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**MEMORANDUM**

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**TO:** STEFAN GALVEZ, CALIFORNIA DEPARTMENT OF TRANSPORTATION

**FROM:** PHIL THORSON, MANTECH SRS TECHNOLOGIES

**SUBJECT:** MARINE MAMMAL OBSERVATIONS MEMO

OBSERVATIONS DURING EAST SPAN PROJECT PILE DRIVING AT TEMPORARY TOWER G ON MAY 12 AND 15, 2009

**DATE:** JUNE 25, 2009

**CC:** IVY EDMONDS-HESS, PARSONS BRINCKERHOFF

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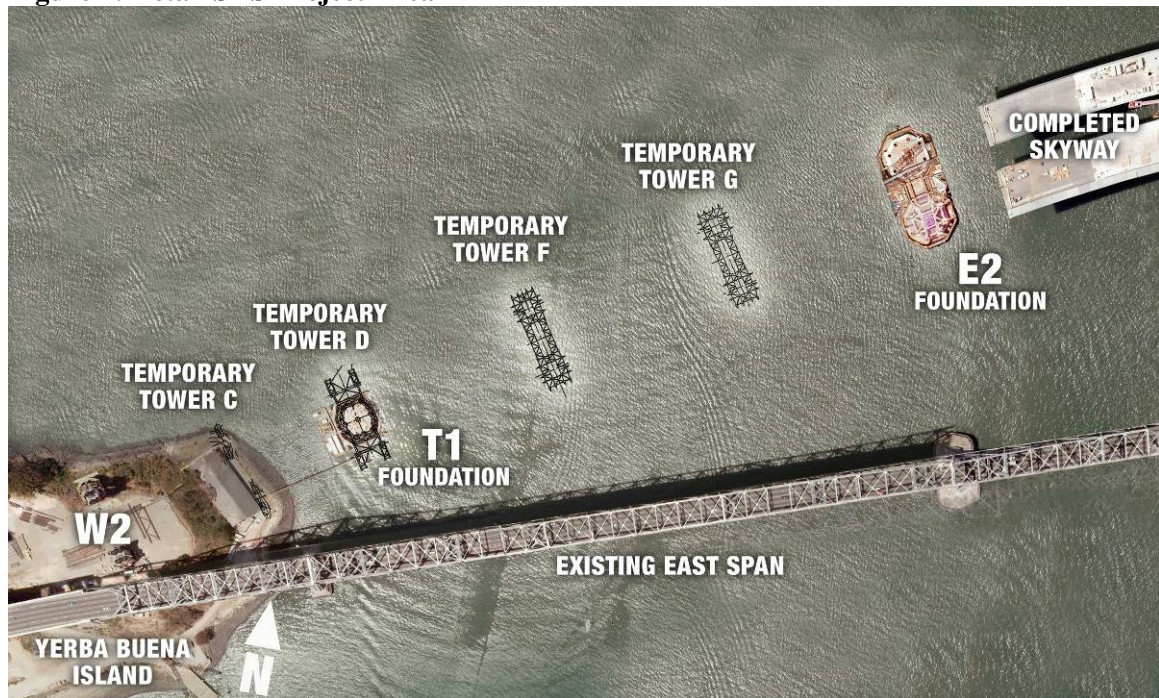
### **Introduction**

The California Department of Transportation (Department) is in the process of replacing the East Span of the San Francisco-Oakland Bay Bridge (SFOBB) with a new bridge immediately to the north of the existing span (Figure 1). Construction of the San Francisco-Oakland Bay Bridge East Span Seismic Safety Project (SFOBB Project) is a multi-year effort that will involve a number of construction activities on land as well as in San Francisco Bay. As part of the construction for the Self-Anchored Suspension (SAS) portion of the project, it is necessary to build temporary towers. These temporary towers, Temporary Towers D, F and G are marine based and require driving of temporary piles to support the SAS portion of the bridge during construction (Figure 2).

**Figure 1: SFOBB East Span Seismic Safety Project Location Map**



**Figure 2: Detail SAS Project Area**



Pursuant to the Marine Mammal Protection Act, the Department requested and received an Incidental Harassment Authorization (IHA) from the National Oceanic and Atmospheric Administration – National Marine Fisheries Service (NOAA-Fisheries) to incidentally take, by harassment, a small number of California sea lions, Pacific harbor seals, and possibly gray whales and harbor porpoises. A comprehensive Marine Mammal Monitoring Plan for the driving of permanent piles was submitted to NOAA-Fisheries in May 2002, which meets the conditions of Section 5 – Mitigation Requirements (see page 2 of the IHA) and Section 6 – Monitoring Requirements (see page 3 of the IHA).

The latest IHA expired on May 1, 2008. A renewal is expected soon from NOAA-Fisheries. In the interim, the Department agreed to follow the requirements of the previous IHA. NOAA-Fisheries did however, request that the marine mammal safety zones (MMSZs) be more conservative and be based on a 160 dB re 1 microPa @ 1 m RMS isopleth during impact pile driving and a 120 dB re 1 microPa @ 1 m RMS isopleth during vibratory pile driving to ensure that Level B harassment to marine mammals would not occur during pile driving of the temporary casings.

Hydroacoustic monitors collected underwater sound data during initial impact pile driving events at each of the three marine based temporary towers to determine the distance to the 160 dB RMS isopleth. For Temporary Towers F and G the distance to the 160 dB RMS level varied in different directions from the pile. In all directions the distance was less than 1,000 meters (3,280 feet). Therefore, for the purpose of marine mammal monitoring, the MMSZ was set at 1,000 meters (3,280 feet) in all directions from impact pile driving.

The request from NOAA-Fisheries to determine a MMSZ for vibratory pile driving based on 120 dB RMS did not come until pile driving had been completed at Temporary Tower D and was more than halfway complete at Temporary Tower F. During vibratory pile driving at Temporary Towers F and G, hydroacoustic monitors were unable to locate the distance at which vibratory pile driving sound levels dropped to 120 dB RMS. Ambient sound levels in the Bay near the project site often equaled or exceeded 120 dB RMS. At a distance of 1,900 meters (6,234 feet) from the vibratory pile driving, monitors could no longer distinguish the pile driving sound from the ambient noise. The Department notified NOAA-Fisheries of this limitation and for the purpose of marine mammal monitoring, the MMSZ was set at 1,900 meters (6,234 feet) from vibratory pile driving.

### Marine Mammal Monitoring Activities

Monitoring was conducted by NOAA-Fisheries-approved marine mammal observers on May 12 and 15, 2009 in the vicinity of Temporary Tower G. A 1,000-meter (3,281-foot) MMSZ was used for the diesel impact hammer to correspond with the 160 dB isopleth described above (Figure 3 & 4).

On May 12, 2009: Observer #1 and #2 were located on the pile driving barge at Temporary Tower G and Observer #3 was located on the southeast end of Treasure Island, as shown on Figure 3. Pile driving was conducted on five piles from 0757 to 1301 hours using the diesel impact hammer. Observations were made from 0700 to 1335 hours.

**Figure 3: SAS temporary tower project area with 500 meter (preliminary), 1,000 meter (160 dB impact), and 1,900 meter (120 dB vibratory) MMSZs and marine mammal monitor observation sites for May 12, 2009.**



On May 15, 2009: Observer #1 and #2 were located on the pile driving barge at Temporary Tower G and Observers #3 and #4 were located on the southeast end of Treasure Island, as shown on Figure 4. Pile driving was conducted on six piles from 0800 to 1406 hours using the diesel impact hammer. Observations were made from 0740 to 1440 hours.

**Figure 4: SAS temporary tower project area with 500 meter (preliminary), 1,000 meter (160 dB impact), and 1,900 meter (120 dB vibratory) MMSZs and marine mammal monitor observation sites for May 15, 2009.**



## Results

### May 12, 2009

Two harbor seals were observed in the MMSZ during pile driving, after pile driving had commenced. A third harbor seal was observed in the MMSZ during a break between the driving of the fourth and fifth piles of the day. One California sea lion was observed after the end of pile driving for the day.

0757 – 1014: Pile driving was conducted for the first three piles using the diesel impact hammer. No marine mammals were observed.

1042: Pile driving begins on the fourth pile of the day using the diesel impact hammer.

- 1101 – 1106: One adult harbor seal was observed at about 245 meters (804 feet) north of the Temporary Tower G piles (19 minutes after the start of pile driving for the fourth pile). In accordance with the IHA, once pile driving has commenced, operations can continue uninterrupted despite the fact that a marine mammal is within the MMSZ. The behavior of the seal seemed to indicate that it was not disturbed by pile driving activities.
- 1116: Pile driving for the fourth pile ends.
- 1206: One juvenile seal was observed 130 meters (427 feet) north of the Temporary Tower G piles and was slowly swimming north (50 minutes after the driving for the fourth pile was completed and 15 prior to the driving of the fifth pile). This was the only observation of this seal.
- 1221: Pile driving begins for the fifth pile using the diesel impact hammer, 15 minutes after the last observation of a marine mammal.
- 1235 – 1243: The second juvenile harbor seal of the day was observed 180 meters (590 feet) east and moved to 675 meters (2,215 feet) southeast of the Temporary Tower G piles (14 minutes after the start of pile driving for the fifth pipe). In accordance with the IHA, once pile driving has commenced, operations can continue uninterrupted despite the fact that a marine mammal is within the MMSZ. The behavior of the seal seemed to indicate that it was not disturbed by pile driving activities.
- 1301: Pile driving for the fifth pile ends and completes pile driving for the day.
- 1303: One sub-adult male California sea lion was observed 525 meters (1,722 feet) west of the Temporary Tower G piles. This was the only observation of this sea lion.

The air temperature ranged from 11.2 to 16.8°C (52.2 to 62.2°F) and the winds were mostly calm to moderate ranging from 3.2 to 13.3 kilometers per hour (2.0 to 8.3 miles per hour). Temperature and wind data were acquired from the NOAA National Ocean Service Physical Oceanographic Real Time System.

### **May 15, 2009**

Three harbor seals were observed in the MMSZ during the monitoring period. Two were observed during pile driving and one just after pile driving had stopped.

- 0800 – 0828: Pile driving was conducted for the first pile using the diesel impact hammer. No marine mammals were observed.
- 0842: Pile driving on the second pile of the day begins using the diesel impact hammer.

- 0905: One juvenile harbor seal was observed 180 meters (591 feet) north of the Temporary Tower G piles (23 minutes after the start of pile driving for the second pile). In accordance with the IHA, once pile driving has commenced, operations can continue uninterrupted despite the fact that a marine mammal is within the MMSZ. The seal was swimming slowly northeast and did not appear to respond to the pile driving noise. This was the only observation of this seal.
- 0909: One adult harbor seal was observed 800 meters (2,625 feet) north of the Temporary Tower G piles near the southeast end of Treasure Island (27 minutes after the start of pile driving for the second pile). In accordance with the IHA, once pile driving has commenced, operations can continue uninterrupted despite the fact that a marine mammal is within the MMSZ. The seal was slowly swimming west at the surface and did not appear to respond to the pile driving noise. This was the only observation of this seal.
- 0911: Pile driving ends for the second pile.
- 0926 – 1114: Pile driving was conducted for the third and fourth piles using the diesel impact hammer. No marine mammals were observed.
- 1139 – 1214: Pile driving is completed for the fifth pile using the diesel impact hammer.
- 1219: A second adult harbor seal was observed 20 meters (66 feet) east of the Temporary Tower G piles (5 minutes after the end of pile driving for the fifth pile and 73 minutes before the start of pile driving for sixth pile). This was the only observation of this seal.
- 1332 – 1406: Pile driving for the sixth pile is completed using the diesel impact hammer. This completed pile driving for temporary tower construction. No marine mammals were observed.

The air temperature ranged from 18.7 to 19.9°C (65.7 to 67.8°F) and the winds were mostly calm to moderate ranging from 6.5 to 18.7 kilometers per hour (4.0 to 11.7 miles per hour). Temperature and wind data were acquired from the NOAA National Ocean Service Physical Oceanographic Real Time System.