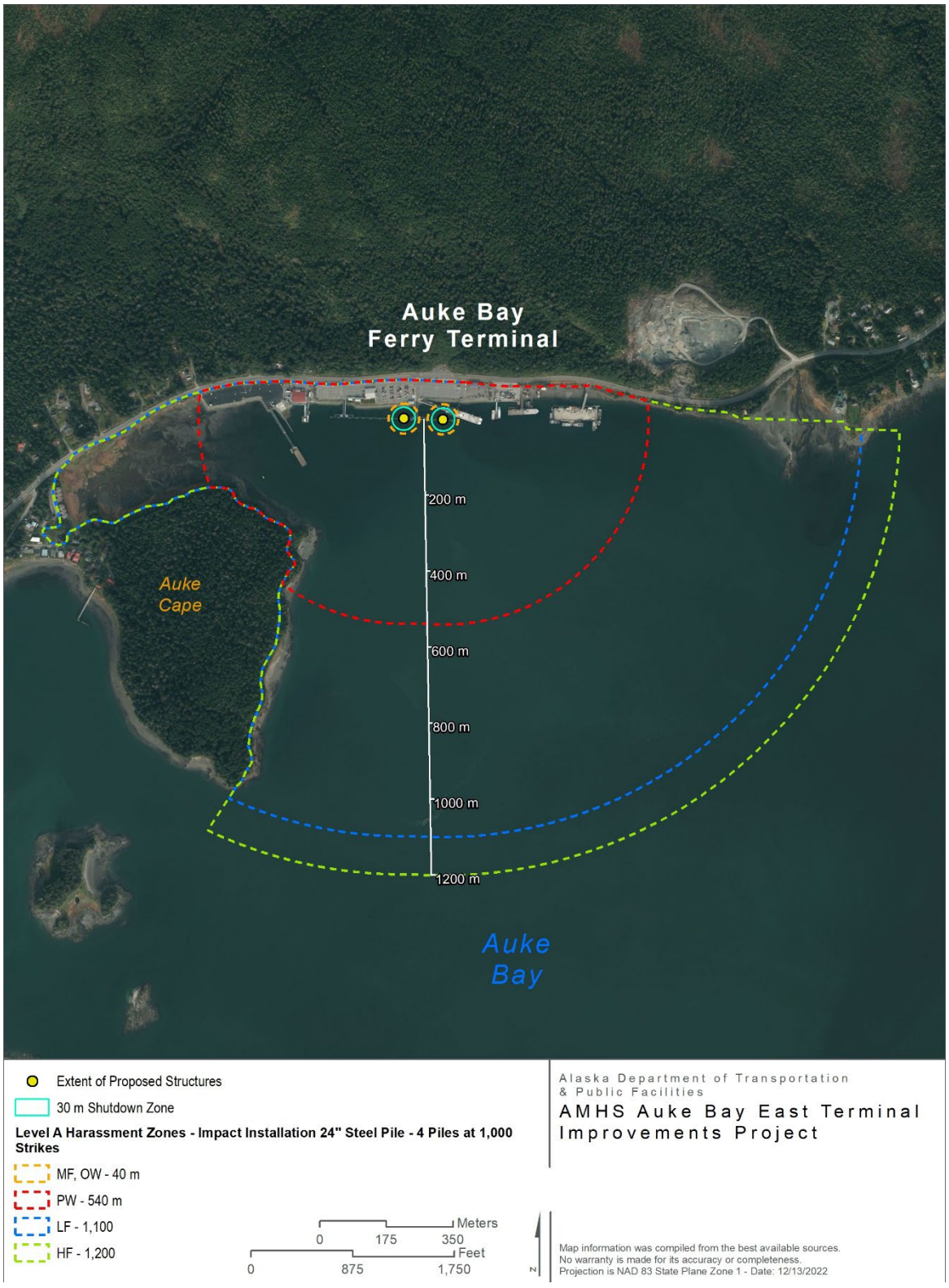

Figure 2-4. Largest Level A Harassment Zones during Impact Installation of 24-inch Steel Piles (four piles at 1,000 strikes each)

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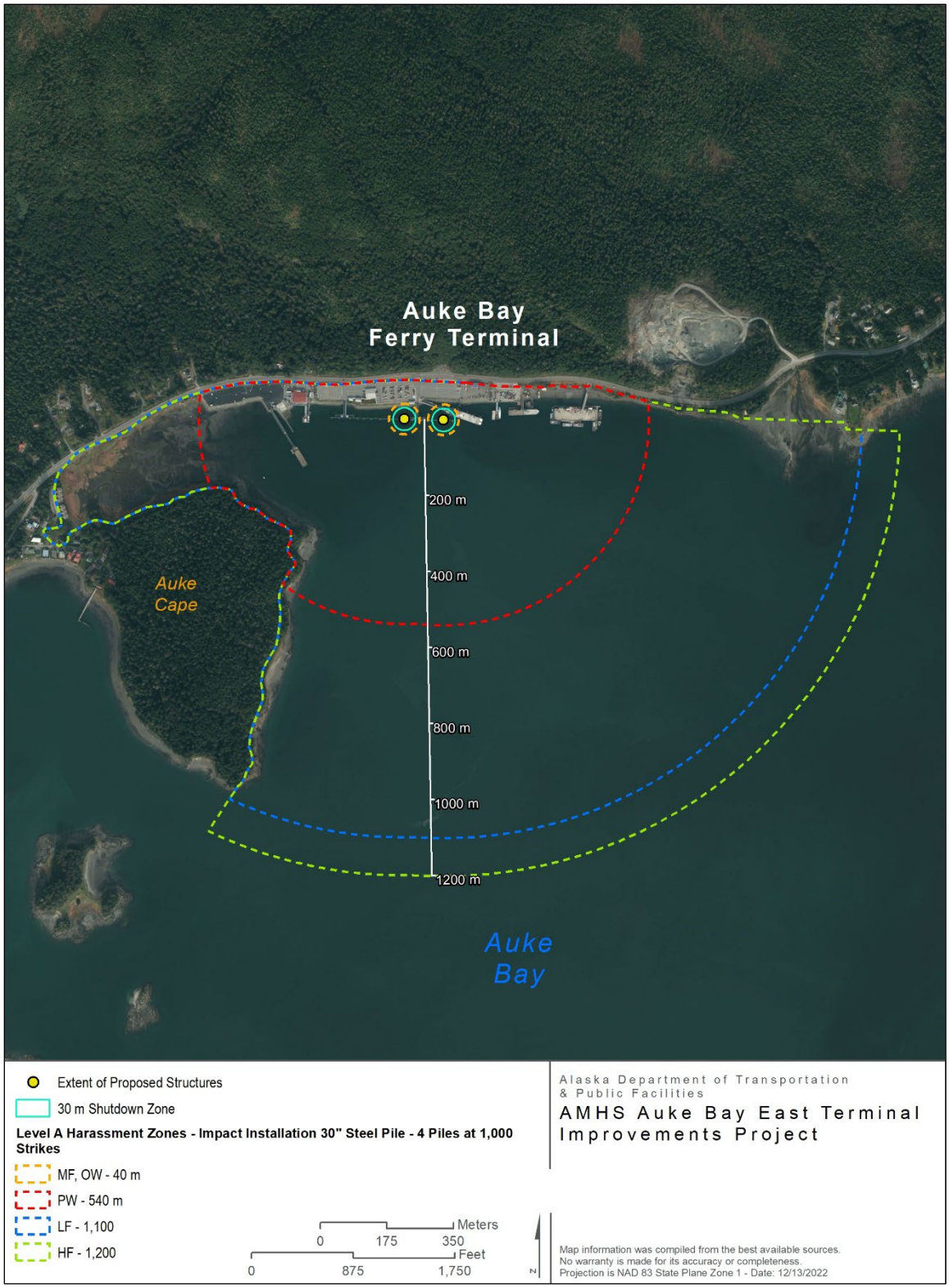

Figure 2-5. Largest Level A Harassment Areas during Impact Installation of 30-inch Steel Piles (four piles at 1,000 strikes each)

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2.2 Marine Mammal Monitoring

To minimize potential impacts of Project activities on marine mammals, MMOs will be present during all in-water pile installation and removal using impact and vibratory methods. The MMOs' primary responsibilities will be to search for, monitor, document, and track marine mammals.

MMOs will have no other construction-related tasks or responsibilities while monitoring for marine mammals. MMOs will understand their roles and responsibilities before beginning observations. A clear authorization and communication system will be in place to ensure that MMOs and construction crew members understand their respective roles and responsibilities.

2.2.1 Positioning

A minimum of two MMOs during impact installation and a minimum of three MMOs during vibratory installation/removal will monitor the construction area and will be positioned at the best practical vantage point(s). Locations from which MMOs will be able to monitor for marine mammals are readily available from publicly accessible shoreside areas at the Auke Bay Ferry Terminal and, if necessary, other public and private points along the Glacier and Douglas highways. Monitoring locations will be selected by the Contractor during pre-construction. MMOs will monitor for marine mammals entering the Level B harassment zones; the position(s) may vary based on construction activity and location of piles or equipment. At least one of the monitoring locations will have the following characteristics:

- An unobstructed view of the pile being driven, and
- An unobstructed view of the Level A harassment zones.

This central position will be staffed by the lead MMO, who will monitor the shutdown zones and communicate with construction personnel about shutdowns and management of take. Walking or otherwise moving around the general construction site may be helpful for monitoring the shutdown zones in their entirety. The other MMO(s) will watch for marine mammals entering and leaving the Level B zone(s) and will alert the lead MMO of the number and species sighted so that no unexpected marine mammals will approach the construction site. This will avoid and minimize Level A take of all species.

2.2.2 Daily Monitoring Protocols

At the start of each day, the Contractor(s) will hold a briefing with the Lead MMO to outline the activities planned for that day. The MMOs will begin observations 30 minutes prior to the start of pile installation/removal and continue observations for 30 minutes following completion each day. Pile installation/removal may commence when MMOs have declared the shutdown zones clear of marine mammals. In the event of a delay or shutdown resulting from marine mammals in the shutdown zones, their behavior must be monitored and documented until they leave of their own volition, at which point pile installation or removal may begin.

At least two MMOs during impact installation event and at least three MMOs during vibratory installation or removal will be available to observe during rotating shifts of no more than 4 hours without a break and no more than 12 hours each day to prevent fatigue. While the 4-hour time limit is required by NMFS, pile driving is intermittent in nature, and it is expected that MMOs on watch will be able to take frequent breaks as needed while still being able to maintain sufficient coverage of the Project area.

Specific aspects and protocols of observations will include:

- If waters exceed a sea-state that restricts the MMO's ability to make observations within the Level A harassment zone of pile driving (e.g., if there is excessive wind or fog), pile installation and removal will be halted. Pile driving will not be initiated until the entire Level A harassment zones are visible.
- If any marine mammal species not authorized for take is encountered during pile installation or removal and is likely to be exposed to Level B harassment, in-water pile installation or removal will be halted. If take occurs, contact the Project Engineer immediately so that the observations can be reported to NMFS Office of Protected Resources by the Department.
- When a marine mammal is observed, its location will be determined using tools to verify distance and heading (e.g., rangefinder, reticle binoculars, GPS, compass).
- The MMOs will record any authorized cetacean or pinniped present during monitoring and the harassment zone within which it is located, if applicable. The harassment zones are described in Table 6-5 and shown on Figure 6-3 through Figure 6-5.
- Ongoing in-water pile installation/removal may be continued during periods when conditions such as low light, high sea state, fog, ice, rain, or glare prevent effective marine mammal monitoring of the entire Level B harassment zone. MMOs will continue to monitor the visible portion of the Level B harassment zone throughout pile installation and removal.
- Ongoing in-water pile installation and removal may be continued during periods when conditions such as low light, high sea state, fog, ice, rain, glare, or other conditions prevent effective marine mammal monitoring of the entire Level B harassment zone. MMOs will continue to monitor the visible portion of the Level B harassment zone throughout the duration of pile installation and removal.
- If waters exceed a sea state that restricts the MMOs' abilities to make observations within the Level A harassment zones (e.g., heavy rain, excessive wind or fog), pile installation and removal will cease. Pile driving will not be re-initiated until the entire relevant Level A harassment zones are visible.
- If zones are unable to be monitored for a period of 30 minutes or more due to environmental conditions, MMO breaks, or other circumstances, the 30-minute observation period prior to pile installation or removal will need to be completed again.

2.3 Mitigation Measures for In-water Pile Installation and Removal

The DOT&PF intends to implement the general monitoring approach that was analyzed in the project BiOp and *Federal Register* Notice of Proposed IHAs. DOT&PF also intends to adhere to the monitoring and mitigation measures as outlined in the final BiOp, Incidental Take Statement, and IHA. The complete list of required avoidance, minimization, and mitigation measures can be found in the Project IHA. Avoidance and minimization measures described here include soft starts, establishment of shutdown zones, and marine mammal monitoring. To minimize the effects of in-water pile installation and removal on marine mammals, the following measures will be observed:

- Pile installation, proofing, and removal will occur only during daylight hours, when visual monitoring of marine mammals can be conducted.
    - Daylight hours, for the purposes of monitoring, are defined as the time between civil dawn and civil dusk. Exact times for civil dawn and dusk for various locations can be found online.
- A 30-meter shutdown zone will be implemented for all species and all pile installation and removal methods to prevent direct contact and injury of marine mammals with construction equipment.
- Shutting down pile installation or removal when a marine mammal is approaching or observed within a defined shutdown zone will be used to avoid exposure.
- If a marine mammal authorized for Level B exposure is present in the Level B harassment zone, in-water pile installation and removal may continue, and a Level B exposure will be recorded. Pile installation may occur when these species are in the Level B harassment zone, whether they entered the Level B zone from the Level A zone (if relevant) or from outside the Project area.
- If Level A or Level B exposure for a species reaches the authorized limit, pile installation will be stopped as individuals of this species approach the relevant zones to avoid additional exposure of this species.
    - Alert the Project Engineer immediately if Level A or Level B exposure for a species reaches 80% of the authorized limit.
- For those marine mammal species for which Level B exposure has not been requested, in-water pile installation and removal will shut down before they enter the Level B harassment zone to avoid unauthorized Level B exposure.
- If a marine mammal is entering or is observed within an established shutdown zone, pile installation and removal must be halted or delayed. Pile driving may not commence or resume until either the animal has voluntarily left and been visually confirmed beyond the shutdown zone or 15 minutes have passed without subsequent detections of the animal.
- For impact pile installation, the Contractor will provide an initial set of three strikes from the impact hammer at reduced energy, followed by a 1-minute waiting period and then two subsequent three-strike sets. This soft start will be applied prior to the beginning of pile installation each day or after an impact hammer has been idle for more than 30 minutes. No vibratory soft start is required.
- If a marine mammal is present within the Level A harassment zone, ramping up will be delayed until the animal leaves the Level A harassment zone. Ramping up and pile installation or removal will begin only after the MMO has determined, through sighting, that the animal has moved outside the Level A harassment zone.
- If a marine mammal authorized for exposure is present in the Level B harassment zone, ramping up may begin and a potential Level B exposure will be recorded. Ramping up may occur when these species are in the Level B harassment zone, whether they enter the Level B zone from the Level A zone or from outside the Project area.

- If a marine mammal is present in the Level B harassment zone, the Contractor may elect to delay ramping up to avoid a Level B exposure. To avoid a Level B exposure, ramping up will begin only after the MMO has determined, through sighting or if 15 minutes has passed without a re-sighting, that the animal has moved outside the Level B harassment zone.
- No vibratory ramping up is required.
- If a marine mammal approaches within 10 meters of a Project vessel (e.g., barge, tugboat), the vessel shall reduce speed to the minimum level required to maintain safe steerage and working conditions until the marine mammal is at least 10 meters away from the vessel.
- The Level A harassment zones for each pile will be monitored and implemented according to pile size, type, duration of installation, installation method, and functional hearing group as analyzed in the project BiOp and *Federal Register* Notice of Proposed IHAs.
- The Level B harassment zone for each pile will be monitored and implemented according to pile size, type, and installation method as outlined in the BiOp and *Federal Register* Notice of Proposed IHAs.
- MMO teams will be staffed as needed (more or fewer MMOs) to effectively monitor the exposure zones.

3 MARINE MAMMAL OBSERVER QUALIFICATIONS

All MMOs will undergo project-specific training in monitoring, data collection, and mitigation procedures specific to the Project. This training will also include communication protocols.

Marine mammal monitoring will be conducted by two or more MMOs who meet or exceed the minimum qualifications identified by NMFS in the final IHA. These include the following:

- MMOs will be independent observers (i.e., not construction personnel).
- One MMO will be designated as the lead MMO or monitoring coordinator. The lead MMO must have prior experience working as an observer.
- Other observers may substitute education (undergraduate degree in biological science or related field) or training for experience.
- MMOs must have:
    - The ability to conduct field observations and collect data according to assigned protocols.
    - Experience or training in the field identification of marine mammals, including the identification of behaviors.
    - Sufficient training, orientation, or experience with construction operations to provide for personal safety during observations.
    - Lead MMOs must have writing skills sufficient to prepare a report of observations, including, but not limited to:
        - The number, species, and behavior of marine mammals observed
        - Dates and times when in-water pile installation and removal were conducted
        - Dates and times when in-water pile installation and removal were suspended to avoid potential harassment of marine mammals observed within the harassment zones
    - The ability to communicate orally, by radio, or in person with Project personnel to provide real-time information on marine mammals observed in the area.

All MMOs must be capable of spotting and identifying marine mammals and documenting applicable data during all types of weather, including rain, sleet, snow, and wind. At a minimum, all MMOs will have or meet the following qualifications:

- MMOs will be independent observers not engaged in construction activities.
- MMOs' visual acuity (correction is permissible) will be sufficient to allow detection and identification of marine mammals at the water's surface; use of binoculars may be necessary to correctly identify a sighting to species.
- MMOs will demonstrate ability to conduct field observations and collect data according to assigned protocols (this may include academic training and/or previous field experience).
- MMOs will have documented marine mammal monitoring experience or training, or an undergraduate degree in biological science or a related field. Project-specific training for

this Project will meet the training requirement if the MMO has experience identifying marine mammals to species.

- MMOs will have sufficient training, orientation, or experience with construction operations to provide for personal safety during observations.
- MMOs will have the ability to communicate orally, by radio or in person, with project personnel about marine mammals observed in the area.
- MMOs will have the ability to collect the required marine mammal observation data as detailed in Section 4.

A designated Lead MMO will always be on-site and will remain responsible for implementing the Monitoring Plan for in-water pile installation and removal for the Project.

The Lead MMO must have education and experience that demonstrates qualifications to serve as the lead, including the following minimum requirements:

- Education in wildlife observation techniques from a university, college, or other formal education program,
- Writing skills sufficient to prepare daily activity logs and monthly and final reports, and
- Previous professional marine mammal observation experience during construction.

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4 DATA COLLECTION

4.1 Environmental Conditions and Construction Activity

MMOs will use the environmental conditions and construction activities log to document environmental conditions, types of construction activities, and other human activity in the area (Attachment 2). Environmental conditions will be recorded at the beginning and end of every monitoring period and at every half hour or as conditions change. Data collected will include MMO names, location of the observation station, time and date of the observation, weather conditions, air temperature, sea state, cloud cover, visibility, glare, tide, and ice coverage (if applicable).

MMOs will record the time that observations begin and end as well as the durations of shutdowns and delays. MMOs will document the reason(s) for stopping work, time of shutdown, and type of pile installation or other in-water work taking place. MMOs will document other, non-project-related activities that could disturb marine mammals in the area, such as the presence of large and small vessels. Additionally, all communications between MMOs and the construction crew will be documented.

Data concerning environmental conditions, marine mammal sightings, and mitigation measures will be entered into a spreadsheet. Each data entry will be checked for quality assurance and quality control (QA/QC). Upon request, the data will be submitted to NMFS along with the final monitoring report.

4.2 Sightings

Each marine mammal observation will be documented on a Marine Mammal Sighting Form consisting of a data page/table and a schematic map of the location of the observed animal (Attachment 1). Sightings data will include start and end times of each sighting; species; number of individuals; sex and age class, if possible; behavior and movement; distances from Project activities to the sighting; initial and final heading of the animal; type of in-water activity at the time of sighting; and if and when Project activities were stopped in response to the sighting (Table 4-1). MMOs will record whether no exposures occurred or a potential Level A and/or Level B exposure occurred, including the number of marine mammals and species potentially exposed. To the extent practicable, the MMOs will record behavioral observations that may make it possible to determine if the same or different individuals are exposed as a result of Project activities over the course of a single day. When marine mammals are sighted, MMOs should delegate responsibilities so that one or more MMOs continue to scan the water to identify other marine mammals that may enter the area while another MMO continues to monitor and track the first sighting.

Table 4-1. Data Attributes and Definitions

Data Attribute	Attribute Definition and Units Collected
Start and end times of monitoring period	Time that monitoring by MMOs/PSOs began and ended, without interruption
Environmental Conditions	
Weather conditions	Dominant weather conditions, collected every 30 minutes: sunny (S), partly cloudy (PC), light rain (LR), steady rain (R), fog (F), overcast (OC), light snow (LS), snow (SN)
Wind speed	In knots
Wind direction	From the north (N), northeast (NE), east (E), southeast (SE), south (S), southwest (SW), west (W), northwest (NW)
Wave height	Calm, ripples (up to 4 inches), small wavelets (up to 8 inches), large wavelets (up to 2 feet), small waves (up to 3 feet), moderate waves (up to 6 feet), large waves (up to 9 feet)
Cloud cover	Amount of cloud cover (0–100%)
Visibility	Maximum distance at which a marine mammal could be sighted
Glare	Amount of water obstructed by glare (0–100%) and direction of glare (from south, north, or another direction)
Tide	Predicted hourly data information gathered from National Oceanic and Atmospheric Administration will be available on-site
Construction and Communication Activities	
Time of event	Time that construction activities and all communications between MMOs/PSOs and construction crews take place
Type of construction activity	Type of construction activity occurring, including ramp-up, startup, shutdown, and type of pile installation technique
Communication	Information communicated between MMOs/PSOs and construction crew
Marine Mammal Sighting Data	
Time of initial and last sightings	Time the animals are initially and last sighted
Species	Species (use unidentified mysticete, odontocete, cetacean, or pinniped if unknown); sex and age class, if possible
Number of individuals	Minimum and maximum number of animals counted; record the count the MMO believes to be the most accurate (i.e., best estimate)
Sex and age, if possible	Generally, numbers of females with pups or calves
Initial and final heading	Direction animals are headed when initially and last sighted
In-water construction activities at time of sighting	Types of construction activities occurring at time of sighting and mitigation measures implemented
Distance from marine mammal to construction activities	Distance from marine mammal to construction activities when initially sighted, at closest approach to activities, and at final sighting (include location relative to monitoring and shutdown zones)
Commercial activities at time of sighting	Description of nearby commercial or anthropogenic activities occurring at time of sighting not associated with the Project
Behavior	Behaviors observed; indicate primary and secondary behaviors
Change in behavior	Changes in behavior; indicate and describe
Group cohesion	Orientation of animals within the group and the distance between animals

4.3 Equipment

The following equipment and information will be required on-site for marine mammal monitoring:

- Portable radios for the MMOs to communicate with the Construction Contractor point of contact and other MMOs, or cellular phones and phone numbers for all MMOs and the Construction Contractor point of contact
- Daily tide tables
- Hand-held binoculars (7X or better) with built-in rangefinder or reticles
- Rangefinder
- Paper data forms or electronic data collection system (e.g., Toughbook or iPad) and backup paper forms
- Large (11- by 17-inch or similar) waterproof maps of the Project area and monitoring zones

4.4 Quality Assurance and Quality Control

Electronic data collection or paper data sheets will be QA/QC'd by the Lead MMO at the end of each monitoring day. No cells or information will be left blank. If information is not available or not applicable, the field will be populated with an "NA" or dash. The data will also be QA/QC'd once it is entered electronically.

4.5 Marine Mammal Monitoring Data Management

All marine mammal monitoring data will be entered into and stored in an electronic database or spreadsheet. The database or spreadsheet will be set up and structured for easy access and management of data and will be used to develop the marine mammal monitoring report. An electronic copy of the data spreadsheet will be available to NMFS upon request.

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5 REPORTING

5.1 Notification of Intent to Commence Construction

DOT&PF will inform the NMFS Office of Protected Resources and the NMFS Alaska Region Protected Resources Division 1 week prior to commencing pile installation and removal ([analyst contact info placeholder]).

5.2 Reporting

During construction, MMOs/PSOs will maintain daily activity logs that include the following information:

- Time that each monitoring period begins and ends
- Prevailing environmental conditions
- In-water construction activities occurring during each monitoring period (including number, type, and size of piles)
- Indication of whether marine mammals were sighted

Within 90 days of the completion of the project, DOT&PF will submit to the NMFS Office of Protected Resources (Silver Spring, MD) a draft final report of all monitoring conducted during the Project. Within 30 days of receiving comments from NMFS on the draft final report, DOT&PF will submit the final report to NMFS.

To the extent practicable, the MMOs will record behavioral observations that may make it possible to determine if the same or different individuals are being “taken” (or exposed) as a result of Project activities over the course of a day.

The monitoring reports will include a description of the monitoring protocol, a summary of the data recorded during monitoring, and an estimate of the number of marine mammals that may have been harassed, including the total number extrapolated from observed animals across the entirety of relevant monitoring zones. The data will include:

- Dates and times of monitoring and total number of days and hours of observations
- Weather and water conditions during each monitoring period
- Locations of observation stations used and dates/times when each location was used
- Numbers, species, group sizes, dates/times, and locations of marine mammals observed
- Sex and age classes of marine mammals observed, if possible
- Distances to marine mammal sightings relative to construction location(s), including closest approach to construction activities
- Details of all recorded marine mammal exposures, including the species, number of individuals, date/time, location, and type of pile installation/removal occurring at the time of exposure
- Descriptions of observable marine mammal behavior in the Level A and Level B harassment zones
- Times of shutdown and delay events, including when work was stopped and resumed

due to the presence of marine mammals or other reasons

- Descriptions of the type and duration of any pile installation work occurring and soft start procedures used while marine mammals were being observed
- Description of all non-Project-related human activities in the area
- Details of all shutdown and delay events and whether they were due to the presence of marine mammals, inability to clear the hazard area due to low visibility, or other reasons
- Tables, text, and maps to clarify observations

5.3 Notification of Injured or Dead Marine Mammals

In the unanticipated event that the specified activity (pile installation and removal) clearly causes the exposure of a marine mammal for which authorization has not been granted, such as a serious injury or mortality, DOT&PF will immediately cease pile installation and removal and report the incident to the NMFS Office of Protected Resources (301-427-8401), the NMFS Alaska Region Protected Resources Division (907-271-5006), and the NMFS Alaska Regional Stranding Coordinator (907-271-3448) or hotline (1-877-925-7773).

The report will include the following information:

- Time, date, and location (latitude/longitude) of the incident
- Detailed description of the incident
- Description of vessel involved (if applicable), including the name, type of vessel, and vessel speed before and during the incident
- Status of all sound source use in the 24 hours preceding the incident
- Environmental conditions (wind speed and direction, wave height, cloud cover, and visibility)
- Description of marine mammal observations in the 24 hours preceding the incident
- Species identification, description, condition, and fate of animal(s) involved
- Photographs or video footage of animal(s) or equipment (if available)

Pile installation and removal shall not resume until NMFS is able to review the circumstances of the prohibited exposure. NMFS shall work with DOT&PF to determine what is necessary to minimize the likelihood of further prohibited exposures and ensure MMPA compliance. DOT&PF may not resume pile installation and removal until notified by NMFS' MMPA program via letter, email, or telephone.

In the event that DOT&PF discovers an injured or dead marine mammal and the Lead MMO determines that the cause of the injury or death is unrelated to the Project, DOT&PF will immediately report the incident to the Alaska Regional Stranding hotline (877-925-7773).

The report will include any applicable information listed above. Activities may continue while NMFS reviews the circumstances of the incident. NMFS will work with DOT&PF to determine whether modifications to the activities are appropriate.

6 LITERATURE CITED

NMFS (National Marine Fisheries Service). 2018. Technical Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing (Version 2.0): Underwater Thresholds for Onset of Permanent and Temporary Threshold Shifts, 2018 Revision. U.S. Department of Commerce, NOAA. NOAA Technical Memorandum NMFS-OPR-59.

NMFS. 2022/3a. Incidental Harassment Authorization – Auke Bay East Terminal Replacement Project. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, NMFS, Silver Spring, MD. Date.

NMFS. 2022/3b. Endangered Species Act Section 7(a)(2) Biological Opinion for Construction of the Auke Bay East Terminal Replacement Project. NMFS Consultation Number: AKRO-XXXX. Date.

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ATTACHMENT 1: EXAMPLE DATA 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** *(if possible)*			
Initial Sighting Time		Steller Sea Lion	Initial Distance		Min Count		Adults		Calves/ Pups	
Final Sighting Time		Harbor Seal								
Time Entered H-Zone B		Harbor Porpoise	Closest Distance		Max Count		Juveniles		Unkn. Age	
Time Exited H-Zone B		Dall's Porpoise								
Time Entered H-Zone A		Killer Whale	Final Distance		Best Count		Male		Female	
Time Exited H-Zone A		Humpback								
		Fin Whale					Unknown Sex			
		Gray Whale								
		Minke Whale								
		other: _____								

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	__ 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

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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