

MEMORANDUM



Date: January 12, 2021

To: Christy Gentemann, DOT&PF

From: Robin Reich and Emerald Hagy, Solstice Alaska Consulting, Inc.

Subject: Tongass Narrows Ferry Berth Improvements: Phase 1
Implications of Increasing the Numbers of Pile Installed per Day

Currently, an Incidental Harassment Authorization (IHA) for the Tongass Narrows Ferry Berth Improvements: Phase 1 authorizes a maximum of 3 piles per day to be installed via impact and vibratory hammering. The contractor approached the Alaska Department of Transportation and Public Facilities (DOT&PF) requesting approval to install up to six piles per day. DOT&PF requested Solstice Alaska Consulting (Solstice) to determine the implications of installing eight (8) piles a day to underwater sound and associated marine mammal impacts.

The purpose of this memorandum is to summarize the changes in Level A pile driving shutdown distances for vibratory hammer and impact hammer installation of 8 piles per day. Sound propagation and the distances to the sound isopleths defined by National Marine Fisheries Service (NMFS) for Level A harassment of marine mammals under the current Technical Guidance were determined using the User Spreadsheet developed by NMFS.

General Notes

- Distances to the Level A sound isopleths under the 8 pile per day scenario were calculated using the identical sound source levels used in the final IHA application.
- Distances to the Level B sound isopleths were not determined since the NMFS model does not incorporate piles per day as a variable.
- Number of piles per day were increased from three (3) to eight (8).
- Calculated distances to the Level A sound isopleths in the IHA application were rounded to the nearest whole number or interval of five.
- Vibratory hammer distances to the Level A sound isopleth with 8 piles per day remained approximately the same for all hearing groups.
- Mid-frequency cetaceans and otariids would not see a change to their impact hammering Level A sound isopleth distance increases.
- The low-frequency cetacean, high-frequency cetacean, and phocid hearing groups saw Level A sound isopleth distance increases with impact hammering 8 piles per day between 550 meters and 20 meters, depending on hearing group.



Vibratory Hammer Installation

- Due to rounding up to 50 meters, the new vibratory hammer distances remained within the original Level A sound isopleth distances.

Impact Hammer Installation

- There were no changes to the mid-frequency cetaceans or otariids' original Level A sound isopleth distances.
- The low-frequency cetacean (humpback whale and minke whale), high-frequency cetacean (Dall's porpoise and harbor porpoise), and phocid (harbor seal) hearing groups surpassed the previously authorized Level A sound isopleth distances. See Table 1 on page 4.
 - **Low-frequency cetacean** Level A shutdown distances with 8 piles impacted per day increased to approximately (compared to 3 piles/day distance):
 - **30-inch** piles with 200 strikes= **1,000 meters from 550 meters** (increased distance= 450 m)
 - **24-inch** piles with 200 strikes= **545 meters from 300 meters** (increased distance=245 m)
 - **18-inch** piles with 50 strikes= **220 meters from 150 meters** (increased distance= 70 m)
 - **High-frequency cetacean** Level A shutdown distances with 8 piles impacted per day increased to approximately (compared to 3 piles/day distance):
 - **30-inch** piles with 200 strikes= **1,200 meters from 650 meters** (increased distance=550 m)
 - **24-inch** piles with 200 strikes= **650 meters from 340 meters** (increased distance=310)
 - **18-inch** piles with 50 strikes= **260 meters from 150 meters** (increased distance=110 m)
 - **Phocid** Level A shutdown distances with 8 piles impacted per day increased to approximately:
 - **30-inch** piles with 200 strikes= **540 meters from 300** (increased distance=240 m)
 - **24-inch** piles with 200 strikes= **300 meters from 200 meters** (increased distance=100 m)
 - **18-inch** piles with 50 strikes= **120 meters from 100 meters** (increased distance=20 m)
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Level A Shutdowns and Take Implications with 8 piles per day

- There are currently no authorized takes for low-frequency cetaceans (humpback whales or minke whales) under the IHA. The impact pile driving shutdown distance would be

up to 280 meters wider. It is possible that with a wider level A area more shutdowns would be needed, particularly if the “resident” humpback continues to visit the project area.

- There are currently 15 authorized takes of Dall’s porpoise and harbor porpoise (high frequency cetaceans) for the project. The impact pile driving Level A take distance would be up to 550 meters wider. It is possible that with a wider level A area all the takes could be used before the project is completed.
- There are currently 18 authorized harbor seal (phocid) takes under the IHA. The impact pile driving Level A take distance would be up to 240 meters wider. It is possible that with a wider level A area all the takes could be used before the project is completed.

Table 1. NMFS Approved Shutdown Zones and New Calculated Distances for Installation of 8 and 6 piles per day (red numbers show new distances)

| Activity | Pile Size (Inches) | Minutes per pile or Strikes per Pile | Piles Installed or Removed per Day | Level B Harassment Isoleth (m) | Shutdown Distances (m) | | | | | | | | | | |
|------------------------|----------------------------------|--------------------------------------|------------------------------------|--------------------------------|------------------------|----------|-------|-------|-------|-------|-----|----|-----|----|----|
| | | | | | LF | LF | MF | MF | HF | HF | PW | PW | OW | OW | |
| Vibratory Installation | 30 | 30 min | 8 | 6,310 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 |
| | | | 6 | | | | | | | | | | | | |
| | 24, 18 | 30 min | 8 | 5,420 | | | | | | | | | | | |
| | | | 6 | 5,420 | | | | | | | | | | | |
| | 27.6 sheet pile, 30.3 sheet pile | 15 min | 10 | 4,650 | | | | | | | | | | | |
| Vibratory Removal | 24, 16 | 30 min | 5 | 5,420 | | | | | | | | | | | |
| Drilling Rock Sockets | 30 | 180 min | 3 | 12,030 | 70 | | 50 | | 60 | | 50 | | | | |
| | 24, 18 | 120 min | 3 | | 60 | 50 | | | | 50 | | | | | |
| Impact Installation | 30 | 50 strikes | 3 | 2,160 | 250 | | 50 | | 250 | | 150 | | 50 | | |
| | | | 2 | | 200 | | 200 | | 100 | | 50 | | | | |
| | | | 1 | | 100 | | 150 | | 100 | | 50 | | | | |
| | | 100 strikes | 6 | | 522.6 | 18.6 | 622.5 | 279.7 | 20.4 | | | | | | |
| | | 8 | 1,005 | | 35.7 | 1,197.10 | 537.8 | 39.2 | | | | | | | |
| | | 200 strikes | 6 | | 829.6 | 29.5 | 988.2 | 444 | 32.3 | | | | | | |
| | | | 3 | | 550 | 650 | 300 | 50 | | | | | | | |
| | | | 2 | | 400 | 500 | 250 | 50 | | | | | | | |
| | | | 1 | | 300 | 300 | 150 | 50 | | | | | | | |
| | | 24 | 50 strikes | | 3 | 1,000 | 150 | | 50 | | 150 | | 100 | | 50 |
| | 2 | | | 100 | | | 150 | | 50 | | 50 | | | | |
| | 1 | | | 100 | | | 100 | | 50 | | 50 | | | | |
| | 100 Strikes | | 6 | 282.8 | 10.1 | | 338.9 | 161.4 | 11 | | | | | | |
| | 8 | | 543.9 | 19.3 | 647.8 | | 291 | 21.2 | | | | | | | |
| | 200 strikes | | 6 | 448.9 | 16 | | 534.8 | 240.3 | 17.5 | | | | | | |
| | | | 3 | 300 | 350 | | 200 | 50 | | | | | | | |
| | | | 2 | 250 | 300 | | 150 | 50 | | | | | | | |
| | | | 1 | 150 | 200 | | 100 | 50 | | | | | | | |
| | 18 | | 50 strikes | 8 | 50 | | 215.8 | 7.7 | 257.1 | 115.5 | 8.4 | | | | |
| | | 6 | | 178.2 | | 6.3 | 212.2 | 95.3 | 6.9 | | | | | | |
| 3 | | 150 | | 150 | | 100 | 50 | | | | | | | | |
| 2 | | 100 | 150 | 50 | | 50 | | | | | | | | | |
| 1 | | 100 | 100 | 50 | | 50 | | | | | | | | | |
| 25 Strikes | | 6 | 112.2 | 4 | | 133.7 | 80.1 | 4.4 | | | | | | | |

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| Permitted Distances |
| New Distances with 6 piles/day |
| Distances outside of permit |

