Request for an Incidental Harassment Authorization

Gustavus Ferry Terminal Improvements

Gustavus, Alaska

Prepared for

Alaska Department of Transportation and Public Facilities

April 15, 2016

12634-02

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Contents

TABLES

FIGURES

SHEETS

APPENDIX A

Sound Source Data, Kake Ferry Terminal

APPENDIX B

Marine Mammal Monitoring Plan, Gustavus Ferry Terminal Improvements

Gustavus Ferry Terminal Improvements

Gustavus, Alaska

1.0 DESCRIPTION OF THE ACTIVITY

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

1.1 Introduction

The Alaska Department of Transportation and Public Facilities (ADOT&PF), in cooperation with the Federal Highway Administration (FHWA), is proposing to make improvements to the Gustavus Ferry Terminal, located on Icy Passage, Gustavus, Southeast Alaska (Figure 1). These improvements include in-water pile driving, and are the subject of this Incidental Harassment Authorization (IHA) request. The proposed project will occur in marine waters that support several marine mammal species. The Marine Mammal Protection Act of 1972 (MMPA) prohibits the taking of marine mammals; take is defined as to "harass, hunt, capture or kill, or attempt to harass, hunt, capture or kill," except under certain situations. Section 101 (a)(5)(D) allows for the issuance of an IHA, provided an activity results in negligible impacts on marine mammals and would not adversely affect subsistence use of these animals.

The project's timing and duration, and specific types of activities (such as pile driving) may result in the incidental taking by acoustical harassment (Level B take) of marine mammals protected under the MMPA. ADOT&PF is requesting an IHA for seven marine mammal species: harbor seal (*Phoca viutlina*), Steller sea lion (*Eumetopias jubatus*), harbor porpoise (*Phocoena phocoena*), Dall's porpoise (*Phocoenoides dalli*), killer whale (*Orcinus orca*), humpback whale (*Megaptera novaeangliae*), and minke whale (*Balaenoptera acutorostra*) that may occur in the vicinity of the project. The 14 specific items required for this application, as set out by 50 CFR 216.104, Submission of requests, are provided in Sections 1 through 14 of this application.

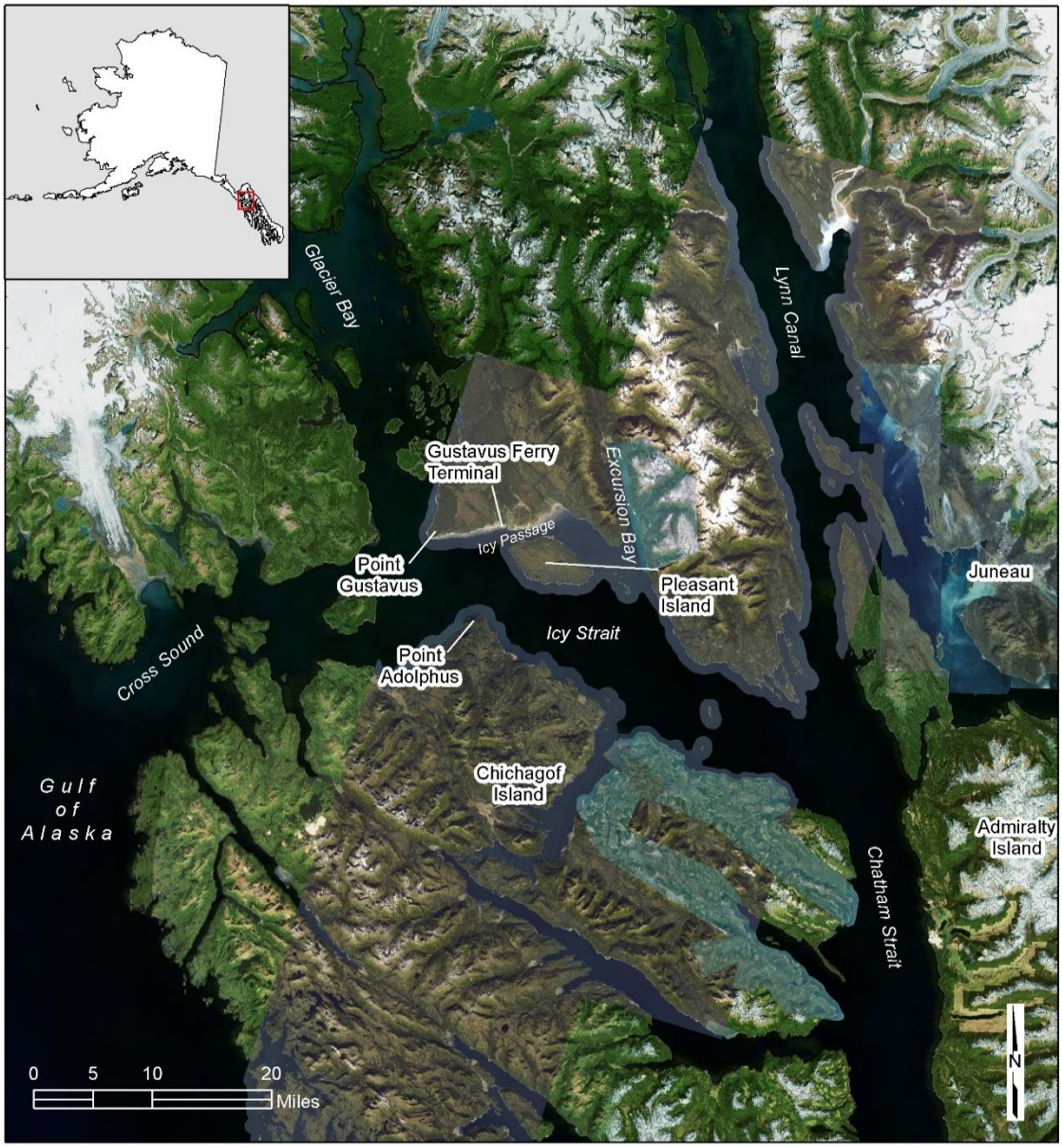


Figure 1 – Site Vicinity Map

1.2 Proposed Action

1.2.1 Purpose and Need

The purpose of the project is to improve the vehicle transfer span and dock such that damage during heavy storms is prevented, and to improve the safety of vehicle and pedestrian transfer operations. The existing transfer span is supported by a float on the seaward end, making it susceptible to damage from waves during storm events. A small vessel mooring float was significantly damaged during a December 2013 storm event and has been removed. The current dock approach has an obstacle that results in unsafe and difficult turning movements for trucks backing onto the ferry. Additionally, shared pedestrian access to the public harbor and ferry terminal may pose a

security risk because harbor and ferry traffic cannot be readily separated and may result in unauthorized access to ferry vessels.

1.2.2 Project Description

The project would remove the existing steel bridge float and restraint structure and replace it with two steel/concrete bridge lift towers capable of elevating the relocated steel transfer bridge above the water when not in use. Each tower would be supported by four 30-inch steel piles. The project would also:

- Expand the dock by approximately 4,100 square feet, requiring 34 new 24-inch steel piles (Sheets 4 and 5);
- Construct new steel six-pile (24-inch) bridge abutment (Sheets 4 and 6);
- Relocate the steel transfer bridge, vehicle apron, and aluminum pedestrian gangway (Sheets 4 and 7);
- Extract 16 steel piles (Sheet 3);
- Relocate the log float to the end of the existing float structure (install three 12.75-inch steel piles);
- Install a new harbor access float (assembled from a portion the existing bridge float) and a steel six-pile (30-inch) float restraint structure (Sheets 4 and 5); and
- Provide access gangways and landing platforms for lift towers and an access catwalk to the existing breasting dolphins (Sheets 4 and 6).

Contractors on previous ADOT&PF dock projects have typically driven piles using the following equipment:

- Air Impact Hammers: Vulcan 512/Max Energy 60,000 foot-pounds (ft-lbs); Vulcan 06/Max Energy 19,000 ft-lbs; ICE/Max Energy 19,500 to 60,000 ft-lbs.
- Diesel Impact Hammer: Delmag D30/Max Energy 75,970 ft-lbs.
- Vibratory Hammers: ICE various models/7,930 to 13,000 pounds static weight.

Similar equipment may be used for the proposed project, though each contractor's equipment may vary. ADOT&PF anticipates driving 1 to 3 piles per day, which accounts for setting the pile in place, positioning the barge while working around existing dock and vessel traffic, splicing sections of pile, and driving the piles. Actual pile driving/removal time for nineteen 12.75-inch-, forty 24-inch-, and fourteen 30-inch-diameter steel piles would be approximately 3 hours per pile for a total of about 114 hours over the course of 16 to 50 days in 2017. Table 1 shows the pile-driving schedule.

Table 1 – Pile-driving Schedule

Description	Project Components							
	Dock Extension	Bridge Abutment	Lift Towers	Access Float	Log Float	Pile Removal	Piles Installed/ Total Piles	Installation/ Removal per Day
# of Piles	34	6	8	6	3	16	57/73	3 piles/day (maximum)
Pile Size (Diameter)	24-inch	24-inch	30-inch	30-inch	12.75-inch	12.75-inch	--	--
Total Strikes (Impact)	20,400	3,600	4,800	3,600	1,800	0	34,200	1,800 blows/day
Total Impact Time	34 hrs	6 hrs	8 hrs	6 hrs	3 hrs	0	57 hrs	3 hrs/day
Total Vibratory Time	54 hrs	9 hrs	13 hrs	9 hrs	5 hrs	24 hrs	114 hrs	6 hrs/day

1.3 Project Elements

The proposed project has two elements involving noise production that may impact marine mammals: vibratory hammer pile driving and pile removal, and impact hammer pile driving. Each of these elements generates in-water noise and in-air noise.

The area of impacts of the proposed action encompasses the injury and behavioral disturbance zones for marine mammals exposed to waterborne noises generated by pile driving (Figures 2 and 3). The National Marine Fisheries Service (NMFS) is in the process of developing waterborne noise guidelines for determining sound thresholds for the injury and disturbance of marine mammals. These thresholds are:

- 180 dB re: 1 µPa RMS (decibels referenced to 1 micropascal root mean square) as the level at which cetaceans experience Level A injury for pulsed sound (impact pile driving);
- 190 dB RMS as the level at which pinnipeds experience Level A injury for pulsed sound (impact pile driving);
- 160 dB RMS as the level all marine mammals experience Level B (behavioral) harassment for pulsed sound (impact pile driving); and
- 120 dB RMS as the level all marine mammals experience Level B harassment for continuous sound (vibratory pile driving).

In addition, NMFS has established an in-air noise disturbance threshold of 90 dB RMS for harbor seals and 100 dB RMS for all other pinnipeds (Figure 2). There are no in-air thresholds for cetaceans.

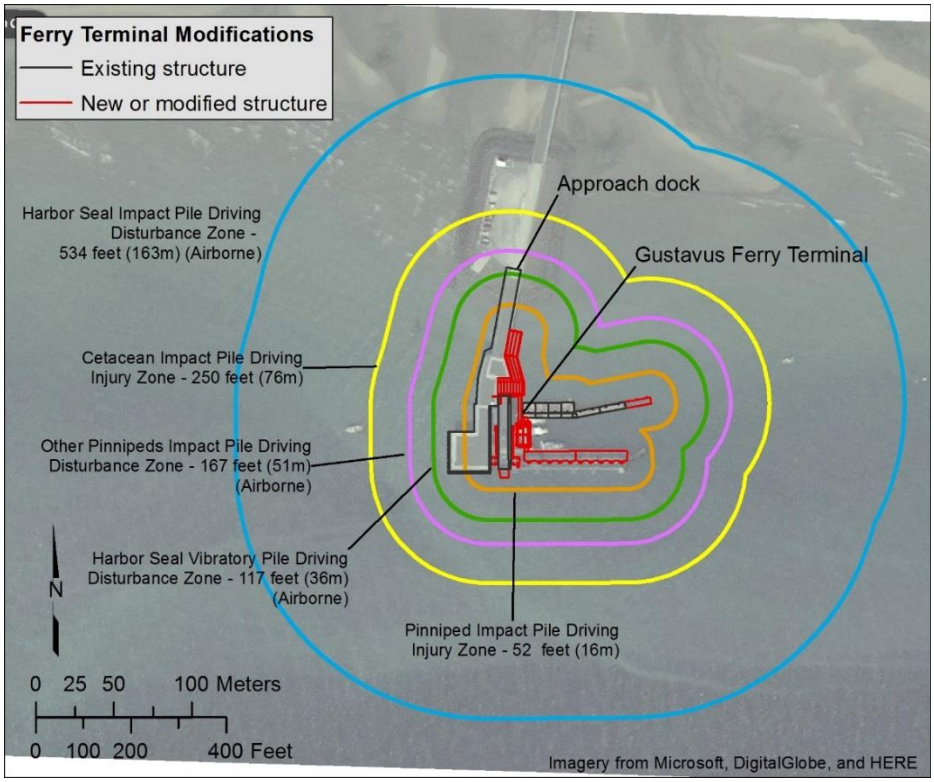


Figure 2 – Waterborne and airborne injury and disturbance zones for marine mammals

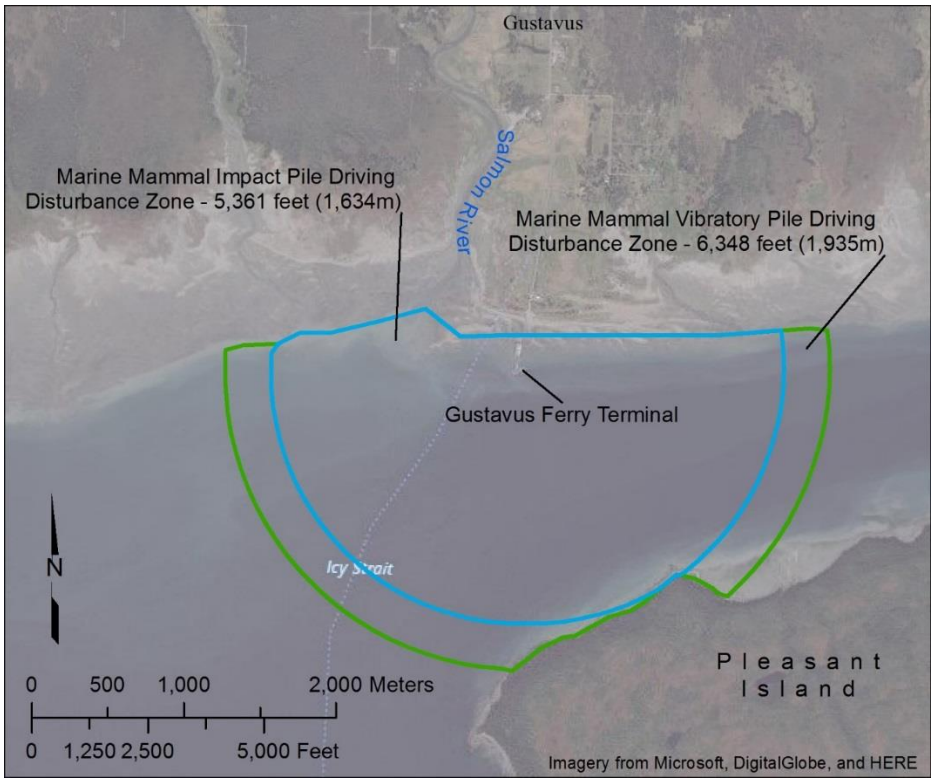


Figure 3 – Marine mammal disturbance zones for impact and vibratory pile driving

Acoustic monitoring data used for this project have been collected at the Kake Ferry Terminal, located approximately 115 miles south of the project area (MacGillvray et al. 2015; Appendix A).

Fewer data are available for in-air sound levels, but WSDOT has collected airborne sound levels for 24-inch-diameter steel piles for both vibratory and impact pile driving at two ferry Terminals in Puget Sound, Washington (Laughlin 2010; WSDOT 2014).

This project proposes to use 24- and 30-inch-diameter steel piles for most project support components (see Section 1.2.2 for details). According to data collected from the Kake Ferry Terminal (MacGillvray et al. 2015; Appendix A) and WSDOT (Laughlin 2010; WSDOT 2014), piles of this size generate similar levels of waterborne and airborne noise; the sound levels selected to calculate impact zones are as follows.

Waterborne Noise

- 193.2 dB RMS for impact driving
- 154.3 dB RMS for vibratory driving

Airborne Noise

- 110 dB RMS for impact driving
- 97 dB RMS for vibratory driving

We then analyzed the acoustic data with the NMFS Practical Spreading Loss model (PSLM; version 1.2, 2011), a standardized model of underwater noise attenuation with distance.

The travel and attenuation of airborne sound was calculated using a standard attenuation rate for hard site conditions (sites dominated by hard reflective substrates such as water, concrete/asphalt, or hard-packed soils). This attenuation rate is a 6-dB reduction in sound per doubling of distance from the pile, beginning at 15 meters from the pile (WSDOT 2013). The waterborne and airborne injury and disturbance zones for marine mammals are presented in Table 2 and Figures 2 and 3.

Table 2 – Impact Zones of Marine Mammals

Pile Driver Type	Distance to Criterion (meters)					
	Waterborne Noise				Airborne Noise	
	Marine Mammal Disturbance (160 dB)	Cetacean Injury (180 dB)	Pinniped Injury (190 dB)	Continuous Noise Disturbance (120 dB)	Harbor Seal (90 dB)	Other Pinnipeds (100 dB)
Impact	1,634	76	16	--	163	51
Vibratory	--	--	--	1,935	36	< Threshold

The PSLM model estimates small injury zones for whales (76 meters) and pinnipeds (16 meters) for pulsed sound generated by piles driven by an impact pile driver within the project area. The disturbance zone for impact pile driving is larger, at approximately 1.6 kilometers from the driven pile for all marine mammals. The disturbance zone for continuous noise generated by a vibratory hammer

is similar, predicted to extend for 1.9 kilometers from the pile to an ambient background level of 120 dB. (Table 2; Figures 2 and 3).

For airborne sound, the disturbance zone for pinnipeds is calculated at 51 to 163 meters from piles driven with an impact pile driver. The disturbance threshold is only exceeded for harbor seals (36 meters) for vibratory pile driving noise (Table 2; Figure 2).

2.0 DATES, DURATION, AND SPECIFIED GEOGRAPHIC REGION

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

2.1 Dates

Project activities are proposed to occur during the following two time periods:

- Spring 2017, with pile driving/removal and in-water work occurring during the period of March through May; and
- Fall 2017, with pile driving/removal and in-water work occurring during the period of September through November.

2.2 Duration

Pile driving is estimated to occur for a total of about 114 hours over the course of 16 to 50 days.

2.3 Region of Activity

The proposed activities will occur at the Gustavus Ferry Terminal located in Gustavus, Alaska on the Icy Passage water body (Figures 1 and 2).

3.0 SPECIES AND NUMBERS OF MARINE MAMMALS IN THE ACTIVITY AREA

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

3.1 Species

For the purpose of this IHA we define the region of activity as Icy Passage as impacts from the project are not anticipated to extend beyond Icy Passage. There are nine marine mammal species documented in the waters of Icy Passage (Dahlheim et al. 2009; NMFS 2013; and personal communications with Janet Neilson, National Park Service [NPS]; Tod Sebens, Cross Sound Express, LLC [CSE]; and Stephen Vanderhoff, Spirit Walker Expeditions [SWE]). Two of the species are known to occur near the Gustavus Ferry terminal: the harbor seal and Steller sea lion. The remaining seven species may occur in Icy Passage but less frequently and farther from the ferry terminal: harbor

porpoise, Dall's porpoise, Pacific white-sided dolphin, killer whale, gray whale, humpback whale, and minke whale.

Although listed on the NMFS MMPA mapper (NMFS 2014), gray whale sightings in Icy Strait are very rare and there have been only eight sightings since 1997 (Janet Neilson, NPS, personal communication). None of these sightings were in Icy Passage. Therefore, exposure of the gray whale to project impacts is considered unlikely and take is not requested for this species.

The range of Pacific white-sided dolphin is also suggested to overlap with the project action area as portrayed on the NMFS MMPA mapper, but no sightings have been documented in the project vicinity (Janet Neilson, NPS, personal communication, Dahlheim et al. 2009). Therefore, exposure of the Pacific white-sided dolphin to project impacts is considered unlikely and take is not requested for this species. Table 3 presents the species most likely to occur in the area.

Table 3 – Marine Mammal Species Potentially Present in Region of Activity

Common Name	Scientific Name	Stock Abundance Estimate[1]	ESA Status	MMPA Status	Frequency of Occurence[2]
Harbor seal	*Phoca vitulina*	7,210	Not listed	Not Strategic, non-depleted	Likely
Steller sea lion	*Eumetopias jubatus*	49,497 (western stock in Alaska) 60,131 (eastern stock)	Endangered	Strategic, depleted	Likely
Dall's porpoise	*Phocoenoides dalli*	Unknown	Not listed	Not Strategic, non-depleted	Infrequent
Harbor porpoise	*Phocoena*	11,146	Not listed	Strategic, non-depleted	Likely
Humpback whale	*Megaptera novaeangliae*	10, 252	Endangered	Strategic, depleted	Infrequent
Killer whale	*Orcinus orca*	261 (Northern resident) 587 (Gulf of Alaska transient) 243 (West Coast transient)	Not listed	Strategic, non-depleted	Infrequent
Minke whale	*Balaenoptera acutorostra*	Unknown	Not listed	Not Strategic	Infrequent

[1] NMFS marine mammal stock assessment reports at: http://www.nmfs.noaa.gov/pr/sars/species.htm
[2] Infrequent: confirmed, but irregular sightings
Likely: confirmed and regular sightings of the species in the area year-round.

Although they are documented near the ferry terminal, harbor seal populations in Glacier Bay are declining (Janet Neilson, NPS, personal communication). It is estimated that less than 10 individuals are typically seen near the ferry dock during charter boat operations in the spring and summer (Tod Sebens, CSE, Stephen Vanderhoff, SWE, personal communication). Steller sea lions are common in the ferry terminal area during the charter fishing season (May to September) and are known to haul out on the public dock (Bruce Kruger, Alaska Department of Fish and Game [ADF&G], personal

communication). The nearest natural Steller sea lion haulout sites are located on Black Rock on the south side of Pleasant Island and Carolus Point west of Point Gustavus (Mathews et al. 2011).

There are confirmed sightings of Dall's porpoise, harbor porpoise, humpback whale, killer whale, and minke whale in Icy Passage (Janet Neilson, NPS, Tod Sebens, CSE, Stephen Vanderhoff, SWE, personal communication). However, sightings are less frequent in Icy Passage than in Icy Strait. Opportunistic sightings of marine mammals by NPS during humpback whale surveys and whale watching tour companies operating out of Gustavus (CSE and WSE operate 100 days of tours in the May to September season), provide the following estimates for each spring/summer season:

- Harbor porpoise are seen in Icy Passage on about 75+ percent of trips.
- Three to four minke whale sightings/season in Icy Strait. One or two in Icy Passage.
- Dall's porpoise have 4- to 12-sightings/season mostly in Icy Strait.
- Killer whales have about 12 sightings/season in Icy Strait and one or two sightings a year in Icy Passage.
- Humpback whale sightings in Icy Passage are infrequent but on occasion they are seen between the ferry terminal and Pleasant Island (Stephen Vanderhoff, SWE, personal communication).

The following sections discuss the species from Table 3 and their numbers in Southeast Alaska and Icy Strait.

3.2 Numbers

By most measures the populations of marine mammals that utilize Icy Strait are healthy and increasing. Populations of humpback whales using Glacier Bay and surrounding areas are increasing by 5.1 percent per year (Hendrix et al. 2012). Steller sea lions have increased in the Glacier Bay region by 8.2 percent per year from the 1970's to 2009, representing the highest rate of growth for this species in Alaska (Mathews et al. 2011). In addition, a Steller sea lion rookery and several haulouts have recently been established in the Glacier Bay region (Womble et al. 2009).

3.2.1 Harbor Seal

Harbor seals occurring in Icy Passage belong to the Glacier Bay/Icy Strait (GB/IS) harbor seal stock. The current statewide abundance estimate for this stock is 7,210 (Muto and Angliss 2015). The GB/IS harbor seals have been rapidly declining despite stable or slightly increasing trends in nearby populations (Womble and Gende 2013). A suite of recent studies suggest that (1) harbor seals in Glacier Bay are not significantly stressed due to nutritional constraints, (2) the clinical health and disease status of seals within Glacier Bay is not different than seals from other stable or increasing populations, and (3) disturbance by vessels does not appear to be a primary factor driving the decline. Long-term monitoring of harbor seals on glacial ice has occurred in Glacier Bay since the 1970s and has shown this area to support one of the largest breeding aggregations in Alaska. After a dramatic retreat of Muir Glacier, in the East Arm of Glacier Bay, between 1973 and 1986 (more than 7 kilometers) and

the subsequent grounding and cessation of calving in 1993, floating glacial ice was greatly reduced as a haulout substrate for harbor seals and ultimately resulted in the abandonment of upper Muir Inlet by harbor seals.

3.2.2 Steller Sea Lion

Steller sea lions occurring in Icy Passage could belong to either the western or eastern U.S. stock. The current total population estimate for the western stock in Alaska is estimated at 49,497 based on 2014 survey results (Muto and Angliss 2015). To get this estimate, pups were counted during the breeding season, and the number of births is estimated from the pup count. The western stock in Alaska shows a positive population trend estimate of 1.67 percent.

The current total population estimate for the eastern stock of Steller sea lions is estimated at 60,131 based on counts made between 2009 and 2014 (Muto and Angliss 2015). To get this estimate, pups were counted during the breeding season, and the number of births is estimated from the pup count. The best available information indicates the eastern stock of Steller sea lion increased at a rate of 4.18 percent per year (90 percent confidence bounds of 3.71 to 4.62 percent per year) between 1979 and 2010 based on an analysis of pup counts in California, Oregon, British Columbia, and Southeast Alaska.

3.2.3 Dall's Porpoise

There are no reliable abundance data for the Alaska stock of Dall's porpoise. Surveys for the Alaska stock of Dall's porpoise are greater than 21 years old (Allen and Angliss 2014). A population estimate from 1987 to 1991 was 83,400. Since the abundance estimate is based on data older than 8 years, the minimum population number is considered unknown.

3.2.4 Harbor Porpoise

There are three harbor porpoise stocks in Alaska including the Southeast Alaska stock, Gulf of Alaska stock, and the Bering Sea stock. Only the Southeast Alaska stock occurs in the project vicinity. Harbor porpoise numbers for the Southeast Alaska stock are estimated at 11,146 animals (Allen and Angliss 2014). Abundance estimates for harbor porpoise occupying the inland waters of Southeast Alaska were 1,081 in 2012. However, this number may be biased low due to survey methodology.

3.2.5 Humpback Whale

The central North Pacific stock of humpback whale s occur in the project area. Estimates of this stock are determined by winter surveys in Hawaiian waters. Point estimates of abundance for Hawaii ranged from 7,469 to 10,252; the estimate from the best model was 10,252 (Muto and Angliss 2015). Using the population estimate of 10,252 the minimum estimate for the central North Pacific humpback whale stock is 9,896 (Muto and Angliss 2015).

Since 1985, the NPS has been monitoring humpback whales in both Glacier Bay National Park and Icy Strait and has published annual reports (http://www.nps.gov/glba/naturescience/whale_acoustic_reports.htm). The NPS typically surveys Icy Strait, located south of Icy Passage, once a week between June 1 and August 31, with most survey effort focused in the area east of Point Gustavus and Pleasant Island. In 2013, 202 humpback whales

were documented in Icy Strait during the NPS monitoring period; this was a 14 percent increase over the previous high count of 177 whales in 2012 (Neilson et al. 2014). However, in 2014, a 39 percent decrease in abundance was observed with only 124 whales documented in Icy Strait. The reasons for this decline in local abundance is not known, but NPS speculated that a magnitude 6.1 earthquake centered in Palma Bay that occurred on July 25, 2014, may have caused unfavorable environmental conditions in the Glacier Bay region. The earthquake and aftershocks caused one or more submarine landslides that increased turbidity in the region and may have decreased humpback whale foraging success over a period of several weeks in lower Glacier Bay and Icy Strait. In response, humpback whales may have shifted their distribution to other areas, such as Frederick Sound, seeking better foraging conditions (Neilson et al. 2015).

Humpback whales are present in Southeast Alaska in all months of the year, but at substantially lower numbers in the fall and winter. At least 10 individuals were found to over-winter near Sitka, and NMFS researchers have documented one whale that over-wintered near Juneau. It is unknown how common over-wintering behavior is in most areas because there is minimal or no photographic identification effort in the winter in most parts of Southeast Alaska. Late fall and winter whale habitat in Southeast Alaska appears to correlate with areas that have over-wintering herring (lower Lynn Canal, Tenakee Inlet, Whale Bay, Ketchikan, Sitka Sound). In Glacier Bay and Icy Strait, the longest sighting interval recorded by NPS was over a span of 219 days, between April 17 and November 21, 2002, but overwintering in this region is expected to be low (Gabriele et al. 2015).

3.2.6 Killer Whale

Killer whales occurring in Icy Passage could belong to one of three different stocks: Eastern North Pacific Northern residents stock (Northern residents), Gulf of Alaska, Aleutian Islands, and Bering Sea transient stock (Gulf of Alaska transients), or West Coast transient stock. The Northern resident stock is a transboundary stock, and includes killer whales that frequent British Columbia, Canada, and southeastern Alaska (Allen and Angliss 2014). Photo-identification studies since 1970 have catalogued every individual belonging to the Northern resident stock and in 2010 the population was composed of three clans representing a total of 261 whales.

In recent years, a small number of the Gulf of Alaska transients (identified by genetics and association) have been seen in southeastern Alaska; previously only West Coast transients had been seen in the region (Allen and Angliss 2014). Therefore, the Gulf of Alaska transient stock occupies a range that includes southeastern Alaska. Photo-identification studies have identified 587 individual whales in this stock.

The West Coast transient stock includes animals that occur in California, Oregon, Washington, British Columbia, and southeastern Alaska. Analysis of photographic data identifies 243 individual transient killer whales (Muto and Angliss 2015). The total number of transient killer whales reported above should be considered a minimum count for the West Coast transient stock.

3.2.7 Minke Whale

The Alaska stock of minke whales occurs in Icy Strait and Southeast Alaska. At this time, it is not possible to produce a reliable estimate of minimum abundance for this wide ranging stock. No estimates have been made for the number of minke whales in the entire North Pacific. Surveys of the Bering Sea, and from Kenai Fjords in the Gulf of Alaska to the central Aleutian Islands estimate 1,003 and 1,233 animals, respectively (Allen and Angliss 2014).

4.0 AFFECTED SPECIES STATUS AND DISTRIBUTION

This section includes information on each species' stock status and distribution (including seasonal information if available). Some of these sections contain direct excerpts from the most current stock assessment reports developed by NMFS.

Opportunistic observations of marine mammals by NPS staff during humpback whale surveys have been recorded since 1993. Because the NPS is most interested in whales within Glacier Bay and areas where vessel management is a concern, their monitoring data do not represent a true distribution of marine mammals in Icy Strait. Their survey locations are also dependent on where the whales are actually distributed (Neilson et al. 2014). In addition, annual surveys don't usually begin until April or May, coinciding with the return of humpbacks whales to the area.

At present, only very limited data are available on the winter or early spring presence or relative abundance of cetaceans in Southeast Alaska. Humpback whales have been reported to winter in the waters of Southeast Alaska, with overall numbers greatly reduced as compared with other seasons. Sporadic sightings of resident and transient killer whales, Dall's porpoise and harbor porpoise have been reported in the region during winter and early spring (Dahlheim et al. 2009). By contrast, no reports could be found on the winter occurrence of minke whales and Pacific white-sided dolphins in Southeast Alaska. The reduced number of sighting reports during winter periods could reflect less effort, fewer hours of daylight or inclement weather, or may be a result of factors associated with the biology of the species (e.g., migratory behavior).

We received the NPS marine mammal data for the months of January through May and September through December (1993–2014) and we mapped their observations in Figures 4 and 5. The majority of marine mammals observed in Icy Strait were recorded in the area between Point Gustavus and Point Adolphus; there was only one minke whale and one pod of less than 10 killer whales observed between Pleasant Island and the Gustavus Ferry Terminal. This suggests that the number of marine mammals present in Icy Passage is relatively low and occurrence is infrequent.

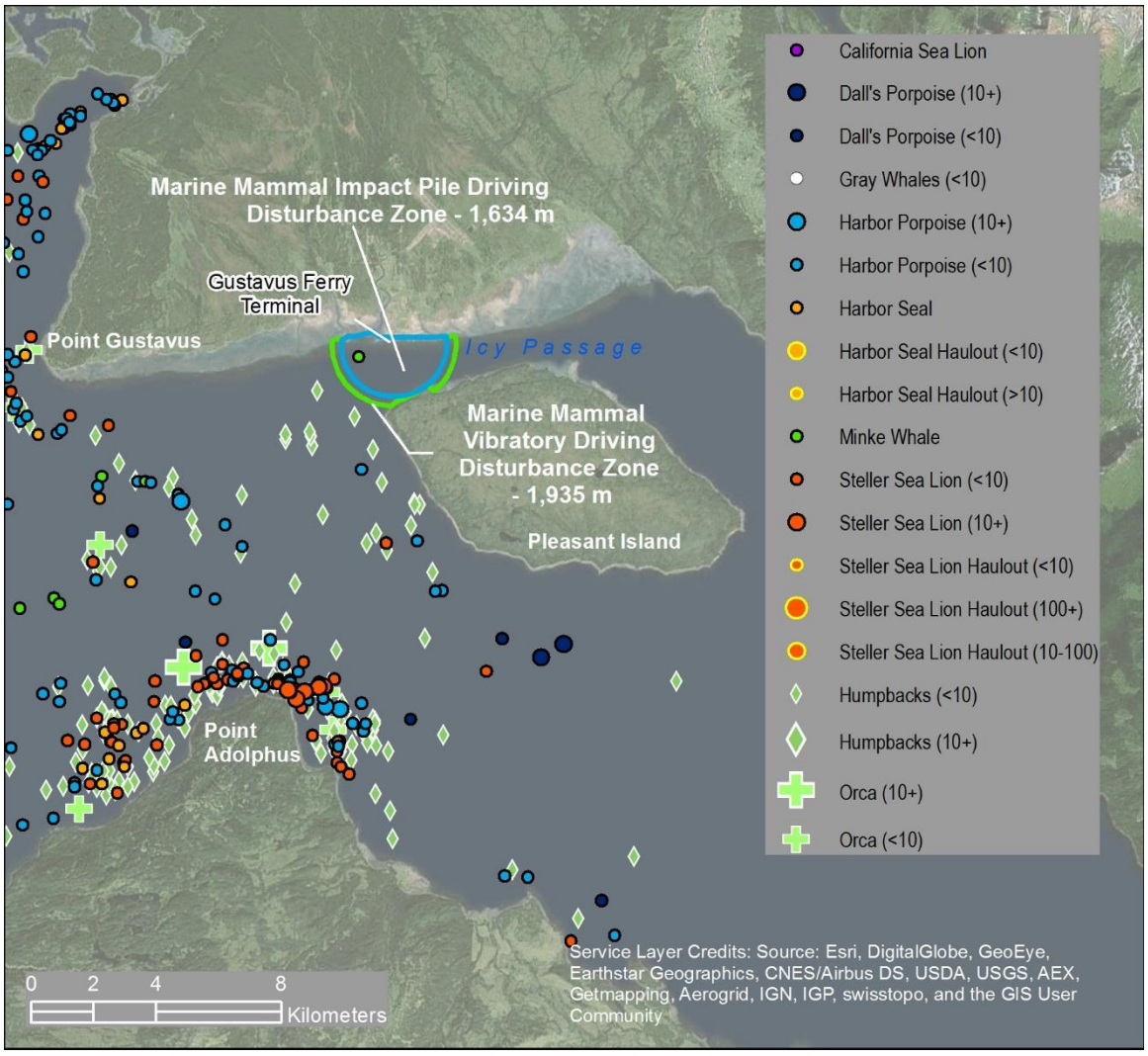


Figure 4 – Marine Mammal Sightings in Icy Strait and Icy Passage from 1993 to 2014 (January–May)

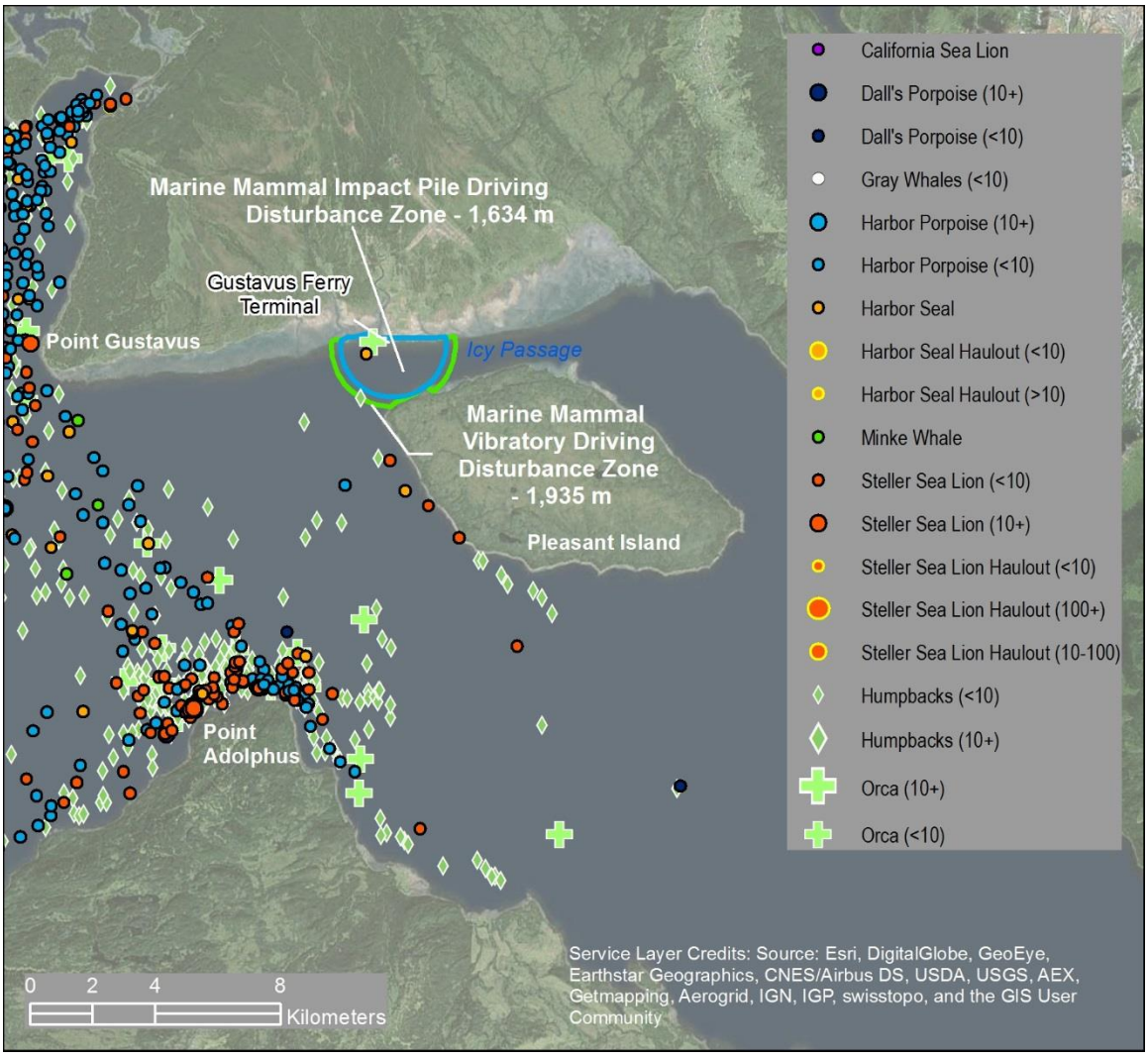


Figure 5 – Marine Mammal Sightings in Icy Strait and Icy Passage from 1993 to 2014 (September–December)

4.1 Harbor Seal

4.1.1 Status

Harbor seals are not listed as depleted under the MMPA and they are not listed under the Endangered Species Act (ESA). The Glacier Bay/Icy Strait stock of harbor seals is not classified as a strategic stock (Allen and Angliss 2014).

4.1.2 Distribution

Harbor seals inhabit coastal and estuarine waters off Baja California, north along the western coasts of the United States, British Columbia, and Southeast Alaska, west through the Gulf of Alaska and Aleutian Islands, and in the Bering Sea north to Cape Newenham and the Pribilof Islands. They haul out on rocks, reefs, beaches, and drifting glacial ice, and feed in marine, estuarine, and occasionally fresh

waters. There are no documented haulout sites for harbor seals in the vicinity of the project. The nearest haulouts, rookeries, and pupping grounds occur in Glacier Bay over 20 miles from the ferry terminal. However, occasionally an individual will haul out on rocks on the north side of Pleasant Island (Stephen Vanderhoff, SWE, personal communication).

A recent study of post-breeding harbor seal migrations from Glacier Bay demonstrates that some harbor seals traveled extensively beyond the boundaries of Glacier Bay during the post-breeding season (Womble and Gende 2013). Strong fidelity of individuals for haulout sites during the breeding season was documented in this study as well.

Harbor seals have declined dramatically in Glacier Bay over the past few decades which may be a reason why there are few observations at the Gustavus Ferry Terminal. Sightings of harbor seals around the ferry terminal used to be more common (Stephen Vanderhoff, SWE, personal communication). NPS has documented one harbor seal observation near the terminal (Figure 5). It is estimated that less than 10 individuals are seen near the ferry dock during charter boat operations from mid- to late-May through September (Tod Sebens, CSE, Stephen Vanderhoff, SWE, Bruce Kruger, ADF&G, personal communication). Harbor seals are also documented in Icy Passage in the winter and early spring (Womble and Gende 2013). For the purposes of our analysis we estimate the same number of animals could be present in winter/spring as during the May to September time period: less than 10 individuals.

4.2 Steller Sea Lion

4.2.1 Status

The eastern U.S. stock of Steller sea lion is currently not listed as “threatened” under the ESA. As a result, this stock is not classified as a strategic stock. The western U. S. stock of Steller sea lion is currently listed as “endangered” under the ESA, and therefore designated as “depleted” under the MMPA. As a result, the stock is classified as a strategic stock.

4.2.2 Distribution

Steller sea lions range along the North Pacific Rim from northern Japan to California, with centers of abundance and distribution in the Gulf of Alaska and Aleutian Islands. Large numbers of individuals disperse widely outside of the breeding season (late May to early July), thus potentially intermixing with animals from other areas, probably to access seasonally important prey resources (Allen and Angliss 2014).

There are numerous Steller sea lion haulouts in Icy Strait but none occurring in Icy Passage (Mathews et al. 2011; Tod Sebens, CSE, Stephen Vanderhoff, SWE, Janet Neilson, NPS, personal communication). The nearest Steller sea lion haulout site is located on Black Rock on the south side of Pleasant Island and Point Carolus west across the strait from Point Gustavus (Mathews et al. 2011). Both haulouts are over 16 kilometers from the Gustavus ferry terminal.

Steller sea lions are common in the ferry terminal area during the charter fishing season (May to September) and are known to haul out on the public dock (Tod Sebens, CSE, Stephen Vanderhoff, SWE, Janet Neilson, NPS, personal communication Bruce Kruger, ADF&G, personal communication). During the charter fishing season, Steller sea lions begin arriving at the ferry terminal as early as 2:00 p.m., reaching maximum abundance when the charter boats return at approximately 5:00 p.m. The sea lions forage on the carcasses of the sport fish catch and then vacate the area. Reports of habituated animal numbers range from 3 to 5 (Pep Scott, Peps Packing, Bruce Kruger, ADF&G, personal communication). The exact number of habituated animals is not known, but for the sake of our analysis we propose at least five individuals are habituated to this routine. Outside of the charter fishing season, it is assumed that Steller sea lions may transit in front of the ferry terminal to and from foraging grounds. For the purpose of our analysis we estimate that two individuals per day passes by the facility.

4.3 Dall's Porpoise

4.3.1 Status

Dall's porpoise are not designated as "depleted" under the MMPA or listed as "threatened" or "endangered" under the ESA. The Alaska stock of Dall's porpoise is not classified as a strategic stock.

4.3.2 Distribution

Dall's porpoise are widely distributed across the entire North Pacific Ocean. Throughout most of the eastern North Pacific they are present during all months of the year, although there may be seasonal onshore – offshore movements along the west coast of the continental United States and winter movements of populations out of Prince William Sound and areas in the Gulf of Alaska and Bering Sea (Allen and Angliss 2014).

Dall's porpoise are documented in Icy Strait but not Icy Passage. Dahlheim et al (2009) found Dall's porpoise throughout the Southeast Alaska, with concentrations of animals consistently found in Icy Strait, Lynn Canal, Stephens Passage, upper Chatham Strait, Frederick Sound, and Clarence Strait. It is estimated that there are anywhere from 4 to 12 sightings of Dall's porpoise in Icy Strait per season during the May through September whale watching charter months (Tod Sebens, CSE, Stephen Vanderhoff, SWE, personal communication). NPS documented seven sightings in Icy Strait since 1993 in September, October, November, April, and May. Six of the seven sightings are of pods with less than 10 individuals. The mean group size of Dall's porpoise in Southeast Alaska is estimated at three individuals (Dahlheim et al. 2009).

4.4 Harbor Porpoise

4.4.1 Status

Harbor porpoise are not designated as "depleted" under the MMPA or listed as "threatened" or "endangered" under the ESA (Allen and Angliss 2014). Because the abundance estimates are 12 years

old and the frequency of incidental mortality in commercial fisheries is not known, the Southeast Alaska stock of harbor porpoise is classified as a strategic stock.

4.4.2 Distribution

Harbor porpoise primarily frequent coastal waters and in the Gulf of Alaska and Southeast Alaska, they occur most frequently in waters less than 100 meters (Dahlheim et al. 2009). Within the inland waters of Southeast Alaska, the harbor porpoise distribution is clumped, with greatest densities observed in the Glacier Bay/Icy Strait region and near Zarembo and Wrangell Islands and the adjacent waters of Sumner Strait (Allen and Angliss 2014).

Harbor porpoise are common in Icy Strait. Concentrations of harbor porpoise were consistently found in varying habitats surrounding Zarembo Island and Wrangell Island, and throughout the Glacier Bay and Icy Strait regions (Dahlheim et al. 2009). These concentrations persisted throughout the three seasons sampled. It is estimated that harbor porpoise are observed on at least 75 percent of whale watch excursions (75 of 100 days) during the May through September months (Tod Sebens, CSE, Stephen Vanderhoff, SWE, personal communication). NPS documented numerous sightings in Icy Strait since 1993 in September, October, November, April, and May, but none in Icy Passage (Figures 4 and 5). The mean group size of harbor porpoise in Southeast Alaska is estimated at two individuals (Dahlheim et al. 2009).

4.5 Humpback Whale

4.5.1 Status

The humpback whale is listed as “endangered” under the ESA, and therefore designated as “depleted” under the MMPA. As a result, the central North Pacific stock of humpback whale is classified as a strategic stock.

4.5.2 Distribution

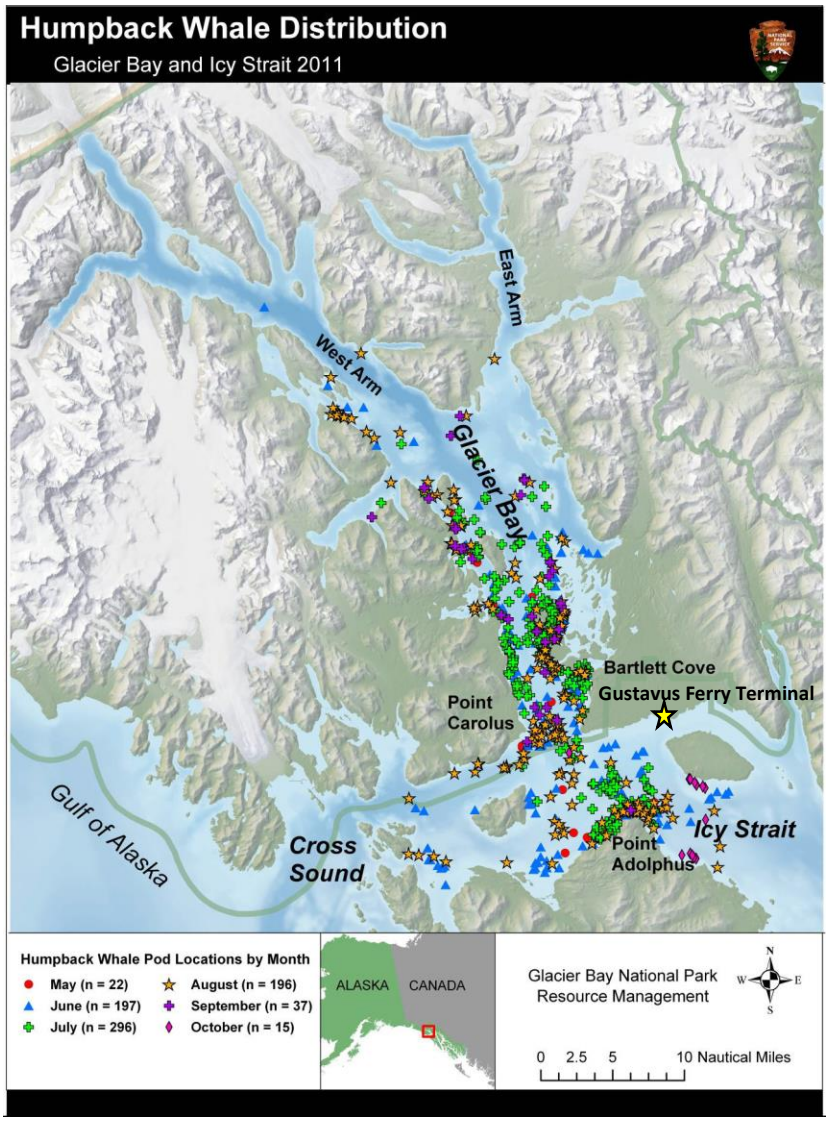
Humpback whales are the most commonly observed baleen whale in the area and surrounding Southeast Alaska, particularly during spring and summer months. Humpback whales in Alaska, although not limited to these areas, return to specific feeding locations such as Frederick Sound, Chatham Strait, North Pass, Sitka Sound, Glacier Bay, Point Adolphus, and Prince William Sound, as well as other similar coastal areas (Wing and Krieger 1983). In Southeast Alaska, the humpback population appears to be increasing with estimates of 547 animals in the mid-1980s (Angliss and Outlaw 2005) and 961 animals in 2000 (Straley et al. 2002).

From May to September, humpback whales congregate and forage in nearby Glacier Bay and in Icy Strait. Since 1985 the NPS has been monitoring humpback whales in both Glacier Bay National Park and Icy Strait and publishing annual reports (http://www.nps.gov/glba/naturescience/whale_acoustic_reports.htm). The NPS typically surveys Icy Strait, located south of Icy Passage, once a week between June 1 and August 31, with most survey effort focused in the area east of Point Gustavus and Pleasant Island (Figure 3). Several Icy Strait surveys included waters around Pleasant Island, the closest island to the Gustavus Ferry Terminal. Because the NPS is most interested in whales

within Glacier Bay and areas where vessel management is a concern, their monitoring data do not represent a true distribution of whales. Their survey locations are also dependent on where the whales are actually distributed (Neilson et al. 2014).

In 2013, 202 humpback whales were documented in Icy Strait during the NPS monitoring period; this was a 14 percent increase over the previous high count of 177 whales in 2012 (Neilson et al. 2014). In 2014, a 39 percent decrease in area abundance was observed (124 whales), which may have been caused by increased turbidity resulting from seismic generated marine landslides (Neilson et al. 2015). The majority of whales observed in Icy Strait in 2013 and 2014 were recorded in the area between the mouth of Glacier Bay and Point Adolphus; there were no whales observed between Pleasant Island and the Gustavus Ferry Terminal (the waterbody known as Icy Passage). While this does not mean that no whales were present between the island and ferry terminal at any time, it does suggest that the number of individual whales present in Icy Passage is relatively low and occurrence is infrequent. In other years, a number of humpback whales have been observed to the south and west of Pleasant Island (Neilson et al. 2014; Figures 4 through 6). The lack of whale observations between Pleasant Island and the ferry terminal likely reflects the fact that Icy Passage is relatively shallow and muddy; for this reason NPS does not consider it a whale "hot spot" (C. Gabriele, NPS, personal communication).

An exception is that in some years, humpback whales forage at the mouth of the Salmon River, approximately 0.4 miles west of the ferry terminal (C. Gabriele, NPS, personal communication). This area may fall within the disturbance zone for continuous noise (Figure 3). C. Gabriele with the NPS believes the timing of the whale presence may be related to availability of Pacific sand lance, a small fish that burrows and spawns in sandy intertidal habitats (Ostrand et al. 2005). However, she reported that the year and season of whale presence in this location is not predictable (C. Gabriele, NPS, personal communication).



Source: Neilson et al. 2012

Figure 6 – Humpback Whale Distribution in 2011

4.6 Killer Whale

4.6.1 Status

Killer whales occurring in Icy Passage could belong to one of three different stocks: Eastern North Pacific Northern residents stock (Northern residents), Gulf of Alaska, Aleutian Islands, and Bering Sea transient stock (Gulf of Alaska transients), or West Coast transient stock. These three stocks are not designated as "depleted" under the MMPA or listed as "threatened" or "endangered" under the ESA (Allen and Angliss 2014). Therefore, all three stocks of killer whales are not classified as a strategic stock.

4.6.2 Distribution

Killer whales are found throughout the North Pacific. Along the west coast of North America, killer whales occur along the entire Alaskan coast, in British Columbia and Washington inland waterways, and along the outer coasts of Washington, Oregon, and California (Allen and Angliss 2014). Seasonal and year-round occurrence has been noted for killer whales throughout Alaska and in the intracoastal waterways of British Columbia and Washington State, where whales have been labeled as 'resident,' 'transient,' and 'offshore' type killer whales based on aspects of morphology, ecology, genetics, and behavior.

Resident and transient killer whales are documented in Icy Strait (Dahlheim et al. 2009, Janet Neilson, NPS, personal communication). Dahlheim et al. (2009) found resident killer whales in all major waterways as well as in protected bays and inlets and they were encountered during all seasons sampled in Southeast Alaska (spring, summer and fall). Resident killer whales were observed in a variety of habitats, including open-strait environments, near-shore waters, bays and inlets, and ice-laden waters near tide-water glaciers. Two resident pods identified as AF and AG pods were frequently encountered throughout Icy Strait, Lynn Canal, Stephens Passage, Frederick Sound and upper Chatham Strait (Dahlheim et al. 2009). The seasonality of resident killer whales could not be investigated statistically owing to low encounter rates. Mean group size did not vary significantly among seasons and ranged from 19 to 33 individuals.

Transient killer whales were found in all major waterways in open-strait environments, near-shore waters, protected bays and inlets, and in ice-laden waters near tidewater glaciers (Dahlheim et al. 2009). Dahlheim et al. (2009) found that transient killer whale mean group size ranged from 4 to 6 individuals in Southeast Alaska. Transient killer whale numbers were highest in summer, with lower numbers observed in spring and fall.

4.7 Minke Whale

4.7.1 Status

Minke whales are not designated as "depleted" under the MMPA or listed as "threatened" or "endangered" under the ESA. Because minke whales are considered common in the waters off Alaska and because the number of human-related removals is currently thought to be minimal, this stock is presumed to not be a strategic stock (Allen and Angliss 2014).

4.7.2 Distribution

In the North Pacific, minke whales occur from the Bering and Chukchi Seas south to near the Equator (Allen and Angliss 2014). Dahlheim et al. (2009) found minke whales were scattered throughout inland waters from Glacier Bay and Icy Strait to Clarence Strait, with concentrations near the entrance of Glacier Bay. All but one encounter consisted of single animals, and thus mean group size was not calculated. Although sightings of minke whales were infrequent over the 17-year study period (n = 31), minke whales were encountered during all seasons, with a few animals recorded each year. NPS documented one minke whale occurrence in Icy Passage on the edge of the disturbance zone.

5.0 TYPE OF INCIDENTAL TAKING AUTHORIZATION REQUESTED

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

The ADOT&PF requests the issuance of an IHA pursuant to Section 101(a)(5) of the MMPA for incidental take by Level B acoustical harassment of seven species. Incidental take may result from exposure to in-air and underwater noise during the planned Gustavus Ferry Terminal Improvements during the period of:

- March through May; and
- September through November.

The activities outlined in Section 1.0 have the potential to take marine mammals by exposure to in-air and in-water sound. Take will potentially result from the following specific aspects of the proposed project: impact and vibratory pile driving. With the exception of Steller sea lions and harbor seals, it is anticipated that all of the marine mammals that enter the disturbance zone (Figures 2 and 3) will be subject to Level B harassment and exposed to pile driving noise only briefly as they are transiting the area (i.e., no injury or mortality expected). Only Steller sea lions and harbor seals are expected to forage and haul out in the disturbance zone with any frequency and could be exposed multiple times during the project.

6.0 TAKE ESTIMATES FOR MARINE MAMMALS

By age, sex, and reproductive condition (if possible), the number of marine mammals (by species) that may be taken by each type of taking identified in Section 5, and the number of times such takings by each type of taking are likely to occur.

This section summarizes potential incidental take of marine mammals during ferry terminal improvements described in Section 1.0 of this IHA. Incidental take is estimated for each species by estimating the likelihood of a marine mammal being present within a disturbance zone during active pile driving. Pile driving is expected to occur over 16 to 50 days in 2017.

Due to the impact and vibratory pile driving source levels, this IHA application will incidentally take by Level B acoustical harassment small numbers of harbor seals, Steller sea lions, Dall's porpoise, harbor porpoise, humpback whales, killer whales, and minke whales. With the exception of harbor seals and Steller sea lions, it is anticipated that all of the marine mammals that enter a Level B acoustical disturbance zone will be exposed to pile driving noise only briefly as they are transiting the area. Only harbor seals and Steller sea lions are expected to forage and haul out in the Gustavus project area with any frequency and could be exposed multiple times during a project.

6.1 Estimated Duration of Pile Driving

As stated in Section 2.0, pile driving is estimated to occur for a total of about 114 hours over the course of 16 to 50 days during 2017.

6.2 Estimated Zones of Influence/Zones of Exclusion

The distances to the acoustic thresholds for Level B (harassment) take for vibratory and impact pile driving, and Level A (injury) take for impact installation were presented in Section 1.3. The zones of influence were calculated from these distances and are summarized in Table 2. These distances include in-air disturbance zones that will be limited to harbor seals and Steller sea lions.

6.3 Estimated Incidental Takes

Incidental take is estimated for each species by estimating the likelihood of a marine mammal being present within the disturbance zone during active pile driving. Expected marine mammal presence is determined by past observations and general abundance near the Gustavus Ferry Terminal during the construction window. The take requests for this IHA were estimated using local marine mammal data sets (e.g., NPS) and observations from local Gustavus area whale specialists. All haulout and observation data available are summarized in Section 4.0. Project duration is presented in Section 2.0. Distances to the NMFS thresholds for Level B (harassment) are presented in Section 1.0. The calculation for marine mammal exposures (except for killer whales) is estimated by:

Exposure estimate = N (number of animals) × no. of days of pile driving/removal activity.

Killer whale exposures are calculated based on the density of individual animals in the Glacier Bay/Icy Strait/Icy Passage area and using that density to calculate an estimate within the disturbance zone (see Section 6.3.5 for details).

Most species will be present only occasionally. Steller sea lions are presumed to be occasional visitors except during the charter fishing season from May through September when they will be daily visitors. It is assumed that take requests will include multiple harassments of the same individual(s).

6.3.1 Harbor Seal

Based on observations of local marine mammal specialists, less than 10 harbor seals are sighted during the 4-month period of May through September. For this analysis, we take a conservative estimate and assume that two harbor seals could be present on any day of pile driving regardless of when the pile driving is conducted (Spring and Fall 2017). Using this number it is estimated that the following number of harbor seals may be present in the disturbance zone:

- In-air exposure estimate: 2 animals × 50 days of pile activity = 100
- Underwater exposure estimate: 2 animals × 50 days of pile activity = 100

ADOT&PF is requesting authorization for 200 Level B acoustical harassment takes of harbor seals.

6.3.2 Steller Sea Lion

For the purpose of our analysis we estimate that one Steller sea lion will transit within the disturbance zones each day during the months of March, April, October, and November 2017. We also estimate, conservatively, that five individuals may be present each day in the months of May and September 2017 during the charter fishing season. We assume that no sea lions will be hauled out during construction due to increased human activity.

We also assume that 33 days of pile driving/removal will occur in March, April, October, and November, and 17 days will occur in May and September. Using these estimates we calculate the following number of Steller sea lions may be present in the disturbance zone:

- March, April, October, November in-air exposure estimate: 1 animal × 33 days of pile activity = 33
- March, April, October, November underwater exposure estimate: 1 animal × 33 days of pile activity = 33
- May in-air exposure estimate: 5 animals × 17 days of pile activity = 85
- May underwater exposure estimate: 5 animals × 17 days of pile activity = 85
- September in-air exposure estimate: 5 animals × 17 days of pile activity = 85
- September underwater exposure estimate: 5 animals × 17 days of pile activity = 85

The total in-air and underwater take estimate for March through November is 406 animals. ADOT&PF is requesting authorization for 406 Level B acoustical harassment takes of Steller sea lions.

6.3.3 Dall's Porpoise

Based on observations of local marine mammal specialists, the possibility of Dall's porpoise occurring in Icy Passage is rare. However, they do occur in Icy Strait and could potentially transit through the disturbance zone. For this analysis, we take the maximum number of 12 sightings per season between May and September, which equates to 2.4 sightings per month. Using this number it is estimated that the following number of Dall's porpoise may be present in the disturbance zone:

- Underwater exposure estimate: 2.4 animals per month x 6 months of pile activity = 14.4

ADOT&PF is requesting authorization for 15 Level B acoustical harassment takes of Dall's porpoise.

6.3.4 Harbor Porpoise

Based on observations of local marine mammal specialists, harbor porpoise are common in Icy Strait and are documented in Icy Passage. Therefore, they could potentially transit through the disturbance zone during pile driving activity. For this analysis we take a conservative estimate and assume that two harbor porpoise could be present on any day of the 50 days of pile driving. Using this number it is estimated that the following number of Dall's porpoise may be present in the disturbance zone:

- Underwater exposure estimate: 2 animals × 50 days of pile activity = 100

ADOT&PF is requesting authorization for 100 Level B acoustical harassment takes of harbor porpoise.

6.3.5 Humpback Whale

Based on observations of local marine mammal specialists, humpback whales are common in Icy Strait and occasionally seen in Icy Passage. However, NPS believes that whale abundance decreases substantially in September through November and March through April, but has limited data for these periods. For this analysis we take a conservative estimate and assume that two humpback whales could be present in the disturbance zone on any day of the 50 days of pile driving. Using this number it is estimated that the following number of humpback whales may be present in the disturbance zone:

- Underwater exposure estimate: 2 animals × 50 days of pile activity = 100

ADOT&PF is requesting authorization for 100 Level B acoustical harassment takes of humpback whales.

6.3.6 Killer Whale

Based on observations of local marine mammal specialists the probability of killer whales occurring in Icy Passage is low. However, they do occur in Icy Strait and could potentially transit through the disturbance zone. For this analysis we estimate numbers of resident and transient killer whales based on their expected densities per square mile in the Glacier Bay/Icy Strait/Icy Passage area. The area of Glacier Bay/Icy Strait/Icy Passage was calculated to be 1,204 square kilometers (km^2). The area of disturbance for vibratory pile driving was also calculated based on the distance of 1,935 meters from pile driving (Figure 3). This area was calculated to be 6.8 km^2. We also assumed a pod size of 33 for resident and 6 for transient killer whales, and calculations were based on these numbers. Using the above calculations it is estimated that the following number of killer whales may be present in the disturbance zone:

- Resident underwater exposure estimate:
  - 33 animals / 1,204 km^2= 0.027 animals/km^2
  - Take estimate = (0.027 whales/ km^2 × 6.8 km^2) × 50 days = 9.2 whales

- Transient underwater exposure estimate:
  - 6 animals / 1,204 km^2 = 0.005 animals/km^2
  - Take estimate = (0.005 whales/km^2 × 6.8 km^2) × 50 days = 1.7 whales

However, because of the gregarious nature of killer whales (i.e., they occur in pods), we would assume that a single pod of resident (33 individuals) or transient (6 individuals) killer whales may occur in the Level 2 disturbance zone once or twice during the course of the project.

Therefore, ADOT&PF is requesting authorization for 78 Level B acoustical harassment takes of killer whales.

6.3.7 Minke Whale

Based on observations of local marine mammal specialists the probability of minke whales occurring in Icy Passage is low. However, they have been documented in Icy Strait and could potentially transit

through the disturbance zone. For this analysis we take a conservative estimate and assume that one minke whale could be present on any one day during the 50 days of pile driving. Using this number it is estimated that the following number of minke whales may be present in the disturbance zone:

- Underwater exposure estimate: 1 animal × 50 days of pile activity = 50

ADOT&PF is requesting authorization for 50 Level B acoustical harassment takes of minke whales.

The total number of takes for which Level B acoustical harassment authorization is requested is presented in Table 4.

Table 4 – Level B Acoustical Harassment Take Requests

Species	Level B Harassment Takes
Harbor seal (in-air)	100
Harbor seal (underwater)	100
Steller sea lion (in-air)	203
Steller sea lion (underwater)	203
Dall's porpoise	15
Harbor porpoise	100
Humpback whale	100
Killer whale	78
Minke whale	50

7.0 ANTICIPATED IMPACT OF THE ACTIVITY

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

Level B harassment take requests, and the percentage of each stock that may be temporarily disturbed, are summarized in Table 5. It is assumed that take requests will include multiple harassments of the same individual(s), resulting in estimates of Take Request Percent of Stock that are high compared to actual take that will occur.

If incidental takes occur, it is expected to only result in short-term changes in behavior and potential temporary hearing threshold shift. These takes would be unlikely to have any impact on stock recruitment or survival and therefore, would have a negligible impact on the stocks of these species. No mortality or injury is expected to occur as a result of project activities.

Icy Passage does not include any natural pinniped haulouts or breeding grounds and is not known as an important feeding ground for cetaceans. Impacts to habitat over existing conditions are negligible and temporary resulting in no permanent impact to marine mammals. The monitoring plan will reduce the number and severity of takes of marine mammals transiting through the disturbance zone. The proposed construction schedule from September through November and/or

March to May will also minimize the number of takes by conducting work when fewer marine mammals are present.

Most of the marine mammals species potentially impacted have a low take request as a percent of the stock. While the resident killer whale take request and percentage of stock affected appears high, in reality 78 resident killer whale individuals will not be temporarily harassed. Instead, it is assumed that there will be multiple takes of a smaller number of individuals. We make this assumption because two resident pods identified as AF and AG pods are known to frequent Icy Straight, Lynn Canal, Stephens Passage, Frederick Sound, and upper Chatham Strait (Dalheim et al. 2009). It is possible that all or part of these pods will enter the Level 2 disturbance zone once or twice during the course of the project. Therefore, we can conservatively estimate that, because of the gregarious nature of killer whales, a single pod of resident (33 individuals) or transient (6 individuals) killer whales may occur in the Level 2 disturbance zone once or twice during the course of the project.

Table 5 – Level B Acoustical Harassment Take Request Percent of Total Stock

Species	Stock Size	Take Request	Take Request Percent of Stock
Harbor seal	7,210	200	2.8
Steller sea lion	49,497 (western stock in Alaska) 60,131 (eastern stock)	406	0.82 0.68
Dall's porpoise	Unknown	15	Unknown
Harbor porpoise	11,146	100	0.90
Humpback whale	10,252	100	0.98
Killer whale	261 (Northern resident) 587 (Gulf of Alaska transient) 243 (West Coast transient)	66 6 6	25.3 1.0 2.5
Minke whale	Unknown	37	Unknown

8.0 ANTICIPATED IMPACTS ON SUBSISTENCE USES

The anticipated impact of the activity on the availability of the species or stocks of marine mammals for subsistence uses. (This issue is only applicable in Alaska.)

Subsistence harvest of harbor seals and Steller sea lions by Alaska Natives is authorized under the MMPA. The proposed Gustavus Ferry Terminal Improvements project will occur near but not overlap the subsistence area used by the villages of Hoonah and Angoon (Wolfe et al. 2013). Harbor seals and Steller sea lions area available for subsistence harvest in this area (Wolfe et al. 2013). There are no harvest quotas for other non-listed marine mammals found there. The Alaska Department of Fish and Game (Wolfe et al. 2013) has regularly conducted surveys of harbor seal and sea lion subsistence harvest in Alaska. Since proposed work at the Gustavus Ferry Terminal will only cause temporary non-lethal disturbance of marine mammals, we anticipate no impacts to subsistence harvest of marine mammals in the region.

9.0 ANTICIPATED IMPACTS ON HABITAT

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

9.1 Introduction

Construction activities will have temporary impacts on marine mammal habitat through increases in in-water and in-air sound from pile driving. Other potential temporary impacts are on water quality (increases in turbidity levels) and on prey species distribution. Best management practices (BMPs) and minimization practices used by ADOT&PF to minimize potential environmental effects from project activities are outlined in Section 11 Mitigation Measures.

9.2 In-air Noise Disturbance to Haulouts

In-air noise from impact and vibratory pile driving are estimated to reach the behavioral thresholds at 163 meters and 36 meters, respectively, for harbor seals. In-air noise from impact pile driving is estimated to reach the behavioral threshold at 51 meters for all other pinnipeds. No documented haulout sites are within the in-air disturbance threshold distances for harbor seals. Although there is no critical habitat designated within the action area, Steller sea lions are known to haul out on the Gustavus public dock between May and September when charter boat guides clean fish and dispose of the carcasses in the water at the dock (C. Gabriele, NPS, personal communication). Therefore, disturbance to hauled-out pinnipeds is anticipated during May and/or September construction activities; however, construction activities will cease by 5:00 p.m. about when fishing charters generally return to the public dock. In-air noise may also disturb pinnipeds while surfacing during swimming within the threshold distances.

9.3 Underwater Noise Disturbance

There are several short-term and long-term effects that noise exposure may have on marine mammals including: impaired foraging efficiency and potential effects of noise on movements of prey, harmful physiological conditions, energetic expenditures, and temporary or permanent hearing threshold shifts due to chronic stress from noise (Southall et al. 2007). A small injury zone is predicted for cetaceans exposed to underwater noise from impact pile driving. This zone is at 76 meters from the project area; however, it is unlikely that cetaceans will approach within 100 meters of an active ferry terminal and public dock. The injury zone for pinnipeds is even smaller, at 16 meters from the driven pile. The composite disturbance zone for all marine mammals is 1,634 meters from the project area. Underwater noise in excess of disturbance thresholds from vibratory pile driving is estimated to extend for 1,935 meters from the pile for all marine mammals. Effects from waterborne noise on marine mammals are expected to be short-term and limited to the 50 days during construction of the terminal when pile driving/removal will occur. Adherence to Anchorage Fish and Wildlife Office (AFWFO) Pile Driving Observer Protocols (AFWFO 2012) will reduce any potential noise disturbance to these species.

Construction activities, in the form of increased in-water noise, have the potential to adversely affect forage fish and juvenile salmonids in the project area. Pacific herring (*Clupea pallasii*), capelin (*Mallotus catervarius*), Pacific sand lance (*Ammodytes hexapterus*) and other forage fish species are part of the prey base for many marine mammals including seals, sea lions and baleen whales. Adult salmon are a part of the prey base for Steller sea lions, harbor seals, and killer whales. Forage fish and salmonids may alter their normal behavior as a result of pile driving activities. However, data indicate that it is unlikely that fish will suffer injury from pile driving (Ruggerone et al. 2008). After pile driving is completed habitat use and function will return to pre-construction levels.

9.4 Water and Sediment Quality

Short-term turbidity is a water quality effect of most in-water work, pile driving. ADOT&PF must comply with state water quality standards during these operations by limiting the extent of turbidity to the immediate project area.

Because of the relatively silt free nature of sediments in subtidal areas, relatively little material will be suspended in the water column during pile driving. However, turbidity may be increased above background levels within the immediate vicinity of construction activities and could exceed turbidity criteria for state water quality standards (18 AAC 70). Because of local currents and tidal action, any potential water quality exceedances are expected to be temporary and highly localized. The local currents will disperse suspended sediments from pile driving operations at a moderate to rapid rate depending on tidal stage. Fish and marine mammals in the Glacier Bay/Icy Strait region are routinely exposed to substantial levels of suspended sediment from glacial sources.

Short-term effects on marine mammal species may occur if petroleum or other contaminants accidentally spill into Icy Passage from machinery or vessels during terminal construction activities. Assuming normal construction and vessel activities, discharges of petroleum hydrocarbons are expected to be small and are not expected to result in high concentrations of contamination within the surface waters. BMPs will be implemented in to minimize the risk of fuel spills and other potential sources of contamination. An approved Hazardous Materials Control Plan including provisions for on-site containment equipment (including a boom) will be developed prior to any construction activities. Spill prevention and spill response procedures will be maintained throughout construction activities (18 AAC 70). Therefore, short-term adverse effects on marine mammals will be insignificant.

Construction activities, in the form of increased turbidity, have the potential to adversely affect forage fish and juvenile salmonid outmigratory routes in the project area. Both herring and salmon form a significant prey base for Steller sea lions, and herring is a primary prey of humpback whales. Increased turbidity is expected to occur in the immediate vicinity (on the order of 10 feet or less) of construction activities. However, suspended sediments and particulates are expected to dissipate quickly within a single tidal cycle and effects on marine mammals will be discountable.

9.5 Passage Obstructions

Pile driving at the Gustavus Ferry Terminal is not likely to obstruct movements of marine mammals. Pile work at Gustavus will occur close to shore, leaving approximately 1 mile of Icy Passage for marine

mammals to pass. A construction barge will be used during the project. The barge will be anchored and/or spudded. No dynamic positioning system (DPS) will be used. Vessel strikes are also unlikely for the proposed project. Construction vessels maneuvering in the construction area will be limited to a speed of 5 knots or less.

9.6 Conclusions Regarding Impacts on Habitat

The most likely effects on marine mammal habitat from the proposed project will be temporary, short duration noise and water quality effects. The direct loss of habitat available to marine mammals during construction due to noise, water quality impacts, and construction activity is expected to be minimal. All cetacean species utilizing habitat near the terminal will be transiting the terminal area.

For the most part, any adverse effects on prey species during project construction will be short term. Given the large numbers of fish and other prey species in Icy Passage, the short-term nature of effects on fish species and the mitigation measures to protect fish during construction (use of a vibratory hammer when possible, BMPs, shutting down by approximately 5:00 p.m. to avoid the time when most sea lions are attracted to the Ferry Terminal, ramp up procedures), the proposed project is not expected to have measurable effects on the distribution or abundance of potential marine mammal prey species.

10.0 ANTICIPATED EFFECTS OF HABITAT IMPACTS ON MARINE MAMMALS

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

The proposed project will occur within the existing Gustavus Ferry Terminal operational footprint and is not expected to result in a significant permanent loss or modification of habitat for marine mammals or their food sources. The most likely effects on marine mammal habitat for the proposed project will be temporary, short duration in-air and in-water noise, temporary prey (fish) disturbance, and localized, temporary water quality effects. The direct loss of habitat available to marine mammals during construction due to noise, water quality impacts and construction activity is expected to be minimal. These temporary impacts have been discussed in detail in Section 9.0, Anticipated Impacts on Habitat.

11.0 MITIGATION MEASURES

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

The exposures outlined in Section 6.0 represent a conservative maximum expected number of marine mammals that could be exposed to acoustic sources reaching Level B harassment levels. ADOT&PF proposes to employ a number of mitigation measures, discussed below, in an effort to minimize the

number of marine mammals potentially affected. Marine mammal monitoring and mitigation measures are summarized below and presented in detail in the Gustavus Ferry Terminal Improvements Marine Mammal Monitoring Plan (Appendix B).

11.1 Mitigation for Pile Driving Activities

The modeling results for the monitoring zones discussed in Section 9.0 were used to develop mitigation measures for pile driving activities during construction of the Gustavus Ferry Terminal Improvements. While the monitoring zones vary between the different diameter piles and types of installation methods, ADOT&PF is proposing to establish mitigation zones for the maximum zone of influence for all pile driving conducted during construction of the Gustavus Ferry Terminal Improvements. To limit the amount of waterborne noise, a vibratory hammer will be used for initial driving, followed by an impact hammer to proof the pile to required load-bearing capacity.

Additionally, for heavy equipment movement (barges and tugs), a 10-meter exclusion zone will be enforced for all marine mammals.

11.1.1 Monitoring Zones and Shutdown Procedures

Impact Pile Driving. During impact pile driving, the monitoring (disturbance) zone will include all areas where the underwater sound pressure levels are anticipated to equal the marine mammal disturbance criterion (160 dB isopleth). The combined impact monitoring zone for marine mammals is 1,634 meters from the pile with specific injury zones (180 and 190 dB dB isopleths) of 76 meters (cetaceans) and 16 meters (pinnipeds) from the pile. The following shutdown methods will be implemented during impact pile driving operations.

- Monitoring will begin 30 minutes prior to impact pile driving. This will ensure that all marine mammals in the monitoring zone are documented and that no marine mammals are present in the injury zone.

- If all marine mammals in the disturbance zone have been documented and no marine mammals are in the injury zone, the coordinator will instruct the contractor to initiate the ramp-up procedure for impact pile driving. This procedure consists of providing an initial set of three strikes from the hammer at 40 percent energy, with no less than a 30-second waiting period between each strike.

- If any cetaceans or pinnipeds are observed approaching injury zones, impact pile-driving activities will be immediately halted. The observer will immediately radio to alert the contractor and raise a red flag, requiring an immediate “all-stop.” Impact pile-driving activities will resume when the animal is no longer proximal to the injury zone or 30 minutes have passed without re-sighting the animal near the zone. The observer will continue to monitor the animal until it has left the larger disturbance zones.

- The observer will record all cetaceans and pinnipeds present in the disturbance zones. These data will be reported to NMFS on a weekly basis to compare with the take levels within the Incidental Harassment Authorization.

- The observer will record all pinnipeds present in the in-air disturbance zones (163 meters for harbor seals and 51 meters for sea lions). For the in-air disturbance zone, this applies to animals that are hauled out and animals that have surfaced while swimming. These data will be reported to NMFS on a weekly basis to compare with the take levels within the Incidental Harassment Authorization.

- At the end of the pile-driving day, post-construction monitoring will be conducted for 30 minutes beyond the cessation of pile driving.

Vibratory Pile Driving. During vibratory pile driving, the monitoring (disturbance) zone will include all areas where the underwater sound pressure levels are anticipated to equal the marine mammal disturbance criterion (120 dB isopleth [background]). The combined vibratory monitoring zone for marine mammals is 1,935 meters from the pile.

- Monitoring will begin 30 minutes prior to vibratory pile driving. This will ensure that all marine mammals in the monitoring zone are documented.

- When a marine mammal is observed, its location will be determined using a rangefinder to verify distance and a GPS or compass to verify heading.

- The observer will record any cetacean or pinniped present in the disturbance zone. These data will be reported to NMFS on a weekly basis to compare with the take levels within the Incidental Harassment Authorization.

- Because there is no in-water injury zone for cetaceans or pinnipeds during vibratory driving, no work stoppage will occur based on the presence of these species.

- The observer will record all harbor seals present in the in-air disturbance zone. This applies to animals that are hauled out and those that have surfaced while swimming. These data will be reported to NMFS on a weekly basis to compare with the take levels within the Incidental Harassment Authorization.

Heavy Equipment Movement. During the in-water operation of heavy machinery (e.g., barge movements), a 10-meter exclusion zone for all marine mammals will be implemented. This includes movement of construction barges, movement of large vessels (e.g., tug boats), and positioning of piles overwater. This is a precautionary step to prevent vessel strike and other detrimental contact with marine mammals located in the area of active construction activity.

- If any cetaceans or pinnipeds are observed approaching the 10-meter exclusion zone, heavy equipment activities will be immediately halted. The observer will immediately radio to alert the contractor and raise a red flag, requiring an immediate "all-stop." Observers will continue to monitor the animal after it has left the injury zone, if visible.

11.1.2 Visual Monitoring Requirements and Protocol

Monitoring will be conducted by qualified, trained marine mammal observers. An observer will have had prior training and experience in conducting marine mammal monitoring or surveys, and who has the ability to identify marine mammal species and describe relevant behaviors that may occur in proximity to in-water construction activities. A trained observer will be placed at the best vantage point(s) practicable to monitor for marine mammals and to implement shutdown/delay procedures, when applicable, by calling for the shutdown to the hammer operator.

Additional details on monitoring procedures and requirements are provided in the attached Marine Mammal Monitoring Plan (Appendix B).

11.1.3 Timing and Daylight Restrictions

- All in-water work will be limited to periods determined appropriate by participating state and federal agencies to avoid potential adverse effects on marine mammal species and their prey. Pile driving will be conducted during daylight hours.

- Pile driving in September or May will end by approximately 5:00 p.m. to avoid the late afternoon period when most fishing charters return to the public dock adjacent to the Ferry Terminal. This is also the time of day when most sea lions are attracted to the Ferry Terminal (due to fish processing activities); therefore, shutting down construction operations at this time will help to avoid take of sea lions.

11.1.4 Soft Start

The use of a soft-start procedure is believed to provide additional protection to marine mammals by providing warning and/or giving marine mammals a chance to leave the area prior to the hammer operating at full capacity. Soft-start techniques for impact pile driving will be conducted in accordance with AFWFO (AFWFO 2012) Observer Protocols. For impact pile driving, contractors will be required to provide an initial set of strikes from the hammer at 40 percent energy, each strike followed by no less than a 30-second waiting period. This procedure will be conducted a total of three times before impact pile driving begins.

12.0 ARCTIC PLAN OF COOPERATION

Where the proposed activity would take place in or near a traditional Arctic subsistence hunting area and/or may affect the availability of a species or stock of marine mammal for Arctic subsistence uses, submit either a plan of cooperation (POC) or information that identifies what measures have been taken and/or will be taken to minimize any adverse effects on the availability of marine mammals for

subsistence uses. (This requirement is applicable only for activities that occur in Alaskan waters north of 60° North latitude.)

Not applicable. The proposed activity will take place off Gustavus in Southeast Alaska. Gustavus is located south of 60°N, the latitude NMFS regulations consider Arctic waters. No activities will take place in or near a traditional Arctic subsistence hunting area. Therefore, there are no relevant subsistence uses of marine mammals impacted by this action.

13.0 MONITORING AND REPORTING

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

13.1 Monitoring Plan

ADOT&PF and Hart Crowser developed a detailed Marine Mammal Monitoring Plan for this project. The monitoring plan is summarized in Section 11.1 and provided in Appendix B. The Marine Mammal Monitoring Plan will be implemented during all in-water pile driving activities.

13.2 Reporting

A monitoring report will be prepared to document general compliance and that projected related takes do not exceed those authorized by NOAA Fisheries/NMFS through this application process.

Observers will collect marine mammal and other observations before and during pile driving activities including, at minimum:

- General data:
  - Date and time of activity.
  - Water conditions (e.g., sea-state).
  - Weather conditions (e.g., precipitation, percent glare, visibility).
- Specific pile-driving data:
  - Description of the pile driving activities including the size and type of pile.
  - The installation methods used for each pile and the duration each method was used per pile.
  - Impact or vibratory hammer force used to drive piles.

- Pre-activity and during activity observational data:
  - Date and time survey is initiated and terminated.
  - Description of any observable marine mammal behavior within monitoring zones or in the immediate area surrounding the monitoring zones, including the following:
    - Distance from animal to pile driving sound source.
    - Reason why shutdown implemented.
    - If a shutdown was implemented, behavioral reactions noted and if they occurred before or after implementation of the shutdown.
    - If a shutdown is implemented, the distance from animal to sound source at the time of the shutdown.
    - Distance to the animal from the source during soft start.
  - Times when pile driving or other in-water construction is delayed due to weather conditions, presence of marine mammals within shutdown zones, etc.
  - Actions performed to minimize impacts to marine mammals.

- Post-activity processing of data:
  - Results, which include the detections of marine mammals, the species and numbers observed, sighting rates and distances, behavioral reactions within and outside of safety zones.
  - Refined exposure estimate based on the number of marine mammals observed during the course of construction.

14.0 SUGGESTED MEANS OF COORDINATION

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

In-water and in-air noise generated by vibratory and impact pile driving at the Gustavus Ferry Terminal is the primary issue of concern to local marine mammals during this project. Potential impacts on marine mammals have been studied, with the results used to establish the noise criteria for evaluating take.

ADOT&PF plans to coordinate with the NPS and whale-watching charters (when appropriate) to gather information on the location of marine mammals prior to initiating pile driving. Marine mammal monitoring will be conducted to collect information on presence of marine mammals within the disturbance and injury zones for this project.

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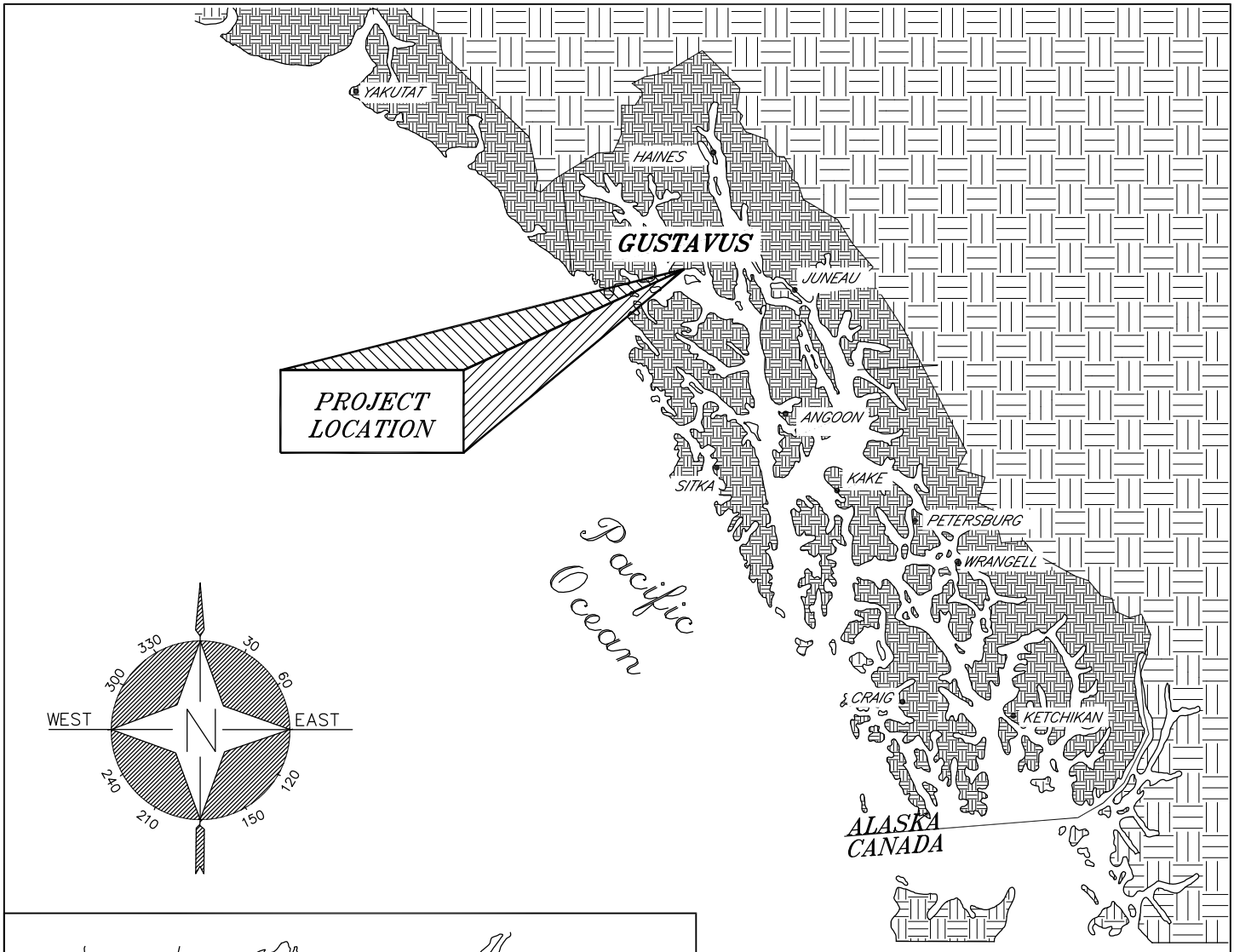
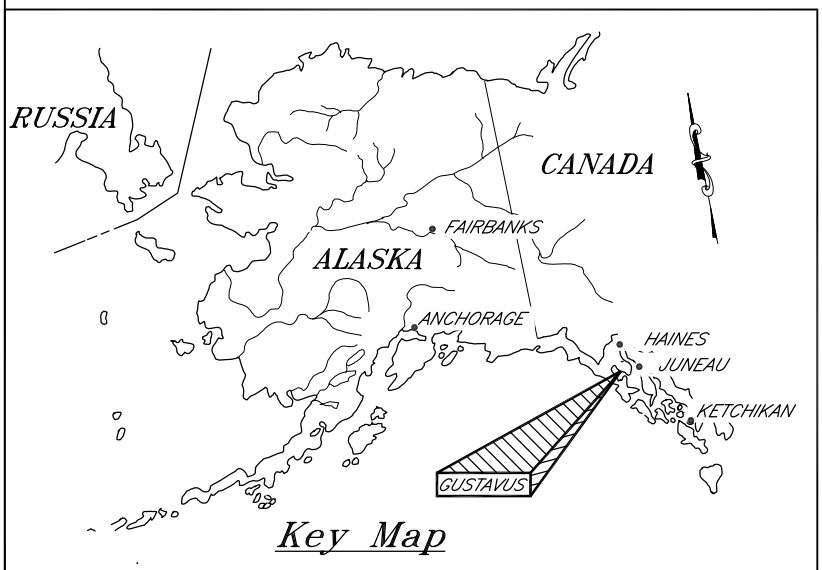
SHEETS



Regional Map



Key Map

TIDAL DATA (ft)	
EXTREME HIGH TIDE	+20.0
MEAN HIGH WATER	+13.7
MEAN LOWER LOW WATER	0.0
EXTREME LOW WATER	−5.0

PROJECT PURPOSE:
MODIFY EXISTING DOCK & BRIDGE
REPLACE MARINE STRUCTURES

ADJACENT PROPERTY OWNERS:
STATE OF ALASKA

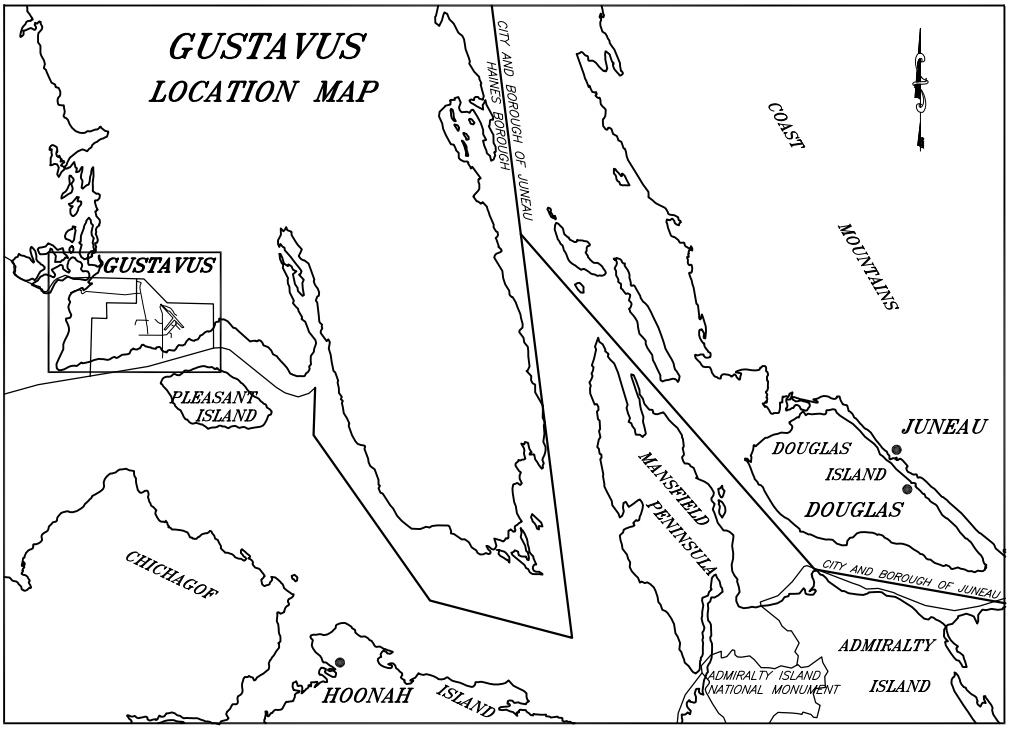
KEY & REGIONAL MAPS

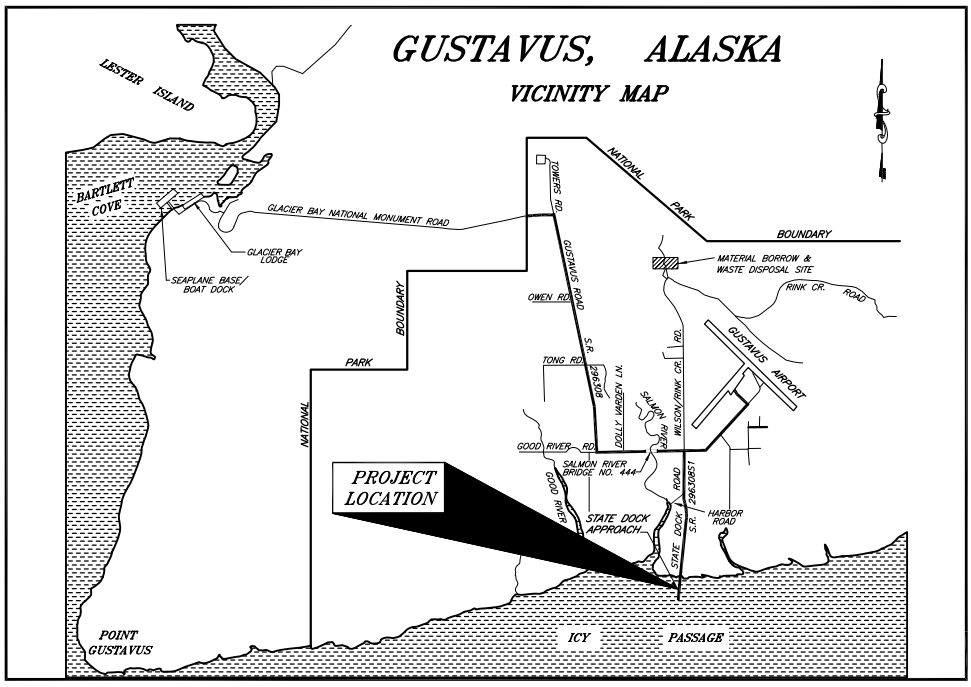
APPLICATION BY:
STATE OF ALASKA
DEPT. OF TRANSPORTATION & PUBLIC FACILITIES
SOUTHCOAST REGION
DESIGN & ENGINEERING SERVICES

GUSTAVUS FERRY TERMINAL IMPROVEMENTS
PROJECT NO. 68128

AT: ICY PASSAGE
LOCATED IN: S19 T40S R59E CRM
LAT: 58° 23' 20.9"
LONG: 135° 43' 47.4"

DATE: FEB. 2016 SHEET 1 OF 7





PROJECT PURPOSE:
MODIFY EXISTING DOCK & BRIDGE
REPLACE MARINE STRUCTURES

ADJACENT PROPERTY OWNERS:
STATE OF ALASKA

VICINITY & LOCATION MAPS

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

GUSTAVUS FERRY TERMINAL IMPROVEMENTS
PROJECT NO. 68128

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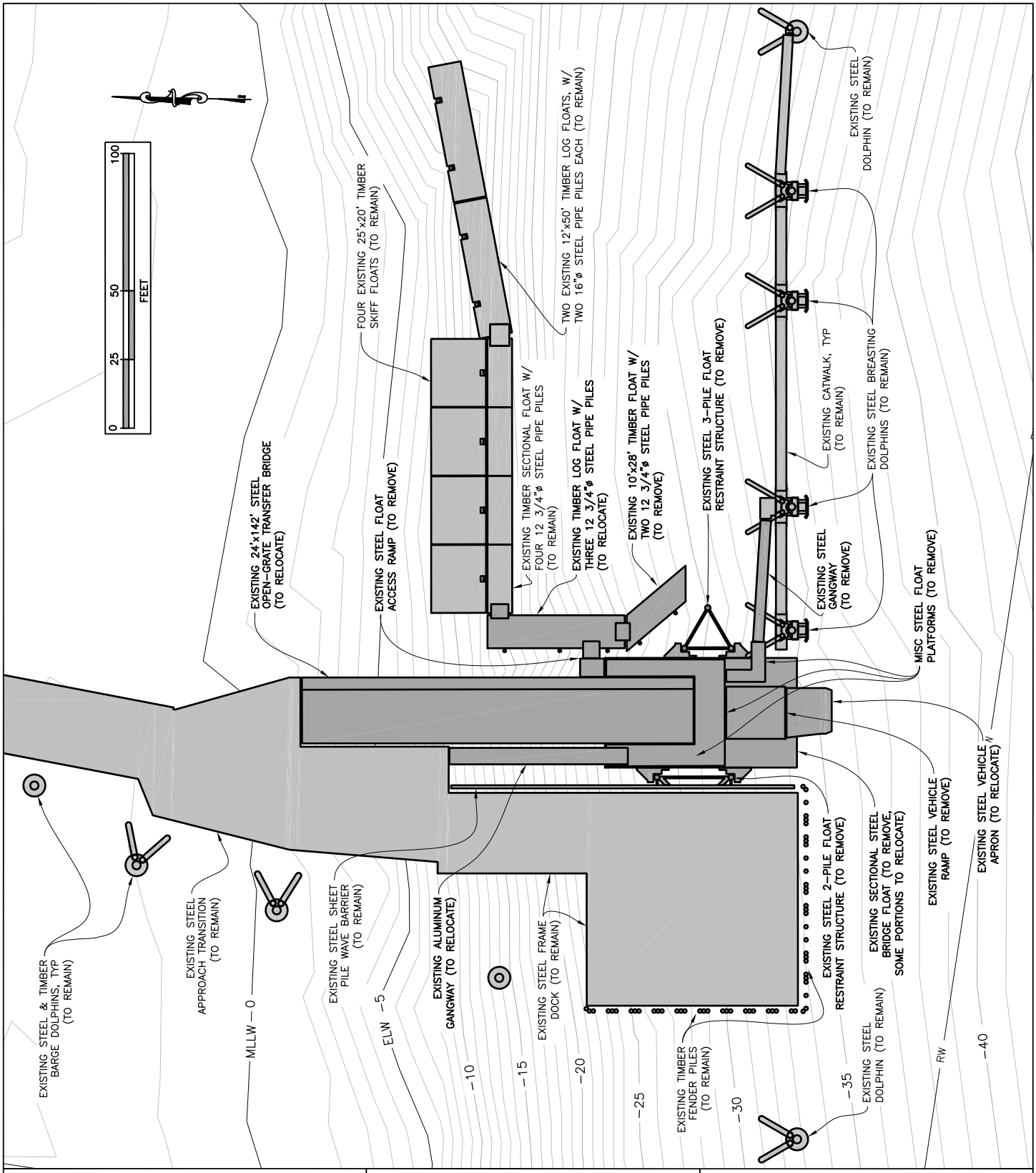

PROJECT PURPOSE:
MODIFY EXISTING DOCK & BRIDGE
REPLACE MARINE STRUCTURES

ADJACENT PROPERTY OWNERS:
STATE OF ALASKA

EXISTING SITE PLAN

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

GUSTAVUS FERRY TERMINAL IMPROVEMENTS
PROJECT NO. 68128

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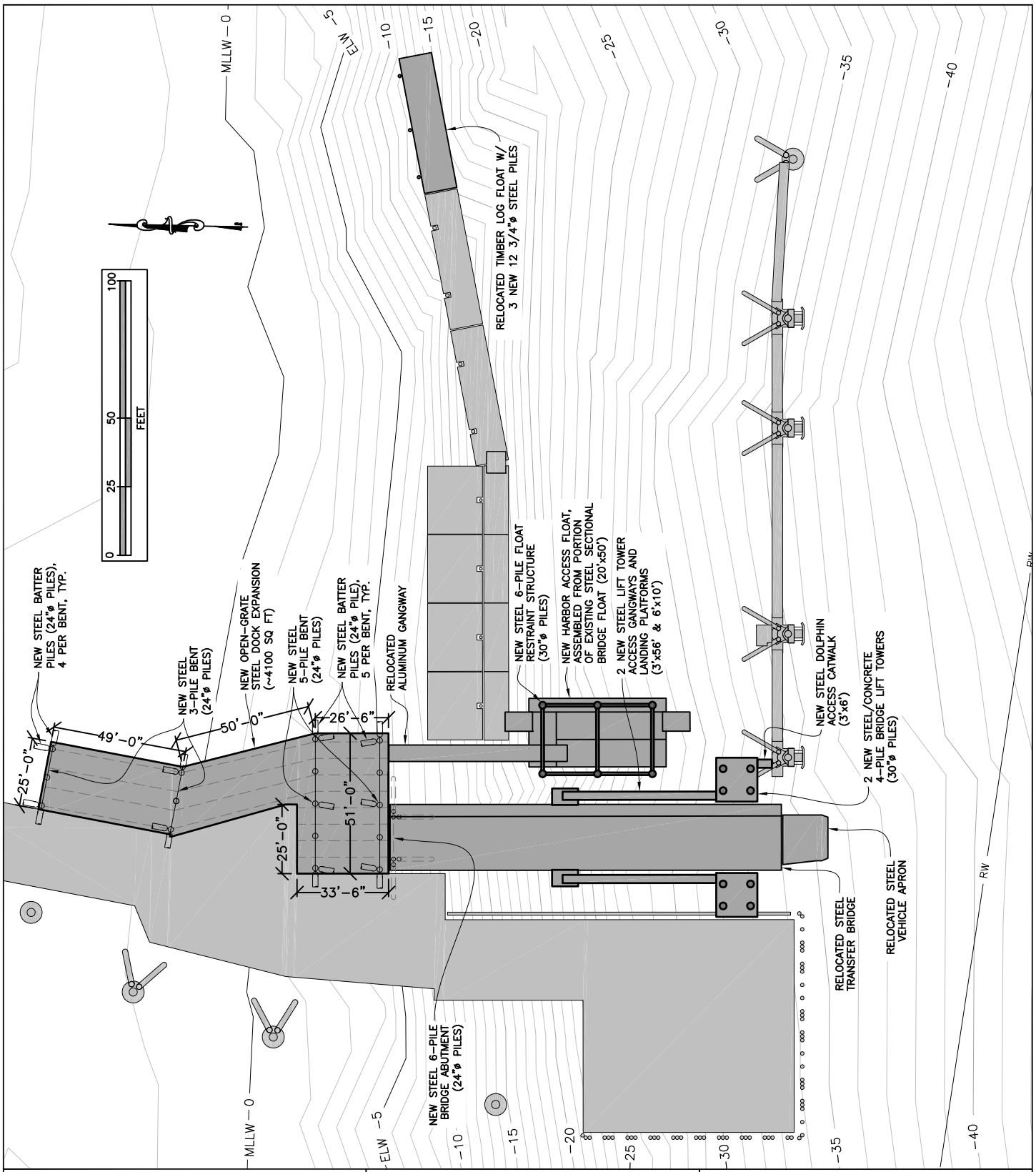

PROJECT PURPOSE:
MODIFY EXISTING DOCK & BRIDGE
REPLACE MARINE STRUCTURES

ADJACENT PROPERTY OWNERS:
STATE OF ALASKA

PROPOSED SITE PLAN

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

GUSTAVUS FERRY TERMINAL IMPROVEMENTS
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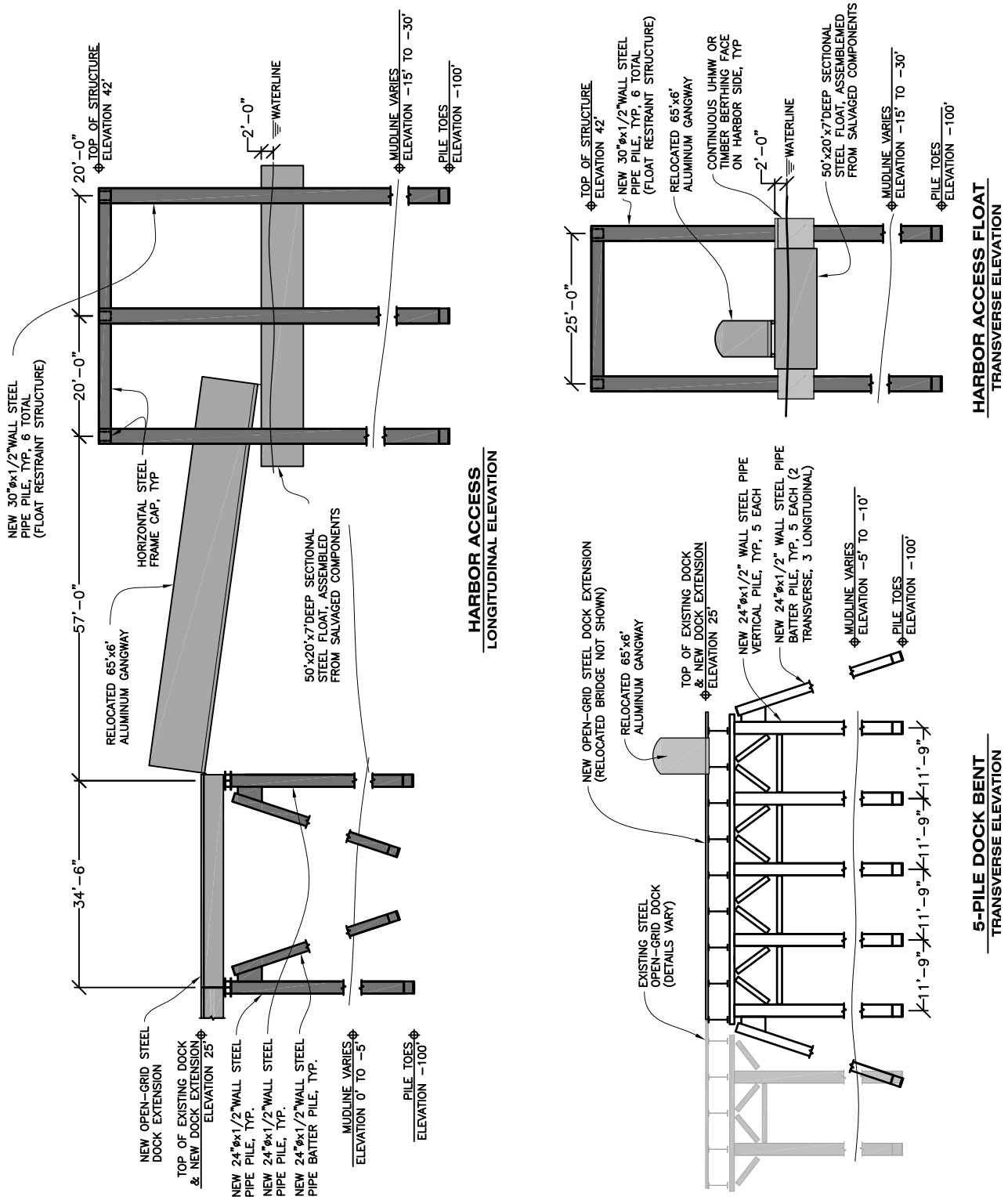

PROJECT PURPOSE:
MODIFY EXISTING DOCK & BRIDGE
REPLACE MARINE STRUCTURES

ADJACENT PROPERTY OWNERS:
STATE OF ALASKA

HARBOR ACCESS GANGWAY AND FLOAT

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

GUSTAVUS FERRY TERMINAL IMPROVEMENTS
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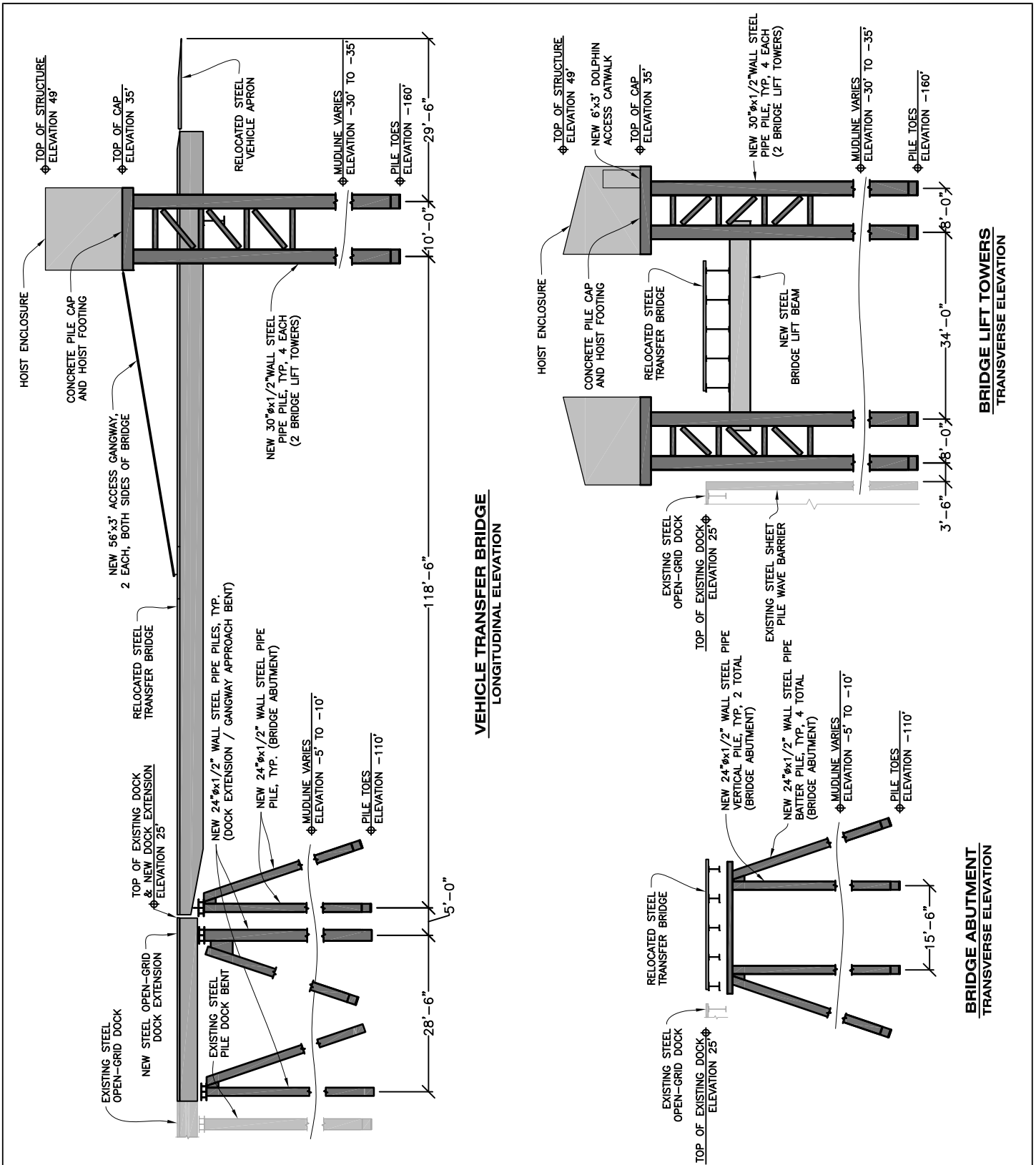

PROJECT PURPOSE:
MODIFY EXISTING DOCK & BRIDGE
REPLACE MARINE STRUCTURES

ADJACENT PROPERTY OWNERS:
STATE OF ALASKA

TRANSFER BRIDGE AND LIFT TOWERS

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

GUSTAVUS FERRY TERMINAL IMPROVEMENTS
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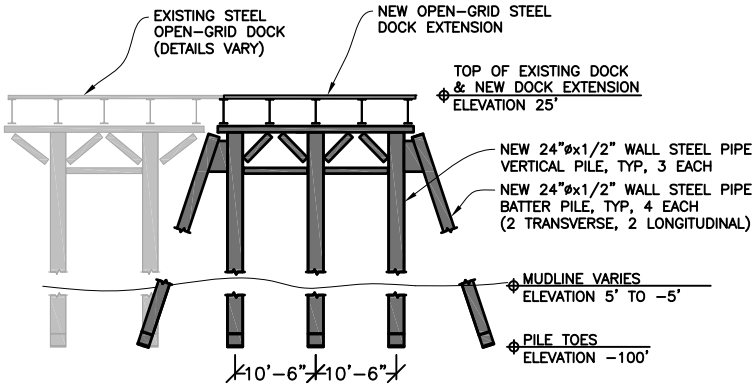

TYP 3-PILE DOCK BENT
FRONT ELEVATION
(2 BENTS TOTAL)

PILE DATA

LOCATION	ORIENTATION	SIZE	QUANTITY
APPROACH DOCK EXTENSION	VERTICAL	24" x0.500"	16
APPROACH DOCK EXTENSION	BATTER	24" x0.500"	18
TRANSFER BRIDGE ABUTMENT	VERTICAL	24" x0.500"	2
TRANSFER BRIDGE ABUTMENT	BATTER	24" x0.500"	4
BRIDGE LIFT TOWERS	VERTICAL	30" x0.500"	8
HARBOR ACCESS FLOAT	VERTICAL	30" x0.500"	6
TIMBER LOG FLOAT	VERTICAL	12.75" x0.500"	3

PROJECT PURPOSE:
MODIFY EXISTING DOCK & BRIDGE
REPLACE MARINE STRUCTURES

ADJACENT PROPERTY OWNERS:
STATE OF ALASKA

DOCK EXPANSION BENT AND PILE DATA

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

GUSTAVUS FERRY TERMINAL IMPROVEMENTS
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APPENDIX A

Sound Source Data, Kake Ferry Terminal

MEMORANDUM

DATE: February 8, 2016

TO: Jill Taylor, Hilary Lindh, Alaska Department of Transportation and Public Facilities

FROM: Jim Starkes, Jessica Blanchette, and Jason Stutes

RE: **Sound Source Data**
12634-02

Hart Crowser, on behalf of the Alaska Department of Transportation and Public Facilities (ADOT&PF), is analyzing sound source data from a recent pile-driving project in Kake, Alaska.

ADOT&PF contracted JASCO Applied Sciences to conduct a hydroacoustic pile-driving noise study at the ferry terminal in Kake (MacGillivray et al. 2015). JASCO conducted this study in September 2015, collecting hydroacoustic data on the impact and vibratory driving of 30-inch steel piles. The impact hammer used was a Delmag D19-42 with maximum energy of 29–66 kilonewton meters (kNm), piston weight of 1,820 kilograms (kg), and blow rate of 35–52/minute. The vibratory hammer was an HPSI 206 with a frequency of 1,600 revolutions per minute (rpm), force of 890 kN, and weight of 4,853 kg. JASCO used two Autonomous Multichannel Acoustic Recorders (AMARs) to monitor noise levels in two ranges: 7 to17 meters (m) away and 1,098 to 1,161 m away from the pile.

Hart Crowser calculated source noise levels at a standard distance (10 meters) for impact and vibratory driving in Kake using the hydroacoustic field data collected by JASCO in the noise study (Figures 8 and 11, MacGillivray et al. 2015). We calculated the root mean square (RMS) sound pressure level (SPL) data for 30-inch steel piles using a best-fit transmission loss curve. Resultant noise levels for impact and vibratory driving were 193.2 and 154.3 decibels (dB) RMS, respectively, calculated for a standardized distance of 10 m from the pile. We then analyzed the acoustic data with the National Marine Fisheries Service (NMFS) Practical Spreading Loss model (PSLM; version 1.2, 2011), a standardized model of underwater noise attenuation with distance. For comparison, we also used the PSLM on pile driving data collected from other data sources from a NMFS-recommended manual titled *Technical Guidance for Assessment and Mitigation of Hydroacoustic Effects of Pile Driving on Fish* (ICF Jones and Stokes and Illingworth and Rodkin 2009, updated in 2012; hereafter, “Technical Guidance”). NMFS recommends the use of this extensive pile-driving dataset collected in California in the absence of site-specific acoustic data. The resulting zones of injury and disturbance for cetaceans and pinnipeds using acoustic data collected at Kake and acoustic data from the Technical Guidance are presented in Table 1.

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Table 1 – Zones of Injury and Disturbance for Cetaceans and Pinnipeds

Description	Threshold (dB)	Impact Hammer		Vibratory Hammer	
		NMFS (m)*	Kake (m)	NMFS (m)*	Kake (m)
Cetacean Injury Threshold	180	46	76	N/A	N/A
Marine Mammal Disturbance Threshold (Impact Driving)	160	1,000	1,634	N/A	N/A
Pinniped Injury Threshold	190	Src ≤ Thres**	16	N/A	N/A
Marine Mammal Disturbance Threshold (Vibratory Driving)	120	N/A	N/A	21,544	1,935

* Data from Jones and Stokes and Illingworth and Rodkin 2009, updated 2012
** Src ≤ Thres indicates the source is below the threshold of disturbance or injury.

Appendix 1 of the Technical Guidance was used as the reference for impact and vibratory driving of 36-inch steel piles (190 dB and 170 dB RMS, respectively). Datasets for the impact and vibratory driving of 30-inch piles were not available in the Technical Guidance so conservatively, the 36-inch pile size was used.

For impact pile driving, the Kake and NMFS acoustic data resulted in different injury and disturbance zones. Using the PSLM on the NMFS dataset resulted in a disturbance zone of 1,000 m (0.63 mile), while the Kake data resulted in a disturbance zone of 1,634 m (1.0 mile). Injury zones were different as well, but both the NMFS-recommended and Kake datasets resulted in relatively small injury zones of less than 100 m (Table 1).

For vibratory driving, as a result of lower measured sound levels collected at Kake (154.3 dB RMS, compared to 170 db RMS in the Technical Guidance), there is a substantial difference in the distance at which noise is indistinguishable from ambient noise (120 dB). The PSLM shows a distance of 1,935 m (1.2 miles) to an ambient underwater noise of 120 dB for the Kake-collected data, whereas PSLM results for the NMFS data show 21,544 m (13.4 miles) to ambient (Table 1). Given the relative similarities in impact distances and the difference in order of magnitude found when using a vibratory hammer, using sound source data from the Kake Ferry Terminal would provide a considerably more manageable monitoring program and likely a much smaller take estimate.

According to NMFS, pile size and type are probably the most important factors affecting sound levels from pile driving. Hammer energy and the type of bottom substrates likely play a smaller role. In addition, water depths are not believed to be very predictive of sound levels (NMFS 2012).

The piles from Kake are the same size (30-inch) or larger than those proposed for Gustavus (24- to 30-inch; Hart Crowser 2015). The ADOT&PF contractors have also confirmed that the same types of vibratory and impact hammers used at Kake will be used at the Gustavus facility. Geotechnical reports indicate that substrates at Kake and Gustavus are somewhat different, but both are composed of

relatively fine-grained sediment. At Kake, sediments are largely composed of organic muds between 10 and 15 feet deep over silty sands and gravel (Dames and Moore 1973). Substrates at Gustavus have a smaller percentage of fines, but are fine-grained, composed primarily of sand and silty sands (ADOT&PF 2008). These data suggest that site-specific acoustic data collected at the Kake Ferry Terminal likely provide a more accurate representation of underwater noise than the compiled dataset from California recommended (in the absence of site-specific data) by NMFS.

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APPENDIX B

Marine Mammal Monitoring Plan, Gustavus Ferry Terminal Improvements

Marine Mammal Monitoring Plan

Gustavus Ferry Terminal Improvements

Gustavus, Alaska

Prepared for

Alaska Department of Transportation and Public Facilities

April 13, 2016

State/Federal Project No.68128/0003182

HARTCROWSER

Marine Mammal Monitoring Plan

Gustavus Ferry Terminal Improvements

Gustavus, Alaska

Prepared for
Alaska Department of Transportation and Public Facilities

April 13, 2016
State/Federal Project No.68128/0003182

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Contents

TABLES

FIGURES

SHEETS

APPENDIX A

Marine Mammal Monitoring Plan

Gustavus Ferry Terminal Improvements

Gustavus, Alaska

1.0 INTRODUCTION

The Alaska Department of Transportation and Public Facilities (ADOT&PF), in cooperation with the Federal Highway Administration (FHWA), is proposing to make improvements to the Gustavus Ferry Terminal, located on Icy Passage, Gustavus, Southeast Alaska. FHWA prepared a biological assessment (BA) to aid in assessing the potential effects of proposed ferry improvements on fish and wildlife species listed as threatened or endangered under the Endangered Species Act (ESA), as well as on their designated critical habitat (Hart Crowser 2015).

The proposed project has the potential to impact some species of marine mammals protected under the ESA and Marine Mammal Protection Act (MMPA) that may occur in nearshore areas of Icy Passage (Table 1).

Table 1 – Marine Mammal Species That May Occur in the Project Area

Common Name	Scientific Name
Humpback whale	*Megaptera novaeangliae*
Killer whale	*Orcinus orca*
Gray whale	*Eschrichtius robustus*
Minke whale	*Balaenoptera acutorostrata*
Dall's porpoise	*Phocoenoides dalli*
Harbor porpoise	*Phocoena phocoena*
Pacific white-sided dolphin	*Lagenorhynchus obliquidens*
Harbor seal	*Phoca vitulina*
Steller sea lion	*Eumetopias jubatus*

2.0 PROJECT DESCRIPTION

2.1 Action Area

The project is located in Gustavus, Southeast Alaska, on Icy Passage in Section 19, Township 40 South, and Range 59 East (Sheets 1 and 2). The project area is the project footprint where proposed improvements are to be constructed. The "action area," where direct or indirect effects of the proposed actions may occur, is defined by the injury and disturbance thresholds of marine mammals to waterborne noise created by pile driving. Waterborne noise is predicted to potentially impact

marine mammals up to 1,634 meters from the driven pile for non-continuous impact pile driving. A distance at which pile driving noise diminishes to ambient background levels of 120 decibels (dB) is estimated to be 1,935 meters from the pile for continuous vibratory pile driving.

2.2 Project Description

The proposed Gustavus Ferry Terminal Improvements project would remove the existing steel bridge float and restraint structure and replace them with two steel/concrete bridge lift towers capable of elevating the relocated steel transfer bridge above the water when not in use (Sheets 3–7). Each tower would be supported by four 30-inch steel piles. The project would also:

- Expand the dock by approximately 4,100 square feet, requiring 34 new 24-inch piles (Sheets 4 and 5);
- Construct new steel six-pile (24-inch) bridge abutment (Sheets 4 and 6);
- Relocate the steel transfer bridge, vehicle apron, and aluminum pedestrian gangway (Sheets 4 and 7);
- Extract 16 steel piles (12.75-inch; Sheet 3);
- Relocate the log float to the end of the existing float structure, requiring three 12.75-inch piles (Sheets 3 and 4);
- Install a new harbor access float (assembled from a portion the existing bridge float) and a steel six-pile (30-inch) float restraint structure (Sheets 4 and 5); and
- Provide access gangways and landing platforms for lift towers, and an access catwalk to existing breasting dolphins (Sheets 4 and 6).

2.3 Construction Methodology

Contractors on previous ADOT&PF dock projects have typically driven piles using the following equipment:

- Air Impact Hammers: Vulcan 512 / maximum energy 60,000 foot-pounds (ft-lbs); Vulcan 06/ maximum energy 19,000 ft-lbs; ICE / maximum energy 19,500 to 60,000 ft-lbs.
- Diesel Impact Hammer: Delmag D30 / maximum energy 75,970 ft-lbs.
- Vibratory Hammers: ICE various models / 7,930 to 13,000 pounds static weight.

Similar equipment may be used for the proposed project, though equipment selection is subject to the discretion of the contractor performing the installation. ADOT&PF anticipates a production rate of 1 to 3 piles driven per day, which takes into account setting the pile in place, positioning the barge while working around existing dock and vessel traffic, splicing sections of pile, and driving the piles. Actual

pile-driving/removal time for nineteen 12.75-inch-, forty 24-inch-, and fourteen 30-inch-diameter steel piles would be approximately 3.0 hours per pile for a total of about 114 hours over the course of 16 to 50 days in 2017.

The sport charter season runs approximately May 20 to September 20, which also tends to be the busiest season for Alaska Marine Highway System (AMHS) ferry service. Ideally, construction would be scheduled to avoid this time period.

2.4 Project Schedule

Project activities are proposed to occur during the following periods and will depend on weather constraints:

- Spring 2017, with pile driving and in-water work occurring during the period of March through May; and
- Fall 2017, with pile driving and in-water work occurring during the period of September through November.

2.5 Impact Avoidance, Minimization Measures, and Conservation Measures

Conservation measures and best management practices (BMPs) will be employed during pile driving to avoid or minimize potential adverse impacts to the aquatic environment. The following conservation measures and general BMPs will be implemented.

2.5.1 Conservation Measures

- All in-water work will be limited to periods determined appropriate by participating state and federal agencies to avoid potential adverse effects on listed marine mammal species and their prey. Ideally, these periods would be March through May and September through November to avoid peak occurrence of marine mammal species in the area.
- To limit the amount of waterborne noise, a vibratory hammer will be used for initial driving, followed by an impact hammer to proof the pile to load-bearing levels

2.5.2 Pile Driving BMPs

- Pile driving will be conducted in the spring (March through May) and fall (September through November) to avoid most of the sport charter fishery, when most sea lions are expected to be present.
- Beginning in late May, when charter activities begin, pile-driving operations will end by approximately 5:00 p.m. to avoid the late afternoon time period when most charters return to the public dock adjacent to the Ferry Terminal. This is likely to be the period of the day when most sea lions are attracted to the Ferry Terminal.

To avoid harm to humpback whales, Steller sea lions, and other protected marine mammals, the protocols described below will be implemented.

- Ramp-up procedures in accordance with Anchorage Fish and Wildlife Field Office (AFWFO; 2012) Observer Protocols will be implemented when the area is clear of marine mammals to minimize the chances of inadvertent exposure to the Injury zone. For impact pile driving, contractors will be required to provide an initial set of three strikes from the hammer at 40 percent energy, followed by a 30-second waiting period. This procedure will be conducted a total of three times before impact pile driving begins.

- A marine mammal observer will be situated on the Ferry Terminal to monitor the appropriate injury and behavioral disturbance zones during all pile driving activities (Figures 1 and 2). Impact pile driving will cease before listed marine mammals enter the injury zone and will not recommence until the animal is out of the zone. If any marine mammals enter the disturbance zone, they will be recorded and the data provided to the National Marine Fisheries Service (NMFS).

- Every effort will be made to minimize release of adhering sediments when extracting piles that are pulled from the water.

3.0 PREDICTED WATERBORNE NOISE AND ACTION AREA

3.1 Interim Criteria and Predicted Waterborne Noise

The action area, where direct or indirect effects of the proposed action may occur, encompasses the injury and behavioral disturbance zones for marine mammals exposed to waterborne and airborne noises generated by pile driving (Figures 1 and 2). NMFS is in the process of developing waterborne noise guidelines for determining sound thresholds for the injury and disturbance of marine mammals. These thresholds are:

- 180 dB referenced to 1 micropascal root mean square (re: 1 µPa RMS) as the level at which cetaceans experience Level A injury for pulsed sound (impact pile driving);

- 190 dB RMS as the level at which pinnipeds experience Level A injury for pulsed sound (impact pile driving);

- 160 dB RMS as the level all marine mammals experience Level B (behavioral) harassment for pulsed sound (impact pile driving); and

- 120 dB RMS as the level all marine mammals experience Level B harassment for continuous sound (vibratory pile driving).

In addition, NOAA Fisheries has established an in-air noise disturbance threshold of 90 dB RMS for harbor seals and 100 dB RMS for all other pinnipeds. There are no in-air thresholds for cetaceans (Figure 1).

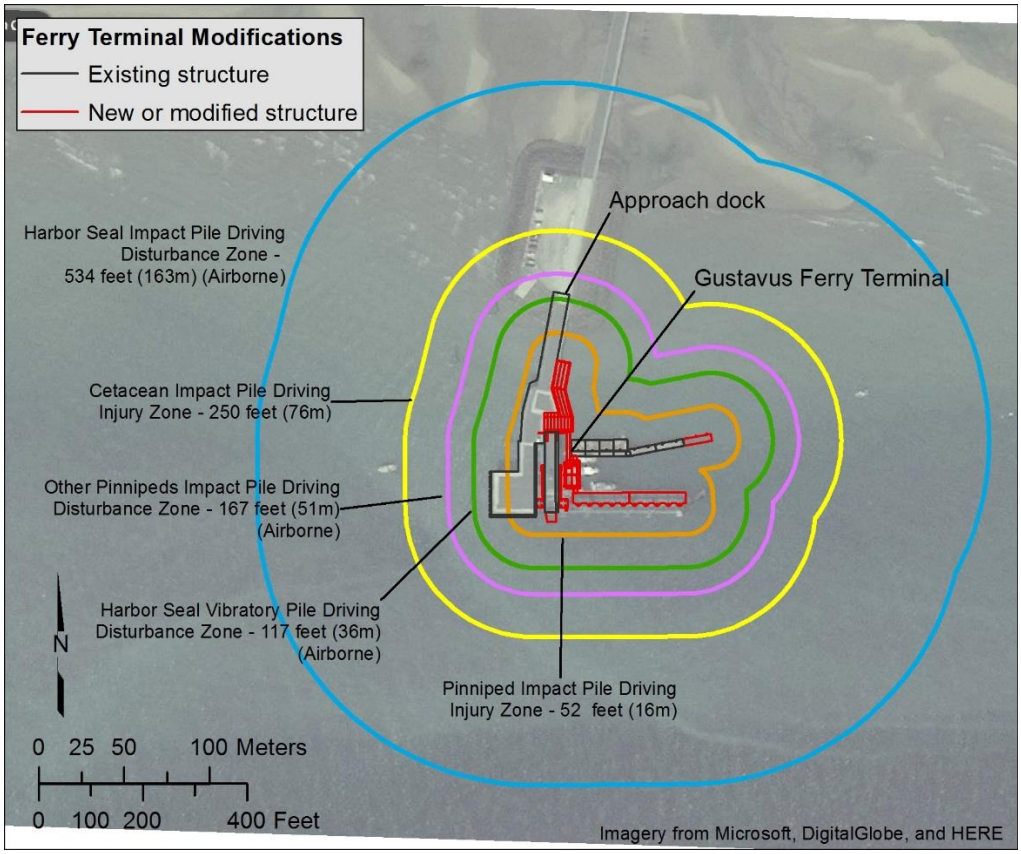


Figure 1 – Waterborne cetacean injury zone and airborne marine mammal disturbance zones

3.2 Action Area

Acoustic monitoring data used for this project have been collected at the Kake Ferry Terminal, located approximately 115 miles south of the project area (MacGillvray et al. 2015; Appendix A).

For in-air sound levels, fewer data are available, but the Washington State Department of Transportation (WSDOT) has collected airborne sound levels for 24-inch-diameter steel piles for both vibratory and impact pile driving at two ferry Terminals in Puget Sound, Washington (Laughlin 2010; WSDOT 2014).

This project proposes to use 24- and 30-inch-diameter steel piles for most project support components (see Section 2.2 for details). According to data collected from Kake Ferry Terminal (MacGillvray et al. 2015) and WSDOT (Laughlin 2010; WSDOT 2014), piles of this size generate similar levels of waterborne and airborne noise. The sound levels selected to calculate impact zones are as follows:

Waterborne Noise

- 193.2 dB RMS for impact driving
- 154.3 dB RMS for vibratory driving

Airborne Noise

- 110 dB RMS for impact driving

- 97 dB RMS for vibratory driving

We then analyzed the acoustic data with the NMFS Practical Spreading Loss model, a standardized model of underwater noise attenuation with distance.

The travel and attenuation of airborne sound was calculated using a standard attenuation rate for hard site conditions (sites dominated by hard reflective substrates such as water, concrete/asphalt, or hard-packed soils). This attenuation rate is a 6 dB reduction in sound per doubling of distance from the pile, beginning at 15 meters from the pile (WSDOT 2013). The waterborne and airborne injury and disturbance zones for marine mammals are presented in Table 2 and Figures 1 and 2.

The Practical Spreading Loss model estimates small injury zones for whales (76 meters) and pinnipeds (16 meters) for pulsed sound generated by piles driven by an impact pile driver within the project area. The disturbance zone for impact pile driving is larger, at approximately 1.6 kilometers from the driven pile for all marine mammals. The disturbance zone for continuous noise generated by a vibratory hammer is similar, predicted to extend for 1.9 kilometers from the pile to an ambient background level of 120 dB (Table 2; Figures 2 and 3).

Table 2 – Impact Zones of Marine Mammals

	Distance to Criterion (meters)					
	Waterborne Noise				Airborne Noise	
Pile Driver Type	Marine Mammal Disturbance (160 dB)	Cetacean Injury (180 dB)	Pinniped Injury (190 dB)	Continuous Noise Disturbance (120 dB)	Harbor Seal (90 dB)	Other Pinnipeds (100 dB)
Impact	1,634	76	16	--	163	51
Vibratory	--	--	--	1,935	36	< Threshold

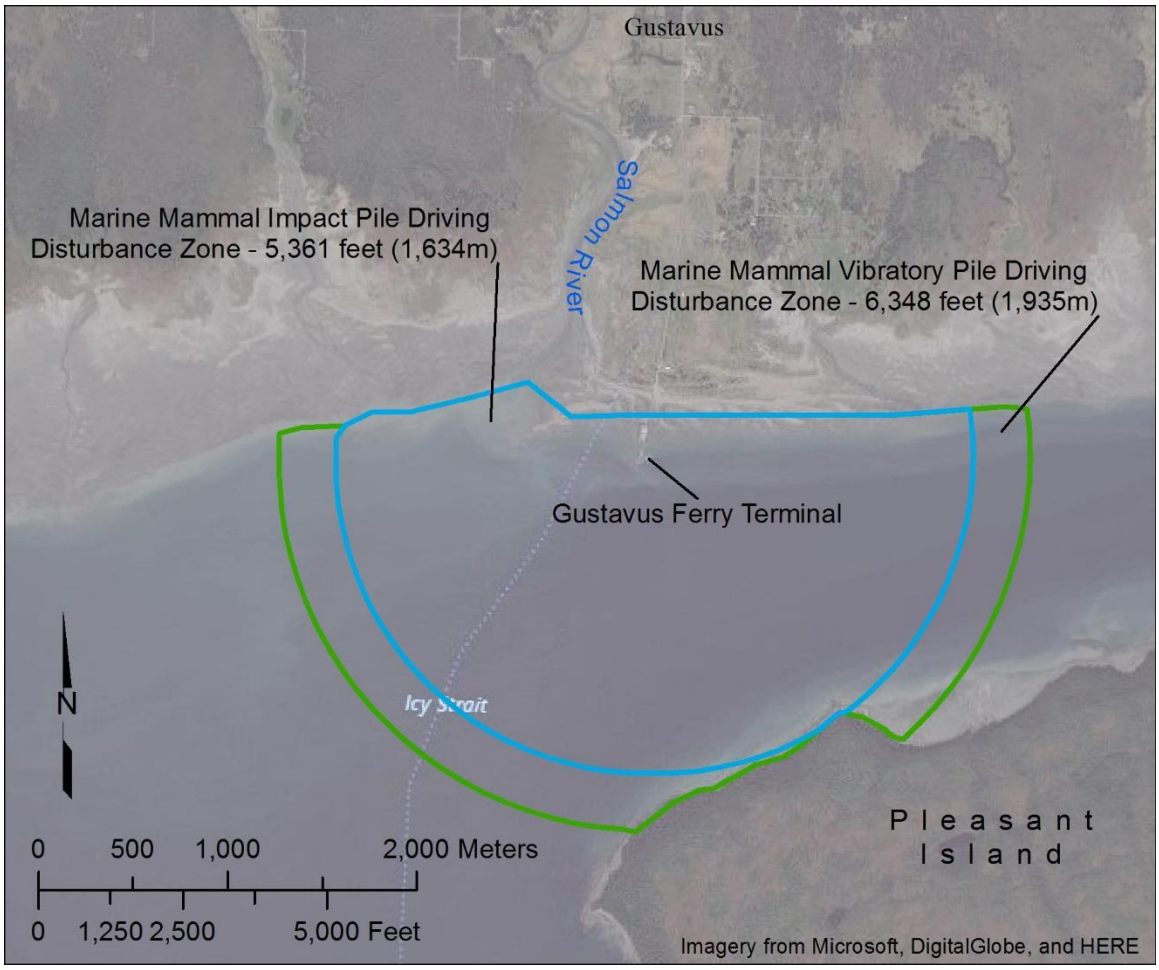


Figure 2 – Marine mammal disturbance zones for impact and vibratory pile driving

For airborne sound, the disturbance zones for pinnipeds is calculated between 36 and 163 meters from piles driven with impact and vibratory pile drivers (Table 2; Figure 1).

4.0 MONITORING PROTOCOL

4.1 Impact Pile Driving

A marine mammal observer will be on site for all pile driving activities and will be responsible for alerting the construction crews when it is appropriate to begin pile driving and when there are work stoppages due to the proximity of a marine mammal to the monitoring zones.

4.1.1 Monitoring Protocol for Impact Pile Driving

During impact pile driving, one qualified observer, familiar with humpback whale and Steller sea lion identification and the AFWFO (2012) Observer Protocols, will monitor the 1.6-kilometer disturbance zone from the Gustavus Ferry Terminal during impact pile driving activities. The smaller injury zone of 76 meters for whales and 16 meters for pinnipeds will also be monitored by the observer during impact pile driving. Monitoring from the Gustavus Ferry Terminal will provide the marine mammal

observer with an unobstructed view of the monitoring areas during impact pile driving (Figure 1). The following survey methods will be implemented during impact pile driving operations:

- At the beginning of each day, the observer will determine their vantage positions using a hand-held GPS unit. If an observer changes position throughout the day, each new position will also be determined using a hand-held GPS unit.

- Monitoring will begin 30 minutes prior to impact pile driving. This will ensure that all marine mammals in the monitoring zone are documented and that no marine mammals are present in the injury zone.

- If all marine mammals in the disturbance zone have been documented and no marine mammals are in the injury zone, the coordinator will instruct the contractor to initiate the ramp-up procedure for impact pile driving. This procedure consists of providing an initial set of three strikes from the hammer at 40 percent energy, with no less than a 30-second waiting period between each strike.

- When a marine mammal is observed, its location will be determined using a rangefinder to verify distance and a GPS or compass to verify heading.

- If a humpback whales or Steller sea lions are observed nearing their respective injury zones, impact pile-driving activities will be immediately halted. The observer will immediately radio to alert the contractor and raise a red flag, requiring an immediate “all-stop.” Impact pile driving will cease before listed marine mammals enter the injury zone and will not recommence until the animal is out of the zone or 30 minutes have passed without re-sighting the animal in the zones. The observer will continue to monitor the animal after it has left the monitoring zones.

- The observer will record any humpback whale or Steller sea lion visible in the disturbance zone during pile-driving operations. These data will be reported to NMFS on a weekly basis to compare with the take levels within the Incidental Harassment Authorization.

- If any other cetaceans (killer whale, minke, Dall’s porpoise, harbor porpoise) or pinnipeds are observed approaching injury zones, impact pile-driving activities will be immediately halted. The observer will immediately radio to alert the contractor and raise a red flag, requiring an immediate “all-stop.” Impact pile-driving activities will resume when the animal has voluntarily left the injury zone or 30 minutes have passed without re-sighting the animal in the zone. The observer will continue to monitor the animal until it has left the larger disturbance zones.

- The observer will record all cetaceans and pinnipeds present in the disturbance zones. These data will be reported to NMFS on a weekly basis to compare with the take levels within the Incidental Harassment Authorization.

- The observer will record all pinnipeds present in the in-air disturbance zones (163 meters for harbor seals and 51 meters for sea lions). For the in-air disturbance zone, this applies to animals that are hauled out and animals that have surfaced while swimming. These data will be reported

to NMFS on a weekly basis to compare with the take levels within the Incidental Harassment Authorization. All observations of marine mammals will be documented in the Marine Mammal Observation Record Form (Appendix A).

- The observer will use their naked eye with the aid of binoculars and a spotting scope to search continuously for marine mammals.
- During the in-water operation of heavy machinery (e.g., barge movements), a 10-meter shutdown zone for all marine mammals will be implemented.
- At the end of the pile-driving day, post-construction monitoring will be conducted for 30 minutes beyond the cessation of pile driving.

4.1.2 Observer Location for Impact Pile Driving

In order to effectively monitor the impact pile driving monitoring (shutdown) zone, the marine mammal observer will be positioned at the best practical vantage point. The monitoring position will be on the ferry terminal, but may vary based on pile driving activities and the locations of the piles and driving equipment.

The monitoring location will be identified with the following characteristics:

1. Unobstructed view of pile being driven;
2. Unobstructed view of all water within a 1.6-kilometer radius of each pile;
3. Clear view of pile-driving operator or construction foreman in the event of radio failure; and
4. Safe distance from pile-driving activities in the construction area.

Because the action area for impact pile-driving disturbance extends for 1.6 kilometers from the Gustavus Ferry Terminal into Icy Strait/Passage, it would be difficult to monitor this area effectively with only a terminal-based observer. ADOT&PF has also considered several options for marine mammal monitor stations besides the dock location.

4.1.2.1 Land-based Monitoring on Pleasant Island

Pleasant Island is located across Icy Passage approximately 2 kilometers from the ferry terminal. Access to the island is only possible by helicopter or by boat. There are no helicopters based in Gustavus, so transportation by that method is not feasible. Boat transportation is a possibility, but weather and wave conditions can be hazardous, particularly for drop-off and pickup at the shore. Sailing conditions can also be rough in Icy Passage, often with 3- to 5-foot swells making reliable transport to and from the terminal difficult. Monitors may not be able to travel to the island when pile-driving activities are scheduled, or, alternatively, may not be able to return from the island when the pile driving is complete. There are no facilities or structures of any kind on Pleasant Island: no camping facilities or water sources, and no emergency services. An observer based on Pleasant Island would need to be completely self-sufficient for an unknown period of

time. Due to the lack of reliable transportation options and lack of services or facilities, ADOT&PF has determined that Pleasant Island would not be a viable marine mammal monitoring location.

4.1.2.2 Land-based Monitoring on the Mainland

There is some potential that an observer could hike along the shore either to the east or west of the ferry terminal to make observations up to 2 kilometers from the pile-driving location; however, the shore observer would be at a lower elevation and further back from the water than one positioned on the dock. It would appear that an observer positioned on the dock would provide the best coverage of the hazard areas.

4.1.2.3 Boat-based Transects within Icy Passage

Boating conditions in Icy Passage can be unsafe. In the 2013 storm that damaged the facility, wave height increased from less than 1 foot to over 6 feet in 10 minutes. This kind of unpredictable weather would make reliable monitoring via boat difficult. ADOT&PF anticipates there would be many occasions where conditions would allow pile driving but would be unsafe for conducting boat transects. If the contractor is not allowed to drive piles due to monitoring unavailability, this would subject ADOT&PF to cost overruns and numerous claims.

When possible, we will augment land-based monitoring with information from boats in Icy Strait/Passage. Specifically, the observer with coordinate with the NPS and whale-watching charters for recent observations of marine mammals within Icy Strait/Passage. This will help inform the observer of humpback whales and Steller sea lions (and other potential marine mammals) in the area. NPS and whale-watching charters could also inform monitoring personnel of any marine mammals seen approaching the disturbance zone.

The marine mammal observer will conduct telephone checks with NPS and whale-watching charters to monitor the locations of humpback whales and Steller sea lions within Icy Strait/Passage. Checks will begin three days before pile-driving operations to ascertain the location and movements of the whales and sea lions in relation to the disturbance zones. Once construction has begun, checks will be made each evening after the completion of pile-driving activities in preparation of the next day's monitoring.

Use of the organizations identified above to augment monitoring efforts will depend on their observation schedules and locations within the Glacier Bay region. It is expected that these organizations will only be active in May and September during the pile-driving season.

4.2 Vibratory Driving

4.2.1 Monitoring Protocol for Vibratory Driving

One qualified observer will use a spotting scope to monitor the 1.9-kilometer disturbance zone from the Gustavus Ferry Terminal during vibratory pile driving activities. Establishing a monitoring station on the Gustavus Ferry Terminal will provide the marine mammal observer an unobstructed view of the action area during vibratory driving (Figure 2). This location may include the catwalk at the ferry

terminal, the contractor barge, or another location deemed to be more advantageous. The following survey methods will be implemented during vibratory driving operations:

- At the beginning of each day, the observer will determine his or her vantage position using a hand-held GPS unit. If the observer changes position throughout the day, each new position will also be determined using a hand-held GPS unit.
- Monitoring will begin 30 minutes prior to vibratory pile driving. This will ensure that all marine mammals in the monitoring zone are documented.
- When a marine mammal is observed, its location will be determined using a rangefinder to verify distance and a GPS or compass to verify heading.
- The observer will record any humpback whale or Steller sea lion visible in the (1.9-kilometer) disturbance zone during vibratory pile driving. These data will be reported to NMFS on a weekly basis to compare with the take levels within the Incidental Harassment Authorization.
- The observer will record any other cetacean or pinniped present in the disturbance zone. These data will be reported to NMFS on a weekly basis to compare with the take levels within the Incidental Harassment Authorization.
- There is no in-water injury zone for cetaceans or pinnipeds during vibratory driving so no work stoppage will occur based on the presence of these species.
- The observer will record all pinnipeds present in the in-air disturbance zone. This applies to animals that are hauled out and those that have surfaced while swimming. These data will be reported to NMFS on a weekly basis to compare with the take levels within the Incidental Harassment Authorization.
- All observations of marine mammals will be documented in the Marine Mammal Observation Record Form (Appendix A).
- The observer will use his or her naked eye with the aid of binoculars and spotting scopes to search continuously for marine mammals.

4.2.2 Observer Location for Vibratory Driving

In order to effectively monitor the vibratory driving monitoring (shutdown) zone, the marine mammal observer will be positioned at the best practical vantage point. The monitoring position may vary based on pile driving activities and the locations of the piles and driving equipment. These may include the catwalk at the ferry terminal, the contractor barge, or another location deemed to be more advantageous.

The monitoring location will be identified with the following characteristics:

1. Unobstructed view of pile being driven;

2. Unobstructed view of all water within a 1.9 kilometers radius of each pile;
3. Clear view of pile-driving operator or construction foreman in the event of radio failure; and
4. Safe distance from pile driving activities in the construction area.

Because the action area for vibratory driving disturbance extends for 1.9 kilometers from the Gustavus Ferry Terminal into Icy Strait/Passage, it would be difficult to monitor this area effectively with only terminal-based observer. For the reasons presented in Sections 4.1.2.1 through 4.1.2.3, ADOT&PF has concluded that the use of Pleasant Island-based, mainland-based, or vessel-based observers would be infeasible and, in many circumstances, unsafe. However, when possible, we will augment land-based monitoring with information from boats in Icy Strait/Passage. Specifically, the observer with coordinate with the NPS and whale-watching charters for recent observations of marine mammals within Icy Strait/Passage. This will help inform the observer of humpback whales and Steller sea lions (and other potential marine mammals) in the area. NPS and whale-watching charters could also inform monitoring personnel of any marine mammals seen approaching the disturbance zone.

The marine mammal observer will conduct telephone checks with NPS and whale-watching charters to monitor the locations of humpback whales and Steller sea lions within Icy Strait/Passage. Checks will begin three days before pile-driving operations to ascertain the location and movements of the whales and sea lions in relation to the disturbance zones. Once construction has begun, checks will be made in the evening after the completion of pile driving activities, in preparation of the next day's monitoring.

Use of the organizations identified above to augment monitoring efforts will depend on their observation schedules and locations within the Glacier Bay region. It is expected that these organizations will only be active in May and September during the pile-driving season.

4.3 Qualifications for the Marine Mammal Observer

The following list includes minimum qualifications for the Marine Mammal Observer.

1. Visual acuity in both eyes (correction is permissible) sufficient for discernment of moving targets at the water's surface with ability to estimate target size and distance. Use of spotting scopes and binoculars may be necessary to correctly identify the target.
2. Experience and ability to conduct field observations and collect data according to assigned protocols (this may include academic experience).
3. Experience or training in the field identification of marine mammals (cetaceans and pinnipeds).
4. Sufficient training, orientation, or experience with the construction operation to provide for personal safety during observations.
5. Writing skills sufficient to prepare a report of observations that would include such information as the number and type of marine mammals observed; the behavior of marine mammals in the project area during construction; dates and times when observations were conducted; dates and times when in-water construction activities were conducted; dates and times when marine mammals were present at or within the defined disturbance or injury

zones; dates and times when in-water construction activities were suspended to avoid injury from construction noise; etc.

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

4.4 Equipment

The following equipment will be available for the observer to ensure adequate coverage of the pile driving monitoring area:

- Hearing protection, steel-toed shoes, and hardhat (other protective gear may be required at the discretion of the construction contractor's health and safety plan);
- Portable radio to communicate with the contractor;
- Cellular phone with contact information for NOAA Fisheries, pile installation contractor, and the Alaska Department of Transportation Engineer;
- Red and green signal flags to use as a back-up to radio communication;
- Daily tide and current tables for the action area;
- Stopwatch or time-keeping device;
- Binoculars;
- Spotting scopes;
- Rangefinder;
- GPS and compass;
- NOAA Fisheries-approved Marine Mammal Observation Record Form (Appendix A) on non-bleeding, waterproof paper;
- Copy of this Gustavus Ferry Terminal Improvements Marine Mammal Monitoring Plan;
- Copy of the Gustavus Ferry Terminal Improvements Incidental Harassment Authorization; and
- Clipboard and pencils.

5.0 INTERAGENCY NOTIFICATION

During some years, humpback whales forage at the mouth of the Salmon River approximately 0.4 miles west of the ferry terminal (C. Gabriele, NPS, personal communication). This area falls within the disturbance zones for impact and vibratory driving (Figure 2). Chris Gabriele with the NPS believes

the timing of the whale presence may be related to availability of Pacific sand lance, a small forage fish species that burrows and spawns in sandy intertidal habitats (Ostrand et al. 2005). However, she reported that the year and season of whale presence in this location is not predictable (C. Gabriele, NPS, personal communication).

If humpback whales are observed to congregate and spend extended periods of time within the marine nearshore near the mouth of the Salmon River within the behavioral disturbance zones, we will shut down pile driving operations if we are approaching take authorizations within the IHA. In such cases, we will immediately contact and begin discussions with NMFS to determine a course of action that both protects foraging whales and allows project activities to continue.

If the observer finds an injured, sick, or dead marine mammal, he or she shall notify NMFS immediately with a description of the animal, location, date, time, photo (if possible), and any observed behaviors (if alive).

6.0 MONITORING REPORT

A monitoring report will be prepared upon request by NMFS.

7.0 REFERENCES

AFWFO 2012. Anchorage Fish and Wildlife Field Office Observer Protocols for Pile Driving. US Fish and Wildlife Service, Anchorage, Alaska.

Hart Crowser 2015. Biological Assessment, Gustavus Ferry Terminal Improvements. Prepared for the Alaska Department of Transportation and Public Facilities. February 11, 2015.

Laughlin, J. 2010. Airborne Noise Measurements (A-weighted and un-weighted) during Vibratory Pile Installation – Technical Memorandum. Prepared by the Washington State Department of Transportation, Office of Air Quality and Noise. June 21, 2010.

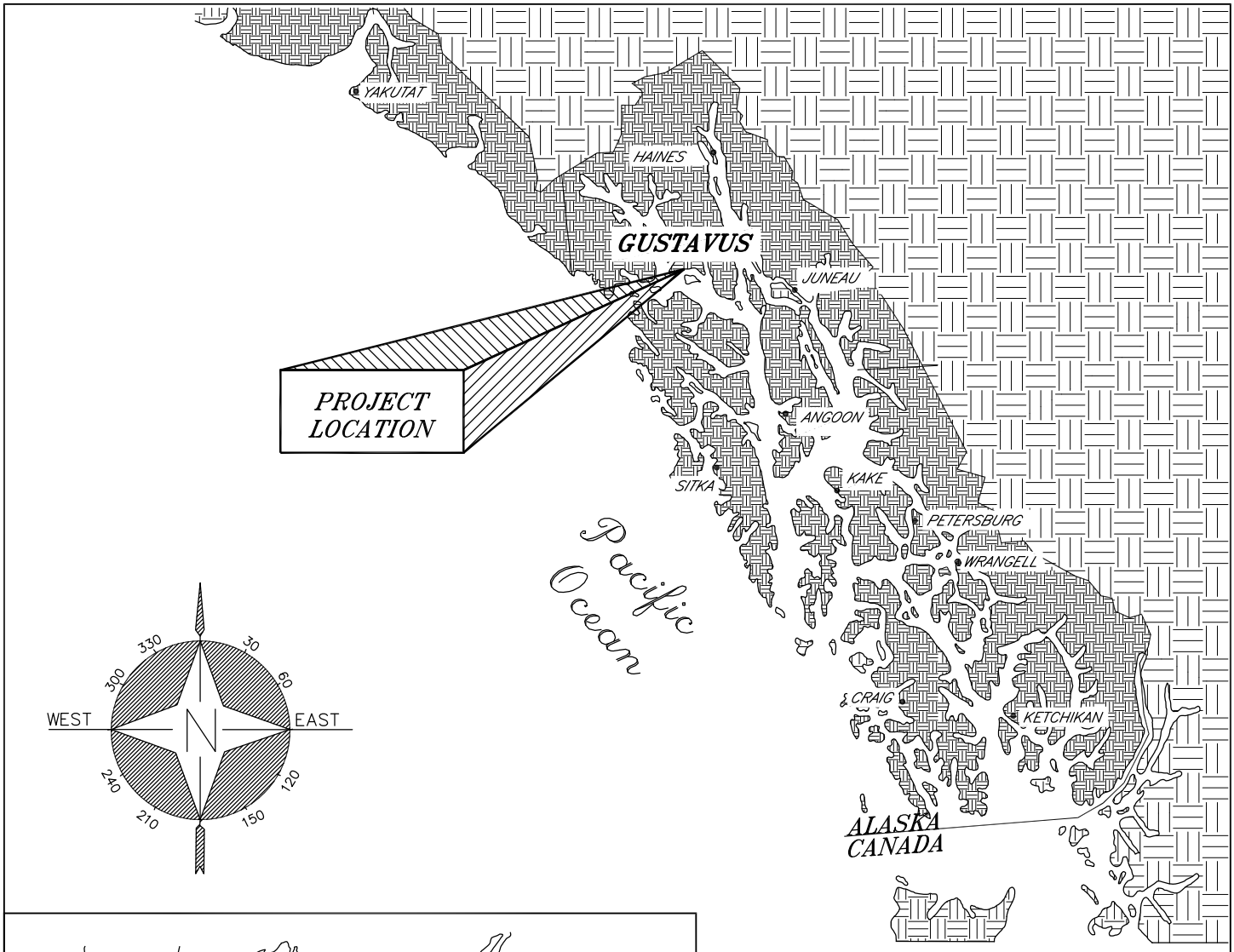
MacGillvray, A., G. Warner, and C. McPherson, 2015. Alaska DOT Hydroacoustic Pile Driving Study, Kake Monitoring Results. JASCO Applied Sciences, Victoria, BC. Prepared for the Alaska Department of Transportation and Public Facilities.

Ostrand, W.D., Gotthardt, T.A., Howlin, S., Robards, M.D. (2005) Habitat selection models for Pacific sand lance (*Ammodytes hexapterus*) in Prince William Sound, Alaska. Northw Natur 86:131–143

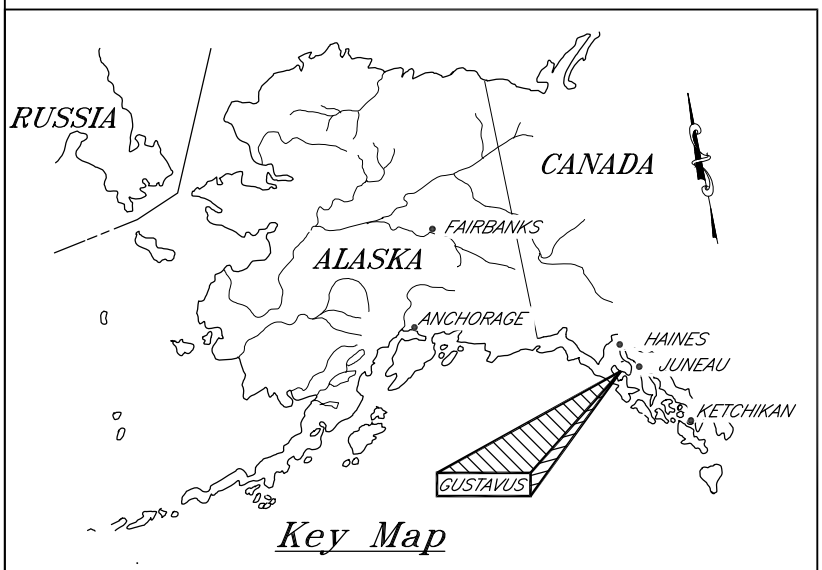
WSDOT 2013. Biological assessment preparation for transportation projects – advanced training manual. Version 2013. Washington State Department of Transportation.

WSDOT 2014. Request for an Incidental Harassment Authorization Under the Marine Mammal Protection Act. Vashon Trestle Seismic Retrofit Washington State Department of Transportation Ferries Division. December 16, 2014.

SHEETS



Regional Map



Key Map

TIDAL DATA (ft)	
EXTREME HIGH TIDE	+20.0
MEAN HIGH WATER	+13.7
MEAN LOWER LOW WATER	0.0
EXTREME LOW WATER	−5.0

PROJECT PURPOSE:
MODIFY EXISTING DOCK & BRIDGE
REPLACE MARINE STRUCTURES

ADJACENT PROPERTY OWNERS:
STATE OF ALASKA

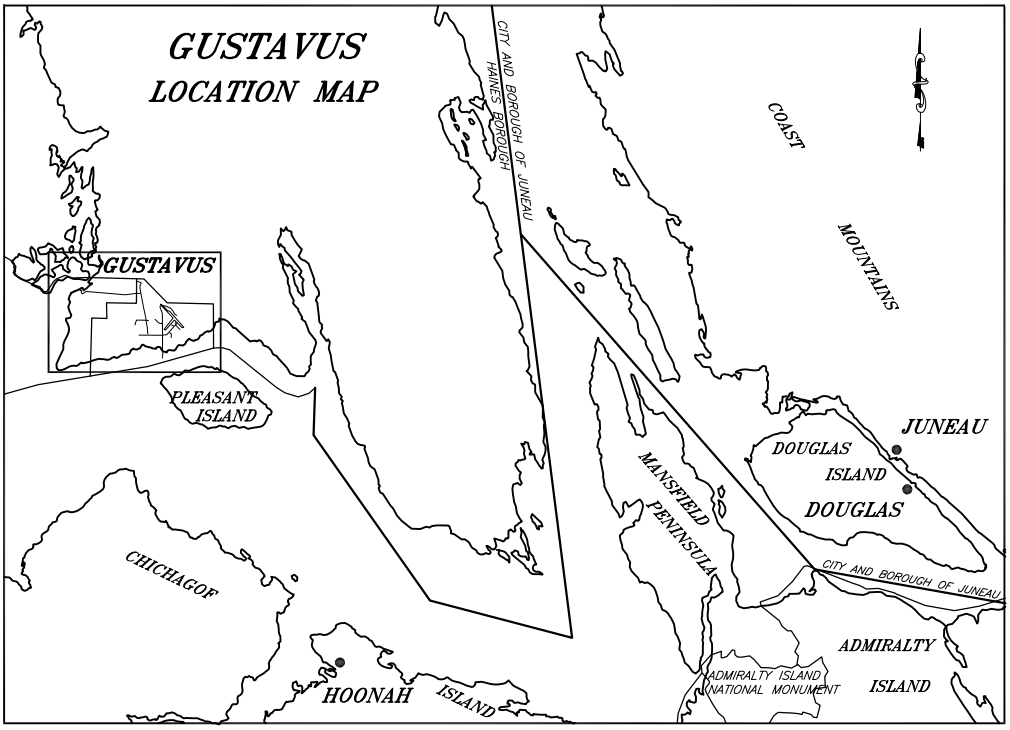
KEY & REGIONAL MAPS

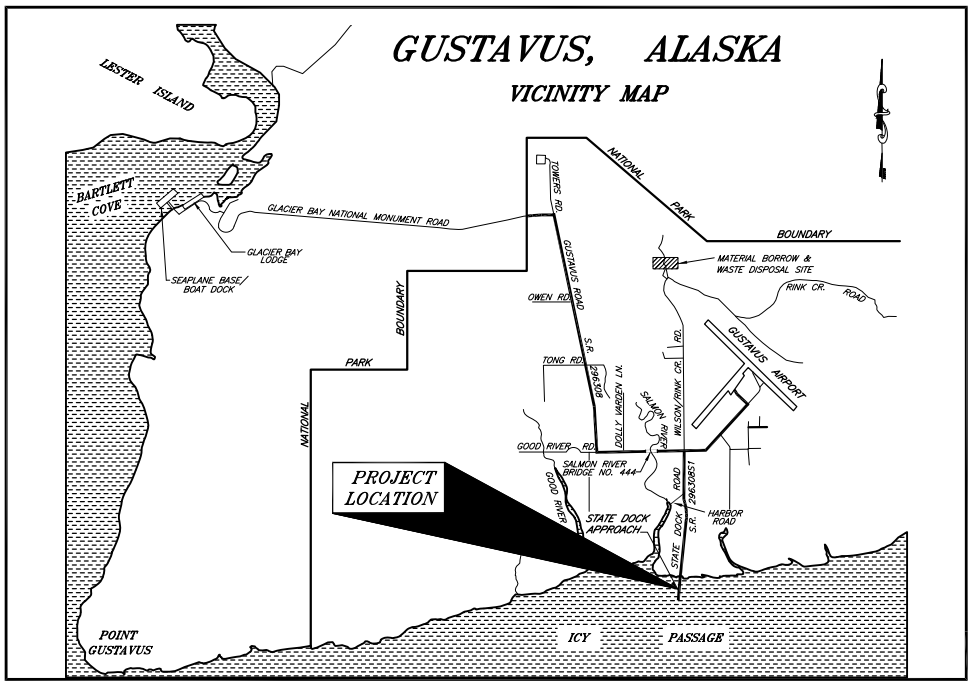
APPLICATION BY:
STATE OF ALASKA
DEPT. OF TRANSPORTATION & PUBLIC FACILITIES
SOUTHCOAST REGION
DESIGN & ENGINEERING SERVICES

GUSTAVUS FERRY TERMINAL IMPROVEMENTS
PROJECT NO. 68128

AT: ICY PASSAGE
LOCATED IN: S19 T40S R59E CRM
LAT: 58° 23' 20.9"
LONG: 135° 43' 47.4"

DATE: FEB. 2016 SHEET 1 OF 7





PROJECT PURPOSE:
MODIFY EXISTING DOCK & BRIDGE
REPLACE MARINE STRUCTURES

ADJACENT PROPERTY OWNERS:
STATE OF ALASKA

VICINITY & LOCATION MAPS

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

GUSTAVUS FERRY TERMINAL IMPROVEMENTS
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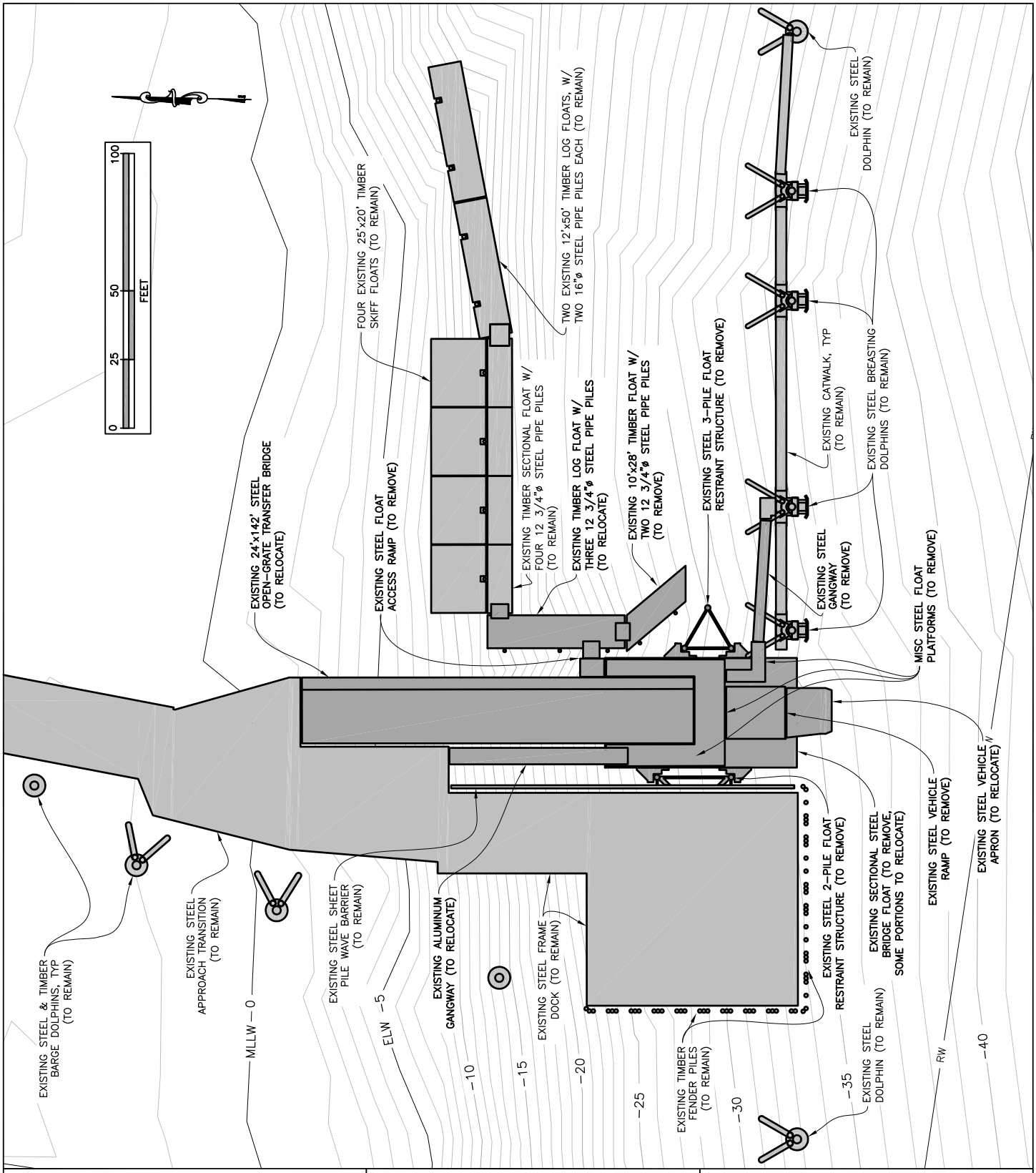

PROJECT PURPOSE:
MODIFY EXISTING DOCK & BRIDGE
REPLACE MARINE STRUCTURES

ADJACENT PROPERTY OWNERS:
STATE OF ALASKA

EXISTING SITE PLAN

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

GUSTAVUS FERRY TERMINAL IMPROVEMENTS
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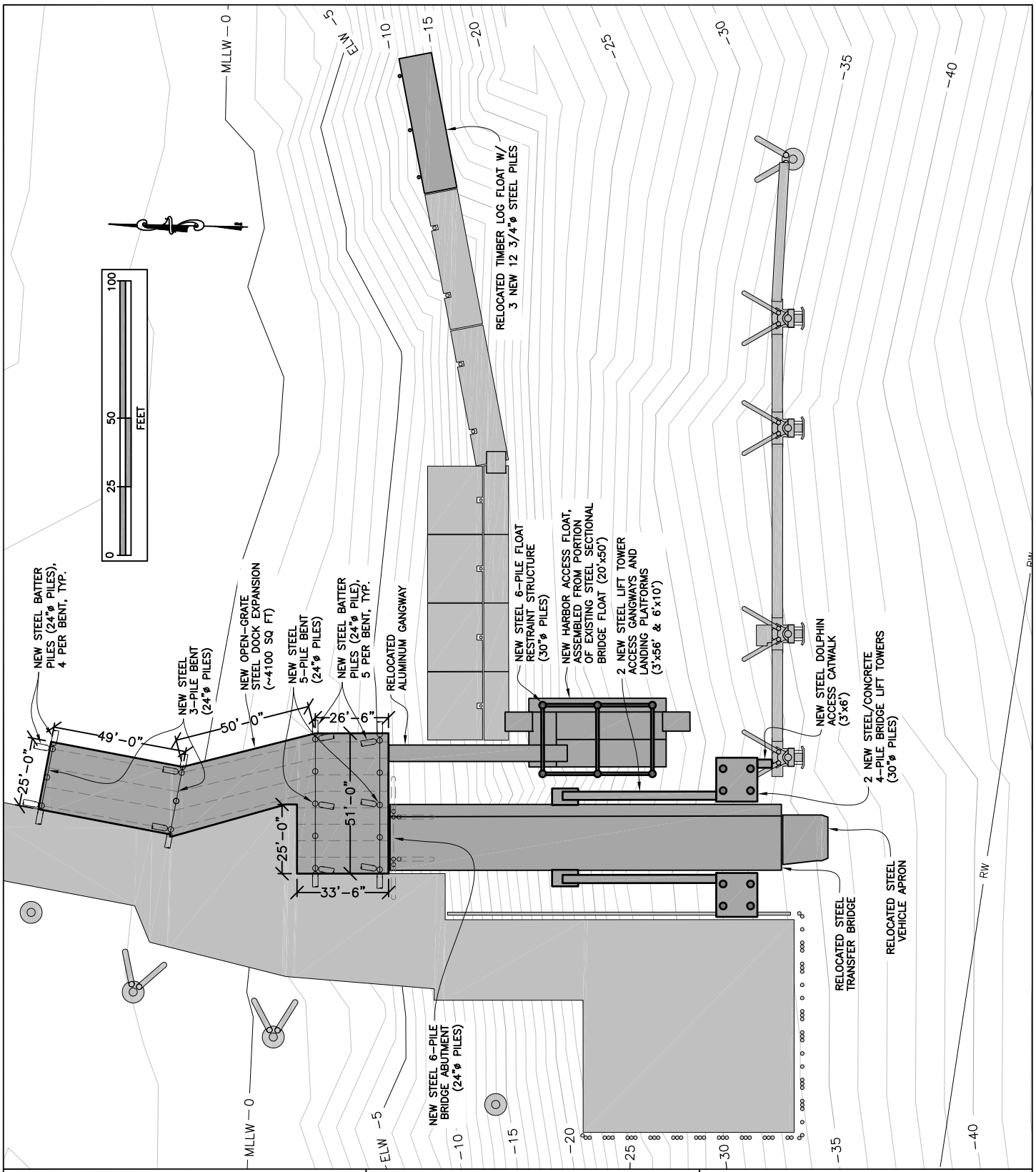

PROJECT PURPOSE:
MODIFY EXISTING DOCK & BRIDGE
REPLACE MARINE STRUCTURES

ADJACENT PROPERTY OWNERS:
STATE OF ALASKA

PROPOSED SITE PLAN

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

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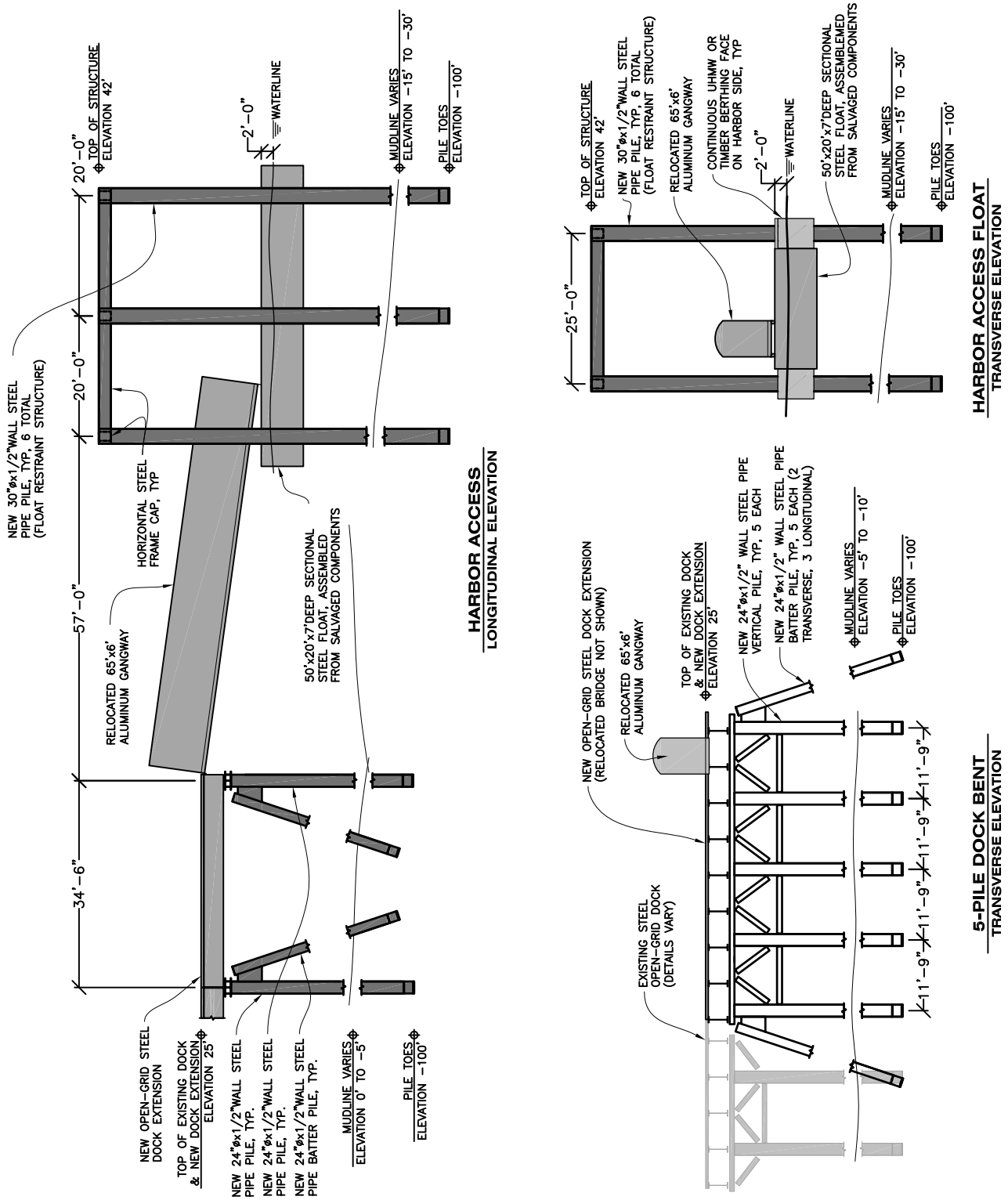

PROJECT PURPOSE:
MODIFY EXISTING DOCK & BRIDGE
REPLACE MARINE STRUCTURES

ADJACENT PROPERTY OWNERS:
STATE OF ALASKA

HARBOR ACCESS GANGWAY AND FLOAT

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

GUSTAVUS FERRY TERMINAL IMPROVEMENTS
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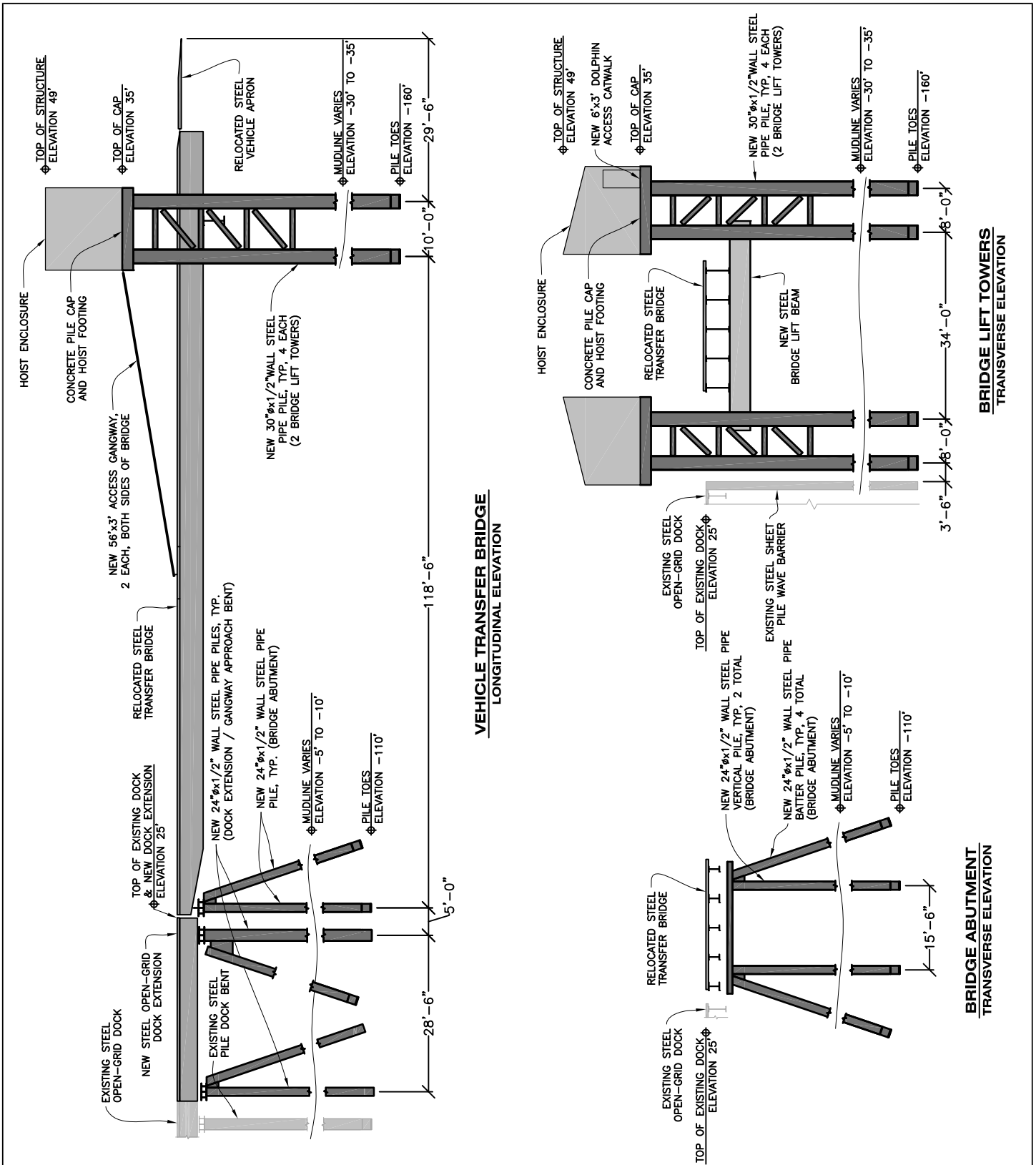

PROJECT PURPOSE:
MODIFY EXISTING DOCK & BRIDGE
REPLACE MARINE STRUCTURES

ADJACENT PROPERTY OWNERS:
STATE OF ALASKA

TRANSFER BRIDGE AND LIFT TOWERS

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

GUSTAVUS FERRY TERMINAL IMPROVEMENTS
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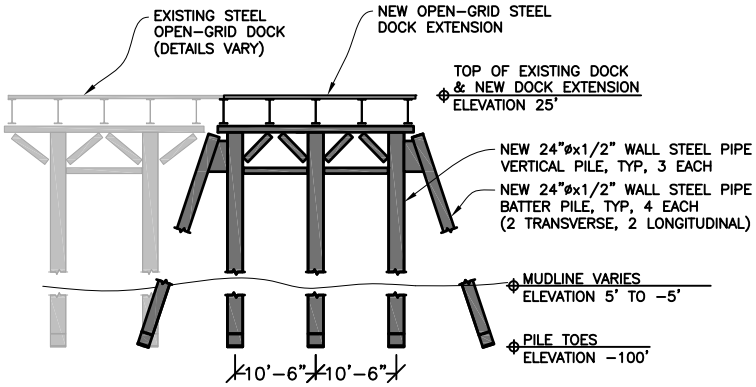

TYP 3-PILE DOCK BENT
FRONT ELEVATION
(2 BENTS TOTAL)

PILE DATA

LOCATION	ORIENTATION	SIZE	QUANTITY
APPROACH DOCK EXTENSION	VERTICAL	24" x0.500"	16
APPROACH DOCK EXTENSION	BATTER	24" x0.500"	18
TRANSFER BRIDGE ABUTMENT	VERTICAL	24" x0.500"	2
TRANSFER BRIDGE ABUTMENT	BATTER	24" x0.500"	4
BRIDGE LIFT TOWERS	VERTICAL	30" x0.500"	8
HARBOR ACCESS FLOAT	VERTICAL	30" x0.500"	6
TIMBER LOG FLOAT	VERTICAL	12.75" x0.500"	3

PROJECT PURPOSE:
MODIFY EXISTING DOCK & BRIDGE
REPLACE MARINE STRUCTURES

ADJACENT PROPERTY OWNERS:
STATE OF ALASKA

DOCK EXPANSION BENT AND PILE DATA

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

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APPENDIX A
Marine Mammal Observation Record Form

APPENDIX A

Example Data Sheet

Marine Mammal Observation Record Form										Observer(s):			Date:
Boat Name/Location:				Time Effort Initiated:									
				Time Effort Completed:						Page _____ of _____ Pages			
Project Name	**Sighting #**	**Sighting Time**	**Latitude**	**Longitude**	**Species**	**# of Anim**	**Dist/Dir to Anim**	**Beh Type(s)**	**Const Type**	**Dist to Pile**	**Weath Cond**	**Beauf**	**Notes**