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DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

RIN 0648-XR009

Taking of Marine Mammals Incidental to Specific Activities; Taking of Marine Mammals Incidental to Pile Driving Activities during Construction of a Ferry Terminal at Seaplane Lagoon, Alameda Point, San Francisco, California

AGENCY: National Marine Fisheries Service (NMFS), National Oceanic and Atmospheric Administration (NOAA), Commerce.

ACTION: Notice; issuance of an incidental harassment authorization.

SUMMARY: In accordance with the regulations implementing the Marine Mammal Protection Act (MMPA) as amended, notification is hereby given that NMFS has issued an incidental harassment authorization (IHA) to the City of Alameda (City) to incidentally harass, by Level A and B harassment only, marine mammals during pile driving and removal activities during construction of a ferry terminal at Seaplane Lagoon, Alameda Point, San Francisco, California.

DATES: This Authorization is effective from August 20, 2019 through August 19, 2020.

FOR FURTHER INFORMATION CONTACT: Stephanie Egger, Office of Protected Resources, NMFS, (301) 427-8401. Electronic copies of the application and supporting documents, as well as a list of the references cited in this document, may be obtained online at: *https://www.fisheries.noaa.gov/permit/incidental-take-authorizations-under-marine-mammal-protection-act*. In case of problems accessing these documents, please call the contact listed above.

SUPPLEMENTARY INFORMATION:

Background

The MMPA prohibits the "take" of marine mammals, with certain exceptions. Sections 101(a)(5)(A) and (D) of the MMPA (16 U.S.C. 1361 *et seq*.) direct the Secretary of Commerce (as delegated to NMFS) to allow, upon request, the incidental, but not intentional, taking of small numbers of marine mammals by U.S. citizens who engage in a specified activity (other than commercial fishing) within a specified geographical region if certain findings are made and either regulations are issued or, if the taking is limited to harassment, a notice of a proposed incidental take authorization may be provided to the public for review.

Authorization for incidental takings shall be granted if NMFS finds that the taking will have a negligible impact on the species or stock(s) and will not have an unmitigable adverse impact on the availability of the species or stock(s) for taking for subsistence uses (where relevant). Further, NMFS must prescribe the permissible methods of taking and other "means of effecting the least practicable adverse impact" on the affected species or stocks and their habitat, paying particular attention to rookeries, mating grounds, and areas of similar significance, and on the availability of such species or stocks for taking for certain subsistence uses (referred to in shorthand as "mitigation"); and requirements pertaining to the mitigation, monitoring and reporting of such takings are set forth.

Summary of Request

On February 22, 2019, NMFS received a request from the City for an IHA to take marine mammals incidental to pile driving activities during construction of a ferry terminal in Seaplane Lagoon, Alameda, California. The application was deemed adequate and complete on June 28, 2019. The applicant's request was for take seven species of marine mammals by Level B

harassment only. Neither the City nor NMFS expects serious injury or mortality to result from this activity and, therefore, an IHA is appropriate.

Description of Activity

Seaplane Lagoon is located at the western end of Alameda Island within the 150-acre Waterfront Town Center area of Alameda Point and on the former Alameda Point Naval Air Station in Alameda, California. The project area is located along the eastern shoreline of Seaplane Lagoon, west of Ferry Point, south of West Atlantic Avenue, and north of West Oriskany Avenue. The purpose of this project is to provide facilities to expand the existing ferry service from Alameda and Oakland to San Francisco in order to address the limited capacity at the existing Main Street Ferry Terminal, accommodate the anticipated increase in demand for ferry service from Alameda to San Francisco due to planned development of the Alameda Point Project, and to provide enhanced emergency response services to Alameda in the event of transbay service disruptions.

Project construction is expected begin in August 2019 and will be completed within approximately one year of initiation. All of the in-water work (float installation with piles and gangway) is expected to be completed within one environmental work season (August 20 to November 30). Approximately 24 total days of pile driving activities are estimated to occur, with 12 days of vibratory hammering installation and removal for template piles, 6 days of vibratory hammering for permanent piles, and 6 days of impact hammering for permanent piles.

A pier and abutment are required at the entrance to the ferry terminal to provide secure and safe entry from the land to the passenger access gangway. The pier will extend out from the abutment to provide sufficient depth for the ferry vessels and float. The abutment will be located on the shoreline and will consist of a concrete abutment (24 feet (ft) long by 3 ft wide) supported on steel piles. The pier will be placed in the water and consist of a cast-in-place concrete structure (83.1 ft long by 20 ft wide) supported on piles with a perimeter guardrail. Approximately six 24-inch (in) diameter octagonal concrete piles offshore of the revetment and four 24-in diameter steel piles inshore of the revetment will be used for the pier. The abutment and pier deck will be installed above the high tide line.

The pier will be covered by a canopy similar to those on other San Francisco Bay Area Water Emergency Transportation Authority (WETA) terminals in the San Francisco Bay Area. Dimensions would be longer than the pier by 16 ft (100 ft long by 20 ft wide), with an approximate height of 8.5 ft to 20 ft above the pier deck. The additional length would overhang the pier landside and shade the stairs up to the pier.

A gangway will connect the pier to the boarding float. The aluminum gangway (90 ft long by 10 ft wide) will be supported on the landside end of the pier by cantilevered seat supports, and the waterside end of the gangway will be supported by a boarding float. The finished walking surface, which will consist of fiberglass micromesh decking, will range in elevation from 8.4 ft at the pier to approximately 4.4 ft above the water surface on the boarding float.

The Seaplane Lagoon Ferry Terminal will include a boarding float where passengers will board and disembark from the ferry (see Figure 3 of the application). The float structure will be a steel pontoon barge (135 ft long by 42 ft wide by 8 ft deep) with internal compartments. Fenders

and mooring cleats will be located around the perimeter of the float to accommodate vessel berthing scenarios. The float will be held in position with an arrangement of four 36-in diameter steel guide piles and two 36-in diameter steel fender piles, totaling six piles.

Piles will be installed for the abutment, pier, and float. The 36-in steel piles will be installed with a vibratory hammer, 24-in concrete piles will be installed with an impact hammer, and 14-in steel template piles will be installed with a vibratory hammer (see Table 1 below). The abutment piles will be installed from the landside, and are expected to require an impact hammer to penetrate the underlying material. Four steel piles (the abutment piles) will be installed above the high tide line and therefore are not discussed further.

Template piles will be used to support the in-water piles. These will consist of 12 to 18 14-in steel H-type piles (see Table 1 below). One template typically includes four piles, but up to six template piles would be used at one time.

(see Table 1 below).

Table 1. Pile driving and removal activities for Seaplane Lagoon Ferry Terminal.

Description	Project Component			
	Temporary Template Pile Installation	**Temporary Template Pile Removal**	**Permanent Pile Installation**	**Permanent Pile Installation**
Diameter of Steel Pile (inches)	14	14	24	36
# of Piles	18	18	6	6
Vibratory Pile Driving				
Total Quantity	18	18	0	6
Max # Piles Vibrated per Day	6	6	0	1
Impact Pile Driving				
Total Quantity	0	0	6	0

Max # Piles Impacted per Day	0	0	1	0

Further details of the planned DPD project is provided in the **Federal Register** notice for the proposed IHA (84 FR 34347; July 18, 2019).

Comments and Responses

A notice of NMFS's proposal to issue an IHA to the City was published in the **Federal Register** on July 18, 2019 (84 FR 34347). That notice described, in detail, the City's activity, the marine mammal species that may be affected by the activity, and the anticipated effects on marine mammals. During the 30-day public comment period, NMFS received comments from the Marine Mammal Commission (Commission). The Commission recommended that NMFS issue the IHA, subject to inclusion of the mitigation, monitoring, and reporting measures.

Comment: The Commission informally noted there were specification missing or incorrect in the proposed hydroacoustic monitoring plan, including number of piles monitored, farfield measurements, frequency range of the hydrophone, and collection of background sound

Response: NMFS discussed these items with the Commission during the comment period and have confirmed the following changes. Two piles from each pile type will be monitored. For impact installation, two 24-in concrete piles, for vibratory installation, 36-in steel piles, and for vibratory installation and extraction, two H-piles will be monitored. The far-field hydrophone will be located at least 1 km from the 36-in piles during vibratory installation to better assess the extent of the Level B harassment zone. The City will conduct recordings from 10 Hz to 20 kHz. Further, the City will collect background sound measurements continuously for 10 minutes prior to pile driving. NMFS has confirmed that the various additions and revisions are included in the final authorization and the hydroacoustic monitoring plan.

Comment: The Commission indicated in previous letter that NMFS should consult with scientists and acousticians to determine the appropriate accumulation time that action proponents should use to determine the extent of the Level A harassment zones based on the associated SELcum thresholds in such situations. The Commission understands that NMFS has formed an internal committee to address this issue and is consulting with external acousticians and modelers as well. The Commission continues to believe that animat modeling, that considers various operational and animal scenarios, is the best way to determine the appropriate accumulation time. More importantly, animat modeling could directly inform or be incorporated into NMFS's user spreadsheet that currently estimates the Level A harassment zones. Commission recommends that NMFS continue to make this issue a priority to resolve in the near future and consider incorporating animat modeling into its user spreadsheet.

Response: As described in NMFS 2018 *Revision to Technical Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing*, NMFS is committed to re-examining the default 24-hour accumulation period and continues to work with the internal committee to investigate alternative means of identifying appropriate accumulation periods.

Comment: The Commission recommends that, for all relevant incidental take authorizations, NMFS refrain from using a source level reduction factor for sound attenuation device implementation during impact pile driving due to the different noise level reduction.

Response: While it is true that noise level reduction measured at different received ranges does vary, given that both Level A and Level B estimation using geometric modeling is based on noise levels measured at near-source distances (approximately 10m), NMFS believes it reasonable to use a source level reduction factor for sound attenuation device implementation during impact pile driving. In the case of the San Francisco-Oakland Bay Bridge impact driving

isopleth estimates using an air bubble curtain for source level reduction, NMFS reviewed Caltrans' bubble curtain "on and off" studies conducted in San Francisco Bay in 2003 and 2004. The equipment used for bubble curtains has likely improved since 2004 but due to concerns for fish species, Caltrans has not able to conduct "on and off" tests recently. Based on 74 measurements (37 with the bubble curtain on and 37 with the bubble curtain off) at both near (< 100 m) and far (> 100 m) distances, the linear averaged received level reduction is 6 dB. If limiting the data points (a total of 28 measurements, with 14 during bubble curtain on and 14 during bubble curtain off) to only near distance measurements, the linear averaged noise level reduction is 7 dB. Based on this analysis, we conclude that there is not a significant difference of source level reduction between near and far-distance measurements. As a conservative approach, NMFS used the reduction of 7 dB of the source level for impact zone estimates.

NMFS will evaluate the appropriateness of using a certain source level reduction factor for sound attenuation device implementation during impact pile driving for all relevant incidental take authorizations when more data become available. Nevertheless at this point, we think it appropriate that a 7 dB reduction is reasonable to be used as a source level reduction factor for impact pile driving using an air bubble curtain system.

Comment: The Commission questioned whether the public notice provisions for IHA Renewals fully satisfy the public notice and comment provision in the MMPA and discussed the potential burden on reviewers of reviewing key documents and developing comments quickly. Additionally, the Commission recommended that NMFS use the IHA Renewal process sparingly and selectively for activities expected to have the lowest levels of impacts to marine mammals and that require less complex analysis.

Response: NMFS has responded to these comments previously and refers the reader to the comment responses included in the final notice of the issuance of an IHA to Avangrid Renewables, LLC (84 FR 31035-31036, June 28, 2019).

Comment: The Commission claims that NMFS did not have sufficient time to review public comments or to revise the proposed IHA accordingly. The Commission recommended that NMFS (1) delay issuance of the Final IHA until it has thoroughly reviewed and assessed the Commission's recommendations and any comments from the public and revised the authorization accordingly and (2) take all steps necessary in the future to ensure that it publishes and finalizes IHAs far enough in advance of the planned start date of the project activities to ensure full consideration is given to comments received

Response: NMFS thanks the Commission for its concerns regarding the IHA process. NMFS had sufficient time and we thoroughly reviewed the comments received. We made all appropriate revisions to the final IHA.

Changes from the Proposed IHA to Final IHA

As described in the **Federal Register** notice for the proposed IHA (84 FR 34347; July 18, 2019), no estimated take by Level A harassment was proposed. After additional consideration, NMFS is authorizing six instances of take by Level A harassment of harbor seals, one instance of take for each day during the six days of impact pile driving. The permanent threshold shift (PTS) ispopleth is 28.5 m for harbor seals during impact pile driving, but because there is a nearby haulout, it is possible that a harbor seal could enter the Level A harassment zone before it was detected and the City is able to shutdown.

As discussed above in the *Comments and Responses* section above, changes were made to the hydoacoustic monitoring plan to clarify monitoring. Two piles from each pile type will be

monitored. For impact installation, two 24-in concrete piles, for vibratory installation, 36-in steel piles, and for vibratory installation and extraction, two H-piles will be monitored. The far-field hydrophone will be located at least 1 km (or as close to 1 km as possible due to access) from the 36-in piles during vibratory installation to better assess the extent of the Level B harassment zone. The City will conduct recordings from 10 Hz to 20 kHz. Further, the City will collect background sound measurements continuously for 10 minutes prior to pile driving. NMFS has confirmed that the various additions and revisions are included in the final authorization and the hydroacoustic monitoring plan.

Description of Marine Mammals in the Area of Specified Activities

Sections 3 and 4 of the application summarize available information regarding status and trends, distribution and habitat preferences, and behavior and life history, of the potentially affected species. Additional information regarding population trends and threats may be found in NMFS's Stock Assessment Reports (SARs; *https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessments*) and more general information about these species (*e.g.*, physical and behavioral descriptions) may be found on NMFS's website (*https://www.fisheries.noaa.gov/find*-species).

Table 2 lists all species with expected potential for occurrence in the project area and summarizes information related to the population or stock, including regulatory status under the MMPA and ESA and potential biological removal (PBR), where known. For taxonomy, we follow Committee on Taxonomy (2016). PBR is defined by the MMPA as the maximum number of animals, not including natural mortalities, that may be removed from a marine mammal stock while allowing that stock to reach or maintain its optimum sustainable population (as described in NMFS's SARs). While no mortality is anticipated or authorized here, PBR and annual serious

injury and mortality from anthropogenic sources are included here as gross indicators of the status of the species and other threats.

Marine mammal abundance estimates presented in this document represent the total number of individuals that make up a given stock or the total number estimated within a particular study or survey area. NMFS's stock abundance estimates for most species represent the total estimate of individuals within the geographic area, if known, that comprises that stock. For some species, this geographic area may extend beyond U.S. waters. All managed stocks in this region are assessed in NMFS's U.S. Pacific and SARs (Carretta *et al*., 2018). All values presented in Table 2 are the most recent available at the time of publication (the SARS available online at: *https://www.fisheries.noaa.gov/national/marine-mammal-protection/draft-marine-mammal-stock-assessment-reports*).

Table 2. Marine Mammal Occurrence in the Project Area.

Common name	Scientific name	Stock	ESA/MMPA status; Strategic (Y/N)[1]	Stock abundance (CV, Nmin, most recent abundance survey)[2]	PBR	Annual M/SI[3]
Order Cetartiodactyla – Cetacea – Superfamily Mysticeti (baleen whales)						
Family Eschrichtiidae						
Gray whale	*Eschrichtius robustus*	Eastern North Pacific	-/- ; N	26,960 (0.05, 25,849, 2016)	801	138
Family Balaenopteridae (rorquals)						
Humpback whale	*Megaptera novaeangliae*	California/Oregon/Washington	E/D ; Y	2,900 (0.048, 2,784, 2014)	16.7 (U.S. waters)	18.8
Superfamily Odontoceti (toothed whales, dolphins, and porpoises)						
Family Delphinidae						
Bottlenose dolphin	*Tursiops truncatus*	California Coastal	-/- ; N	453 (0.06, 346, 2011)	2.7	> 2
Family Phocoenidae (porpoises)						
Harbor porpoise	*Phocoena phocoena*	San Francisco-Russian River	-/- ; N	9,886 (0.51, 6,625, 2011)	66	0
Order Carnivora – Superfamily Pinnipedia						

Family Otariidae (eared seals and sea lions)						
California sea lion	*Zalophus californianus*	U.S.	-/- ; N	257,606 (n/a, 233,515, 2014)	14,011	≥319
Northern fur seal	*Callorhinus ursinus*	California	-/- ; N	14,050 (n/a, 7,524, 2013)	451	1.8
		Eastern North Pacific	-/- ; N	626,734 (n/a., 530,474, 2014)	11,405	1.1
Guadalupe fur seal	*Arctocephalus townsendi*	Mexico to California	T/D ; Y	20,000 (n/a, 15,830, 2010)	542	> 3.2
Family Phocidae (earless seals)						
Pacific harbor seal	*Phoca vitulina richardii*	California	-/- ; N	30,968 (n/a, 27,348, 2012)	1,641	43
Northern elephant seal	*Mirounga angustirostris*	California Breeding	-/- ; N	179,000 (n/a, 81,368, 2010)	4,882	8.8

1 - Endangered Species Act (ESA) status: Endangered (E), Threatened (T)/MMPA status: Depleted (D). A dash (-) indicates that the species is not listed under the ESA or designated as depleted under the MMPA. Under the MMPA, a strategic stock is one for which the level of direct human-caused mortality exceeds PBR or which is determined to be declining and likely to be listed under the ESA within the foreseeable future. Any species or stock listed under the ESA is automatically designated under the MMPA as depleted and as a strategic stock.
2- NMFS marine mammal stock assessment reports online at: www.nmfs.noaa.gov/pr/sars/. CV is coefficient of variation; Nmin is the minimum estimate of stock abundance. In some cases, CV is not applicable [explain if this is the case]
3 - These values, found in NMFS's SARs, represent annual levels of human-caused mortality plus serious injury from all sources combined (*e.g.*, commercial fisheries, ship strike). Annual M/SI often cannot be determined precisely and is in some cases presented as a minimum value or range. A CV associated with estimated mortality due to commercial fisheries is presented in some cases.
NOTE - Italicized species are not expected to be taken or authorized.

All species that could potentially occur in the project area are included in Table 2. However, the temporal and/or spatial occurrence of humpback whales and Guadalupe fur seals is such that take is not expected to occur, and they are not discussed further as this was previously explained in the **Federal Register** notice for the proposed IHA (84 FR 34347; July 18, 2019).

A detailed description of the of the species likely to be affected by the City's project, including brief introductions to the species and relevant stocks as well as available information regarding population trends and threats, and information regarding local occurrence, were provided in the **Federal Register** notice for the proposed IHA (84 FR 34347; July 18, 2019), since that time, we are not aware of any changes in the status of these species and stocks; therefore, detailed descriptions are not provided here. Please refer to that **Federal Register**

notice for these descriptions. Please also refer to NMFS' website (*https://www.fisheries.noaa.gov/find-species*) for generalized species accounts.

Potential Effects of Specified Activities on Marine Mammals and their Habitat

Acoustic effects on marine mammals during the specified activity can occur from vibratory and impact pile driving. The effects of underwater noise from the City's planned activities have the potential to result in Level A and B harassment of marine mammals in the vicinity of the action area. The effects of pile driving on marine mammals are dependent on several factors, including the size, type, and depth of the animal; the depth, intensity, and duration of the pile driving sound; the depth of the water column; the substrate of the habitat; the standoff distance between the pile and the animal; and the sound propagation properties of the environment. With both types, it is likely that the pile driving could result in temporary, short term changes in an animal's typical behavioral patterns and/or avoidance of the affected area. The **Federal Register** notice for the proposed IHA (84 FR 34347; July 18, 2019), included a discussion of the effects of anthropogenic noise on marine mammals, therefore that information is not repeated here; please refer to the **Federal Register** notice (84 FR 34347; July 18, 2019).

Anticipated Effects on Marine Mammal Habitat

The main impact issue associated with the planned activity would be temporarily elevated sound levels and the associated direct effects on marine mammals. The most likely impact to marine mammal habitat occurs from pile driving effects on likely marine mammal prey (*i.e.*, fish) near where the piles are installed. Impacts to the immediate substrate during installation and removal of piles are anticipated, but these would be limited to minor, temporary suspension of sediments, which could impact water quality and visibility for a short amount of time, but which would not be expected to have any effects on individual marine mammals. Impacts to substrate

are therefore not discussed further. These potential effects are discussed in detail in the **Federal Register** notice for the proposed IHA (84 FR 34347; July 18, 2019); therefore, that information is not repeated here; please refer to that **Federal Register** notice for that information.

Estimated Take

This section provides an estimate of the number of incidental takes authorized through this IHA, which will inform both NMFS' consideration of "small numbers" and the negligible impact determination.

Except with respect to certain activities not pertinent here, section 3(18) of the MMPA defines "harassment" as any act of pursuit, torment, or annoyance, which (i) has the potential to injure a marine mammal or marine mammal stock in the wild (Level A harassment); or (ii) has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering (Level B harassment).

Take of marine mammals incidental to the City's pile driving and removal activities could occur as a result of Level A and B harassment. Below we describe how the potential take is estimated. As described previously, no mortality is anticipated or authorized for this activity. Below we describe how the take is estimated.

Generally speaking, we estimate take by considering: (1) acoustic thresholds above which NMFS believes the best available science indicates marine mammals will be behaviorally harassed or incur some degree of permanent hearing impairment; (2) the area or volume of water that will be ensonified above these levels in a day; (3) the density or occurrence of marine mammals within these ensonified areas; and, (4) and the number of days of activities. We note that while these basic factors can contribute to a basic calculation to provide an initial prediction

of takes, additional information that can qualitatively inform take estimates is also sometimes available (*e.g.*, previous monitoring results or average group size). Below, we describe the factors considered here in more detail and present the take estimate.

Acoustic Thresholds

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

Level B Harassment – Though significantly driven by received level, the onset of behavioral disturbance from anthropogenic noise exposure is also informed to varying degrees by other factors related to the source (*e.g.*, frequency, predictability, duty cycle), the environment (*e.g.*, bathymetry), and the receiving animals (hearing, motivation, experience, demography, behavioral context) and can be difficult to predict (Southall *et al.*, 2007, Ellison *et al.*, 2012). Based on what the available science indicates and the practical need to use a threshold based on a factor that is both predictable and measurable for most activities, NMFS uses a generalized acoustic threshold based on received level to estimate the onset of behavioral harassment. NMFS predicts that marine mammals are likely to be behaviorally harassed in a manner we consider Level B harassment when exposed to underwater anthropogenic noise above received levels of 120 dB re 1 μPa (rms) for continuous (*e.g.*, vibratory pile driving) and above 160 dB re 1 μPa (rms) for impulsive sources (*e.g.*, impact pile driving). The City's planned activity includes the use of continuous (vibratory pile driving) and impulsive (impact pile driving) sources, and therefore the 120 and 160 dB re 1 μPa (rms) are applicable.

Level A harassment - NMFS' *Technical Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing* (Version 2.0) (Technical Guidance, 2018) identifies dual criteria to assess auditory injury (Level A harassment) to five different marine mammal groups (based on hearing sensitivity) as a result of exposure to noise. The technical guidance identifies the received levels, or thresholds, above which individual marine mammals are predicted to experience changes in their hearing sensitivity for all underwater anthropogenic sound sources, and reflects the best available science on the potential for noise to affect auditory sensitivity by:

- Dividing sound sources into two groups (*i.e.*, impulsive and non-impulsive) based on their potential to affect hearing sensitivity;
- Choosing metrics that best address the impacts of noise on hearing sensitivity, *i.e.*, sound pressure level (peak SPL) and sound exposure level (SEL) (also accounts for duration of exposure); and
- Dividing marine mammals into hearing groups and developing auditory weighting functions based on the science supporting that not all marine mammals hear and use sound in the same manner.

These thresholds were developed by compiling and synthesizing the best available science, and are provided in Table 3 below. The references, analysis, and methodology used in the development of the thresholds are described in NMFS 2018 Technical Guidance, which may be accessed at *https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-acoustic-technical-guidance*.

The City's pile driving and removal activity includes the use of impulsive (impact pile driving) and non-impulsive (vibratory pile driving and removal) sources.

Table 3. Thresholds identifying the onset of Permanent Threshold Shift (Auditory Injury).

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

* Dual metric acoustic thresholds for impulsive sounds: Use whichever results in the largest isopleth for calculating PTS onset. If a non-impulsive sound has the potential of exceeding the peak sound pressure level thresholds associated with impulsive sounds, these thresholds should also be considered.

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

Ensonified Area

Here, we describe operational and environmental parameters of the activity that will feed into identifying the area ensonified above the acoustic thresholds, which include source levels and transmission loss coefficient.

Sound Propagation

Transmission loss (TL) is the decrease in acoustic intensity as an acoustic pressure wave propagates out from a source. TL parameters vary with frequency, temperature, sea conditions, current, source and receiver depth, water depth, water chemistry, and bottom composition and topography. The general formula for underwater TL is:

$TL = B * \log_{10}(R_1/R_2)$, where

B = transmission loss coefficient (assumed to be 15)

R_1 = the distance of the modeled SPL from the driven pile, and

R_2 = the distance from the driven pile of the initial measurement.

This formula neglects loss due to scattering and absorption, which is assumed to be zero here. The degree to which underwater sound propagates away from a sound source is dependent on a variety of factors, most notably the water bathymetry and presence or absence of reflective or absorptive conditions including in-water structures and sediments. Spherical spreading occurs in a perfectly unobstructed (free-field) environment not limited by depth or water surface, resulting in a 6 dB reduction in sound level for each doubling of distance from the source (20*log(range)). Cylindrical spreading occurs in an environment in which sound propagation is bounded by the water surface and sea bottom, resulting in a reduction of 3 dB in sound level for each doubling of distance from the source (10*log(range)). As is common practice in coastal waters, here we assume practical spreading loss (4.5 dB reduction in sound level for each doubling of distance). Practical spreading is a compromise that is often used under conditions where water depth increases as the receiver moves away from the shoreline, resulting in an expected propagation environment that would lie between spherical and cylindrical spreading loss conditions.

Sound Source Levels

The intensity of pile driving sounds is greatly influenced by factors such as the type of piles, hammers, and the physical environment in which the activity takes place. There are source level measurements available for certain pile types and sizes from the similar environments recorded from underwater pile driving projects (CALTRANS 2015) that were evaluated and used as proxy sound source levels to determine reasonable sound source levels likely result from the City's pile driving and removal activities (Table 4). Many source levels used were more conservation as the values were from larger pile sizes.

Table 4. Predicted Sound Source Levels.

Activity	Sound Source Level at 10 meters	Sound Source
Vibratory Pile Driving/Removal		
14-in H pile steel pile temporary	155 SPL	CALTRANS 2015 (12-in H piles sound source value used, as no 14-in H pile sound source level is available)
36-in steel pile permanent	170 SPL	CALTRANS 2015
Impact Pile Driving		
24-in concrete pile permanent	166 SEL/176 SPL	CALTRANS 2015

Notes: These are unattentuated values, as the applicant proposes to use a bubble curtain for a 7dB reduction for impact driving.

Level A Harassment

When the NMFS Technical Guidance (2016) was published, in recognition of the fact that ensonified area/volume could be more technically challenging to predict because of the duration component in the new thresholds, we developed a User Spreadsheet that includes tools to help predict a simple isopleth that can be used in conjunction with marine mammal density or occurrence to help predict takes. We note that because of some of the assumptions included in the methods used for these tools, we anticipate that isopleths produced are typically going to be

overestimates of some degree, which may result in some degree of overestimate of Level A harassment take. However, these tools offer the best way to predict appropriate isopleths when more sophisticated 3D modeling methods are not available, and NMFS continues to develop ways to quantitatively refine these tools, and will qualitatively address the output where appropriate. For stationary sources (such as from impact and vibratory pile driving), NMFS User Spreadsheet predicts the closest distance at which, if a marine mammal remained at that distance the whole duration of the activity, it would not incur PTS. Inputs used in the User Spreadsheet (Tables 5 and 6), and the resulting isopleths are reported below (Table 7).

Table 5. NMFS Technical Guidance (2018) User Spreadsheet Input to Calculate PTS Isopleths for Vibratory Pile Driving.

USER SPREADSHEET INPUT –Vibratory Pile Driving **Spreadsheet Tab A.1 Vibratory Pile Driving Used.**		
	14-in H piles (temporary install/removal)	**36-in piles (permanent)**
Source Level (RMS SPL)	155	170
Weighting Factor Adjustment (kHz)	2.5	2.5
Number of piles within 24-hr period	6	1
Duration to drive a single pile (min)	4	20
Propagation (xLogR)	15	15
Distance of source level measurement (meters)$^{+}$	10	10

Table 6. NMFS Technical Guidance (2018) User Spreadsheet Input to Calculate PTS Isopleths for Impact Pile Driving.

USER SPREADSHEET INPUT – Impact Pile Driving Spreadsheet Tab E.1 Impact Pile Driving Used.	
	24-in concrete piles (permanent)
Source Level (Single Strike/shot SEL)	159*
Weighting Factor Adjustment (kHz)	2
Number of strikes per pile	3100
Number of piles per day	1
Propagation (xLogR)	15
Distance of source level measurement (meters)+	10

*this includes the 7dB reduction from use of a bubble curtain.

Table 7. NMFS Technical Guidance (2018) User Spreadsheet Outputs to Calculate Level A Harassment PTS Isopleths.

USER SPREADSHEET OUTPUT		**PTS isopleths (meters)**				
Activity	**Sound Source Level at 10 m**	**Level A harassment**				
		Low-Frequency Cetaceans	**Mid-Frequency Cetaceans**	**High-Frequency Cetaceans**	**Phocid**	**Otariid**
Vibratory Pile Driving/Removal						
14-in H pile steel installation /removal	155 dB SPL	1.5	0.1	2.2	0.9	0.1
36-in steel permanent installation	170 dB SPL	13.1	1.2	19.3	7.9	0.6
Impact Pile Driving						
24-in concrete permanent installation	166 SEL/176 SPL (159 dB SEL as attenuated)	53.3	1.9	63.5	28.5	2.1

Level B Harassment

Utilizing the practical spreading loss model, the City determined underwater noise will fall below the behavioral effects threshold of 120 dB rms for marine mammals at the distances shown in Table 8 for vibratory pile driving/removal. For calculating the Level B Harassment Zone for impact driving, the practical spreading loss model was used with a behavioral threshold of 160 dB rms for marine mammals at the distances shown in Table 8 for impact pile driving.

Table 8 below provides all Level B Harassment radial distances (m) and their corresponding areas (km^2) during the City's planned activities.

Table 8. Radial Distances (meters) to Relevant Behavioral Isopleths and Associated Ensonified Areas (square kilometers (km^2)) Using the Practical Spreading Model.

Activity	Received Level at 10 m	Level B Harassment Zone (m)*	Level B Harassment Zone (km^2)
Vibratory Pile Driving/Removal			
14-in H piles installation/removal	155 dB SPL	2,154	2.190
36-in steel permanent installation	170 dB SPL	21,544	21.49
Impact Pile Driving			
24-in concrete permanent installation	166 dB SEL/176 dB SPL (169 dB SPL attenuated)	39.8	0.004

Marine Mammal Occurrence and Take Calculation and Estimation

In this section we provide the information about the presence, density, or group dynamics of marine mammals that inform the take calculations. Potential exposures to impact pile driving and vibratory pile driving/removal for each acoustic threshold were estimated using group size estimates and local observational data to create a density estimate. As previously stated, take by Level B harassment only will be considered for this action. Distances to Level A harassment thresholds are relatively small and mitigation is expected to avoid Level A harassment from these activities.

Gray whales

There are no density estimates of gray whales available in the project area. Gray whales travel alone or in small, unstable groups, although large aggregations may be seen in feeding and breeding grounds (NMFS 2018). Gray whales are uncommon in the San Francisco Bay. It is estimated that approximately 2–6 individuals enter the bay in a typical year (CALTRANS 2018).

However nine gray whales have stranded in the San Francisco Bay in 2019 (Katz 2019). To be conservative, NMFS authorizes seven instances of take by Level B harassment of gray whales. Because the required shutdown measures are larger than the associated Level A harassment zones, and those zones are relatively small (53.3 m at the largest during impact pile driving), and activities will occur over a small number of days, we believe the PSO will be able to effectively monitor the Level A harassment zones and we do not anticipate take by Level A harassment of gray whales.

Bottlenose dolphin

There are no density estimates of Bottlenose dolphin available in the project area. Individuals in the San Francisco Bay are typically sighted near the Golden Gate Bridge, where an average of five dolphins enter the bay approximately three times annually. Two individuals are sighted regularly near Alameda Point, outside of the Seaplane Lagoon (CALTRANS 2018). Low numbers (ranging from 1 to 5) of individually identified coastal bottlenose dolphins have been seen along the southwest side of Alameda Island since July 2016. Much of the time, the dolphins were close to the south side of the main outer breakwater that separates the bay from the lagoon areas. The last reliable sighting there was April 7, 2019 of a single individual (TMMC, B. Keener pers. comm. 2019). For the purpose of this assessment it is predicted that two bottlenose dolphins may occur in the San Francisco Bay in the Project vicinity on all pile driving days (*i.e.*, up to 48 individuals in 24 days. Therefore, NMFS authorizes 48 instances of take of bottlenose dolphin by Level B harassment. The Level A harassment zones are all under 2 m for mid-frequency cetaceans; therefore, no take by Level A harassment is anticipated.

Harbor porpoise, Harbor seals, and California sea lions

In-water densities of harbor porpoises, harbor seals, California sea lions were calculated based on 17 years of observations during monitoring for the San Francisco Bay-Oakland Bay Bridge (SFOBB) construction and demolition project (Caltrans 2018). Care was taken to eliminate multiple observations of the same animal, although this can be difficult and is likely that the same individual may have been counted multiple times on the same day. The amount of monitoring performed per year varied, depending on the frequency and duration of construction activities with the potential to affect marine mammals. During the 257 days of monitoring from 2000 through 2017 (including 15 days of baseline monitoring in 2003), 1,029 harbor seals, 83 California sea lions, and 24 harbor porpoises were observed in waters in the project vicinity in total. In 2015, 2016, and 2017, the number of harbor seals in the project area increased significantly. A California sea lion density estimate of 0.161 animals/km^2 was calculated using the data from 2000-2017. In 2017, the number of harbor porpoise in the project area also increased significantly. Therefore, a harbor seal density estimate of 3.957 animals/km^2 was calculated using the 2015–2017 data. A harbor porpoise density estimate of 0.167 animals/km^2 was calculated using the 2017 data, which may better reflect the current use of the project area by these animals. These observations included data from baseline, pre-, during, and post-pile driving, mechanical dismantling, on-shore blasting, and off-shore implosion activities.

In addition to the information provided above regarding harbor seal density estimates, harbor seals are known to use the tip of Breakwater Island, which is located approximately 1.0 mile southwest of the project area, as a haulout site. These seals forage in the project area as well (WETA 2011). In recent years, up to 32 harbor seals have been observed making irregular use of the Breakwater Island haulout (AECOM 2017). The City of Alameda has also recently installed a haulout platform approximately 0.5 mile southeast of the site. Although these locations are not

considered primary haulouts for harbor seals due to the relatively low numbers of individuals that are present, Breakwater Island and the City haulout platform are reportedly the only haulout sites in the central Bay that are accessible to seals throughout the full tidal range.

A local group of Alameda Point Harbor Seal Monitors regularly counts the number of harbor seals at Alameda Point, and based on count data from 2014 to 2019 an average of 11.7 harbor seals is present at Alameda Point year-round (Bangert pers. comm. 2019 in the application). However, the numbers of harbor seals present in the area varies considerably with season, with higher numbers in the winter due to the presence of spawning Pacific herring (*Clupea pallasii*) in the San Francisco Bay. Project pile driving activities will occur during the months of August and September, and therefore we estimated the average number of harbor seals based on count data these months only. The data summary indicated that the numbers of harbor seals present at Alameda increased in 2017 and 2018 compared to 2015 and 2016, and therefore only count data from 2017 and 2018 was used to ensure that the density estimate reflects current conditions. The average number of harbor seals counted at Alameda Point in August and September of 2017 and 2018 was 6.5 individuals. These densities described above for harbor porpoise, harbor seals, and California sea lions are then used to calculate estimated take and described in the sub-sections below for these species.

Harbor porpoise

A predicted density of 0.167 animals/km^2 based for harbor porpoise was used to estimate take (Table 9). The estimated take was calculated using this density multiplied by the area ensonified above the threshold multiplied by the number of days per activity (*e.g.*, 6 days of impact pile driving) (Table 9). Therefore, a total of 26 instances of take by Level B harassment are authorized for harbor porpoise. Because the required shutdown measures are larger than the

associated Level A harassment zones, and the harassment zones are not very larger (63.5 m at the largest during impact pile driving), and will only occur over a small number of days, we believe the PSO can effectively monitor the Level A harassment zones and therefore we do not anticipate take by Level A harassment of harbor porpoise.

Table 9. Estimated Take by Level B Harassment of Harbor Porpoise.

Source	**Density (animals/km^2)**	**Area (km^2)**	**Days of Activity**	**Take by Level B Harassment**
Vibratory Installation and Removal 14-in H piles	0.167	2.190	12	4.389
Vibratory 36-in piles	0.167	21.490	6	21.533
Impact 24-in piles	0.167	0.004	6	0.004
Total Take by Level B harassment				25.926 (rounded to 26)

Harbor Seal

A predicted a density of 3.957 animals/km^2 for harbor seals was used to estimate take by Level B harassment (Table 10). This density should account for harbor seals exposed in the water while moving to and from the breakwater haulout since those animals would be in the bay and accounted for by the density estimate. The estimated take was calculated using this density multiplied by the area ensonified above the threshold multiplied by the number of days per activity (*e.g.*, 6 days of impact pile driving) (Table 10). Therefore, a total of 615 instances of take by Level B harassment are authorized for harbor seals.

As discussed in the *Changes from the Proposed IHA to the Final IHA* section we reconsidered Level A harassment for harbor seals during impact pile driving. Although the PTS isopleths are small (28.5 m at the largest during impact pile driving), it is possible a harbor seal could pop up in the Level A harassment zone without being detected and before a PSO could

communicate a shutdown to the contractor. Therefore, we will authorize one instance of take by Level A harassment of harbor seals per day during the six days of impact piles driving for a total of six instances of take by Level A harassment of harbor seals.

Table 10. Estimated Take by Level B Harassment of Harbor Seal.

Source	**Density (animals/km^2)**	**Area (km^2)**	**Days of Activity**	**Take by Level B Harassment**
Vibratory Installation and Removal 14-in H piles	3.957	2.190	12	103.999
Vibratory 36-in piles	3.957	21.490	6	510.216
Impact 24-in piles	3.957	0.004	6	0.095
Total Take by Level B harassment				614.31 (rounded to 615)

California sea lions

A predicted a density of 0.161 animals/km^2 based for California sea lions was used to estimate take by Level B harassment (Table 11). The estimated take was calculated using this density multiplied by the area ensonified above the threshold multiplied by the number of days per activity (*e.g.*, 6 days of impact pile driving) (Table 11). Therefore, a total of 25 instances of take by Level B harassment are authorized for California sea lions. The Level A harassment zones are all under 2.1 m for otariids; therefore, no take by Level A harassment of California sea lions is anticipated.

Table 11. Estimated Take by Level B Harassment of California sea lions.

Source	**Density (animals/km^2)**	**Area (km^2)**	**Days of Activity**	**Take by Level B Harassment**
Vibratory Installation and Removal 14-in H piles	0.161	2.190	12	4.231
Vibratory 36-in piles	0.161	21.490	6	20.759
Impact 24-in piles	0.161	0.004	6	0.004

Total Take by Level B Harassment				**24.994 (rounded to 25)**

Northern elephant seal

There are no density estimates of northern elephant seals available in the project area. Elephant seals breed between December and March and have been rarely cited in San Francisco Bay. It is anticipated that if an elephant seal is encountered at all during pile driving or drilling it would be a juvenile. For the purpose of this assessment, we predict that up to one northern elephant seal may occur in the San Francisco Bay in the Project vicinity on up to 20 percent of pile driving days (*i.e.*, up to 4.8 individuals in 24 days). This assumption is consistent with the recent IHA for the demolition and reuse of the marine foundations of the original east span of the San Francisco-Oakland Bay Bridge (CALTRANS 2018). Therefore, NMFS authorizes five instances of take (0.2 seals/day multiplied by 24 project days) by Level B harassment of elephant seals. Because the required shutdown measures are larger than the associated Level A harassment zones, and those zones are relatively small (28.5 m at the largest during impact pile driving), we believe the PSO can effectively monitor the Level A harassment zones and therefore we do not anticipate any take by Level A harassment of northern elephant seals.

Northern fur seals

There are no density estimates of northern fur seals available in the project area. The Marine Mammal Center reported only two to four northern fur seal strandings in the Bay in 2015 and 2016 (in Marin, San Francisco, and Santa Clara counties) (TMMC 2017). To account for the possible rare presence of the species in the action area, NMFS authorizes three instances of take by Level B harassment of northern fur seals. The Level A harassment zones are all under 2.1 m for otariids; therefore, no take by Level A harassment of Northern fur seals is anticipated.

Table 12 below summarizes the estimated take for all the species described above as a percentage of stock abundance.

Table 12. Authorized Take as a Percentage of Stock Abundance.

Species	Stock (N_{EST})	Authorized Level A Harassment	Authorized Level B Harassment	Percent of Stock
Gray Whale	Eastern North Pacific (26,960)	0	7	Less than 1 percent
Bottlenose Dolphin	California Coastal (453)	0	48	10.596 percent
Harbor Porpoise	San Francisco-Russian River (9,886)	0	27	Less than one percent
Harbor Seal	California (30,968)	4	615	Less than 2 percent
Northern Elephant Seal	California Breeding (179,000)	0	5	Less than one percent
California Sea Lion	U.S. (257,606)	0	25	Less than one percent
Northern fur seal	Eastern DPS, California (20,000)	0	3	Less than one percent

Mitigation

In order to issue an IHA under Section 101(a)(5)(D) of the MMPA, NMFS must set forth the permissible methods of taking pursuant to such activity, and other means of effecting the least practicable impact on such species or stock and its habitat, paying particular attention to rookeries, mating grounds, and areas of similar significance, and on the availability of such

species or stock for taking for certain subsistence uses (latter not applicable for this action). NMFS regulations require applicants for incidental take authorizations to include information about 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 and their habitat (50 CFR 216.104(a)(11)).

In evaluating how mitigation may or may not be appropriate to ensure the least practicable adverse impact on species or stocks and their habitat, as well as subsistence uses where applicable, we carefully consider two primary factors:

1) the manner in which, and the degree to which, the successful implementation of the measure(s) is expected to reduce impacts to marine mammals, marine mammal species or stocks, and their habitat. This considers the nature of the potential adverse impact being mitigated (likelihood, scope, range). It further considers the likelihood that the measure will be effective if implemented (probability of accomplishing the mitigating result if implemented as planned) the likelihood of effective implementation (probability implemented as planned); and

2) the practicability of the measures for applicant implementation, which may consider such things as cost, impact on operations, and, in the case of a military readiness activity, personnel safety, practicality of implementation, and impact on the effectiveness of the military readiness activity.

The following mitigation measures are planned in the IHA:

Timing Restrictions

All work will be conducted during daylight hours. If poor environmental conditions restrict visibility full visibility of the shutdown zone, pile installation would be delayed.

Sound Attenuation

To minimize noise during impact pile driving, a 12-in thick wood cushion block will be used. Bubble curtains will be also used during any impact pile driving of piles located in the water. The bubble curtain will be operated in a manner consistent with the following performance standards:

a. The bubble curtain will distribute air bubbles around 100 percent of the piling perimeter for the full depth of the water column;

b. The lowest bubble ring will be in contact with the mudline for the full circumference of the ring, and the weights attached to the bottom ring shall ensure 100 percent mudline contact. No parts of the ring or other objects shall prevent full mudline contact; and

c. Air flow to the bubblers must be balanced around the circumference of the pile.

Soft start

Soft start requires contractors to provide an initial set of strikes at reduced energy, followed by a thirty-second waiting period, then two subsequent reduced energy strike sets. A soft start must be implemented at the start of each day's impact pile driving and at any time following cessation of impact pile driving for a period of thirty minutes or longer.

Shutdown Zone for in-water Heavy Machinery Work

For in-water heavy machinery work other than pile driving, if a marine mammal comes within 10 m of such operations, operations shall cease and vessels shall reduce speed to the minimum level required to maintain steerage and safe working conditions.

Shutdown Zones

For all pile driving/removal activities, the City will establish shutdown zones for a marine mammal species that is greater than its corresponding Level A harassment zone. The calculated PTS isopleths were rounded up to a whole number to determine the actual shutdown zones that

the applicant will operate under (Table 13). The purpose of a shutdown zone is generally to define an area within which shutdown of the activity would occur upon sighting of a marine mammal (or in anticipation of an animal entering the defined area).

Table 13. Pile Driving Shutdown Zones during Project Activities.

Activity	Shutdown Zones (radial distance in meters, area in km^{2*})				
	Low-Frequency Cetaceans	**Mid-Frequency Cetaceans**	**High-Frequency Cetaceans**	**Phocid**	**Otariid**
In-Water Construction Activities					
Heavy machinery work (other than pile driving)	10 (0.00015 km^2)	10 (0.00015 km^2)	10 (0.00015 km^2)	10 (0.00015 km^2)	10 (0.00015 km^2)
Vibratory Pile Driving/Removal					
14-in H pile steel installation /removal	10 (0.00015 km^2	10 (0.00015 km^2	10 (0.00015 km^2	10 (0.00015 km^2	10 (0.00015 km^2
36-in steel permanent installation	15 (0.00035 km^2)	10 (0.00015 km^2)	20 (0.00063 km^2)	10 (0.00015 km^2)	10 (0.00015 km^2)
Impact Pile Driving					
24-in concrete permanent installation	55 (0.00475 km^2)	10 (0.00015 km^2)	65 (0.00663 km^2)	30 (0.00141 km^2)	10 (0.00015 km^2)

*Note: km^2 were divided by two to account for land.

Non-authorized Take Prohibited

If a species enters or approaches the Level B harassment zone and that species is either not authorized for take or its authorized takes are met, pile driving and removal activities must shut down immediately using delay and shut-down procedures. Activities must not resume until the animal has been confirmed to have left the area or an observation time period of 15 minutes has elapsed for pinnipeds and small cetaceans and 30 minutes for large whales.

Based on our evaluation of the City's planned measures, as well as other measures considered by NMFS, NMFS has determined that the planned mitigation measures provide the

means of effecting the least practicable impact on the affected species or stocks and their habitat, paying particular attention to rookeries, mating grounds, and areas of similar significance.

Monitoring and Reporting

In order to issue an IHA for an activity, Section 101(a)(5)(D) of the MMPA states that NMFS must set forth, requirements pertaining to the monitoring and reporting of such taking. The MMPA implementing regulations at 50 CFR 216.104 (a)(13) indicate that requests for authorizations must include the suggested means of accomplishing the necessary monitoring and reporting that will result in increased knowledge of the species and of the level of taking or impacts on populations of marine mammals that are expected to be present in the action area. Effective reporting is critical both to compliance as well as ensuring that the most value is obtained from the required monitoring.

Monitoring and reporting requirements prescribed by NMFS should contribute to improved understanding of one or more of the following:

- Occurrence of marine mammal species or stocks in the area in which take is anticipated (*e.g.*, presence, abundance, distribution, density);
- Nature, scope, or context of likely marine mammal exposure to potential stressors/impacts (individual or cumulative, acute or chronic), through better understanding of: (1) action or environment (*e.g.*, source characterization, propagation, ambient noise); (2) affected species (*e.g.*, life history, dive patterns); (3) co-occurrence of marine mammal species with the action; or (4) biological or behavioral context of exposure (*e.g.*, age, calving or feeding areas);
- Individual marine mammal responses (behavioral or physiological) to acoustic stressors (acute, chronic, or cumulative), other stressors, or cumulative impacts from multiple stressors;

- How anticipated responses to stressors impact either: (1) long-term fitness and survival of individual marine mammals; or (2) populations, species, or stocks;
- Effects on marine mammal habitat (*e.g.*, marine mammal prey species, acoustic habitat, or other important physical components of marine mammal habitat); and
- Mitigation and monitoring effectiveness.

Pre-Activity Monitoring

Prior to the start of daily in-water construction activity, or whenever a break in pile driving of 30 minutes or longer occurs, PSOs will observe the shutdown and monitoring zones for a period of 30 minutes. The shutdown zone will be cleared when a marine mammal has not been observed within the zone for that 30-min period. If a marine mammal is observed within the shutdown zone, pile driving activities will not begin until the animal has left the shutdown zone or has not been observed for 15 minutes. If the Level B Harassment Monitoring Zone has been observed for 30 minutes and no marine mammals (for which take has not been authorized) are present within the zone, work can continue even if visibility becomes impaired within the Monitoring Zone. When a marine mammal permitted for Level B harassment take has been permitted is present in the Monitoring zone, piling activities may begin and Level B harassment take will be recorded.

Monitoring Zones

The City will establish and observe monitoring zones for Level B harassment as presented in Table 8. The monitoring zones for this project are areas where SPLs are equal to or exceed 120 dB rms (for vibratory pile driving/removal) and 160 dB rms (for impact pile driving). These zones provide utility for monitoring conducted for mitigation purposes (*i.e.*, shutdown zone monitoring) by establishing monitoring protocols for areas adjacent to the shutdown zones.

Monitoring of the Level B harassment zones enables observers to be aware of and communicate the presence of marine mammals in the project area, but outside the shutdown zone, and thus prepare for potential shutdowns of activity.

Visual Monitoring

Monitoring will be conducted 30 minutes before, during, and 30 minutes after all pile driving/removal and socking/rock anchoring activities. In addition, PSO will record all incidents of marine mammal occurrence, regardless of distance from activity, and shall document any behavioral reactions in concert with distance from piles being driven/removed. Pile driving/removal activities include the time to install, remove a single pile or series of piles, as long as the time elapsed between uses of the pile driving equipment is no more than 30 minutes.

Monitoring will be conducted by PSOs from on land. The number of PSOs will vary from one to two, depending on the type of pile driving, method of pile driving and size of pile, all of which determines the size of the harassment zones. Monitoring locations will be selected to provide an unobstructed view of all water within the shutdown zone and as much of the Level B harassment zone as possible for pile driving activities. A single monitor will be present during impact pile driving, when impacts of the project will be limited to the area within the Alameda Lagoon, and two monitors will be present during vibratory pile driving when project impacts will extend into the waters of the San Francisco Bay. Any areas that the PSO is not able to see will include a correction factor in the take estimate.

In addition, PSOs will work in shifts lasting no longer than 4 hours with at least a 1-hour break between shifts, and will not perform duties as a PSO for more than 12 hours in a 24- hour period (to reduce PSO fatigue).

Monitoring of pile driving will be conducted by qualified, NMFS-approved PSOs, who shall have no other assigned tasks during monitoring periods. The City will adhere to the following conditions when selecting PSOs:

- Independent PSOs will be used (*i.e.*, not construction personnel);
- At least one PSO must have prior experience working as a marine mammal observer during construction activities;
- Other PSOs may substitute education (degree in biological science or related field) or training for experience;
- Where a team of three or more PSOs are required, a lead observer or monitoring coordinator will be designated. The lead observer must have prior experience working as a marine mammal observer during construction; and
- The City will submit PSO CVs for approval by NMFS for all observers prior to monitoring.

The City shall ensure that the PSOs have the following additional qualifications:

- Visual acuity in both eyes (correction is permissible) sufficient for discernment of moving targets at the water's surface with ability to estimate target size and distance; use of binoculars may be necessary to correctly identify the target;
- Experience and ability to conduct field observations and collect data according to assigned protocols;
- Experience or training in the field identification of marine mammals, including the identification of behaviors;
- Sufficient training, orientation, or experience with the construction operation to provide for personal safety during observations;

- Writing skills sufficient to prepare a report of observations including but not limited to the number and species of marine mammals observed; dates and times when in-water construction activities were conducted; dates, times, and reason for implementation of mitigation (or why mitigation was not implemented when required); and marine mammal behavior;
- Ability to communicate orally, by radio or in person, with project personnel to provide real-time information on marine mammals observed in the area as necessary; and
- Sufficient training, orientation, or experience with the construction operations to provide for personal safety during observations.

Acoustic Monitoring

The City has developed a sound attenuation monitoring plan to protect fish and marine mammals during pile driving activities (see Appendix B of the application for further details). The acoustic monitoring will include, but not limited to:

- Two piles from each pile type will be monitored. For impact installation, two 24-in concrete piles, for vibratory installation, 36-in steel piles, and for vibratory installation and extraction, two H-piles will be monitored;
- The far-field hydrophone will be located at least 1 km from the 36-in piles during vibratory installation to better assess the extent of the Level B harassment zone;
- Recordings will be conducted from 10 Hz to 20 kHz;
- Background sound measurements will occur continuously for 10 minutes prior to pile driving;

The acoustic monitoring will include documentation of the following, at a minimum:

- Hydrophone equipment and methods: recording device, sampling rate, distance from the pile where recordings were made; and depth of recording device(s);

- Type of pile being driven and method of driving during recordings; and
- Mean, medium, and maximum sound levels (dB re: 1µPa): cumulative sound exposure level, peak sound pressure level, rms sound pressure level, and single-strike sound exposure level.

Reporting of injured or dead marine mammals

In the unanticipated event that the planned activity clearly causes the take of a marine mammal in a manner prohibited by the IHA, such as serious injury, or mortality, the City must immediately cease the specified activities and report the incident to the NMFS Office of Protected Resources and the West Coast Region Stranding Coordinator. The report must include the following information:

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

Activities must not resume until NMFS is able to review the circumstances of the prohibited take. NMFS will work with the City to determine what measures are necessary to minimize the likelihood of further prohibited take and ensure MMPA compliance. The City may not resume their activities until notified by NMFS.

In the event the City discovers an injured or dead marine mammal, and the lead observer determines that the cause of the injury or death is unknown and the death is relatively recent (*e.g.*, in less than a moderate state of decomposition), the City must immediately report the incident to the Office of Protected Resources, NMFS, and the West Coast Region Stranding Coordinator, NMFS. The report must include the same information as the bullets described above. Activities may continue while NMFS reviews the circumstances of the incident. NMFS will work with the City to determine whether additional mitigation measures or modifications to the activities are appropriate.

In the event that the City discovers an injured or dead marine mammal, and the lead observer determines that the injury or death is not associated with or related to the specified activities (*e.g.*, previously wounded animal, carcass with moderate to advanced decomposition, or scavenger damage), the City must report the incident to the Office of Protected Resources, NMFS, and the West Coast Region Stranding Coordinator, NMFS, within 24 hours of the discovery.

Final report

The City shall submit a draft report to NMFS no later than 90 days following the end of construction activities or 60 days prior to the issuance of any subsequent IHA for the project. The City shall provide a final report within 30 days following resolution of NMFS' comments on the draft report. Reports shall contain, at minimum, the following:

- Date and time that monitored activity begins and ends for each day conducted (monitoring period);
- Construction activities occurring during each daily observation period, including how many and what type of piles driven;

- Deviation from initial proposal in pile numbers, pile types, average driving times, etc.;
- Weather parameters in each monitoring period (*e.g.*, wind speed, percent cloud cover, visibility);
- Water conditions in each monitoring period (*e.g.*, sea state, tide state);
- For each marine mammal sighting:
  - Species, numbers, and, if possible, sex and age class of marine mammals;
  - Description of any observable marine mammal behavior patterns, including bearing and direction of travel and distance from pile driving activity;
  - Type of construction activity that was taking place at the time of sighting;
  - Location and distance from pile driving activities to marine mammals and distance from the marine mammals to the observation point;
  - If shutdown was implemented, behavioral reactions noted and if they occurred before or after shutdown; and
  - Estimated amount of time that the animals remained in the Level A or B Harassment Zone;
- Description of implementation of mitigation measures within each monitoring period (*e.g.*, shutdown or delay);
- Other human activity in the area within each monitoring period; and
- A summary of the following:
  - Total number of individuals of each species detected within the Level B Harassment Zone, and estimated as taken if correction factor appropriate;

- Total number of individuals of each species detected within the Level A Harassment Zone and the average amount of time that they remained in that zone; and
- Daily average number of individuals of each species (differentiated by month as appropriate) detected within the Level B Harassment Zone, and estimated as taken, if appropriate.

Negligible Impact Analysis and Determination

NMFS has defined negligible impact as an impact resulting from the specified activity that cannot be reasonably expected to, and is not reasonably likely to, adversely affect the species or stock through effects on annual rates of recruitment or survival (50 CFR 216.103). A negligible impact finding is based on the lack of likely adverse effects on annual rates of recruitment or survival (*i.e.*, population-level effects). An estimate of the number of takes alone is not enough information on which to base an impact determination. In addition to considering estimates of the number of marine mammals that might be "taken" through harassment, NMFS considers other factors, such as the likely nature of any responses (*e.g.*, intensity, duration), the context of any responses (*e.g.*, critical reproductive time or location, migration), as well as effects on habitat, and the likely effectiveness of the mitigation. We also assess the number, intensity, and context of estimated takes by evaluating this information relative to population status. Consistent with the 1989 preamble for NMFS's implementing regulations (54 FR 40338; September 29, 1989), the impacts from other past and ongoing anthropogenic activities are incorporated into this analysis via their impacts on the environmental baseline (*e.g.*, as reflected in the regulatory status of the species, population size and growth rate where known, ongoing sources of human-caused mortality, or ambient noise levels).

As stated in the mitigation section, shutdown zones that are larger than the Level A harassment zones and are expected avoid the likelihood of Level A harassment for six of the seven species. As previously described, six instances of take by Level A harassment were added for harbor seals as a conservative measure if they enter the Level A harassment zone before detected by PSOs.

Exposures to elevated sound levels produced during pile driving activities may cause behavioral disturbance of marine mammals, but they are expected to be mild and temporary. Effects on individuals that are taken by Level B harassment, on the basis of reports in the literature as well as monitoring from other similar activities, will likely be limited to reactions such as increased swimming speeds, increased surfacing time, or decreased foraging (if such activity were occurring) (*e.g.,* Thorson and Reyff, 2006; Lerma, 2014). Most likely, individuals will simply move away from the sound source and be temporarily displaced from the areas of pile driving, although even this reaction has been observed primarily only in association with impact pile driving. These reactions and behavioral changes are expected to subside quickly when the exposures cease.

To minimize noise during pile driving, and thereby both the scale and potential severity of the anticipated effects, the City will use pile cushions and a bubble curtain during impact pile driving.

During all impact driving, implementation of soft start procedures and monitoring of established shutdown zones will be required, significantly reducing the possibility of injury. Given sufficient notice through use of soft start (for impact driving), marine mammals are expected to move away from an irritating sound source prior to it becoming potentially injurious. In addition, PSOs will be stationed within the action area whenever pile driving/removal

activities are underway. Depending on the activity, the City will employ one to two PSOs to ensure all monitoring and shutdown zones are properly observed.

Two known pinniped haulout sites (non-pupping sites) are located in the vicinity of the project area. One is an existing haulout platform approximately 0.5 mile southeast of the project area (separated from project activities by approximately 0.3 mile of developed areas on-land). The second haulout is the western end of Breakwater Island, approximately 1.0 mile southwest of the location of pile driving activities (Figure 4 of the application). They are both well outside the PTS isopleths for pinnipeds. Exposures to elevated sound levels produced during pile driving activities once the animals enter the water from the haulouts may cause behavioral responses by an animal, but they are expected to be mild and temporary and limited to Level B harassment.

The planned activities would not result in permanent impacts to habitats used directly by marine mammals except the actual footprint of the project. The footprint of the project is small, and equal to the area the ferry associated pile placement. The installation of piles for the new pier will result in permanent impacts on 61 ft^2 of aquatic habitat. At best, the impact area, which is located in Seaplane Lagoon, provides marginal foraging habitat for marine mammals and fish. In addition, impacts to marine mammal prey species are expected to be minor and temporary. Overall, the area impacted by the project is very small compared to the available habitat in the bay. The most likely impact to prey will be temporary behavioral avoidance of the immediate area. During pile driving/removal activities, it is expected that fish and marine mammals would temporarily move to nearby locations and return to the area following cessation of in-water construction activities. Therefore, indirect effects on marine mammal prey during the construction are not expected to be substantial.

In summary and as described above, the following factors primarily support our determination that the impacts resulting from this activity are not expected to adversely affect the species or stock through effects on annual rates of recruitment or survival:

- No serious injury or mortality is anticipated;
- Anticipated incidents of Level A harassment are very small in number and would consist of no more than a small degree of PTS;
- Anticipated incidents of Level B harassment consist of, at worst, temporary modifications in behavior;
- Minimal impacts to marine mammal habitat are expected;
- The action area is located and within an active marine commercial area;
- There are no rookeries, or other known areas or features of special significance for foraging or reproduction in the project area;
- The required mitigation measures (*i.e.* shutdown zones and pile cushion, and bubble curtain) are expected to be effective in reducing the effects of the specified activity.

Based on the analysis contained herein of the likely effects of the specified activity on marine mammals and their habitat, and taking into consideration the implementation of the planned monitoring and mitigation measures, NMFS finds that the total marine mammal take from the planned activity will have a negligible impact on all affected marine mammal species or stocks.

Small Numbers

As noted above, only small numbers of incidental take may be authorized under Section 101(a)(5)(D) of the MMPA for specified activities other than military readiness activities. The MMPA does not define small numbers and so, in practice, where estimated numbers are

available, NMFS compares the number of individuals taken to the most appropriate estimation of abundance of the relevant species or stock in our determination of whether an authorization is limited to small numbers of marine mammals. Additionally, other qualitative factors may be considered in the analysis, such as the temporal or spatial scale of the activities.

The take of 6marine mammal stocks comprises less than two percent of the stock abundance, and less than 11 percent for bottlenose dolphins (California coastal).

Based on the analysis contained herein of the planned activity (including the mitigation and monitoring measures) and the anticipated take of marine mammals, NMFS finds that small numbers of marine mammals will be taken relative to the population size of the affected species or stocks.

Unmitigable Adverse Impact Analysis and Determination

There are no relevant subsistence uses of the affected marine mammal stocks or species implicated by this action.

National Environmental Policy Act

To comply with the National Environmental Policy Act of 1969 (NEPA; 42 U.S.C. 4321 *et seq*.) and NOAA Administrative Order (NAO) 216-6A, NMFS must review our action (*i.e.*, the issuance of an incidental harassment authorization) with respect to potential impacts on the human environment. This action is consistent with categories of activities identified in Categorical Exclusion B4 (incidental harassment authorizations with no anticipated serious injury or mortality) of the Companion Manual for NOAA Administrative Order 216-6A, which do not individually or cumulatively have the potential for significant impacts on the quality of the human environment and for which we have not identified any extraordinary circumstances

that would preclude this categorical exclusion. Accordingly, NMFS has determined that the issuance of the IHA qualifies to be categorically excluded from further NEPA review.

Endangered Species Act (ESA)

Section 7(a)(2) of the Endangered Species Act of 1973 (ESA: 16 U.S.C. 1531 *et seq*.) requires that each Federal agency insure that any action it authorizes, funds, or carries out is not likely to jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of designated critical habitat. No ESA listed species are authorized for take. Therefore, NMFS has determined consultation under the ESA is not required.

Authorization

As a result of these determinations, NMFS authorizes an IHA to the City for pile driving and removal activities during construction of the Alameda Seaplane Lagoon ferry terminal provided the previously mentioned mitigation, monitoring, and reporting requirements are incorporated.

Dated: August 27, 2019.

Donna S. Wieting,

Director, Office of Protected Resources,

National Marine Fisheries Service.

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