Brannan Street Wharf Noise and Biological Monitoring Final Summary Report

Submitted by:

The Port of San Francisco

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1 INTRODUCTION

Biological monitoring for the Port of San Francisco (Port) was conducted in support of construction of the Brannan Street Wharf Project (BSW). The BSW Project includes constructing a 57,000-square-foot pile-supported park at the former site of Pier 36 in San Francisco, California. The completed Brannan Street Wharf will be approximately 830 feet (253 meters) long, and will vary in width from approximately 10 feet (3 meters) at the northern end to approximately 140 feet (43 meters) at the southern end. The deck will consist of a mixture of precast and cast-in-place concrete components, topped by a cast-in-place architectural finish slab. The deck will be supported by approximately 261 concrete and steel piles, to be driven to depths of more than 60 feet (18 meters) below the mud line. The wharf structure will cantilever over the existing seawall and interface with the existing Embarcadero sidewalk (USACE 2011).

The main components of the BSW include a 400-foot-long (122-meter) lawn, a waterside walkway with seating, shade-sheltered picnic and game tables, and a small float and ramp for landing and launching small human-powered craft (kayaks and row boats).

Before construction, the Port and the USACE consulted with the National Marine Fisheries Service (NMFS) which issued an Incidental Harassment Authorization (IHA) (NMFS 2012a) requiring biological and noise monitoring for the BSW Project. NMFS also issued a Project Biological Opinion (BO) (NMFS 2011) based on its review of the BSW Project which included measures to protect listed species.

Biological resource monitoring was conducted periodically during both steel and concrete pile driving from July through November 2012. Monitoring was focused on marine mammals and fishes; bird predation was also assessed during fish monitoring. The construction company the Dutra Group drove both steel and concrete piles. Concrete piles were driven using impact methods only, while steel piles were driven using a combination of impact and vibratory methods. The Dutra Group used US Army Corps of Engineers (USACE) and NMFS-approved sound attenuation methods (bubble curtains) during all steel impact pile-driving to minimize noise.

Underwater noise monitoring was conducted during both steel and concrete pile driving activities from July through September by Municon. Noise monitoring was conducted at prescribed depths from a vessel and on the piers to measure sound attenuation in order to delineate zones of influence for biological monitoring.

2 BACKGROUND

The Port maintained compliance with the IHA (NMFS 2012a) and with the Project BO (NMFS 2011) for noise by performing sound monitoring for underwater noise levels in accordance with the NMFS approved Hydroacoustic Monitoring Plan (USACE and Port 2012) Appendix A. This monitoring provided the quantitative data on the sound pressure from vibratory and impact pile driving necessary to confirm or establish zones of influence (ZOI) related to the sound threshold for fish and marine mammals used in visual monitoring. Results from noise monitoring are contained in Appendix B.

The Marine Mammal Protection Act (MMPA) prohibits the intentional harassment of marine mammals. NMFS defines harassment as "any act of pursuit, torment, or annoyance which has the potential to injure a marine mammal or marine mammal stock in the wild (Level A harassment) or has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption to behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering (Level B harassment). After consultation with NMFS, the Port was issued an IHA under Section 101(a)(5)(D) of the MMPA which allows for the incidental take (by Level B harassment only) of 138 Pacific harbor seals (*Phoca vitulina richardii*), 69 California sea lions (*Zalophus californius)*, 69 harbor porpoises (*Phocoena phocoena*) and five gray whales (*Eschrichtius robustus*) (NMFS 2012a) during the BSW Project.

Biologists ensured the Port maintained IHA compliance for marine mammals by visually monitoring for the presence and behavior of marine mammals during pile driving. Methodologies for the biological monitoring protocols used in this project were presented in a biological monitoring protocol report included in Appendix C. Biological monitoring was conducted in conjunction with noise monitoring to establish the monitoring ZOI (Level B harassment zone, alternatively called ZOI for disturbance, the disturbance zone, or the disturbance ZOI) and the exclusion zone which delineates Level A harassment zones as recommended in the NMFS-approved Marine and Noise Monitoring Plan for the adjacent and concurrent 34th America's Cup/Cruise Terminal Project (Marine and Noise Monitoring Plan 2012) Appendix D. Data collection sheets used during the biological monitoring are included in Appendix E.

Pile driving was conducted by the Dutra Group which used both USACE- and NMFS-approved sound attenuation methods (soft start, bubble curtain and cushion blocks) to mitigate for sound effects as required by the IHA. These methods and protocols for monitoring noise are delineated in detail in the NMFS-approved Pier 36 Demolition/Brannan Street Wharf Project Hydroacoustic Monitoring Plan (USACE and Port 2012) in Appendix A. Noise was monitored by MUNICON consultants in conjunction with biological monitoring which was performed by Tetra Tech, Inc. (Tt/AEW JV) for marine mammals and birds and by A.A. Rich and Associates (AAR) in conjunction with Tt/AEW JV for fish.

Previously reported hydroacoustic data were used to determine the initial distances for monitoring for this project where sound was anticipated to reach levels that could result in injury (Level A, exclusion zone) or disturbance (Level B, ZOI) to marine mammals. The size of the disturbance ZOI varies depending on the type of pile driving. NMFS recommended a preliminary 3,038-foot (926-meter) radius disturbance ZOI around a vibratory pile-driving site for both cetaceans and pinnipeds. No threshold for the exclusion zone for vibratory pile driving was given; sound levels from vibratory pile driving do not exceed the Level A harassment threshold. For impact pile driving, a 7-foot (2.2-meter) radius ZOI was recommended for injury to cetaceans (whales, dolphin, porpoise) with no distance set for injury to pinnipeds, and a 151-foot (46-meter) ZOI for disturbance to pinnipeds (seals) (Marine and Noise Monitoring Plan 2012; NMFS 2012a, 2012b). The actual ZOIs utilized in the BSW Project were established during the project by the noise monitoring findings.

NMFS also required biological monitoring of protected fishes during pile driving. Monitoring focused on potential effects on the Endangered Species Act (ESA) listed threatened Central California Coast (CCC) steelhead (*Oncorhynchus mykiss*) distinct population segment (DPS) and the ESA threatened Southern DPS of the North American green sturgeon (*Acipenser medirostris*) and their designated critical habitats. According to the Project BO, the following reasonable and prudent measures were necessary and appropriate to minimize take of CCC steelhead and green sturgeon (NMFS 2011):

1. Undertake measures to minimize harm to steelhead and green sturgeon from demolition, construction, and degradation of aquatic habitat;
2. Ensure the fisheries monitoring program minimizes harm and mortality of steelhead and green sturgeon, and assists in the evaluation of project effects on salmonids and green sturgeon; and
3. Prepare and submit reports regarding construction of the proposed project and the results of the fisheries monitoring program.

Furthermore the terms and conditions in the Project BO include the “evaluation of fish mortality and injury rates through the use of visual observations and collections during pile driving events.” AAR conducted all fish monitoring and prepared a summary report of the monitoring; that report and associated appendices and datasheets are provided in Appendix F. Concurrent with fish monitoring, Tt/AEW JV monitored bird behavior and observed fish predation and strikes during pile driving.

Noise monitoring data collected from pile driving projects throughout the bay indicate that sound pressure levels resulting from the proposed project’s pile driving will in some instances exceed the dual metric criteria and therefore likely result in injury to CCC steelhead and green sturgeon. With the use of a bubble curtain at the BSW Project, none of the proposed pile driving exceeded the 206 dB re: one micropascal peak sound pressure level threshold. However, some of the pile driving exceeded the

accumulated Sound Exposure Level (SEL) threshold of 187 dB re: one micropascal squared-second for physical injury and the 150 dB root mean-square pressure (RMS) threshold for behavioral responses. The Dutra Group used a bubble curtain to attenuate sound levels which in turn reduced the distance in which the fish were affected by these elevated sound levels (NMFS 2011).

3 MONITORING METHODS

3.1 NOISE MONITORING

In accordance with the IHA, the NMFS BO, and pertinent permit conditions for the BSW Project, field operations for noise monitoring were conducted to obtain data as follows:

1. Using sound meters to measure baseline of ambient noise in the vicinity of pile driving locations; and
2. Measuring noise from vibratory and impact pile driving to establish/confirm threshold distances.

Noise monitoring was performed prior to pile driving to acquire ambient underwater sound levels in the vicinity of the project, as well as during all steel and concrete pile driving from locations on Pier 32, Pier 38, and on the pile driving barge and a small mobile vessel. Noise monitoring was performed for seven weeks from July 25th to September 14th. Noise monitoring in the immediate vicinity of pile driving ceased as of August 16th as disturbance zones were clearly identified for both concrete and steel pile driving activities. Noise monitoring was performed in accordance with the NMFS-approved hydroacoustic monitoring plan found in Appendix A. Measurements were used to determine approximate distances where SELs will equal the maximum exposure levels of 180 dB for marine mammals, 183 dB for small fish, and 187 dB for large fish for both steel and concrete piles. These findings and pile driving records are presented in Appendix B.

3.2 MARINE MAMMAL MONITORING

The biological monitoring protocol report included in Appendix C describes the observation and reporting methodologies for marine mammals, birds, and fishes used during pile driving. Methodology information for BSW biological monitoring is also described below.

Tt/AEW JV, assisted by AAR, monitored the presence and behavior of marine mammals during pile driving to assist the Port with IHA compliance. Marine mammals were monitored for the first 10 days of concrete pile driving and the first 24 days of steel pile driving. Marine mammal observers (MMO) visually monitored the presence and behavior of marine mammals 30 minutes before, during, and after all pile driving. The MMOs complied with IHA (NMFS 2012a) mitigation requirements 7b and 7c, which required (1) monitoring of the exclusion zone to ensure that no marine mammals enter; and (2) notification of the on-site engineer if a marine mammal is seen within or approaching the exclusion zone prior to the start of impact pile driving. MMOs observed and recorded the number, type, location, and behavior of all marine mammals in the designated exclusion zone.

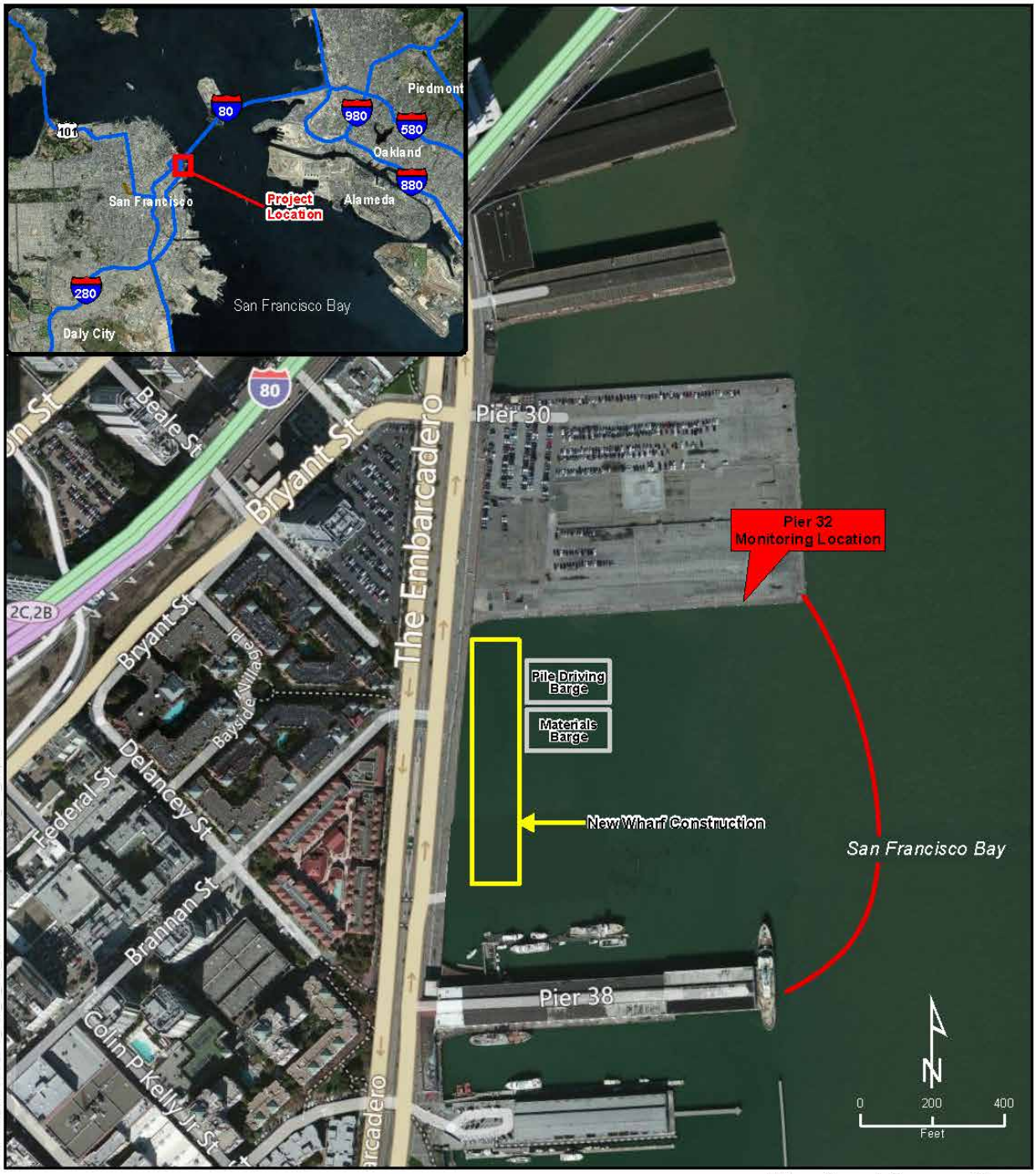
The exclusion zone was established based on the IHA by NMFS for all in-water impact pile driving of 164 feet (50 meters) around each pile (Figure 2) to avoid exposing marine mammals to sounds at or above 180 dB RMS or Level A harassment levels. This zone was monitored during pile driving to ensure no marine mammals entered this radius. An exclusion zone for vibratory pile driving was considered unnecessary to prevent Level A harassment as sound levels did not exceed the Level A harassment threshold (Marine and Noise Monitoring Plan 2012; NMFS 2012a and 2012b).

Observers scanned the surface of the water around the pile driving within and outside the exclusion zone in search of marine mammals during the survey. MMOs scanned the exclusion zone and out to the vessel transit boundary (Figure 1) and past into the ZOI (disturbance zone ZOI) i.e. up to a half mile beyond with unaided eyes and further with 8 x 42 binoculars during daylight observations (out to 6,233 feet [1,900 meters]). From July 27 through 30, 2012, during steel pile driving, the MMO was stationed on a platform on the pile-driving barge. From July 31 through August 10, 2012, during steel pile driving the MMO was stationed on a boat that was moved within and outside of the exclusion zone, depending on visibility and the location of the barge. From August 13 through November 15, 2012, the MMO was stationed near the eastern end of Pier 32. Concrete pile driving began on August 13 and continued through August 24. Steel pile driving resumed August 27 – September 5, and resumed on November 12-15 at which time monitoring completed. The project location and MMO stations are shown in Figure 1. Observations from the boat were made during continuous (all day) transit within and along the boundary (Figure 1). The exclusion zone around the piles established to avoid exposing marine mammals to Level A harassment is shown in Figure 2.

The MMOs observed and recorded start and stop times, environmental and ambient conditions (such as visibility, tide, and other human activity in the area), and other details related to the pile driving on standardized data sheets. Pile-related data, such as pile type, pile numbers, and pile driving start/stop times, were noted and updated throughout the day if needed. In addition, the number, type, location, and behavior of any marine mammal observed within the designated exclusion zone and the ZOI were recorded; initial behaviors and any changes in behavior (such as reactions) were noted. MMOs kept a photo documentation log and made diagrams when necessary.

3.3 BIRD PREDATION OBSERVATIONS

Bird predation and general behavior were monitored concurrently with fish and marine mammal monitoring during the first 10 days of steel pile driving (July 27 through August 10, 2012), and during the first 10 days of concrete pile driving (August 13 through 24, 2012). This monitoring was conducted by the marine mammal observer. See Figure 1 for monitoring location. Monitors scanned with unaided eyes and with 8 x 42 binoculars during daylight observations. Any occurrence of birds feeding on fish during or immediately after pile driving was recorded on standardized data sheets



Project Location

Vessel Transit Boundary

San Francisco, California

TETRA TECH

Figure 1

Exclusion Zone

Legend

Wharf Area

Exclusion Zone

San Francisco, California

TETRA TECH

Figure 2

general bird activity and behavior were observed immediately before, during, and immediately after pile driving, and any atypical behavior was noted on the data sheets. Start and stop times, environmental and ambient conditions (such as visibility, tide, and other human activity in the area), and other details related to the pile driving were recorded on standardized data sheets. Pile-related data, such as pile type pile numbers, and pile driving start/stop times, were noted and modified throughout the day if needed.

3.4 FISHERIES MONITORING

Fish monitoring was conducted for 10 days for each pile type. Steel pile driving was conducted on July 27, 30, 31, August 1-3, and, August 6-9; concrete pile driving was conducted on August 13-17, and August 20-24. From July 27th - August 6th, the fish monitor began searching for fishes before pile driving began, but at about the same time (6:45 am) that various other activities (e.g., shuttling people to the barge) had begun. From the onset of the fish monitoring, the monitors reported that the visibility in the water was very poor, even prior to pile driving activities, and no fishes were observed. Thus, beginning on August 7th to the end of the monitoring, the fish monitors began searching for fishes earlier, between 6:15-6:30 am. To assist with seeing fish, the fish monitors used a high-powered flashlight throughout each day of monitoring. Methods used to monitor fisheries are described in Appendix F.

3.5 REPORTING FOR MARINE MAMMAL, BIRD PREDATION, AND FISHERIES MONITORING

Data summaries and completed data sheets for all biological monitoring events were completed by 9:00 a.m. on the first Monday after the prior week's monitoring activities. As required by NMFS, the Port sent the daily and weekly summary noise and marine mammal reports to NMFS. Copies of the weekly summary narrative reports are included in Appendix E (marine mammals and bird predation) and Appendix F (fisheries).

3.6 REPORTING FOR NOISE MONITORING AND PILE DRIVING

Summaries of weekly and daily pile driving records were submitted to NMFS the week following the pile driving activities. In addition, weekly noise monitoring summary reports were also submitted to NMFS the week after measurements were collected for a period of seven weeks. Appendix B includes the noise monitoring workplan describing approach and methodology, descriptions of daily hydroacoustic monitoring stations, the total number of pile strikes per day, the peak sound pressure level, and accumulated SEL per day for each location for the three weeks of noise monitoring required which included the initial installation of 15 steel piles and 12 concrete piles.

4 RESULTS

Monitoring results are summarized below.

4.1 NOISE RESULTS

Results of noise monitoring are presented in Appendix B. A summary of MUNICON results for the BSW Project is as follows: measurements indicated that the mean average ambient noise levels recorded at Pier 32 were 174 dBz, and 169 dBz at Pier 38. During steel pile driving activities SEL sound levels ranged from 191-195 dBz at a distance of 60 feet (18 meters) on the noise monitoring boat, and from 166-185 dBz at a distance of 550-700 feet (167-213 meters) at Pier 38, and from 174-177 dBz at a distance of 840-915 feet (256-279 meters) at Pier 32. During concrete pile driving activities, SEL sound levels ranged from 183-190 dBz at a distance of 45-90 feet (14-27 meters) on the monitoring boat, from 165-180 dBz at a distance of 375-700 feet (114-213 meters) at Pier 38, and from 170-177 dBz at a distance of 800-990 feet (244-302 meters) at Pier 32. The ZOI and exclusion zone were delineated and adjusted as needed during construction at BSW based on the IHA and upon these findings. Based on the results of the noise monitoring, these measurements showed that the ranges for these two zones were smaller than those originally prescribed by NMFS.

4.2 MARINE MAMMAL MONITORING RESULTS

Observations were made on ten concrete pile driving days and 24 steel pile driving days between July 27 and November 15, 2012 (Table 1). A total of 74 harbor seals, 36 California sea lions, and 29 harbor porpoise sightings were recorded during this time (Table 1). Pinnipeds were observed on every monitoring day.

Harbor seals and sea lions were generally observed at distances of 200 to 1,000 feet (61 to 305 meters) from pile-driving activities. Harbor porpoises were observed much less frequently, farther out in the bay and typically at a distance of 1,200 feet (365 meters) or more. They were spotted only on the east side of the vessel transit boundary. These observations were all outside of the exclusion zone. No marine mammal was observed within the exclusion zone. Harbor seals were the most commonly observed species in the area, typically between 200 to 600 feet (61 to182 meters) from the pile driving. On fewer occasions, they were spotted out to 1,000 feet (305 meters) from the barge while pile driving was occurring. No individuals of this species showed any sign of disturbance even with the proximity to the pile driving. Sea lions were observed typically farther from the pile driving (600 to 1,000 feet [182 to 305 meters]) and harbor porpoise were observed only outside the vessel transit boundary. No behavioral changes or signs of disturbance or reactions were observed in any of the individuals of sea lion or harbor seal in the survey zone or exclusion zone. No work delays or shut downs were required for any species. See Appendix E for completed data sheets and compiled text summaries.

4.3 BIRD PREDATION OBSERVATIONS RESULTS

Observations were made on 10 concrete pile driving days and 10 steel pile driving days between July 27 and August 24, 2012 (Table 1). No occurrences of bird predation on fish were observed during the survey. Western gull (*Larus occidnetalis*), Caspian tern (*Sterna caspia*), double-crested cormorant (*Phalacrocorax auritis*) and brown pelican (*Pelicanus occidentalis*) were seen frequently in the area. Birds were often observed feeding within the project area; however, none were observed taking dead fish associated with pile-driving impacts.

4.4 FISHERIES MONITORING RESULTS

Fisheries monitoring during steel pile driving was conducted on July 27, 30, 31, August 1 to 3, and, August 6 to 9. Fisheries monitoring during concrete pile driving was conducted on August 13 to 17, and August 20 to 24. No dead or injured fish were observed throughout the monitoring period. No work delays or shut downs were required for any fish species. Water visibility was often poor because of the high level of turbidity , turbulence during pile driving, and generally dark conditions in the water early in the morning. Live fish were observed only on August 9. Many small (1 to 2 inch [2 to 5 centimeter]) unidentified fish were observed prior to pile driving and other activities (before the formal monitoring start time). The fish were not seen once pile driving commenced. Fisheries monitoring results are presented in Appendix F.

TABLE 1. MARINE MAMMAL MONITORING DATES, OBSERVER POSITION, NUMBER AND TYPE OF PILES DRIVEN, AND NUMBER AND TYPES OF SPECIES OBSERVED

Date	Monitoring Position	Number of Piles Driven	Type of Pile	Number of Species Observed		
				Harbor Seal	Sea Lion	Harbor Porpoise
7/27/2012	Crane Barge	1	Steel	2	1	0
7/28/2012	Crane Barge	1	Steel	3	0	0
7/31/2012	Boat	2	Steel	1	1	0
8/1/2012	Boat	4	Steel	3	1	3
8/2/2012	Boat	5	Steel	4	2	0
8/3/2012	Boat	5	Steel	2	2	1
8/6/2012	Boat	5	Steel	2	1	0
8/7/2012	Boat	5	Steel	2	1	5
8/8/2012	Boat	5	Steel	3	0	0
8/9/2012	Boat	7	Steel	3	2	0
8/10/2012	Boat	7	Steel	4	1	0
8/13/2012	Pier 32	1	Concrete	2	0	0
8/14/2012	Pier 32	4	Concrete	0	2	0
8/15/2012	Pier 32	4	Concrete	1	0	1
8/16/2012	Pier 32	5	Concrete	3	1	0
8/17/2012	Pier 32	5	Concrete	2	1	0
8/20/2012	Pier 32	4	Concrete	3	2	0
8/21/2012	Pier 32	6	Concrete	1	0	0
8/22/2012	Pier 32	7	Concrete	2	0	2
8/23/2012	Pier 32	5	Concrete	2	4	0
8/24/2012	Pier 32	6	Concrete	3	2	0
8/27/2012	Pier 32	5	Steel	1	2	4
8/28/2012	Pier 32	8	Steel	3	0	0
8/29/2012	Pier 32	7	Steel	1	1	6
8/30/2012	Pier 32	6	Steel	1	1	4
8/31/2012	Pier 32	6	Steel	2	2	3
9/4/2012	Pier 32	4	Steel	3	1	0
9/5/2012	Pier 32	1	Steel	0	1	0
11/7/2012	Pier 32	4	Steel	2	1	0
11/8/2012	Pier 32	5	Steel	4	0	0
11/9/2012	Pier 32	5	Steel	1	1	0
11/12/2012	Pier 32	6	Steel	4	1	0
11/14/2012	Pier 32	8	Steel	3	1	0
11/15/2012	Pier 32	1	Steel	1	0	0
TOTAL		**160**		**74**	**36**	**29**

5 CONCLUSIONS

The size of the ZOI for the project was adjusted depending on the type of pile driving. We initially followed NMFS recommendations which state according to published thresholds that neither vibratory or impact pile driving produces sound pressure levels of sufficient intensity to cause injury (Level A harassment) to pinnipeds regardless of distance; that vibratory pile driving also does not produce sound pressure levels of sufficient intensity to cause injury (Level A harassment) to cetaceans; and that a preliminary 3,038-foot (926-meter) radius ZOI around a vibratory pile-driving site for both cetaceans and pinnipeds is recommended. In addition, that impact pile driving may cause injury to cetaceans at a distance of 7 feet (2.2 meters) or less, and could cause disturbance to pinnipeds or cetaceans at 151 feet (46 meters) or less (77 Code of Federal Regulations [CFR] 106). Real time findings of noise monitoring during the BSW Project indicated that ZOI distances were less than the recommended distances. They were thus adjusted in the course of the project to reflect the levels measured by the field staff during the pile driving sessions; the ZOI safety zones for marine mammals were reduced based on the actual recorded SELs.

Our observations of marine mammal behavior during BSW pile driving were consistent with effects reported elsewhere. Neither pinnipeds nor cetaceans were observed within distances of pile driving at BSW expected to cause behavioral disturbances, based on sound thresholds described in 77 CFR 106. In addition, no marine mammal species was observed to react behaviorally to the pile driving. There was no Level A or B harassment or takes to any marine mammals during the BSW pile driving monitoring. There were no work stoppages or delays. The marine mammal ZOIs recommended by NMFS were modified in the course of the BSW Project based on noise monitoring results. Based on noise monitoring results, zones were smaller than originally recommended. With the use of a bubble curtain at the BSW Project, none of the proposed pile driving exceeded the 206 dB peak threshold. However, some of the pile driving exceeded the 187 dB SEL threshold for physical injury and the 150 dB RMS threshold for behavioral responses. Noise monitoring results are presented in Appendix B.

No bird predation on fish kills associated with of pile-driving impacts were observed. The species and abundance of birds near the BSW Project site was typical for the time of year when pile driving occurred. No injured or dead fish were noted in the project vicinity at any time throughout the monitoring period. Given the poor water visibility, it is unknown if any ESA-listed steelhead, North American green sturgeon, or any other fishes might have been in the area. Fisheries monitoring conclusions are presented in Appendix F.

6 LITERATURE CITED

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APPENDIX A

PIER 36 DEMOLITION/BRANNAN STREET WHARF PROJECT HYDROACOUSTIC MONITORING PLAN

Pier 36 / Brannan St. Wharf
San Francisco, San Francisco County, California

Hydroacoustic Monitoring Plan

July 2012

US Army Corps of Engineers ®
San Francisco District

PORT OF SAN FRANCISCO

INTRODUCTION

The U.S. Army Corps of Engineers (USACE) and the Port of San Francisco (Port) are undertaking the Pier 36 Demolition/Brannan Street Wharf Project to demolish and remove the existing Pier 36 along the San Francisco Embarcadero and construct a 57,000 square-foot open space, pile-supported park, the Brannan Street Wharf (BSW), in its place. The overall Project is divided into two major components: Demolition of the existing Pier 36 and construction of the BSW project. The USACE is undertaking the demolition and removal of the existing Pier 36. Immediately following the demolition of Pier 36, the Port will begin construction of the BSW at the former Pier 36 site.

The BSW park will provide a new public open space atop a pile-supported deck over the San Francisco Bay. The park will landscaped to provide a major new public amenity for passive recreational enjoyment in the South Beach Waterfront area. It will be oriented in a north-south configuration, and will connect alongside the eastern side of the Embarcadero Promenade. The northern end of the park will begin south of Piers 30-32, extending south for about 830 feet to a point south of Pier 36. The BSW park will have a wedge shape, with a width ranging from approximately 10 feet at its narrowest point at the northern end, widening to approximately 140 feet at the southern end (Figure 1).

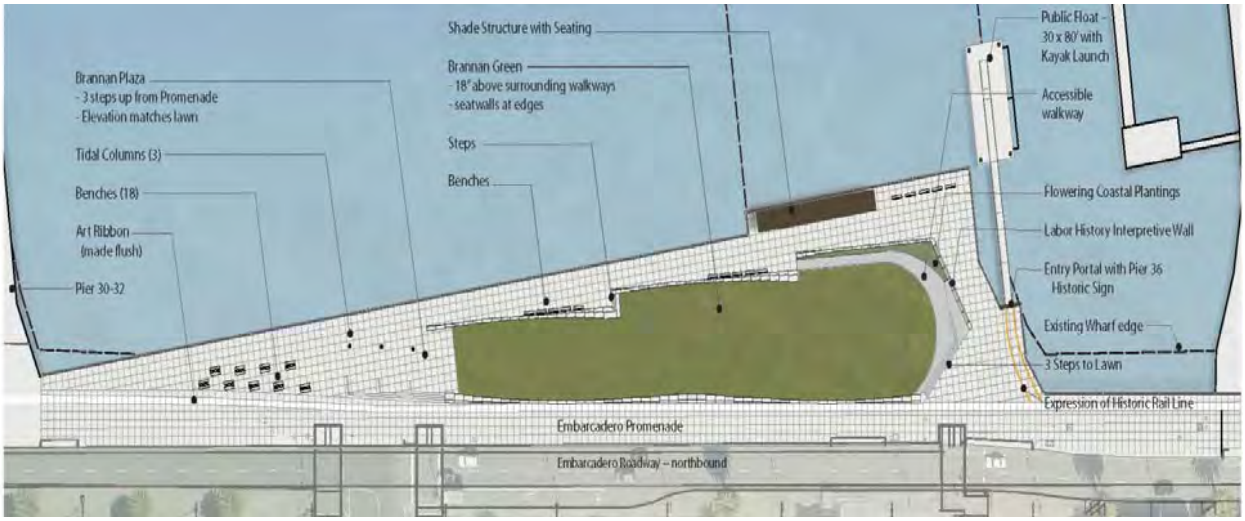

Figure 1. Brannan Street Wharf Site Plan (Port of San Francisco 2010)

PROJECT DESCRIPTION

The Pier 36/BSW site is located in San Francisco City and County, California, on the San Francisco Bay waterfront. The pier sits four blocks south of the San Francisco Oakland Bay Bridge at a longitude and latitude of 122°23'13.34"W and 37°47'1.07"N (Figure 2).

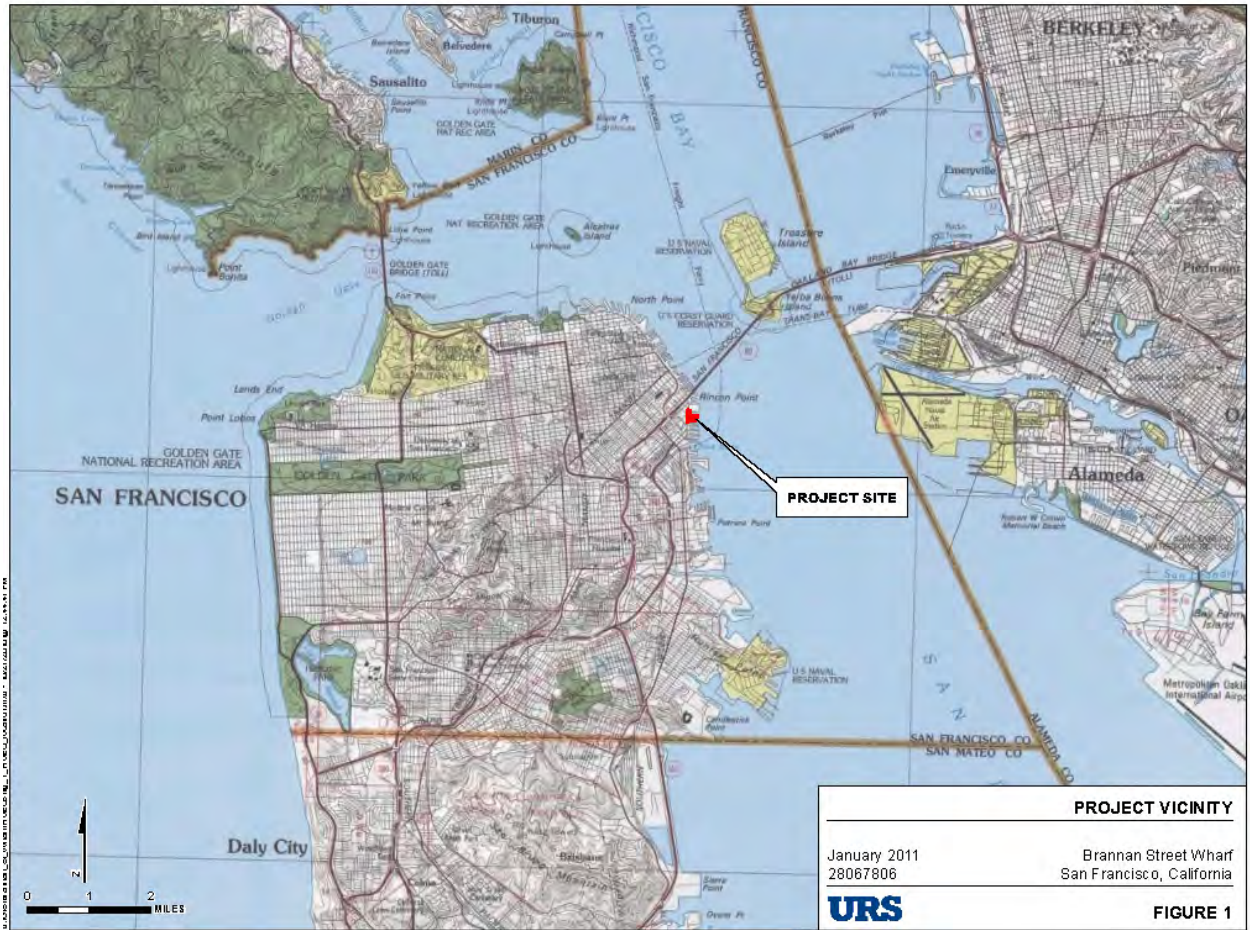

Figure 2. Pier 36 Project Vicinity Map (USACE 2011a)

The site (San Francisco Assessor's Block 9900, Lot 034, 036) is located between Pier 30-32 and Pier 38 directly fronting the east side of waterfront street, the Embarcadero. The site is in proximity of the intersection of Brannan and Townsend Streets with the Embarcadero, within the South of Market (SOMA) district of San Francisco (Figure 3).

Figure 3 – Pier 36 Site Location (Port of San Francisco 2011)

The Pier 36 Demolition project will begin in March 2012 and is expected to take approximately four months to complete. Construction of the BSW will follow the demolition, beginning in approximately June 2012, and is expected to be completed within 13 months. In–water work, including pile driving, will not extend beyond November 30, 2012 to avoid the peak migration period for salmonids and spawning adult green sturgeon. Construction will be conducted during daylight hours, except for a section of wharf near Pier 32, which will require double shifts to minimize impacts to traffic on the Embarcadero.

Construction of the Brannan Street Wharf will require the installation of 262 steel and concrete piles and 57,000 square feet of new decking (116, 24-inch diameter steel pipe piles and 146, 24-inch diameter octagonal concrete piles). All piles will be driven to depths of more than 60 feet

below the mudline in water depths ranging approximately 2 to 15 feet at mean low lower water (MLLW) and will be installed using a combination of impact and vibratory hammer driving methods. Pile driving will be done from the water using a barge-mounted marine crane and other construction activities will be primarily done from land.

Only one pile type (24-inch concrete or 24-inch steel) is expected to be installed on any given day. Concrete piles will be driven into the bay using impact driving methods only, while steel shell piles will be driven using a combination of impact and vibratory driving methods. All Impact pile driving will employ a "soft start" technique. To reduce sound levels during pile driving, an unconfined bubble curtain system will be used to place all steel shell piles when water depth is greater than 2 feet deep.[1] Bubbles in the water attenuate noise energy by disrupting the sound waves and on other projects in the San Francisco Bay area, such systems have been shown to reduce peak sound levels by 5 to15 decibels (dB) (Caltrans 2009a). The proposed pile driving work is summarized in Table 1 and detailed in the following paragraphs.

Table 1. Proposed Pile Driving for the Pier 36/Brannan St. Wharf Project

Pile Type	Total Piles Proposed	Pile Driver	Attenuation device	Minutes of Vibratory Driving	Impact Blows per Pile	Max Piles Per Day
24-inch octagonal concrete	146	Impact	None	n/a	800	8
24-inch steel shell	116	Vibratory and Impact	Bubble Curtain	8:00	300	5

24-Inch Octagonal Concrete Piles
Approximately 146 24-inch octagonal concrete piles will be driven in water depths ranging from 2 to 15 feet mean lower low water (MLLW) with an impact pile driver to a depth of approximately 60 feet below the mudline elevation. The substrate at the site includes approximately 20 feet of Bay Mud underlain by a sand mixture. The total time of pile driving for each pile is estimated to be 20 minutes in duration. During one work day, five to eight of these piles may be installed. Up to 800 blows from an impact driver will occur for each pile, using a DelMag D46-32 diesel impact hammer, producing approximately 122,000 foot-pounds (ft-lbs) maximum energy per blow, 1.5 seconds per blow (sec/blow) average.

24-Inch Steel Shell Piles
Two rows of 24-inch steel shell piles (approximately 116) will be installed nearest the shoreline as pier support piles. These will be used instead of concrete piles due to the presence of rock dike material along the shoreline. These piles will be driven through waters with a depth of approximately 0 to 6 feet MLLW, depending on the location and tides. As with the concrete piles, they will be driven to a depth of approximately 60 feet below the mudline. The substrate at the site includes a layer of rocky dike material and Bay Mud underlain by a sand/clay mixture. During one work day, three to five of these piles may be installed. Each pile will be driven for 20

[1] A bubble curtain is not planned to be used for attenuation of noise energy associated with driving concrete piles, due to the cost of using the bubble curtain and the lack of exceedance of the 206dB threshold expected from driving the concrete piles without it.

to 30 minutes. Installation will begin with approximately 8 to 15 minutes of vibratory pile driving, and finish with up to 300 blows from an impact hammer using the DelMag D46-32 diesel hammer referenced for the 24-inch octagonal concrete piles.

THRESHOLDS FOR HIGH-INTENSITY SOUND

On July 8, 2008, the Fisheries Hydroacoustic Working Group (FHWG), whose members include NMFS' Southwest and Northwest Divisions, California, Washington, and Oregon departments of transportation, the CDFG, and the U.S. Federal Highway Administration, issued an agreement for the establishment of interim threshold criteria to determine the effects of high-intensity sound on fish. While these criteria are not formal regulatory standards, they are generally accepted as viable criteria for underwater noise effects on fish. These criteria were established after extensive review of the most recent analysis of the effect of underwater noise on fish. The agreed-upon threshold criteria for impulse-type noise to harm fish have been set at 206 dB peak, 187 dB accumulated SEL for fish over 2 grams, and 183 dB for fish less than 2 grams (CalTrans, 2009a).

With the use of a bubble curtain during installation of the steel shell piles, none of the proposed pile driving will exceed the 206 dB threshold. However, under all scenarios the proposed pile driving will exceed the SEL threshold of 187 dB (though the use of bubble curtains during installation of the steel shell piles will greatly reduce the area of effect). To estimate the distance at which sound levels will exceed the 187dB criteria for injury to fish a pile driving sound assessment (memo to NMFS file #151422SWR2011SR00130, July 5, 2011) was prepared. The assessment resulted in zone's of physical injury with radial distances of 178 meters for installation of the 24-inch concrete piles (without bubble curtain), and 129 meters for the installation of the 24-inch steel piles (NMFS 2012). Figure 4 below illustrates the anticipated zones of exceedance by pile type.

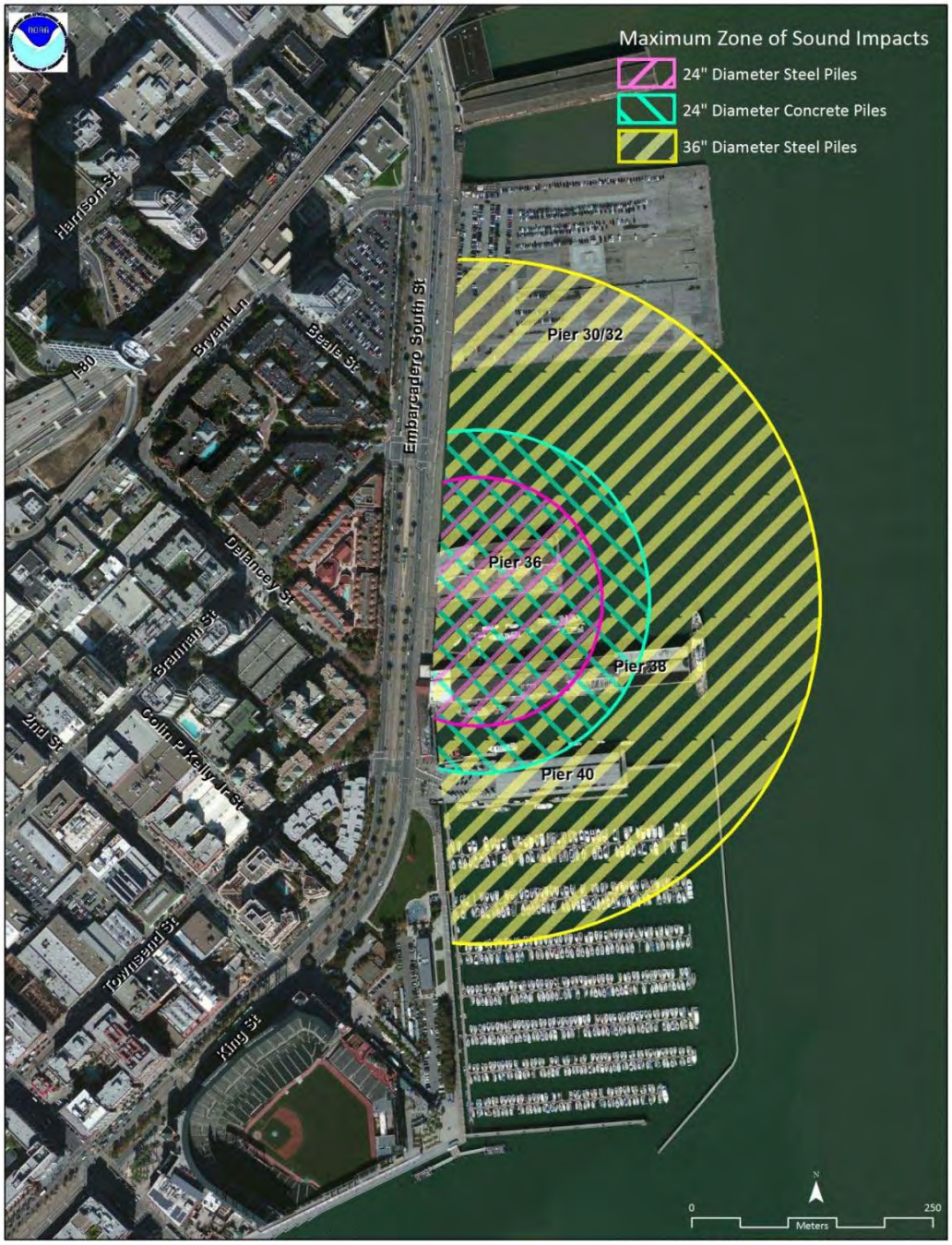

Figure 4. Expected zones of 187 dB threshold exceedence by pile type (NMFS 2012)

In accordance with the Terms and Conditions of the project Biological Opinion (NMFS 2012), the following monitoring plan will be implemented to minimize harm and mortality of steelhead and green sturgeon as well as assist in the evaluation of project effects on these species.

HYDROACOUSTIC MONITORING METHODS

Monitoring will include underwater sound measurements within and at the threshold boundary of where lethal sound impacts are anticipated, identification and collection of dead or moribund fish during pile driving activities, and observation of bird predation/ behavior.

Any personnel or contractor conducting monitoring must have an appropriate bachelor's degree and a minimum of 3 years experience in noise monitoring and analysis (Experience in the San Francisco Bay preferred). The contractor or monitoring personnel shall submit a monitoring proposal based on this plan for review and approval by USACE, NMFS, and the Port of San Francisco.

Underwater Sound Measurement

Underwater sound measurements will be conducted in the absence of construction activities, during 10% of the impact pile driving for 24-inch concrete and 24-inch steel piles, and whenever a new variable is introduced such as a substrate, pile material or pile driver.

Monitoring in the absence of construction activities will be conducted to determine background underwater noise levels. This monitoring will include a minimum of three full 24-hour cycles at the project site in the absence of construction activities. Data will be used to calculate 30-second Root Mean Square (RMS) values for each 30 seconds of the three 24-hour cycles measured and plot a Cumulative Distribution Function (CDF) (Washington Department of Transportation, 2011). Overall average background sound levels will be reported as the 50% CDF and include a spectral analysis of the frequencies for a minimum of an hourly cycle (Washington Department of Transportation, 2011).

In terms of monitoring during pile installation, the 24-inch concrete and 24-inch steel piles chosen for monitoring will be representative of the various water depths in which piles are being driven for the project.

Additionally, sound monitoring will be preformed to test the effectiveness of the bubble curtain attenuation system during installation of the 24-inch steel piles. This bubble curtain monitoring will be performed during driving of twelve 24-inch steel piles. Such monitoring will involve measurements performed on pile strikes with the bubble curtain alternating between operational (presence) and off (absence). To account for varying resistance as the pile is driven, the bubble curtain will be turned off for 30 second periods during the beginning, the middle, and near the end of the drive (Washington Department of Transportation, 2011). Pile driving should resume for a minimum of two minutes after each 30 second period the curtain is off and thus if any piles require less than 5 minutes to drive, the sound attenuation system would be turned off for only two 30-second periods, one near the beginning and one near the end of the drive (Washington Department of Transportation, 2011). Again, the specific piles chosen for attenuation effectiveness monitoring will be representative of the various water depths in which piles are being driven for the project.

Measurements are proposed to be taken between 10 and 20 meters from the pile being driven. A clear line of sight between the hydrophone and the pile driver will be maintained, however the exact measurement positions from the pile will be dependent on access to the construction area,

concerns for safety of the monitors, and fluctuations caused by currents, waves and wind. Therefore, the position distance referenced above is approximate. If sound pressure levels exceed threshold levels at distances greater than those described in the Biological Opinion and repeated in this monitoring plan, NMFS will be notified within 24 hours to determine how to proceed. Any proposed changes in measurement frequency or location will be submitted in writing to NMFS for pre-approval prior to implementation.

Hydrophones are proposed be placed at a depth below the surface approximately equivalent to mid-channel at the location of measurement. A weighted tape measure will be used to determine the depth of the water. If the water depth is shallower than 2 meters, hydrophones will be positioned at a depth of 1 meter below the water surface. In order to allow for evaluation of impacts to fish it is expected that peak sound pressure, accumulated unweighted SEL, and $RMS_{90\%}$ sound pressure level will be measured. The peak pressure and accumulated SEL are the sound descriptors most widely used to describe potential sound effects and resource agencies on the West Coast have been using SEL to evaluate pile driving sound impacts to fish (CalTrans 2009a). For behavioral response of fish, the RMS sound pressure level of a pile driving pulse is generally used (CalTrans 2009a).

The peak pressure is the highest absolute value of the measured waveform, and can be a negative or positive pressure peak (CalTrans 2009a). The total sound energy in the pulse is equivalent to the unweighted SEL for a plane wave propagating in a free field with units of dB re 1μPa2-sec (CalTrans 2009a). The accumulated SEL is calculated as all sound pressure measured during pile driving in one day at a location accumulated and referenced to one second. The $RMS_{90\%}$ level is determined by analyzing the waveform and computing the average of the squared pressures over the time that comprise that portion of the waveform containing 90 percent of the sound energy (CalTrans 2009a). This has been approximated in the field for pile driving sounds by measuring the signal with a precision sound level meter set to the "impulse" RMS setting (CalTrans 2009a). Peak pressures and RMS sound pressure levels will be expressed in dB re 1 μPa as well.

Any proposed changes in the sound descriptors to be measured would be submitted to NMFS in writing for pre-approval prior to implementation of such changes.

Measurement Equipment

As recommended by CalTrans (2009a), measurements are anticipated to be made using hydrophones that have a flat frequency response and are omni-directional over a frequency range of 25 to 10,000 Hz. For example, CalTrans (2009a) suggests Reson Model TC-4013 or Model TC-4033 hydrophones with PCB in-line charge amplifiers (Model 422E13) and PCB Multi-Gain Signal Conditioners (Model 480M122) or equivalent systems be used to adjust the received signals to appropriately measure and record the large range of sound pressures that pile driving could generate.

The signals are anticipated to be fed into Integrating Sound Level Meters (SLM) which will measure peak pressure and SEL. Quality recordings using a digital audio recorder (either solid state or tape) would be made at times during attended measurements. As recommended by CalTrans (2009a), the SLM is expected to have the ability to measure the unweighted peak sound

pressure levels over relative short periods and is expected to be used to approximate the unweighted SEL of each pile strike by measuring the one-second equivalent sound energy level (Leq [1-sec]) using the C-weighting network setting or equivalent. All measurement equipment will be required to have a frequency response of +1dB from 10 Hz to 10,000 Hz over the anticipated measurement range and hydrophones of different sensitivities may be required depending on the acoustic environment.

Alternative equipment or measurement procedures may be proposed by the contractor performing the sound monitoring. In this case descriptions and specifications of such equipment/measurement procedures would be provided to NMFS for pre-approval prior to implementation.

Quality Control

Calibration of measurement systems would be established prior to use in the field. Calibration would be performed using the following techniques described by CalTrans (2009a) or by alternative techniques proposed by the contractor performing the sound monitoring and pre-approved by NMFS:

1. Use an acoustically certified piston phone and hydrophone coupler that fits the hydrophone to directly calibrate the measurement system. In this case, the volume correction of the hydrophone coupler using the hydrophone is known so that the piston phone produces a known signal that can be compared against the measurement system response. The response of the measurement system is noted in the field book and applied to all measurements.

2. Use the procedure described in 1 above to calibrate a "reference" hydrophone. The reference hydrophone is then replaced with the field hydrophone used to make actual measurements. Both the field and reference hydrophones would be required to have manufacturer calibration certifications that would include the hydrophone sensitivities. The sensitivity of the field hydrophone would be compared with the sensitivity of the "reference" hydrophone. The difference between the two hydrophones is the offset that would be applied to the measurements made using the "field" hydrophone. With this method, the response of the reference system to the calibration tone is noted in the field book along with the calculated "offset." The calibration is applied to all measurements made using the "field" hydrophone. This procedure is useful for different model hydrophones that do not fit the piston phone coupler. These types of hydrophones are typically more rugged, and therefore, may be preferable in construction environments.

The SLMs will be calibrated to the calibration tone prior to use in the field. The tone is then measured by the SLM and is recorded on to the beginning of the digital audio recordings that will be used. The system calibration status would be checked by measuring the calibration tone and recording the tones. The recorded calibration tones are used for subsequent detailed analyses of recorded pile strike sounds.

The effects of high current or water velocities on the hydrophone and resulting measurements will be mitigated by attaching the to a nylon cord or a steel chain if the current is swift enough to

cause strumming of the line (Washington Department of Transportation, 2011). The nylon cord or chain will be attached to an anchor that will keep the line the appropriate distance from each pile. Current Velocity will be measured concurrent to sound measurements (Washington Department of Transportation, 2011). If velocity is greater than 1 meter/ second, a correlation between sound levels and current speed will be made to determine whether the data is valid and should be included in the analysis (Washington Department of Transportation, 2011). If water velocity is expected to be greater than 1 meter/second, a flow shield around each hydrophone may be used to provide a barrier between the irregular, turbulent flow and the hydrophone (Washington Department of Transportation, 2011). Any strong currents will be noted in the field notes (see below).

Field notes will be recorded during all measurements in a water-resistant field notebook and are expected to include calibration notes, measurement positions, pile-driving information, system gain setting, and equipment used to make each measurement (also see the "Reporting" section for detailed acoustic monitoring data that must be collected)

BIRD PREDATION AND FISH MORTALITY MONITORING

Bird predation monitoring will be performed during all impact pile driving activities for the first 2 weeks of pile driving for each type of pile and will include observation and recording of any occurrence of birds feeding on fish during and immediately following pile driving activities. The objectives of such monitoring will be to:

- confirm the presence or absence of bird predation as an indicator of fish mortality;
- gauge the magnitude of bird predation by quantifying the number of bird strikes per minute and the duration of the event;
- Identify size and species of fish affected; and
- Collect and transfer of any dead green sturgeon or salmonids to NOAA-Fisheries.

If after 2 weeks of monitoring, no bird predation or dead fish are observed, the Port will consult with NMFS to consider cessation of monitoring.

In accordance with the Terms and Conditions of the project Biological Opinion (NMFS 2012), If any salmonids or sturgeon are found dead or injured during visual observations, NMFS biologist Amanda Morrison will be contacted immediately by phone at (707) 575-6083 or at the NMFS Santa Rosa Area Office at (707) 575-6050. All salmonid and sturgeon mortalities shall be retained, placed in an appropriately-sized sealable plastic bag, labeled with the date and location of collection, fork length, and be frozen as soon as possible. Frozen samples shall be retained by the monitors or project biologist until specific instructions are provided by NMFS. The biological samples may not be transferred to anyone other than the NMFS Santa Rosa Area Office without obtaining prior written approval from the NMFS Santa Rosa Area Office, Supervisor of the Protected Resources Division. Any such transfer will be subject to such conditions as NMFS deems appropriate.

Methods

The following methods adapted from CalTans (2009a) are anticipated to be used. Any alternative techniques proposed by a contractor performing the monitoring will be submitted to NMFS in writing for pre-approval prior to initiation:

> Monitors may be located onshore with binoculars during installation of the 24-inch steel shell piles where the anticipated effect distance is approximately 129 m. During installation of the 24-inch concrete piles (without bubble curtain) monitors will be located on a boat within 178 meters of the pile driving activity. Monitors will record bird feeding activity during pile driving on standardized data sheets (Similar to that included Attachment 1). If feeding is observed, one-minute counts of bird strikes will be initiated. These counts will be repeated throughout the duration of the monitoring period. Birds, such as gulls, that appear to scavenge fish from the surface will be recorded during each strike upon the surface. Diving birds which may be present, but which cannot be confirmed to scavenge on injured fish while diving, will be noted on the data sheet but will not be included in the count of bird strikes. Monitors will be prepared to identify the species and size of any dead or moribund fish, either through observation with binoculars, or by collection and release of specimens with a dip-net. Any salmonids or sturgeon found dead will be collected and processed as described above. In addition, general bird activity and behavior during pile driving and throughout the day will be noted and recorded.

REPORTING

Monitors will provide daily hydroacoustic and bird predation monitoring reports to the Port of San Francisco and US Army Corps of Engineers summarizing preliminary monitoring results. Daily reports of noise and biological monitoring will be submitted daily for the first 3 days for each type of pile driving activity, and if pile driving occurs in a significantly different substrate. After that, daily reports will be compiled and one week's worth of daily monitoring reports will be forwarded by the Port of San Francisco to NMFS biologist Amanda Morrison by close of business the Monday of the following week. Daily reports will include the following:

- A description of hydroacoustic monitoring stations, including the number, location, distances and depths of hydrophones;
- The total number of pile strikes per day, the peak sound pressure level, and accumulated SEL per day for each hydroacoustic monitoring location; and
- Bird predation and behavior, and evaluation of fish mortality and injury through use of visual observation and collection (NMFS will be notified of any salmonids or sturgeon found dead will immediately as described above).

Monitors will prepare and submit to the Port of San Francisco and USACE a draft and final monitoring report once construction is complete. Per the Terms and Conditions of the project Biological Opinion (NMFS 2012), the final report will be provided to NOAA-Fisheries by the Port of San Francisco and USACE no later than January 15 of the year following construction of the project. The monitoring report will include data collected and summarized from all

monitoring locations in graphical form and as summary statistics and time histories of impact sound values for each pile. The following information will be included in the draft and final reports (adapted from Washington Department of Transportation, 2011):

- Size and type of piles;
- A detailed description of the bubble curtain attenuation device, including design specifications;
- The impact hammer energy rating used to drive the piles, make and model of the hammer;
- A description of the sound monitoring equipment;
- The distance between hydrophone(s) and pile;
- The depth of the hydrophone(s) and depth of water at hydrophone locations;
- The distance from the pile to the water's edge;
- The depth of water in which the pile was driven;
- The depth into the substrate that the pile was driven;
- The physical characteristics of the bottom substrate into which the piles were driven;
- The total number of strikes to drive each pile and for all piles driven during a 24-hour period;
- The background sound pressure level reported as the 50% CDF;
- The results of the hydroacoustic monitoring, including the frequency spectrum, ranges and means including standard deviation/error for peak and RMS SPL's, single-strike and cumulative SEL with and without the attenuation system, an estimation of the number of strikes that exceeded the cumulative SEL threshold and an estimation of the distance at which the peak and cumulative SEL values reach the respective thresholds and the distance at which the RMS values reach the relevant marine mammal thresholds and background sound levels;
- A description of any observable fish, marine mammal or bird behavior in the immediate area will and, if possible, correlation to underwater sound levels occurring at that time;
- the total number of pile strikes per pile and the interval between strikes; a discussion of any unanticipated effects or unanticipated levels of effects on steelhead and green sturgeon including the occurrence of any mortality of salmonids or green sturgeon and the detail of collection for those species;
- a discussion of the number of other fish killed or injured during the pile driving including the size and species of fish; and
- a discussion of any observed bird predation and behavior including bird strike counts.

In addition, per the Terms and Conditions of the project Biological Opinion (NMFS 2012) the Port of San Francisco and USACE will prepare and submit to NMFS a final report on construction related activities no later than January 15 of the year following construction of the project. The construction related activates will include the following:

- the dates construction began and was completed;
- a discussion of any unanticipated effects or unanticipated levels of effects on steelhead and green sturgeon;
- a description of any and all measures taken to minimize those unanticipated effects;
- the number of fish killed or injured during the project action; and
- photographs taken before, during, and after the activity from photo reference points.

The final monitoring report and final report on construction related activities will be submitted by the Port of San Francisco and/or USACE by the dates indicated above to NMFS Santa Rosa Area Office, Attention: Supervisor of Protected Resources Division, 777 Sonoma Avenue, Room 325, Santa Rosa, California, 95404-6528.

References

California Department of Transportation (CalTrans). 2009a. Final Hydroacoustic Monitoring Plan for Driving of Temporary Access Trestle Piles for the Self-Anchored Suspension Span. File Number EA 0120F3, 04-SF-80 KP 12.2/KP 14.3, 04-ALA-80 KP 0.0/KP 2.1

California Department of Transportation (Caltrans). 2009. Technical Guidance for Assessment and Mitigation of the Hydroacoustic Effects of Pile Driving on Fish. Prepared by ICF Jones and Stokes and Illingworth and Rodkin. Retrieved from http://www.dot.ca.gov/hq/env/bio/files/Guidance_Manual_2_09.pdf.

National Marine Fisheries Service (NMFS). 2012. Biological Opinion for Completion of Pier 36 Demolition/Brannan Street Wharf Project in San Francisco, California. File Number 2012/02694, July 17, 2012.

Washington Department of Tansportation. 2011 Underwater Noise Monitoring Plan Template.

Attachment 1
Monitoring Sheets

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

FISHERY RESOURCES

Date _____ **Monitor** _____ **Visibility** _____

Tide Level _____ **Human Activity in the Area** _____

Latitude _____ **Longitude** _____

Monitoring Locale: Pier 30 ☐ **Pier 32** ☐ **Pier 38** ☐ **178m from pile driving** ☐ **129m from pile driving** ☐

Pile Type: 24-inch octagonal concrete ☐ **24-inch steel shell** ☐

Piles/Day (1-8): ☐ **Pile Driver: Impact** ☐ **Vibratory/Impact** ☐ **Attenuation Device: None** ☐

Bubble Curtain: On ☐ **Off** ☐ **Minutes of Vibratory Driving : n/a** ☐ **8:00** ☐

Impact Blows per Pile: 800 ☐ **300** ☐

Pile No.	Pile Driver (Impact, Vibratory) [1]	Pile Driving Start/End Time	Observer Start/End Time	Dead/Injured Fish Observed (Number/Species)[2] and Time		Dead/Injured Fish Collected (Number/Species) and Time		Comment: Reference Number

[1] Steel shell pile driving will include both vibratory (up to the last 10 feet) and impact (last 10 feet) pile drivers
[2] SH=Steelhead; GS=North American Green Sturgeon; O=Other

Pile No.	Pile Driver (Impact, Vibratory) [3]	Pile Driving Start/End Time	Observer Start/End Time	Dead/Injured Fish Observed (Number/Species)[4] and Time		Dead/Injured Fish Collected (Number/Species) and Time		Comment: Reference Number

[3] Steel shell pile driving will include both vibratory (up to the last 10 feet) and impact (last 10 feet) pile drivers
[4] SH=Steelhead; GS=North American Green Sturgeon; O=Other

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

FISHERY RESOURCES

Comment: Reference No.	Fish Species	Life Stage and Status (A,J,L,E,FT,ST, FE,SE,CF, CS)	Time of observation	Comments

A=adult; J=juvenile; L=larva; E=egg; FT = federal threatened; ST=state threatened; FE=federal endangered SE=state endangered; CF = federal candidate; CS=state candidate

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

FISHERY RESOURCES

PHOTOS

Comment: Reference No.	Photo Number	Time of Photo	Photo Taken Before (B), During (D) or After (A) Pile Driving	Description

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

FISHERY RESOURCES

ADDITIONAL COMMENTS

Comment: Reference No.	Additional Comments

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

FISHERY RESOURCES

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DIAGRAM

BIOLOGICAL MONITOR _____ _____

Signature **Print Name**

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

BIRDS[8]

Page ___ of ___

Date _____ **Monitor** _____ **Weather** _____

Monitoring Locale: Pier 30 ☐ **Pier 32** ☐ **Pier 38** ☐ **178m from pile driving** ☐ **129m from pile driving** ☐ **1900m from pile driving on vessels** ☐

Pile Type: 24-inch octagonal concrete ☐ **24-inch steel shell** ☐ **Ambient Conditions** ☐ **Piles/Day (1-8):** ☐

Pile Driver: Impact ☐ **Vibratory/Impact** ☐ **Attenuation Device: None** ☐ **Bubble Curtain: On** ☐ **Off** ☐

Minutes of Vibratory Driving : n/a ☐ **8:00** ☐ **15:00** ☐ **Impact Blows per Pile: 800** ☐ **300** ☐ **600** ☐

Pile No.	Pile Driver (Impact, Vibratory)[9]	Pile Driving Start/End Time	Observer Start/End Time	Bird Predation on Fish Observed (Y/N) and Time		General Bird Activity/Behavior	Comment: Reference Number

[8] The bird monitor will have to work closely with the fish monitor because the monitor must attempt to determine the amount of bird predation on fishes, including the size and species of fish affected.

[9] Steel shell pile driving will include both vibratory (up to the last 10 feet) and impact (last 10 feet) pile drivers.

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

BIRDS

Comment: Reference No.	Predation[10]		Dead/Injured Fish Observed[11]		Dead/Injured Fish Collected[8]	
	Bird Strikes Per Minute	Duration	Species	Size	Species	Size

[10] Diving birds that may be present, but which cannot be confirmed to scavenge on injured fish while diving, will be noted on the data sheet, but are not included in the count of bird strikes.
[11] SH = steelhead; G=North American Green Sturgeon; O=Other

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

BIRDS

PHOTOS

Comment: Reference No.	Photo Number	Time of Photo	Photo Taken Before (B), During (D) or After (A) Pile Driving	Description

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

BIRDS

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ADDITIONAL COMMENTS

Comment: Reference No.	Additional Comments

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

BIRDS

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DIAGRAM

BIOLOGICAL MONITOR _____ _____

Signature **Print Name**

APPENDIX B

NOISE MONITORING WORKPLAN AND WEEKLY PILE DRIVING SUMMARIES

Dutra Construction Co., Inc.

July 6, 2012

Submittal 009.1 – Underwater Noise Monitoring

Dutra Construction Co., Inc. has reviewed and approved this submittal.

Bryan O'Sullivan
Project Engineer

2350 KERNER BLVD., SUITE 200 • SAN RAFAEL, CALIFORNIA 94901 • (415) 258-6876 • FAX (415) 258-9714

Municon Consultants
Geotechnical Instrumentation

July 6, 2012

Dutra Construction Co., Inc.
2350 Kerner Boulevard, Suite 200
San Rafael, CA 94901

Attn: Bryan OSullivan

RE: BRANNAN STREET WHARF PROJECT, SAN FRANCISCO
PORT OF SAN FRANCISCO CONTRACT 2726

SUBJECT: WORK PLAN FOR UNDERWATER SOUND MONITORING

1.0 GENERAL:

The following is a written description of the underwater sound monitoring system which Municon Consultants will use to monitor underwater sound levels during the course of in-water pile driving work for the Brannan Street Wharf project, in accordance with the requirements of the project plans and specifications and the National Marine Fisheries Service's Incidental Harassment Authorization (NMFS, 2012).

The project includes driving of 262 piles – 116 24-inch octagonal concrete piles and 146 24-inch steel pipe piles – to depths of more than 60 feet below the mudline in water depths ranging approximately 2 to 15 feet at mean low lower water (MLLW). Piles will be installed using a combination of impact and vibratory hammer driving methods. Pile driving will be done from the water using a barge-mounted marine crane

Concrete piles will be driven into the bay using impact driving methods only, while steel shell piles will be driven using a combination of impact and vibratory driving methods. All Impact pile driving will employ a "soft start" technique. To reduce sound levels during pile driving, an unconfined bubble curtain system will be used to place all steel shell piles when water depth is greater than 2 feet deep. A bubble curtain is not planned to be used for attenuation of noise energy associated with driving concrete piles, due to the lack of exceedance of the 206dB threshold expected from driving the concrete piles without it. Bubbles in the water attenuate noise energy by disrupting the sound waves and on other projects in the San Francisco Bay area, such systems have been shown to reduce peak sound levels by 5 to15 decibels (dB) (Caltrans 2009a).

2.0 MONITORING SCHEULDE

The requirements of the Incidental Harassment Authorization (NMFS 2012) include visual monitoring and hydroacoustic monitoring. We understand that the Port of San Francisco, the project owner, will provide for visual monitoring by a qualified biologist. Municon Consultants will provide hydroacoustic monitoring as described in this work plan.

Based on the requirements of the NMFS IHA, and the preliminary workplan prepared by the USACE, we propose the following monitoring schedule:

1. Preconstruction monitoring to observe ambient in-water sound levels. This monitoring will occur for at least 72 hours, and preferably up to one week prior to the beginning of pile installation work. Monitoring will be an unattended operation running around the clock to obtain differences between night-time and daytime sound levels.

2. Monitoring during "initial installation of each pile type" (NMFS IHA). This monitoring will be performed during installation of fifteen 24-inch concrete piles and twelve 24-inch steel piles.

   Such monitoring will involve measurements performed on pile strikes with the bubble curtain alternating between operational (presence) and off (absence). To account for varying resistance as the pile is driven, the bubble curtain will be turned off for 30 second periods during the beginning, the middle, and near the end of the drive. Pile driving should resume for a minimum of two minutes after each 30 second period the curtain is off and thus if any piles require less than 5 minutes to drive, the sound attenuation system would be turned off for only two 30-second periods, one near the beginning and one near the end of the drive (Washington Department of Transportation, 2011). In order to correlate sound records with the piledriving and bubble-curtain activities, Municon will have an experienced hydrophone technician present during pile-driving activities in this phase. Depending on site logistics, monitoring may continue outside work hours at some or all monitoring locations.

3. (OPTIONAL) Monitoring during production piledriving. After completion of the monitoring for initial installation of the concrete piles and steel piles, the Port will review the data obtained and, in consultation with NMFS, determine if continued monitoring is required, and if so, for which pile types and in which piledriving locations. This monitoring will be performed as a generally unattended operation with hydrophone(s) in fixed locations, and configured with real-time alarms to notify the biological monitors of exceedences, and to be read remotely.

3.0 INSTRUMENTATION AND EQUIPMENT

Municon Consultants will use a Reson model TC4033 Hydrophone connected to a Larson Davis Model 831 Sound Level Meter to measure underwater sound during all in-water pile driving. We will use a G.R.A.S. Pistonphone 42AA calibrator for field calibration of the hydrophone/SLM system. The Reson hydrophone, Larson-Davis SLM, and G.R.A.S. Pistonphone have the following minimum features:

Reson Model TC4033 hydrophone:

1. Usable frequency range of 1 Hz to 140 kHz.
2. Horizontal Directivity Pattern: Omnidirectoinal ±2 dB at 100 kHz.
3. Vertical Directivity Pattern: 270 degree ±2 dB at 100 kHz.
4. Operating Depth: 900 meters (3000 ft.)
5. Operating temperature range: -2 °C to +80 °C.
6. Resistant to sea and fresh water, limited resistance to petrol and most acids.

Larson Davis Model 831 Sound Level Meter

1. Precision integrating sound level meter, ANSI S1.4 type 1, IEC 61672 class 1.
2. Single measurement range from 20 to140 dB SPL.
3. 120 MB standard data memory.
4. Slow, fast, and impulse RMS detectors and peak detector with A, C, and Z (flat) frequency weighting.
5. Integrating capacity to determine accumulated Sound Exposure Levels

G.R.A.S. Pistonphone 42AA Acoustic Calibrator

1. Sound pressure level 114 dB re 20 µPa
2. Frequency of 250 Hz ±0.5%
3. Calibration accuracy of ±0.08 dB
4. Nominal effective couple volume of 15.6 cm^3

Reson Model TC4033 hydrophone, Larson Davis Model 831 SLM, and G.R.A.S. Pistonphone 42AA Acoustic Calibrator specifications sheets are attached in Supplemental Documents section.

3.1. INSTALLATION.

Municon Consultants will install and set up hydrophones and SLMs at different location for the different phases of the monitoring. For phase 1 monitoring (preconstruction ambient levels), we propose to place SLMs and hydrophones at 2 locations in semi-permanent installations; one near the southeast corner of Pier 30/32, and one on the floating dock north of Pier 38, depending on permission and site conditions. For phase 2 monitoring (during initial installation of each pile type), we will maintain the installation on Pier 30/32 as it is in the vicinity of the predicted threshold isopleths for the permissible sound level for harassment to marine mammals. We will also monitor the piledriving from the piledriving barge, and will attempt to set up the hydrophone at a distance of approximately 25 to 75 feet (7.6 m to 23 m) from the pile. Actual location will depend on the availability of space on the piledriving barge.

A clear line of sight between the hydrophone and the pile driver will be maintained, however the exact measurement positions from the pile will be dependent on access to the construction area, concerns for safety of the monitors, and fluctuations caused by currents, waves and wind. Therefore, the position distances referenced above are approximate.

Hydrophones are proposed be placed at a depth below the surface approximately equivalent to mid-channel at the location of measurement. A weighted tape measure will be used to determine the depth of the water. If the water depth is shallower than 2 meters, hydrophones will be positioned at a depth of 1 meter below the water surface.

The Washington Department of Transportation (2011) procedures for hydroacoustic monitoring include various methods to account for strumming of the line if current flow is greater than 1 m/s. Current flows at the end of Pier 30/32 are not expected to exceed 2.0 knots, which is 1.0 m/s. Current flows in the piledriving area will be lower than those at the end of the pier.

During attended monitoring, field notes will be recorded during all measurements in a water-resistant field notebook and are expected to include calibration notes, measurement positions, pile-driving information, and equipment used to make each measurement.

3.2 Quality Control

Calibration of measurement systems will be established prior to use in the field. Calibration will be performed using an acoustically certified piston phone and hydrophone coupler that fits the hydrophone to directly calibrate the measurement system. The Sound Level Meter allows for programmatically adjusting its measurement levels in response to calibration.

4.0. DATA COLLECTION, ANALYSIS, and REPORTING.

4.1. Data Collection

In order to allow for evaluation of impacts to fish, peak sound pressure, accumulated unweighted SEL, and $RMS_{90\%}$ sound pressure level will be measured. The peak pressure and accumulated SEL are the sound descriptors most widely used to describe potential sound effects and resource agencies on the West Coast have been using SEL to evaluate pile driving sound impacts to fish (CalTrans 2009a). For behavioral response of fish, the RMS sound pressure level of a pile driving pulse is generally used (CalTrans 2009a).

The peak pressure is the highest absolute value of the measured waveform, and can be a negative or positive pressure peak (CalTrans 2009a). The total sound energy in the pulse is equivalent to the unweighted SEL for a plane wave propagating in a free field with units of dB re 1μPa2-sec (CalTrans 2009a). The accumulated SEL is calculated as all sound pressure measured during pile driving in one day at a location accumulated and referenced to one second. The unweighted SEL of each pile strike is approximated by measuring the one-second equivalent sound energy level (Leq [1-sec]) using the C-weighting or Z-weighting (flat) network setting. The $RMS_{90\%}$ level is determined by analyzing the waveform and computing the average of the squared pressures over the time that comprise that portion of the waveform containing 90 percent of the sound energy (CalTrans 2009a). This has been approximated in the field for pile driving sounds by measuring the signal with a precision sound level meter set to the "impulse" RMS setting (CalTrans 2009a). Peak pressures and RMS sound pressure levels will be expressed in dB re 1 μPa as well.

4.2. Data Analysis

Measurements taken during Phase 1 (ambient) and Phase 2 (initial) monitoring stages will be used to determine approximate distances where SELs will equal the maximum exposure levels of 180 dB for marine mammals, 183 dB for small fish, and 187 dB for large fish for both steel and concrete piles, and this information transmitted to the Port for evaluation and transmittal to the NMFS.

4.3. Data Reporting

Data collected during Phase 1 (ambient) monitoring will be collected into one report (multiple weekly reports if the ambient monitoring lasts more than 8 days). The report will include:

1. Type of equipment used to collect hydroacoustic data
2. Locations of hydrophones during monitoring, including measurements or estimates of water depth and current velocities during monitoring.
3. A plot of peak sound pressure, SEL, and $RMS_{90\%}$ over time

This report will be transmitted to the General Contractor and the Port of San Francisco within 2 business days of completion of Phase 1 monitoring.

Data collected during Phase 2 (initial) monitoring will be collected into daily and weekly reports. We understand that the Port will forward daily reports to NMFS. The daily reports will include:

1. Type of equipment used to collect hydroacoustic data
2. Locations of hydrophones during monitoring, including measurements or estimates of water depth and current velocities and distance to piles during monitoring.
3. A plot of peak sound pressure, SEL, and $RMS_{90\%}$ over time

The weekly reports will include:

1. Type of equipment used to collect hydroacoustic data
2. Locations of hydrophones during monitoring, including measurements or estimates of water depth and current velocities and distance to piles during monitoring.
3. A plot of peak sound pressure, SEL, and $RMS_{90\%}$ over time and accumulated SEL per day for each hydroacoustic monitoring location, and data tables with the raw data collected at each hydroacoustic monitoring location.
4. The results of the hydroacoustic monitoring, including the frequency spectrum, ranges and means including standard deviation/error for peak and RMS SPL's, single-strike and cumulative SEL with and without the attenuation system, an estimation of the number of strikes that exceeded the cumulative SEL threshold and an estimation of the distance at which the peak and cumulative SEL values reach the respective thresholds and the distance at which the RMS values reach the relevant marine mammal thresholds and background sound levels;
5. Types of piledriving equipment, type of piles driven, methods of piledriving, number of piles driven, and the total number of strikes for all piles driven during each 24-hour period
6. Start and end times of pile driving for each pile, times of bubble-curtain pauses, and any other times relevant to determining exposure of marine life to excess sounds.
7. For each pile, depending on receipt of the following information from the General Contractor:
    a. The distance from the pile to the water's edge
    b. The depth of water in which the pile was driven
    c. The depth into the substrate that the pile was driven
    d. The physical characteristics of the bottom substrate into which the pile was driven
    e. The total number of strikes to drive each pile
8. Estimated rate of attenuation or transmission loss (TL) based on collected measurements; and estimated source levels based on TL rate.

If data is collected during Phase 3 (production) monitoring, the data will be collected into weekly reports. The weekly reports will include:

1. Type of equipment used to collect hydroacoustic data
2. Locations of hydrophones during monitoring, including measurements or estimates of water depth and current velocities and distance to piles during monitoring.
3. A plot of peak sound pressure, SEL, and $RMS_{90\%}$ over time and accumulated SEL per day for each hydroacoustic monitoring location, and data tables with the raw data collected at each hydroacoustic monitoring location.
4. The results of the hydroacoustic monitoring, including the frequency spectrum, ranges and means including standard deviation/error for peak and RMS SPL's, single-strike and cumulative SEL with and without the attenuation system, an estimation of the number of strikes that exceeded the cumulative SEL threshold and an estimation of the distance at which the peak and cumulative SEL values reach the respective thresholds and the distance at which the RMS values reach the relevant marine mammal thresholds and background sound levels;
5. Depending on receipt of the following information from the General Contractor: Types of piledriving equipment, type of piles driven, methods of piledriving, number of piles driven, and the total number of strikes for all piles driven during each 24-hour period
6. For each pile, depending on receipt of the following information from the General Contractor:
    a. The distance from the pile to the water's edge
    b. Start and end times of pile driving for each pile.
    c. The depth of water in which the pile was driven
    d. The depth into the substrate that the pile was driven
    e. The physical characteristics of the bottom substrate into which the pile was driven
    f. The total number of strikes to drive each pile
7. Estimated rate of attenuation or transmission loss (TL) based on collected measurements; and estimated source levels based on TL rate.

5.0. SUPPLEMENTAL DOCUMENTATION.

Included in this submittal are, as follows:

- Hydrophone Deployment Sketch
- Reson Hydrophone TC4033 specification sheets.
- G.R.A.S. Pistonphone (Calibration Reference Source) specification sheets.
- Larson Davis 831 Sound Level Meter specification sheets.
- Sample Monitoring Report.

Thank you for allowing us to assist you in this project.

Yours Truly,
MUNICON Consultants

Anthony Argyriou, G.E.
AA:aa:eh
\\Operations\projects\831\Workplan\831-HydrophoneWorkplan-07-06-12.doc

References

California Department of Transportation (CalTrans). 2009a. Final Hydroacoustic Monitoring Plan for Driving of Temporary Access Trestle Piles for the Self-Anchored Suspension Span. File Number EA 0120F3, 04-SF-80 KP 12.2/KP 14.3, 04-ALA-80 KP 0.0/KP 2.1

California Department of Transportation (Caltrans). 2009. Technical Guidance for Assessment and Mitigation of the Hydroacoustic Effects of Pile Driving on Fish. Prepared by ICF Jones and Stokes and Illingworth and Rodkin. Retrieved from http://www.dot.ca.gov/hq/env/bio/files/Guidance_Manual_2_09.pdf.

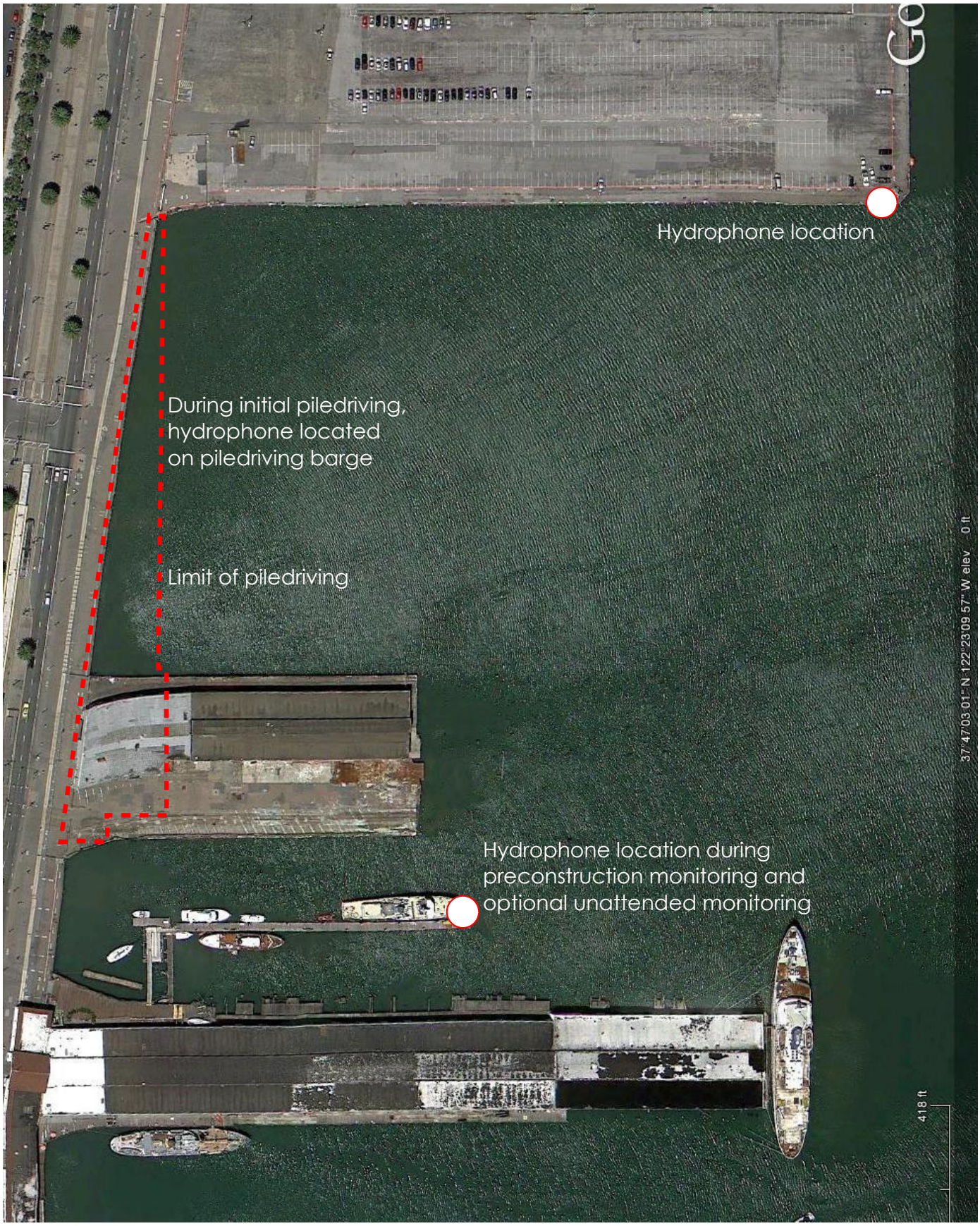
National Marine Fisheries Service (NMFS). 2011. Biological Opinion for the Pier 36 Demolition/Brannan Street Wharf Project in San Francisco, California. File Number 2011/00130, September 16, 2011.

National Marine Fisheries Service (NMFS). 2012. Incidental Harassment Authorization for the Pier 36 Demolition/Brannan Street Wharf Project in San Francisco, California. File Number 2011/00130, September 16, 2011.

Washington Department of Tansportation. 2011 Underwater Noise Monitoring Plan Template.

SUPPLEMENTAL DOCUMENTATION

HYDROPHONE DEPLOYMENT SKETCH



MuniconConsultants
Geotechnical Instrumentation

HYDROPHONE DEPLOYMENT SKETCH

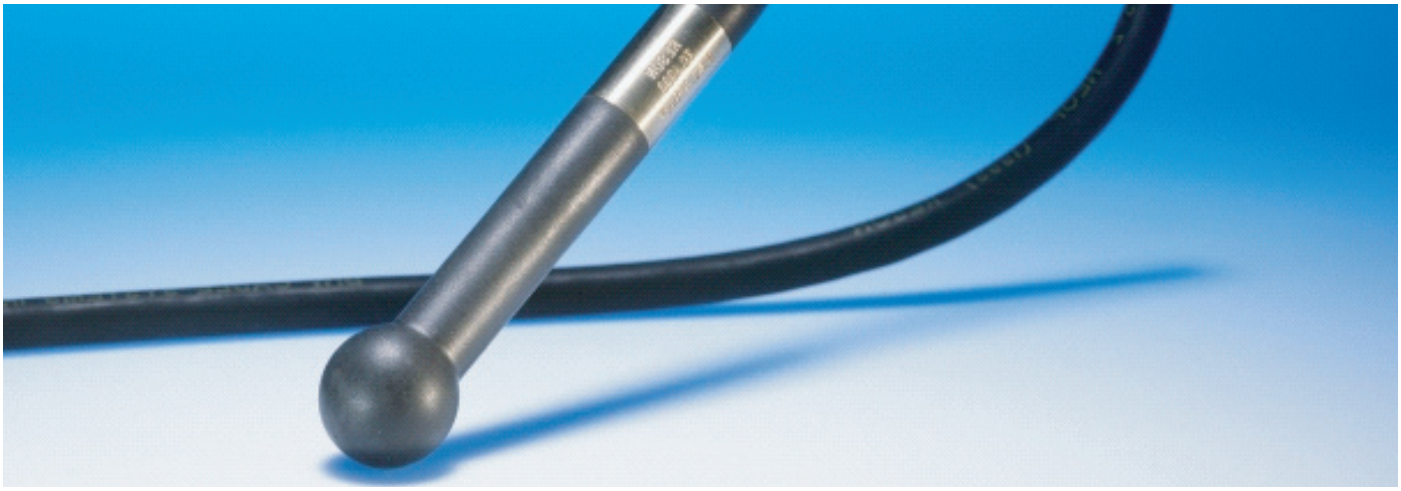
N W E S

Client: Dutra Group	Scale: 1" ≈ 170'
Designed By: AA	(1cm ≈ 20m)
Drawn By: AA	
Checked By:	
Date Submitted: 07/03/12	

RESON HYDROPHONE TC4033
SPECIFICATION SHEETS

Hydrophone TC4033

Robust Spherical Reference Hydrophone



TC4033

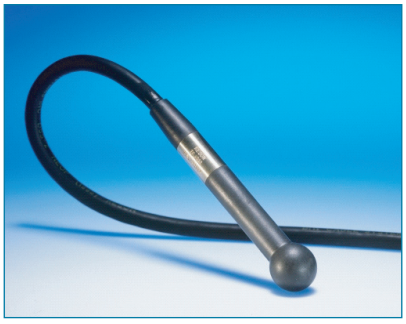
- Omnidirectional in the full frequency range
- Wide frequency range
- Durable construction
- Long term stability
- Individually calibrated

The TC4033 provides uniform omnidirectional characteristics within the full frequency range of 1Hz to 140kHz.

The Typical sensitivity of -203dB re 1V/µPa and the capacitance of 7nF, ensure an excellent signal to noise ratio, thereby allowing TC4033 to be used with extension cables with only a limited reduction in sensitivity.

The TC4033 offers excellent acoustic characteristics and durability, which makes it ideal for a wide range of applications and for calibration purposes.

TECHNICAL SPECIFICATIONS	
Usable Frequency range:	1Hz to 140kHz
Linear Frequency range:	1Hz to 80kHz
Receiving Sensitivity:	-203dB ±2dB re 1V/µPa at 250Hz
Transmitting Sensitivity:	144dB ±2dB re 1µPa/V at 1m at 100kHz
Directivity, Horizontal:	Omnidirectional ±2dB at 100kHz
Vertical Directivity:	270°±2dB at 100kHz
Nominal Capacitance:	7,8 nF (incl.10m cable)
Operating depth:	900m
Operating Temperature range:	-2°C to +80°C
Storage Temperature range:	-40°C to +80°C
Weight incl. 10m cable, (in air):	1.5kg
Cable (length and type):	Standard 10m shielded pair DSS-2/MIL-C-915. Optional cable length available on request
Connector type:	BNC
Encapsulating material:	Special formulated NBR
Metal body:	Alu bronze - AlCu10Ni5Fe4



NBR means Nitrile Rubber

The NBR rubber is first of all resistant to sea and fresh water but also resistant to oil. It is limited resistant to petrol, limited resistant to most acids and will be destroyed by base, strong acids, halogenated hydrocarbons (carbon tetrachloride, trichloroethylene), nitro hydrocarbons (nitrobenzene, aniline), phosphate ester hydraulic fluids, Ketones (MEK, acetone), Ozone and automotive brake fluid.

Hydrophone TC4033

Robust Spherical Reference Hydrophone

Documentation:

Individually calibration curves:

Sensitivity at ref.: frequencies:
250 kHz

Receiving sensitivity:
At 5 kHz to 200 kHz

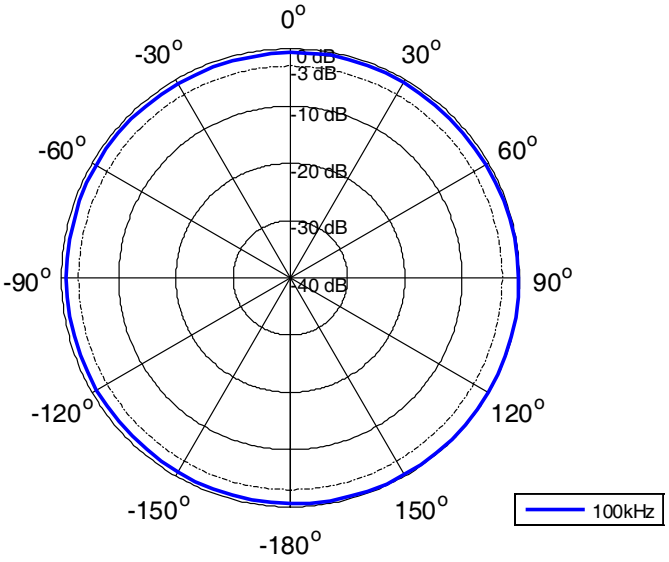
Impedance:
5 kHz to 200kHz

Horizontal directivity:
At 100 kHz

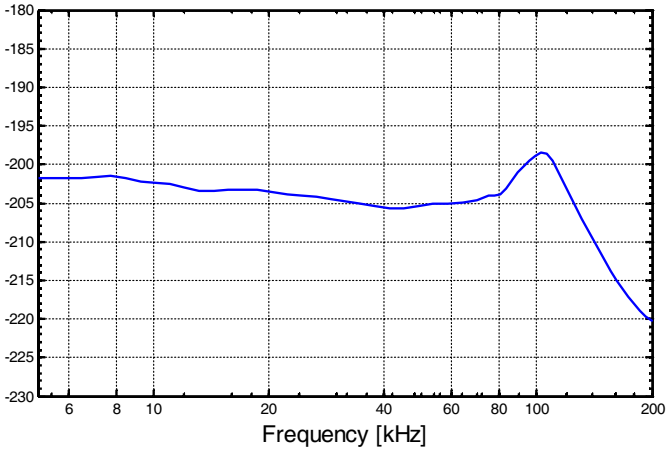
Vertical directivity:
At 100 kHz

Transmitting sensitivity:
5 kHz to 200 kHz

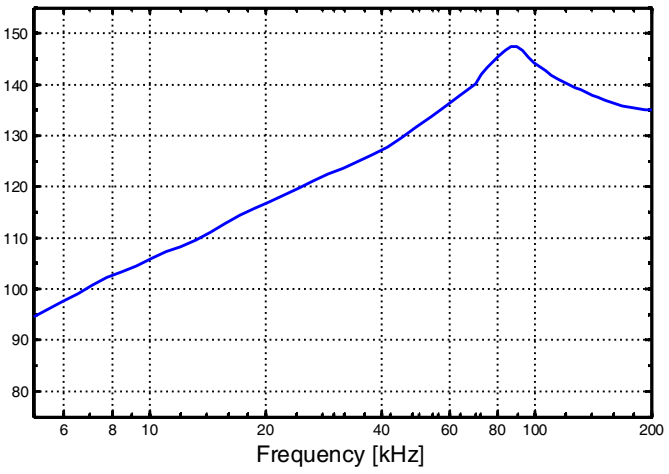
Horizontal directivity pattern



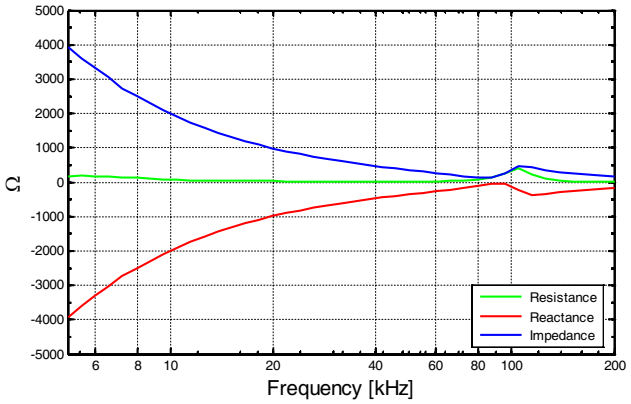
Receiving Sensitivity [dB re 1V/µPa @ 1m]



Transmitting Sensitivity [dB re 1µPa/V @ 1m]



Impedance



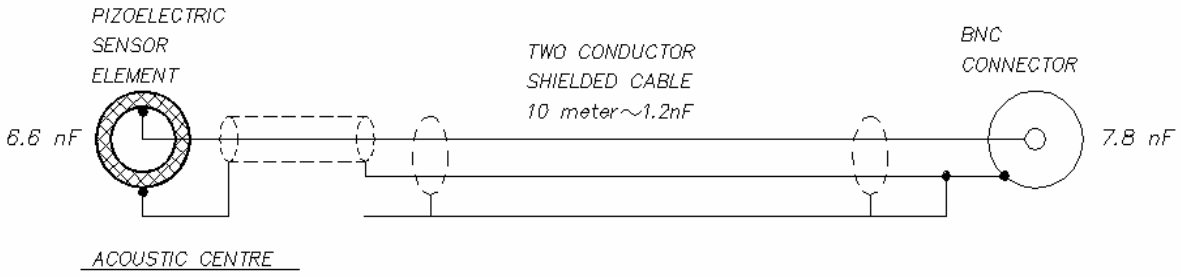
Hydrophone TC4033

Robust Spherical Reference Hydrophone

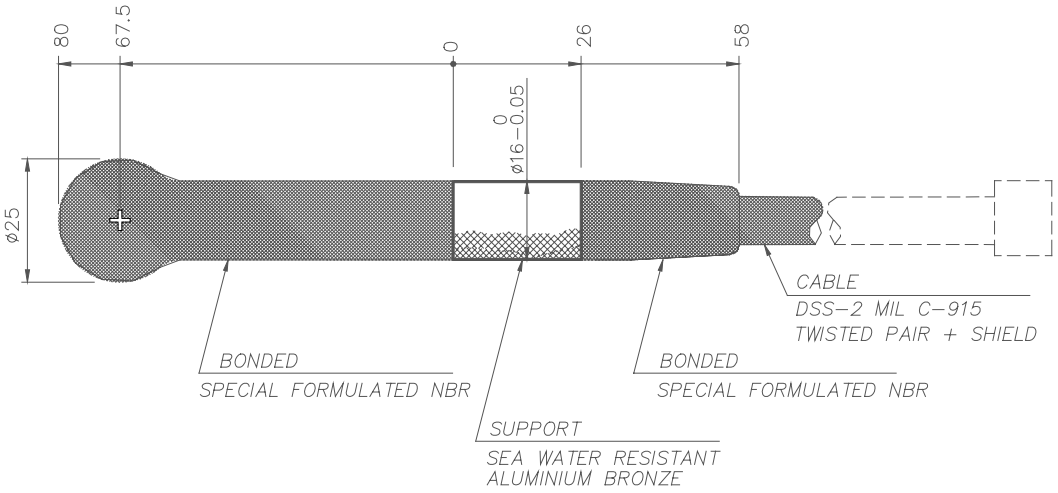
Documentation:

The sensor element is permanently encapsulated in Special formulated NBR, which has been especially compounded to ensure acoustic impedance close to that of water and low water permeability.

Electrical Diagram and Outline Dimensions

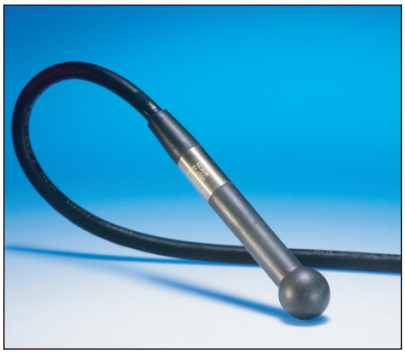


ELECTRIC DIAGRAM



OUTLINE DIMENSIONS

(Weight, (in air): Incl. 10m cable 1500 grams)



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Version: B111 070711 / A4

GRAS PISTONPHONE 42-AA SPECIFICATION SHEETS

Pistonphone Type 42AA

Product Data and Specifications

Typical applications

- ***Reference calibration source***
- ***Precision microphone calibrations***
- ***Microphone comparisons***
- ***P-I index measurement at 250 Hz***

The G.R.A.S. Pistonphone Type 42AA (Fig. 1) is a battery-operated, precision sound source for accurate and reliable calibration of measurement microphones, sound level meters and other sound measuring equipment.

With a microphone placed in the coupler of the pistonphone, the calibration level and frequency is:

- 114 dB re. 20 µPa (±0.08 dB) at 250 Hz (note: 114 dB is equivalent to 10 Pa)

  with A-weighting applied;
- 105.4 dBA re. 20 µPa (±0.08 dB) at 250 Hz

At a static ambient pressure of 101.3 kPa, no further correction factors need be applied.

The Type 42AA is an extremely stable laboratory-standard sound source which can also be used for field calibrations - it retains its high accuracy even under hostile environmental conditions.

The Type 42AA complies with all the requirements of IEC Standard 942 (1988) *Sound Calibrators* Class 1 with an included barometer as well as Class 0 with a precision barometer (not included).

The Type 42AA is normally delivered for calibrating ½-inch microphones directly since these are most commonly used but can be delivered with a 1-inch coupler (RA0023) for calibrating 1-inch microphones directly if preferred. Please state preference when ordering.

The pistonphone works on the principle of two reciprocating pistons actuated by a precision-machined cam with a sinusoidal profile. The rotation speed of the cam is controlled to within 0.5% via a tachometer signal in a feed-back loop. The Type 42AA has a dual-colour LED above the ON/OFF switch to indicate both battery condition and stable operation. When the pistonphone is operating properly, the LED shows green, indicating that the speed of the cam is correctly locked to give 250 Hz. If it shows red while the pistonphone is switched on, the speed is incorrect; most likely because of low batteries.

Fig. 1 Pistonphone Type 42AA 114 dB at 250 Hz. Shown with Barometer ZC0002K - for applying corrections for ambient pressure

The operating procedure is straight forward, simply fit the microphone into the coupler of the pistonphone and switch on. The pistonphone will now produce a constant sound pressure level on the diaphragm of the microphone.

The Pistonphone Type 42AA is compatible with

Vers.09-11-04

G.R.A.S.
Sound & Vibration

Skovlytoften 33
2840 Holte, Denmark
Tel +45 45 66 40 46 Fax +45 45 66 40 47
e-mail: gras@gras.dk www.gras.dk

G.R.A.S. ½-inch, ¼-inch and ⅛-inch microphones and all other microphones having the same standard diameters. Adapters are included for calibrating ¼-inch and ⅛-inch microphones. Where applicable, the coupler RA0023 is also available for calibrating 1-inch microphones.

Each pistonphone is factory adjusted to give 114 dB ± 0.08 dB re. 20 µPa and is supplied with an individual calibration certificate stating the exact value to within ± 0.05 dB and the test conditions. Since the output level of a pistonphone depends on the static ambient pressure, the Type 42AA is delivered with a barometer (Fig. 1) which shows directly on a printed scale what must be added or subtracted to the output level of the pistonphone. For use as a Type 0 calibrator, a precision barometer (not included) with an accuracy of ± 1 hPa or better should be used. The barometric correction at a given altitude very seldom varies by more than ± 0.2 dB.

Adapters for the G.R.A.S. Environmental Microphone Type 41AL and Outdoor Microphone Systems Types 41AM and 41CN are available for use with Pistonphone Type 42AA fitted with a 1-inch microphone coupler RA0023.

A two-port calibration coupler for ½-inch microphones (RA0024) is available for making comparison calibrations with a reference microphone . This can also be used for measuring the P-I (Pressure-Intensity) index of intensity systems at 250 Hz.

Octopus couplers are also available for simultaneously calibrating upto 8 mirophones.

Specifications

Sound pressure level:
Nominal: . . . . . 114 dB re. 20 µPa
Individually calibrated under the following reference conditions:-
Ambient pressure: . . . . . 101.3 kPa
Ambient temperature: . . . . . 20 °C
Ambient humidity: . . . . . 65 % RH

Calibration accuracy:
± 0.08 dB

Frequency:
250 Hz ± 0.5 %

Distortion:
< 1.5 %

Nominal effective coupler volume:
Including 0.05 cm^3 microphone load volume:
15.6 cm^3

Temperature range:
Batteries permitting: . . . . . − 10 °C to + 55 °C

Batteries:
Four standard LR6-AA alkaline cells

Dimensions:
Length: . . . . . 175 mm (6.89 in)
Width: . . . . . 35 mm (1.38 in)
Height: . . . . . 35 mm (1.38 in)
Weight: . . . . . 325 g (0.7 lbs)

Accessories included:
Adapter for ½-inch microphones [1]: RA0048
Adapter for ¼-inch microphones: RA0049
Adapter for ⅛-inch microphones: RA0069
Barometer: ZC0002K
Four LR6-AA alkaline cells: EL0001

Accessories available:
Adapter for Outdoor Microphone System [1]:-
Type 41AM: RA0009
Type 41CN: RA0041
Adapter for Environmental Microphone [1]:-
Type 41AL: RA0010
1-inch microphone coupler: RA0023
Two-port calibration coupler: RA0024
Octopus coupler (¼-inch mics.) [2]: RA0025
Octopus coupler (½-inch mics.): RA0072
Hydrophone-coupler Adapter: RA0055
Coupler for Hydrophone:-
Type 10CT: RA0043
Type 10CC: RA0046
(to be used with Coupler Adapter RA0055)
Type 10CD: RA0078

[1] Applies only to pistonphones fitted with a 1-inch microphone coupler RA0023
[2] Also for the G.R.A.S. Array Microphone Type 40PR

G.R.A.S.
Sound & Vibration

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2840 Holte, Denmark
Tel +45 45 66 40 46 Fax +45 45 66 40 47
e-mail: gras@gras.dk www.gras.dk

LARSON-DAVIS
MODEL 831 SOUND LEVEL METER
SPECIFICATION SHEETS

Model 831 Sound Level Meter

for Environmental Noise

Highlights

- Exceedance Based Logging
- Audio and Voice Recording with Replay
- Multiple Communication Options, Including GPRS
- 2 GB Data Storage Including Audio Files
- Small, Lightweight, Ergonomic Design
- Real Time 1/1 and 1/3 Octave

...and a whole lot more

Model 831

Model 831 is the newest Sound Level Meter from Larson Davis – with capabilities not found in other meters: USB powered, ANY LEVELTM data representation, huge data storage, and remote access technologies that fit your "real life" needs and expectations. The rugged, ergonomic design is ideal for one-handed operation, right or left.

The 831 can be used with a complete range of microphones and preamplifiers including weather-resistant units for unattended and semi-permanent monitoring applications.

As with all Larson Davis equipment, this product is complemented with toll free applications assistance, 24-hour customer service, and is backed by a no-risk policy that guarantees satisfaction or your money refunded.

Model 831 Sound Level Meter

- Precision integrating sound level meter, ANSI S1.4 type 1, IEC 61672 class 1
- Single measurement range from 20 to 140 dB SPL
- 120 MB standard data memory, expands up to 2GB
- 160 x 240 graphic LCD display with backlight and icon driven user interface
- Elastomeric illuminated keypad with "Quiet Touch" tactile action
- Detectors: linear, slow, fast, impulse, peak
- Frequency weighting: A, C, Z
- Peak frequency weighting: A, C, Z
- Ln statistics (L0.01 through L99.99 available) and Histogram tables
- Measurement or Interval History stores statistics with every run or by time interval
- Exceedance History with programmable length and triggers
- Jack for AC/DC output or Headset microphone and speaker
- Voice annotation recording with playback, from headset or measurement microphone
- Digital audio recording of events and interval start
- Detachable preamplifier with up to 30m (100 feet) microphone extension cable (full scale to 20 kHz)
- 4 – AA batteries provides up to 12 hours of battery life
- Dust tight (IP53), durable plastic case with tripod mount and lanyard
- USB 2.0 peripheral full-speed port
- AUX control connector for USB Mass Storage, Cellular & Dialup Modems and future devices
- AC and DC signal output connector, 2.5 mm phone jack
- Utility software included for setup, control and high speed data download, application software available
- Field-upgradeable firmware

LARSON DAVIS
A PCB PIEZOTRONICS DIV.
3425 Walden Avenue, Depew, NY 14043-2495 USA
Phone 716-926-8243
Toll-Free in USA 888-258-3222
Fax 716-926-8215 **E-mail** sales@larsondavis.com
Web Site www.larsondavis.com

ISO 9001 CERTIFIED

LD-831-1011 Printed in U.S.A.

For environmental noise monitoring and building acoustics, **Larson Davis** offers a full line of instruments, accessories and software. For personal noise and vibration exposure monitoring, Larson Davis complements this with sound level meters, personal noise dosimeters, human vibration meters, audiometric calibration systems and hearing conservation programs.

Visit **www.larsondavis.com** *to locate your nearest sales office*

SAMPLE MONITORING REPORT

Municon Consultants
Geotechnical Instrumentation

LETTER OF TRANSMITTAL

DATE: October 5, 2009

TO: General Contractor
ATTN: Superintendent

From: Municon Consultants – Barry Roth JOB #: 719

RE: UNDERWATER SOUND MONITORING – SAMPLE PROJECT

SUBJECT: DAILY REPORT

WE ARE SENDING YOU THE FOLLOWING:
_____SUBMITTALS __X___ REPORTS _____PHOTOS ____CD'S ____OTHER
BY:
____FAX ____POST____HAND CARRIED_X___EMAIL

DESCRIPTION

Please find herewith, the sound monitoring report for today's session

REMARKS:

Included you will find the graph you requested of underwater sound levels in the Lake Merritt Channel for October 5th, 2009. The hydrophone was suspended at a depth of about 5 feet in water about 10 feet deep during monitoring. Values plotted are dBa (Lmax) measured approximately 15 meters from pile driving and were logged at 5 minute intervals. Event driven alarms, both visual and electronic logging, were enabled and set to trigger at or above 170 dBa (Lmax).

OBSERVATIONS:

The background levels were approx. 120 dBa and during pile driving a high of 157.3 dBa was logged.

The following piles were driven at the following times:

1300 22nd Street, Suite A, San Francisco, CA 94107
PH: 415-641-2570; FAX: 415-282-4097

Municon Consultants
Geotechnical Instrumentation

Pile:	Driving time
34	07:45 – 08:10
35	08:40 – 09:05
36	09:35 – 10:00
52	10:30 – 10:55
51	11:25 – 11:50
50	12:45 – 13:10

NOTES:

Driving was suspended early to await delivery of additional piles.

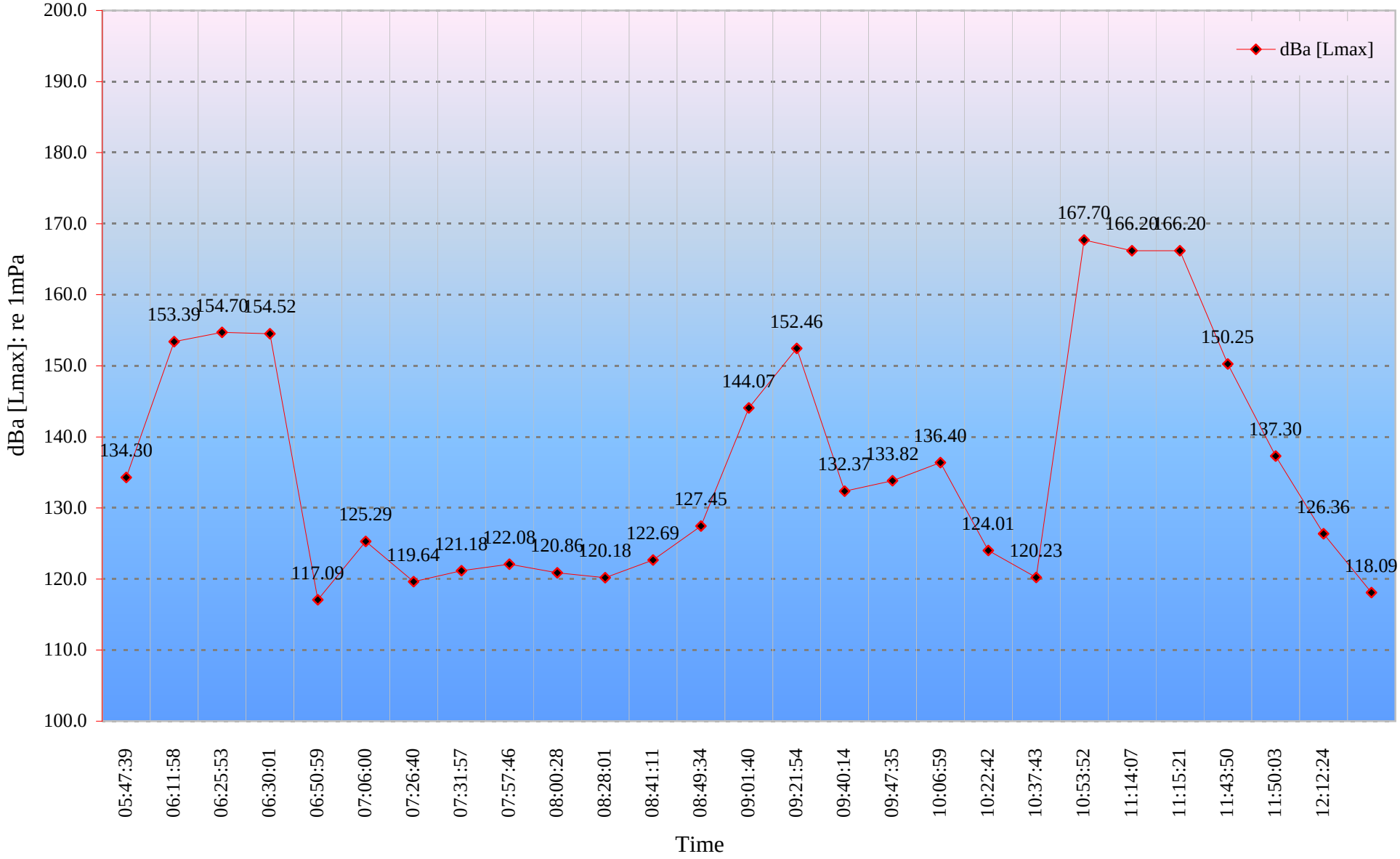
SIGNED:

Barry C Roth P.E.

1300 22nd Street, Suite A, San Francisco, CA 94107
PH: 415-641-2570; FAX: 415-282-4097

Municon Consultants
Geotechnical Instrumentation

Underwater Sound Monitoring:
Lake Merritt Channel



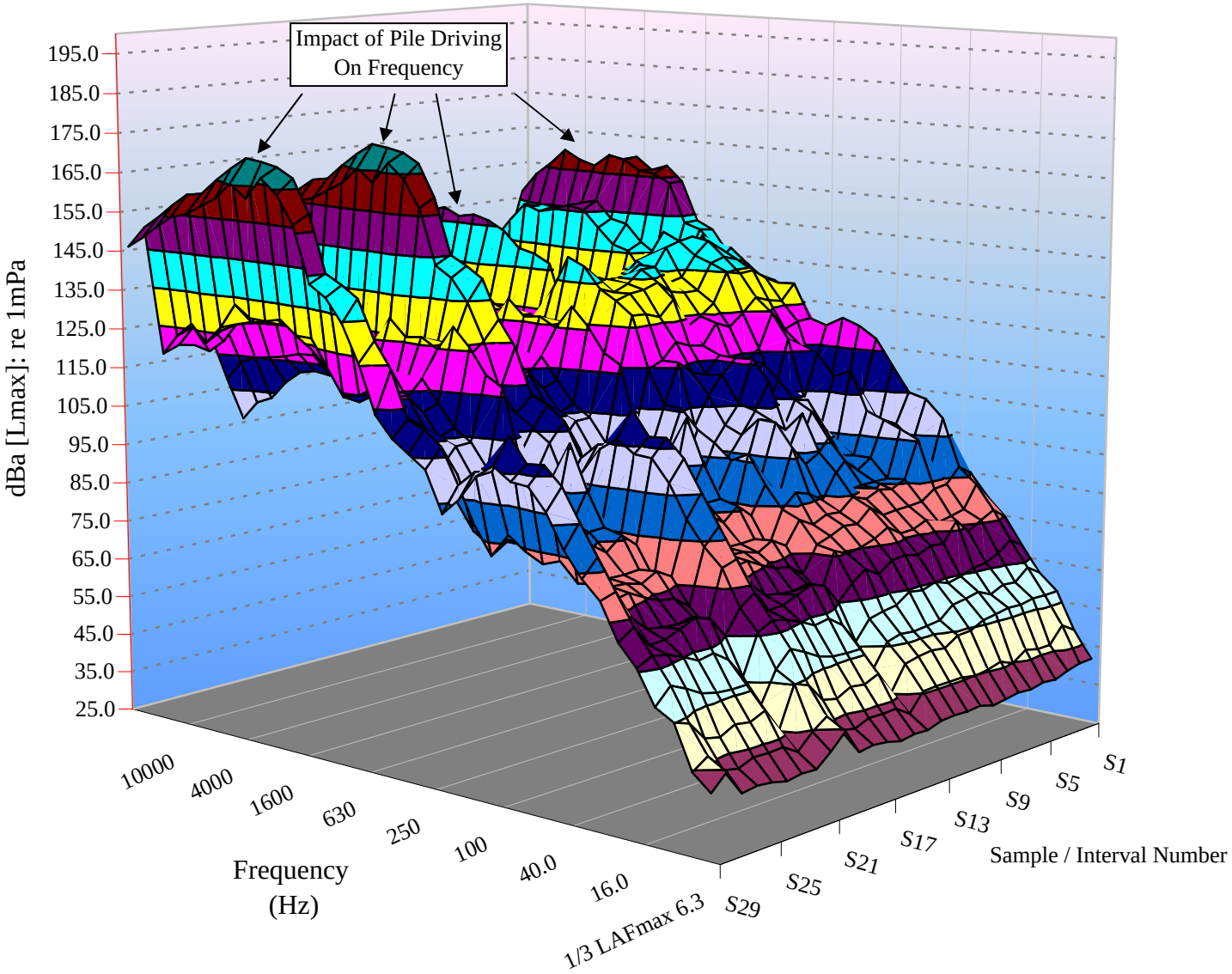
Underwater Sound Monitoring -
Lake Merritt Channel
CDOT# 04-1706U4

HYDRO_REPORT_08-10-09.xls

Prepared By E Roth
For MCM Construction
Reviewed By B Roth P.E.
12/11/2009

Municon Consultants
Geotechnical Instrumentation

Underwater Sound Monitoring:
Lake Merritt Channel



STRUCTURE SHEET NOTES:

1 SM–121.1 **STRUCTURE PLAN – WHARF** SCALE: 1/16"=1'–0"

16' 8' 0 16' 32'
SCALE: 1/16" = 1'–0"

NO.	DATE	DESCRIPTION	BY	APP.

TABLE OF REVISIONS
CHECK WITH TRACING TO SEE IF YOU HAVE LATEST REVISION

REFERENCE INFORMATION & FILE NO. OF SURVEYS

SAN FRANCISCO PORT COMMISSION
PORT OF SAN FRANCISCO
DEPARTMENT OF ENGINEERING
PORT OF SAN FRANCISCO

WINZLER & KELLY
A Joint Venture
Structus, Inc.

REGISTERED PROFESSIONAL ENGINEER
No. S3671
Exp. 3/31/12
STRUCTURAL
STATE OF CALIFORNIA
11-14-11

DESIGNED: CSS	DATE: 11/14/11
DRAWN: PVB	DATE: 11/14/11
CHECKED: CL	DATE: 11/14/11

APPROVED BY
SAN FRANCISCO PORT COMMISSION
DATE: 11/17/11
CHIEF HARBOR ENGINEER

SCALE: AS NOTED

SHEET OF SHEETS 57 OF 198

BRANNAN STREET WHARF

STRUCTURE PLAN – WHARF 1 (BID ALTERNATE NO. 1)

CONTRACT NO. 2726
DRAWING NO. SM–121.1
FILE NO.
REV. NO. 0

STRUCTURE SHEET NOTES:

1 SM-122 **STRUCTURE PLAN – WHARF**
SCALE: 1/16"=1'-0"

16' 8' 0 16' 32'
SCALE: 1/16" = 1'-0"

NO.	DATE	DESCRIPTION	BY	APP.

TABLE OF REVISIONS
CHECK WITH TRACING TO SEE IF YOU HAVE LATEST REVISION

REFERENCE INFORMATION & FILE NO. OF SURVEYS

SAN FRANCISCO PORT COMMISSION
PORT OF SAN FRANCISCO
DEPARTMENT OF ENGINEERING
PORT OF SAN FRANCISCO

WINZLER & KELLY
A Joint Venture
Structus, Inc.

REGISTERED PROFESSIONAL ENGINEER
No. S2871
Exp. 3/31/12
STRUCTURAL
STATE OF CALIFORNIA
11-14-11

DESIGNED: CSS	DATE: 11/14/11
DRAWN: PVB	DATE: 11/14/11
CHECKED: CL	DATE: 11/14/11

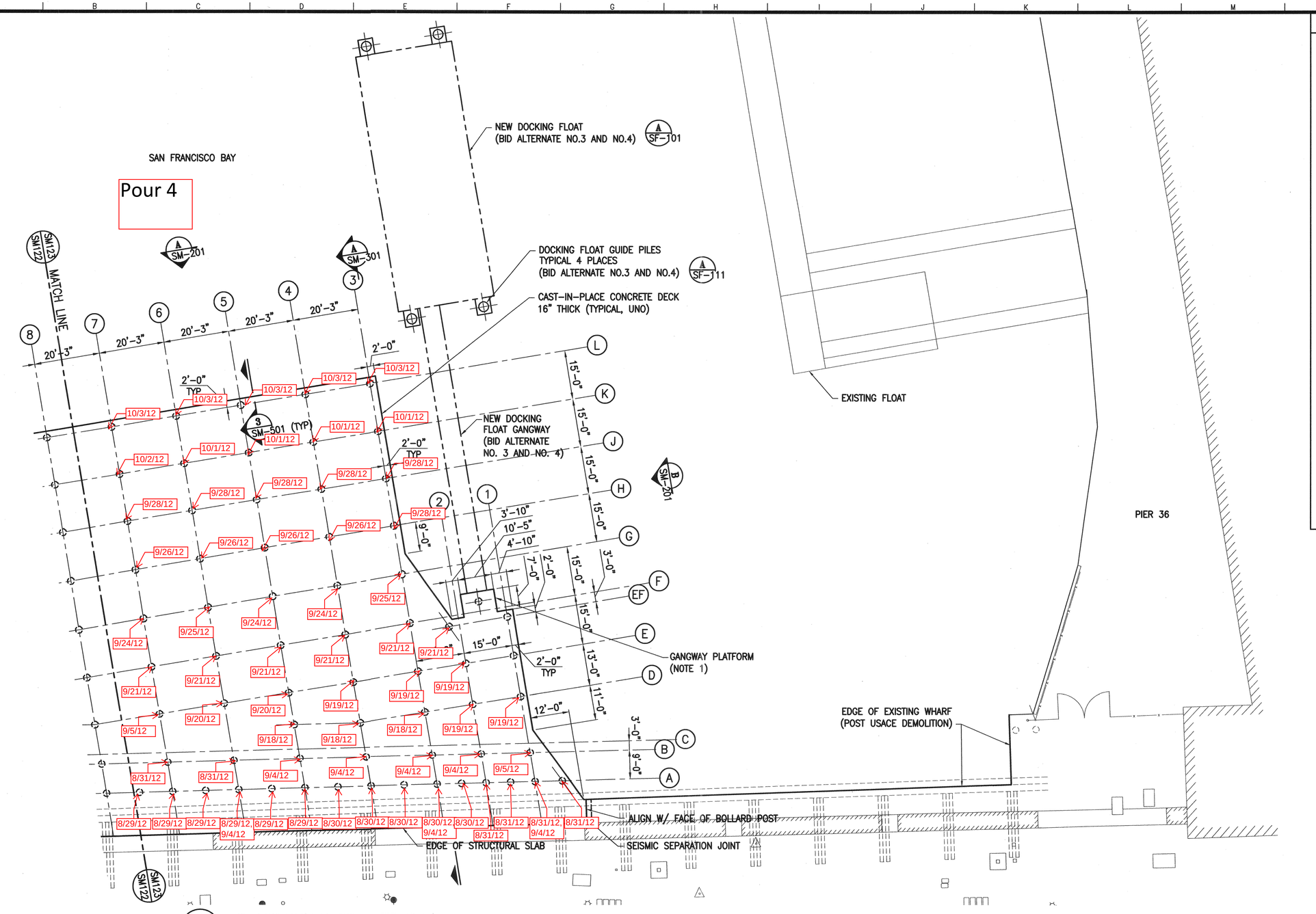
APPROVED BY
SAN FRANCISCO PORT COMMISSION
DATE: 11/17/11
CHIEF HARBOR ENGINEER

SCALE: AS NOTED
SHEET OF SHEETS 58 OF 198

BRANNAN STREET WHARF
STRUCTURE PLAN – WHARF 2

CONTRACT NO. 2726
DRAWING NO. SM-122
FILE NO.
REV. NO. 0

VIEW: PLOT1



1 SM-123 **STRUCTURE PLAN – WHARF**
SCALE: 1/16"=1'-0"

16' 8' 0 16' 32'
SCALE: 1/16" = 1'-0"

STRUCTURE SHEET NOTES:

1. GANGWAY PLATFORM IS PART OF BASE BID.

NO.	DATE	DESCRIPTION	BY	APP.

TABLE OF REVISIONS
CHECK WITH TRACING TO SEE IF YOU HAVE LATEST REVISION

REFERENCE INFORMATION & FILE NO. OF SURVEYS

SAN FRANCISCO PORT COMMISSION
PORT OF SAN FRANCISCO
DEPARTMENT OF ENGINEERING
PORT OF SAN FRANCISCO

WINZLER & KELLY
A Joint Venture
Structus, Inc.

REGISTERED PROFESSIONAL ENGINEER
KAY S. SERAFINI
No. 3251
Exp. 3/31/12
STRUCTURAL
STATE OF CALIFORNIA
11-14-11

DESIGNED: CSS	DATE: 11/14/11
DRAWN: PVB	DATE: 11/14/11
CHECKED: CL	DATE: 11/14/11

APPROVED BY
SAN FRANCISCO PORT COMMISSION
DATE: 11/17/11
CHIEF HARBOR ENGINEER

SCALE: AS NOTED
SHEET OF SHEETS: 59 OF 198

BRANNAN STREET WHARF

STRUCTURE PLAN – WHARF 3

CONTRACT NO. 2726
DRAWING NO. SM-123
FILE NO.
REV. NO. 0

Drawing Path: C:\Users\Cole\appdata\local\temp\AcPublish_4644\180809001SM-121 THRU SM-123.dwg, Login: Cole
Plot Time: Sun, 13 Nov 2011 - 10:18am
Dimension Scale: 16
Model Units: Undefined
Measurement Units are English

VIEW: PLOT1

2726 BSW Pile Driving Schedule Sorted by Date

Total Piles To Date	Date	Pile #	Type	PDA / Indicator	Restrike	Start Time	Finish Time	Tip Elevation	Butt Elevation	Pile Length	Comments / General Notes	Total Time Spent Pile Driving (mins.)	Dutra Related Delays (mins.)	Unforseen Site Conditions Delays (mins.)
1	07/26/12	A 24	Steel	X		3:40 PM	5:00 PM	-	-	105 ft.	Used D36 Hammer. Stop driving at elevation 73, refer to A24 on 7/27/12 for completion of pile.Indicator pile: Hammer setting switched to D62-22 on 7/27/12 . No other issues.	80	0	0
RS	07/27/12	A 24	Steel	X	X	12:45 PM	3:00 PM	94/.4	10.60	105 ft.	Reading taken @water surface. Used D62 Hammer. Restriking of pile started from elevation 74, continuing from A24 on 7/26/12.	165	0	0
2	07/27/12	A 27	Steel	X		2:45 PM	5:16 PM	-94.08	10.92	105 ft.	Indicator pile. No issues.	80	0	0
3	07/30/12	A 30	Steel	X		9:19 AM	10:33 AM	-93.37	10.63	105 ft.	Indicator pile: Install PDA. No other issues reported.	74	0	0
4	07/30/12	A 29	Steel			1:08 PM	1:40 PM	-93.31	10.69	105 ft.	Coordinates of butt end of pile significantly deviate from design coordinates due to outfall structure obstruction encountered during pile driving. See Submittal #45 for details. No other issues.	32	0	0
5	07/30/12	A 28.5	Steel			2:30 PM	3:10 PM	-93.26	10.74	105 ft.	No issues.	40	0	0
6	07/31/12	A 28	Steel			8:32 AM	9:05 AM	-95.68	9.32	105 ft.	No issues.	33	0	0
7	07/31/12	A 27.5	Steel			10:15 AM	1:00 PM	-94.38	10.62	105 ft.	Started driving pile on 7/31/12, D62 hammer not working properly, hit twice & stops. Finish driving on 8/1/12. Delay during initial placement.	165	125	0
F	08/01/12	A 27.5	Steel			7:45 AM	7:55 AM	-94.38	10.62	105 ft.	Problem with hammer/ fuel injector at -36ft. Started driving pile on 7/31/12, D62 hammer not working properly, hit twice & stops. Finish driving on 8/1/12.	10	0	0
8	08/01/12	A 26.5	Steel			8:40 AM	9:25 AM	-94.31	10.69	105 ft.	No issues.	45	0	0
9	08/01/12	A 26	Steel			10:07 AM	10:36 AM	-94.30	10.70	105 ft.	No issues.	29	0	0
10	08/01/12	A 25.5	Steel			12:00 PM	1:12 PM	-94.21	10.79	105 ft.	No issues.	32	0	0
11	08/01/12	A 25	Steel			1:53 PM	2:35 PM	-94.37	10.63	105 ft.	No issues.	42	0	0
12	08/02/12	A 24.5	Steel			10:05 AM	10:35 AM	-94.38	10.62	105 ft.	No issues.	30	0	0
13	08/02/12	A 23.5	Steel			11:30 AM	11:58 AM	-94.47	10.53	105 ft.	No issues.	28	0	0
14	08/02/12	A 23	Steel			1:15 PM	1:40 PM	-93.42	10.59	105 ft.	No issues.	25	0	0
15	08/02/12	A 22.5	Steel			2:25 PM	2:53 PM	94.32	10.68	105 ft.	No issues. Municon left after pile placement.	28	0	0
16	08/02/12	A 21	Steel	X		3:50 PM	4:15 PM	-	-	105 ft.	Stop driving at elevation 48, refer to A/21 on 8/7/12 for completion of pile.	25	0	0
17	08/03/12	A 18	Steel	X		8:47 AM	9:05 AM	-	-	105 ft.	Stop driving at elevation 50, refer to A/18 on 8/7/12 for completion of pile.	18	0	0
18	08/03/12	A 15	Steel	X		11:00 AM	11:16 AM	-	-	105 ft.	Stop driving at elevation 52, refer to A/15 on 8/7/12 for completion of pile.	16	0	0
19	08/03/12	A 22	Steel			12:55 PM	1:33 PM	-94.29	10.71	105 ft.	No issues.	38	0	0
20	08/03/12	A 21.5	Steel			2:05 PM	2:33 PM	-94.28	10.72	105 ft.	No issues.	28	0	0
21	08/03/12	A 20.5	Steel			3:30 PM	4:07 PM	-94.47	10.53	105 ft.	No issues.	37	0	0
22	08/06/12	A 20	Steel			7:55 AM	8:21 AM	-94.32	10.68	105 ft.	No issues.	26	0	0
23	08/06/12	A 19.5	Steel			9:15 AM	9:50 AM	-94.36	10.64	105 ft.	No issues.	35	0	0
24	08/06/12	A 19	Steel			10:28 AM	11:13 AM	-94.37	10.63	105 ft.	No issues.	45	0	0
25	08/06/12	A 18.5	Steel			12:30 PM	1:03 PM	-94.29	10.71	105 ft.	No issues.	33	0	0
26	08/06/12	J 30	Steel			2:25 PM	2:49 PM	-84.03	10.97	95 ft.	No issues.	24	0	0
27	08/07/12	B 27	Steel			7:38 AM	8:02 AM	-84.23	10.77	95 ft.	No issues.	24	0	0
RS	08/07/12	A 15	Steel	X	X	8:47 AM	9:03 AM	-	-	105 ft.	Reading taken @water surface. Restriking of pile started from elevation 53, continuing from A/15 on 8/3/12. The pile was 1 ft. higher.	14	0	0
RS	08/07/12	A 18	Steel	X	X	9:38 AM	9:55 AM	-	-	105 ft.	Reading taken @water surface. Restriking of pile started from elevation 51, continuing from A/18 on 8/3/12. Was left 14" high.	17	0	0
RS	08/07/12	A 21	Steel	X	X	10:52 AM	10:35 AM	-94.29	10.71	105 ft.	Reading taken @water surface. Restriking of pile started from elevation 49, continuing from A/21 on 8/2/12.	17	0	0
28	08/07/12	C 21	Steel			11:25 AM	11:50 AM	-84.06	10.94	95 ft.	No issues.	25	0	0
29	08/07/12	B 22	Steel			1:03 PM	1:23 PM	-84.16	10.84	95 ft.	No issues.	20	0	0
30	08/07/12	B 23	Steel			1:50 PM	2:15 PM	-84.26	10.74	95 ft.	No issues.	25	0	0
31	08/07/12	B 24	Steel			2:55 PM	3:16 PM	-84.25	10.75	95 ft.	No issues.	21	0	0
32	08/08/12	B 26	Steel			7:47 AM	8:12 AM	-84.26	10.76	95 ft.	No issues.	25	0	0
33	08/08/12	B 25	Steel			8:45 AM	9:12 AM	-84.20	10.80	95 ft.	No issues.	27	0	0
34	08/08/12	C 20	Steel			10:05 AM	10:26 AM	-84.19	10.81	95 ft.	No issues.	20	0	0
RS	08/08/12	A 18	Steel	X	X	11:25 AM	11:28 AM	-94.42	10.58	105 ft.	Restrike after initial drive on 8/7/12. Was left 14" high. Restrike occurred, inspector noted progress in 1 inch increments.	3	0	0
RS	08/08/12	A 15	Steel	X	X	11:52 AM	11:54 AM	-94.34	10.66	105 ft.	Restrike after initial drive on 8/7/12. Was left 1' high. Restrike occurred, inspector noted progress in 1 inch increments.	2	0	0
35	08/08/12	A 15.5	Steel			1:03 PM	1:42 PM	-94.41	10.59	105 ft.	No issues.	39	0	0
36	08/08/12	A 16	Steel			2:12 PM	2:43 PM	-94.33	10.67	105 ft.	No issues.	31	0	0
37	08/09/12	A 17.5	Steel			7:38 AM	8:15 AM	-94.36	10.64	105 ft.	No issues.	37	0	0
38	08/09/12	C 19	Steel			8:53 AM	9:13 AM	-84.13	10.87	95 ft.	No issues.	20	0	0
39	08/09/12	C 18	Steel			9:35 AM	9:58 AM	-84.17	10.83	95 ft.	No issues.	23	0	0
40	08/09/12	A 17	Steel			10:44 AM	11:13 AM	-94.43	10.57	105 ft.	No issues.	29	0	0
41	08/09/12	A 16.5	Steel			11:35 AM	12:05 PM	-94.39	10.61	105 ft.	No issues.	30	0	0
42	08/09/12	C 17	Steel			1:10 PM	1:28 PM	-82.98	10.85	95 ft.	No issues.	18	0	0
43	08/09/12	C 16	Steel			1:52 PM	2:19 PM	-82.93	10.90	95 ft.	No issues.	27	0	0
44	08/10/12	A 14.5	Steel			7:37 AM	8:02 AM	-93.20	10.63	105 ft.	No issues.	25	0	0
45	08/10/12	A 14	Steel			8:27 AM	8:55 AM	-93.16	10.67	105 ft.	No issues.	28	0	0
46	08/10/12	A 13.5	Steel			9:17 AM	9:45 AM	-93.19	10.64	105 ft.	Hammer problem at -35ft. No other issues.	25	0	0
47	08/10/12	A 13	Steel			10:07 AM	10:32 AM	-93.29	10.54	105 ft.	No issues.	25	0	0
48	08/10/12	C 13	Steel			11:00 AM	11:20 AM	-83.01	10.82	95 ft.	No issues.	20	0	0
49	08/10/12	C 14	Steel			12:32 PM	1:00 PM	-82.97	10.86	95 ft.	No issues.	28	0	0
50	08/10/12	C 15	Steel			1:30 PM	2:40 PM	-82.95	10.88	95 ft.	No issues.	27	0	0
51	08/13/12	J 29	Concrete			11:47 AM	1:42 PM	-88.11	10.89	99 ft.	Two separate jetting hose breaks delays 20 mins. Also obstruction: reposition 20min.	115	20	20
52	08/14/12	K 30	Concrete	X		8:25 AM	9:15 AM	-90.67	8.33	99 ft.	Problem with hammer shut down @ 92 ft. marker per pile driving record. Surveyor tried to stop Dutra hammer at blow count #18.	50	10	0
53	08/14/12	J 28	Concrete			10:30 AM	11:07 AM	-87.96	11.04	99 ft.	No issues.	37	0	0
54	08/14/12	J 27	Concrete			1:03 PM	1:37 PM	-88.10	10.90	99 ft.	Oily stains shown on pile during "plumb" adjustments. Pile ended up out of plumb to the north.	34	0	0
55	08/14/12	H 25	Concrete			2:30 PM	3:47 PM	-88.14	10.86	99 ft.	30 minute delay to secure pile in hammer. Hose break caused 15 min delay.	77	45	0
56	08/15/12	H 24	Concrete			8:33 AM	9:08 AM	-88.04	10.96	99 ft.	No issues.	35	0	0
57	08/15/12	H 23	Concrete			10:05 AM	10:38 AM	-87.97	11.03	99 ft.	No issues.	33	0	0
58	08/15/12	H 22	Concrete			11:30 AM	12:01 PM	-87.98	11.02	99 ft.	No issues.	31	0	0
59	08/15/12	G 20	Concrete			1:28 PM	2:00 PM	-88.09	10.91	99 ft.	No issues.	32	0	0
60	08/16/12	G 19	Concrete			7:45 AM	8:55 AM	-86.80	12.20	99 ft.	Problems with jet hose connection and cushion block. Pile left 14" high due to concrete spalling.	70	7	0
61	08/16/12	G 17	Concrete			9:33 AM	10:40 AM	-87.87	11.13	99 ft.	Pile out of plumb approx 1' to the north. Cresote seen at water surface. Surveyor says top is leaning 2' to the north @ butt. Reposition barge 32 min delay.	51	32	0
62	08/16/12	F 15	Concrete			12:00 PM	12:48 PM	-88.03	10.97	99 ft.	No issues.	48	0	0
63	08/16/12	F 14	Concrete			1:28 PM	2:07 PM	-88.04	10.96	99 ft.	No issues.	39	0	0
64	08/16/12	G 16	Concrete			2:47 PM	3:23 PM	-88.00	11.00	99 ft.	No issues.	36	0	0
65	08/17/12	J 26	Concrete			8:25 AM	8:53 AM	-87.93	11.07	99 ft.	No issues.	28	0	0
66	08/17/12	J 25	Concrete			9:40 AM	10:03 AM	-87.82	11.18	99 ft.	No issues.	23	0	0
67	08/17/12	J 24	Concrete			10:43 AM	11:08 AM	-87.93	11.07	99 ft.	No issues.	25	0	0
68	08/17/12	J 23	Concrete			12:20 PM	12:57 PM	-87.70	11.30	99 ft.	Pile ends up leaning south 6" and 3" west. 5 min delay due to pile deflection during initial placement.	37	0	5
69	08/17/12	K 29	Concrete			1:41 PM	1:59 PM	-87.89	11.11	99 ft.	No issues.	18	0	0
70	08/20/12	G 15	Concrete	X		8:57 AM	9:48 AM	-87.41	11.59	99 ft.	Capacity ~ 300 kips. 10 min delay installing PDA.	51	0	0
71	08/20/12	G 18	Concrete	X		11:02 AM	11:53 AM	-87.36	11.64	99 ft.	Capacity ~ 520 kips. 13 min delay installing PDA.	51	0	0
72	08/20/12	K 24	Concrete	X		1:10 PM	1:50 PM	-84.97	14.03	99 ft.	Capacity ~ 540 kips. Pile left high for future restrike.	40	0	0
73	08/20/12	K 28	Concrete			2:50 PM	3:18 PM	-87.35	11.65	99 ft.	No issues.	28	0	0
74	08/21/12	K 27	Concrete			8:00 AM	8:33 AM	-87.11	11.89	99 ft.	Black secretions observed, no odor, possibly cresote. Pile positioned 1.1 ft south to avoid obstruction.	33	0	5

2726 BSW Pile Driving Schedule Sorted by Date

Total Piles To Date	Date	Pile #	Type	PDA / Indicator	Restrike	Start Time	Finish Time	Tip Elevation	Butt Elevation	Pile Length	Comments / General Notes	Total Time Spent Pile Driving (mins.)	Dutra Related Delays (mins.)	Unforseen Site Conditions Delays (mins.)
75	08/21/12	K 26	Concrete			9:17 AM	9:47 AM	-87.13	11.87	99 ft.	Black water observed during jetting, no odor, possibly cresote. Pile positioned 0.5 ft south to avoid obstruction.	40	0	10
76	08/21/12	K 25	Concrete			10:24 AM	10:58 AM	-87.01	11.99	99 ft.	No issues.	34	0	0
77	08/21/12	H 21	Concrete			1:07 PM	1:43 PM	-87.31	11.69	99 ft.	20 min delay w/ twisted wire rope placing pile in pokcet prior to 1:07 start.	36	20	0
78	08/21/12	H 20	Concrete			2:30 PM	3:00 PM	-86.18	11.65	99 ft.	Obstruction hit around marker 88 when jet turned off, causing pile to be slightly out of plumb.	30	0	0
79	08/21/12	H 19	Concrete			3:25 PM	4:02 PM	-86.01	11.82	99 ft.	No issues.	37	0	0
80	08/22/12	H 15	Concrete			7:40 AM	8:22 AM	-86.93	12.07	99 ft.	No issues.	42	0	0
81	08/22/12	H 16	Concrete			9:05 AM	9:30 AM	-87.19	11.81	99 ft.	No issues.	25	0	0
82	08/22/12	H 17	Concrete			10:05 AM	10:30 AM	-87.13	11.87	99 ft.	Pile left ~0.5' high to be cut off. Minor puddle of cresote observed.	25	0	0
83	08/22/12	H 18	Concrete			11:25 AM	11:40 AM	-87.32	11.68	99 ft.	No issues.	25	0	0
84	08/22/12	J 22	Concrete			1:10 PM	1:44 PM	-87.32	11.68	99 ft.	No issues.	34	0	0
85	08/22/12	J 21	Concrete			2:18 PM	2:55 PM	-87.15	11.85	99 ft.	No issues.	43	0	0
86	08/22/12	J 20	Concrete			3:35 PM	4:27 PM	-87.11	11.89	99 ft.	No issues.	52	0	0
87	08/23/12	J 17	Concrete			7:44 AM	8:30 AM	-87.36	11.64	99 ft.	Water hose break at -53ft.	46	10	0
88	08/23/12	J 18	Concrete			9:05 AM	9:53 AM	-86.86	12.14	99 ft.	Jet hose pop off pile at -74ft.	48	10	0
89	08/23/12	J 19	Concrete			10:23 AM	11:00 AM	-86.92	12.08	99 ft.	No issues.	37	0	0
RS	08/23/12	G 15	Concrete	X	X	11:50 AM	11:55 AM	-88.28	10.72	99 ft.	Capacity approximately 540 kips.	51	0	0
RS	08/23/12	K 24	Concrete	X	X	1:00 PM	1:06 PM	-87.02	11.98	99 ft.	Capacity approximately 1000 kips on first hit.	40	0	0
90	08/23/12	K 18	Concrete	X		2:00 PM	3:15 PM	-84.60	14.40	99 ft.	Pile left ~2.5' high, to be retapped 2.0' and cut off 0.5'. Capacity approximately 940 kips.	75	0	0
91	08/23/12	K 19	Concrete			3:58 PM	4:40 PM	-86.67	12.33	99 ft.	No issues.	42	0	0
92	08/24/12	K 20	Concrete			7:30 AM	7:57 AM	-86.67	12.33	99 ft.	No issues.	27	0	0
93	08/24/12	K 21	Concrete			8:30 AM	8:58 AM	-86.83	12.17	99 ft.	No issues.	28	0	0
94	08/24/12	K 22	Concrete			9:33 AM	9:59 AM	-86.97	12.03	99 ft.	No issues.	24	0	0
95	08/24/12	K 23	Concrete			10:40 AM	11:30 AM	-86.76	12.24	99 ft.	Pile left ~0.5' high to be cut off. Problems with jet hose connection and wood cushion block catching fire.	50	10	0
96	08/24/12	J 16	Concrete			12:53 PM	1:30 PM	-86.97	12.03	99 ft.	No issues.	37	0	0
97	08/24/12	K 17	Concrete			2:05 PM	2:44 PM	-86.49	12.51	99 ft.	No issues.	39	0	0
98	08/27/12	A 12.5	Steel			9:25 AM	10:06 AM	-94.44	10.56	105 ft.	No issues.	41	0	0
99	08/27/12	A 11	Steel			10:58 AM	11:27 AM	-94.45	10.55	105 ft.	Pile originally placed at bent A11.5 but relocated to A11 because it was a T2 coated pile, rather than a T1	29	0	0
100	08/27/12	A 12	Steel	X		12:25 PM	1:03 PM	-	-	105 ft.	Reading taken @ water surface. Pile left high to be retapped. Firing problem with hammer during initial placement.	38	5	0
101	08/27/12	A 11.5	Steel			1:33 PM	2:03 PM	-94.36	10.64	105 ft.	No issues.	30	0	0
102	08/27/12	A 10.5	Steel			2:23 PM	2:55 PM	-94.43	10.57	105 ft.	No issues.	32	0	0
103	08/28/12	A 10	Steel			8:00 AM	8:26 AM	-94.55	10.65	105 ft.	No issues.	26	0	0
104	08/28/12	A 9.5	Steel			8:55 AM	9:20 AM	-94.41	10.59	105 ft.	No issues.	25	0	0
105	08/28/12	A 9	Steel	X		9:43 AM	10:00 AM	-	-	105 ft.	Pile left ~40' high to be restruck.	25	0	0
106	08/28/12	A 8.5	Steel			10:35 AM	11:07 AM	-94.40	10.60	105 ft.	No issues.	32	0	0
107	08/28/12	A 8	Steel			11:30 AM	11:58 AM	-94.43	10.57	105 ft.	No issues.	28	0	0
108	08/28/12	C 12	Steel			1:07 PM	1:26 PM	-84.11	10.89	95 ft.	No issues.	19	0	0
109	08/28/12	B 11	Steel			1:55 PM	2:24 PM	-84.22	10.78	95 ft.	No issues.	29	0	0
110	08/28/12	B 10	Steel			2:45 PM	3:07 PM	-84.20	10.80	95 ft.	No issues.	22	0	0
111	08/29/12	A 07.5	Steel			8:05 AM	8:38 AM	-94.41	10.59	105 ft.	No issues.	33	0	0
112	08/29/12	A 07	Steel			9:00 AM	9:38 AM	-94.41	10.59	105 ft.	No issues.	38	0	0
113	08/29/12	A 06.5	Steel			9:58 AM	10:25 AM	-94.38	10.62	105 ft.	No issues.	27	0	0
114	08/29/12	A 06	Steel	X		10:45 AM	11:03 AM	-	-	105 ft.	Pile left ~40' high to be restruck.	26	0	0
115	08/29/12	A 05.5	Steel			11:25 AM	12:01 PM	-94.41	10.59	105 ft.	No issues.	36	0	0
116	08/29/12	A 05	Steel			12:57 PM	1:28 PM	-94.35	10.65	105 ft.	No issues.	31	0	0
117	08/29/12	B 09	Steel			1:56 PM	2:33 PM	-84.23	10.77	95 ft.	No issues.	37	0	0
118	08/30/12	B 08	Steel			7:27 AM	7:53 AM	-84.25	10.75	95 ft.	No issues.	26	0	0
119	08/30/12	A 04.5	Steel			8:25 AM	9:03 AM	-94.48	10.52	105 ft.	No bubble curtain installed. Obstruction @ ~-30 ft which threw pile slightly out of plumb.	38	0	5
120	08/30/12	A 04	Steel			9:27 AM	9:57 AM	-94.37	10.63	105 ft.	No issues.	30	0	0
121	08/30/12	A 03.5	Steel			10:17 AM	10:56 AM	-94.38	10.62	105 ft.	No issues.	39	0	0
122	08/30/12	A 03	Steel	X		11:19 AM	12:00 PM	-	-	105 ft.	Pile left ~30' high to be restruck.	41	0	0
123	08/30/12	A 02.5	Steel			12:57 PM	1:45 PM	-94.40	10.60	105 ft.	Problem during initial placement. Broekn bolt from hammer after assembly.	48	10	0
124	08/31/12	B 07	Steel			7:25 AM	7:50 AM	-84.19	10.81	95 ft.	No bubble curtain installed due to low tide.	25	0	0
125	08/31/12	B 06	Steel			8:28 AM	9:07 AM	-84.23	10.77	95 ft.	No issues.	39	0	0
126	08/31/12	A 02	Steel			9:30 AM	10:15 AM	-94.49	10.51	105 ft.	Dutra pointed out small amount of oil residue @ water surface.	45	0	0
127	08/31/12	A 01.5	Steel			10:33 AM	11:23 AM	-94.43	10.57	105 ft.	Problem during initial placement. 15 min delay. Pilebutt cut finger.	50	0	15
128	08/31/12	A 01	Steel	X		12:28 PM	1:33 PM	-	-	105 ft.	Pile left ~40' high to be restruck. Problem during initial placement.	50	0	15
129	08/31/12	A 00.5	Steel			1:53 PM	2:40 PM	-94.46	10.54	105 ft.	Pile drift during initial placement.	47	0	0
130	09/04/12	B 05	Steel			7:38 AM	8:06 AM	-84.23	10.77	95 ft.	No issues.	28	0	0
131	09/04/12	B 04	Steel			8:15 AM	9:15 AM	-84.24	10.76	95 ft.	Dutra having problem with hammer control. Send pilebutt up lead. No issues during pile placement.	60	25	0
132	09/04/12	B 03	Steel			9:38 AM	10:13 AM	-84.22	10.78	95 ft.	Dutra send 2 pilebutts up lead to remove sling. No issues during pile placement.	35	5	0
133	09/04/12	B 02	Steel			10:30 AM	11:09 AM	-84.22	10.78	95 ft.	Send pilebutt up lead. No issues during pile placement.	39	10	0
RS	09/04/12	A 01	Steel		X	11:23 AM	11:45 AM	-94.41	10.59	105 ft.	Capacity ~ 580 kips (Abe). No issues during pile restrike.	22	0	0
RS	09/04/12	A 03	Steel		X	12:43 PM	1:03 PM	-94.46	10.54	105 ft.	Capacity ~ 550 kips (Abe). No issues during pile restrike.	20	0	0
RS	09/04/12	A 06	Steel		X	1:29 PM	1:39 PM	-94.45	10.55	105 ft.	Capacity ~ 580 kips (Abe). No issues during pile restrike.	10	0	0
RS	09/04/12	A 09	Steel		X	2:25 PM	2:38 PM	-94.42	10.58	105 ft.	Capacity ~ 560 kips (Abe). No issues during pile restrike.	13	0	0
RS	09/04/12	A 12	Steel		X	3:00 PM	3:13 PM	-94.43	10.57	105 ft.	Capacity ~ 460 kips (Abe). No issues during pile restrike.	13	0	0
RS	09/04/12	K 18	Concrete		X	4:10 PM	-	-86.72	12.28	99 ft.	Capacity ~ 1000 kips (Abe). No issues during pile restrike.		0	0
134	09/05/12	E 07	Concrete			11:05 AM	12:07 PM	-87.42	11.58	99 ft.	Issues with pile not going down during jetting for first 33 mins, 10 min delay at lead.	62	10	33
135	09/05/12	B 01	Steel			7:55 AM	8:39 AM	-84.22	10.78	95 ft.	Issues with hammer, causing possible relocation.	44	10	0
136	09/06/12	E 08	Concrete			7:00 AM	7:45 AM	-87.40	11.60	99 ft.	No issues.	45	0	0
137	09/06/12	E 09	Concrete			8:23 AM	9:48 AM	-87.56	11.44	99 ft.	Oily residue @ water surface immediately after jetting turned on. 8:40 pile slipped 0.8'south. Raise pile, re-position @ 9:03 to -20' off westerly. Finished out of plumb leaning north. 0.9' north, 0.5' west.	85	0	43
138	09/06/12	E 10	Concrete			10:20 AM	11:41 AM	-87.76	11.24	99 ft.	Hose issue spray water up to city sidewalk. Cushion block smoking @ -85'. Stop 11:23 @ -86'. Reinstall 11:29. Finished out of plumb North 1.3'. Ok E/W.	81	30	0
139	09/06/12	E 11	Concrete			12:50 PM	1:56 PM	-87.61	11.39	99 ft.	Hose fitting leaking water at top of pile. 1:08 jet pump problem @ -28'. Resolve @ 1:20 - turn on jet. 1:25 pilebutt up lead, resolved at 1:27. Heavy smoke from cushion block @ -91'. No issues with pile placement.	66	15	0
140	09/06/12	F 11	Concrete			2:30 PM	3:00 PM	-87.39	11.61	99 ft.	No issues.	30	0	0
141	09/06/12	F 12	Concrete			3:35 PM	4:11 PM	-87.52	11.48	99 ft.	No issues.	36	0	0
142	09/07/12	F 13	Concrete			7:25 AM	8:33 AM	-87.65	11.35	99 ft.	Obstruction @ -34'. Raise and reposition, 15 min. delay. 8:05 jetting hose leak at pile. 8:22 replace cushion block. Reposition onto pile @ 8:30. Pile ended up 0.9' west.	68	0	15
143	09/07/12	G 13	Concrete			9:15 AM	9:59 AM	-87.25	11.75	99 ft.	No issues.	44	0	0
144	09/07/12	G 14	Concrete			10:35 AM	11:16 AM	-87.25	11.75	99 ft.	No issues.	41	0	0
145	09/07/12	J 15	Concrete			12:25 PM	12:59 PM	-86.90	12.10	99 ft.	No issues.	34	0	0
146	09/07/12	K 16	Concrete			1:29 PM	1:55 PM	-86.76	12.24	99 ft.	No issues.	26	0	0
147	09/18/12	D 05	Concrete			10:38 AM	11:42 AM	-87.69	11.31	99 ft.	Had to stop hammer mid-drive. The pile bowed, Dutra installed come-along. Cushion block smoked up. No issues with pile placement.	64	6	0

2726 BSW Pile Driving Schedule Sorted by Date

Total Piles To Date	Date	Pile #	Type	PDA / Indicator	Restrike	Start Time	Finish Time	Tip Elevation	Butt Elevation	Pile Length	Comments / General Notes	Total Time Spent Pile Driving (mins.)	Dutra Related Delays (mins.)	Unforseen Site Conditions Delays (mins.)
148	09/18/12	D 04	Concrete			12:52 PM	2:23 PM	-87.44	11.56	99 ft.	Hose connection problem causing Dutra to turn off jet. Dutra picked the pile to reattach the hose and re-drove the pile. No other issues during placement.	91	41	0
149	09/18/12	D 03	Concrete			2:58 PM	3:35 PM	-87.43	11.57	99 ft.	No issues during placement.	37	0	0
150	09/19/12	D 02	Concrete			7:26 AM	8:46 AM	-87.28	11.72	99 ft.	Problem during initial pile placement. Oily substance at water surface. DB 8:00am, 8:27 come-along at lead / pile leaning north. 8:31am resolved. Pile ended up 1ft west and leaning north. Bolt chipped.	80	4	
151	09/19/12	D 01	Concrete			9:30 AM	11:03 AM	-87.21	11.79	99 ft.	Pile relocated 5ft north to D01.5 per Port (20 min delay). Jet pump ran out of fuel / send PB up lead (23 min delay). No other issues during pile placement.	93	23	20
152	09/19/12	E 02	Concrete			12:28 PM	1:03 PM	-87.02	11.98	99 ft.	No issues during placement.	35	1	0
153	09/19/12	E 03	Concrete			1:35 PM	2:33 PM	-87.29	11.71	99 ft.	Remove/reposition pile during initial placement (15 min delay). Install come-along to lead @ 2:05PM.	58	15	0
154	09/19/12	E 04	Concrete			3:17 PM	3:52 PM	-87.36	11.64	99 ft.	No issues during placement.	35	0	0
155	09/20/12	E 05	Concrete			7:38 AM	8:38 AM	-87.36	11.64	99 ft.	Jet hose leak at nipple. Problems during initial placement, causing remove/reinstall. Pile ended up within tolerance.	60		
156	09/20/12	E 06	Concrete			9:28 AM	10:10 AM	-87.47	11.53	99 ft.	No issues during placement.	42	0	0
157	09/20/12	F 10	Concrete			10:40 AM	11:18 AM	-87.36	11.64	99 ft.	Remove/reinstall @ -18 ft. No other issues during pile placement.	38	0	0
158	09/20/12	F 09	Concrete			12:15 PM	12:55 PM	-87.40	11.60	99 ft.	No issues during placement.	40	0	0
159	09/20/12	F 08	Concrete			1:30 PM	2:07 PM	-87.39	11.61	99 ft.	No issues during placement.	37	0	0
160	09/21/12	EF 02	Concrete			7:25 AM	7:55 AM	-86.89	12.11	99 ft.	Port OK to relocate pile 0.9' North. No issues during placement.	30	0	0
161	09/21/12	F 03	Concrete			8:22 AM	9:06 AM	-87.04	11.96	99 ft.	Jetting hose leak at butt connection. Send PB up lead to repair leak (2 min. delay). Hammer removed and reset on pile (5 min delay)	44	7	0
162	09/21/12	F 04	Concrete			9:38 AM	10:08 AM	-87.05	11.95	99 ft.	No issues during placement.	30	2	0
163	09/21/12	F 05	Concrete			10:42 AM	11:15 AM	-86.89	12.11	99 ft.	No issues during placement.	33	0	0
164	09/21/12	F 06	Concrete			12:20 PM	12:58 PM	-87.05	11.95	99 ft.	No issues during placement.	38	0	0
165	09/21/12	F 07	Concrete			1:20 PM	1:48 PM	-87.17	11.82	99 ft.	No issues during placement.	28	0	0
166	09/21/12	G 10	Concrete			2:23 PM	2:57 PM	-87.02	11.98	99 ft.	No issues during placement.	34	0	0
167	09/21/12	G 11	Concrete			3:28 PM	3:55 PM	-87.08	11.92	99 ft.	No issues during placement.	27	0	0
168	09/24/12	G 08	Concrete			7:50 AM	8:23 AM	-86.91	12.09	99 ft.	No issues during placement.	33	0	0
169	09/24/12	G 07	Concrete			8:50 AM	9:30 AM	-86.78	12.22	99 ft.	Problems during initial placement (15 min delay). Jet problem at 37'.	40		
170	09/24/12	G 05	Concrete			10:02 AM	10:33 AM	-86.97	12.13	99 ft.	No issues during placement.	31	0	0
171	09/24/12	G 04	Concrete			10:55 AM	11:33 AM	-86.78	12.22	99 ft.	No issues during placement.	38	0	0
172	09/24/12	G 12	Concrete			12:48 PM	2:05 PM	-87.16	11.84	99 ft.	Problem during initial pile placement. Remove/reinstall (27 min. delay)	77		
173	09/25/12	G 09	Concrete	X		8:55 AM	9:54 AM	-86.96	12.04	99 ft.	No issues during placement. Axial capacity ~ 650 kips (Abe Eng.)	59	0	0
174	09/25/12	G 06	Concrete	X		10:47 AM	11:33 AM	-86.81	12.19	99 ft.	No issues during placement. Axial capacity ~ 660 kips (Abe Eng.)	46	0	0
175	09/25/12	G 03	Concrete	X		12:45 PM	1:42 PM	-86.65	12.35	99 ft.	No issues during placement. Axial capacity ~ 830 kips (Abe Eng.)	57	0	0
176	09/25/12	H 12	Concrete	X		2:20 PM	3:00 PM	-86.91	12.09	99 ft.	No issues during placement. Axial capacity ~ 670 kips (Abe Eng.)	40	0	0
177	09/25/12	H 11	Concrete			3:52 PM	4:24 PM	-86.89	12.11	99 ft.	No issues during placement.	32	0	0
178	09/26/12	H 13	Concrete			7:31 AM	8:10 AM	-86.93	12.07	99 ft.	No issues during placement.	39	0	0
179	09/26/12	H 10	Concrete			9:07 AM	9:39 AM	-86.86	12.14	99 ft.	No issues during placement.	32	0	0
180	09/26/12	H 08	Concrete			11:03 AM	11:33 AM	-86.65	12.35	99 ft.	No issues during placement.	30	0	0
181	09/26/12	H 09	Concrete			10:05 AM	10:34 AM	-86.79	12.21	99 ft.	No issues during placement.	29	0	0
182	09/26/12	H 07	Concrete			12:35 PM	1:03 PM	-86.45	12.55	99 ft.	No issues during placement.	28	0	0
183	09/26/12	H 06	Concrete			1:28 PM	1:59 PM	-86.73	12.27	99 ft.	No issues during placement.	31	0	0
184	09/26/12	H 05	Concrete			2:27 PM	2:55 PM	-86.53	12.47	99 ft.	No issues during placement.	28	0	0
185	09/26/12	H 04	Concrete			3:20 PM	3:57 PM	-86.33	12.67	99 ft.	No issues during placement.	37	0	0
186	09/27/12	H 14	Concrete			8:00 AM	8:30 AM	-86.92	12.08	99 ft.	No issues during placement.	30	0	0
187	09/27/12	J 14	Concrete			9:12 AM	9:41 AM	-86.65	12.35	99 ft.	No issues during placement.	29	0	0
188	09/27/12	J 13	Concrete			10:20 AM	10:43 AM	-86.63	12.37	99 ft.	No issues during placement.	23	0	0
189	09/27/12	J 12	Concrete			11:15 AM	11:52 AM	-86.60	12.40	99 ft.	No issues during placement.	37	0	0
190	09/27/12	J 11	Concrete			1:13 PM	1:37 PM	-86.52	12.48	99 ft.	No issues during placement.	30	0	0
191	09/27/12	J 10	Concrete			2:36 PM	3:03 PM	-86.41	12.59	99 ft.	No issues during placement.	29	0	0
192	09/28/12	H 03	Concrete			7:23 AM	7:50 AM	-86.34	12.66	99 ft.	No issues during placement.	27	0	0
193	09/28/12	J 03	Concrete			8:24 AM	9:08 AM	-86.02	12.98	99 ft.	No issues during placement.	44	0	0
194	09/28/12	J 04	Concrete			9:35 AM	10:14 AM	-86.14	12.86	99 ft.	No issues during placement.	39	0	0
195	09/28/12	J 05	Concrete			10:35 AM	11:00 AM	-86.16	12.84	99 ft.	No issues during placement.	25	0	0
196	09/28/12	J 06	Concrete			11:30 AM	12:04 PM	-86.31	12.69	99 ft.	No issues during placement. 5 min delay to address leaning pile.	34	5	0
197	09/28/12	J 07	Concrete			1:15 PM	1:43 PM	-86.32	12.68	99 ft.	No issues during placement.	28	0	0
198	09/28/12	J 08	Concrete			2:10 PM	2:36 PM	-86.42	12.58	99 ft.	No issues during placement.	26	0	0
199	10/01/12	J 09	Concrete			7:45 AM	8:07 AM	-86.42	12.58	99 ft.	No issues during placement.	22	0	0
200	10/01/12	K 15	Concrete			8:38 AM	9:05 AM	-86.50	12.50	99 ft.	No issues during placement.	27	0	0
201	10/01/12	K 14	Concrete			9:35 AM	10:00 AM	-86.41	12.59	99 ft.	No issues during placement.	25	0	0
202	10/01/12	K 13	Concrete			10:47 AM	11:11 AM	-86.41	12.59	99 ft.	No issues during placement.	24	0	0
203	10/01/12	K 03	Concrete			12:20 PM	12:52 PM	-85.91	13.09	99 ft.	No issues during placement.	32	0	0
204	10/01/12	K 04	Concrete			1:23 PM	1:49 PM	-85.91	13.09	99 ft.	No issues during placement.	26	0	0
205	10/01/12	K 05	Concrete			2:21 PM	2:45 PM	-85.94	13.06	99 ft.	No issues during placement.	24	0	0
206	10/01/12	K 06	Concrete			3:15 PM	3:52 PM	-86.02	12.98	99 ft.	Problems during initial placemtn (15min delay). Hammer problem between #58-#65. No other issues.	37	0	15
207	10/02/12	K 07	Concrete			7:20 AM	7:50 AM	-86.07	12.93	99 ft.	No issues during placement.	30	0	0
208	10/02/12	K 08	Concrete			8:22 AM	8:48 AM	-86.13	12.87	99 ft.	No issues during placement.	26	0	0
209	10/02/12	K 09	Concrete			9:17 AM	9:43 AM	-86.19	12.81	99 ft.	No issues during placement.	26	0	0
210	10/02/12	K 10	Concrete			10:15 AM	10:43 AM	-86.26	12.74	99 ft.	No issues during placement.	28	0	0
211	10/02/12	K 11	Concrete			11:25 AM	11:53 AM	-86.30	12.70	99 ft.	No issues during placement.	23	0	0
212	10/02/12	K 12	Concrete			1:07 PM	2:16 PM	-82.90	16.10	99 ft.	Seismic pile. Problem during initial placement (40 min delay) Butt spalling during impact. Leave 2ft high.	69	20	20
213	10/02/12	L 12	Concrete			2:50 PM	3:30 PM	-86.03	12.97	99 ft.	No issues during placement.	40	0	0
214	10/02/12	L 11	Concrete			3:58 PM	4:22 PM	-85.98	13.02	99 ft.	No issues during placement.	24	0	0
215	10/03/12	L 10	Concrete			7:20 AM	7:48 AM	-85.97	13.03	99 ft.	No issues during placement.	28	0	0
216	10/03/12	L 09	Concrete			8:15 AM	8:45 AM	-85.80	13.20	99 ft.	No issues during placement.	30	0	0
217	10/03/12	L 08	Concrete			9:15 AM	9:47 AM	-85.82	13.18	99 ft.	Loose jet hose. Shut down jet pump @ 74 ft. No other issues.	32	0	0
218	10/03/12	L 07	Concrete			10:14 AM	10:45 AM	-85.78	13.22	99 ft.	No issues during placement.	31	0	0
219	10/03/12	L 06	Concrete			11:14 AM	11:38 AM	-85.72	13.28	99 ft.	No issues during placement.	24	0	0
220	10/03/12	L 05	Concrete			12:48 PM	1:13 PM	-85.70	13.30	99 ft.	No issues during placement.	35	0	0
221	10/03/12	L 04	Concrete			1:43 PM	2:12 PM	-85.63	13.37	99 ft.	No issues during placement.	29	0	0
222	10/03/12	L 03	Concrete			2:35 PM	3:03 PM	-85.54	13.46	99 ft.	No issues during placement.	28	0	0
223	11/07/12	AA 31	Steel			9:50 AM	11:32 PM	-94.73	10.27	105 ft.	Issues with hammer, 35 min delay.	102	35	0
224	11/07/12	AA 32	Steel			12:45 PM	2:00 PM	-94.72	10.28	105 ft.	Issues with hammer, 50 min delay.	75	50	0
225	11/07/12	AA 33	Steel			2:25 PM	3:02 PM	-94.69	10.31	105 ft.	No issues during placement.	37	0	0
226	11/07/12	AA 34	Steel			3:40 PM	4:20 PM	-94.67	10.33	105 ft.	No issues during placement.	40	0	0
227	11/08/12	AA 35	Steel			9:15 AM	9:57 AM	-94.83	10.17	105 ft.	No issues during placement.	42	0	0
228	11/08/12	AA 36	Steel			10:21 AM	11:10 AM	-93.45	11.55	105 ft.	Soft pile left high to potentially be retapped.	49	0	0
229	11/08/12	AA 37	Steel			12:30 PM	1:10 PM	-95.15	9.85	105 ft.	No issues during placement.	40	0	0

2726 BSW Pile Driving Schedule Sorted by Date

Total Piles To Date	Date	Pile #	Type	PDA / Indicator	Restrike	Start Time	Finish Time	Tip Elevation	Butt Elevation	Pile Length	Comments / General Notes	Total Time Spent Pile Driving (mins.)	Dutra Related Delays (mins.)	Unforseen Site Conditions Delays (mins.)
230	11/08/12	AA 39	Steel			2:00 PM	2:43 PM	-94.69	10.31	105 ft.	No issues during placement.	43	0	0
231	11/08/12	AA 38	Steel			3:03 PM	3:42 PM	-94.75	10.25	105 ft.	No issues during placement.	39	0	0
232	11/09/12	CC 31	Steel			7:25 AM	8:15 AM	-84.32	10.68	95 ft.	No issues during placement.	50	0	0
233	11/09/12	BB 31	Steel			9:00 AM	11:18 AM	-84.70	10.30	95 ft.	Dutra having problems during placement, pile shifting north and east.	78	25	0
234	11/09/12	BB 32	Steel			12:30 PM	2:09 PM	-84.70	10.30	95 ft.	Dutra having problems with pile drift during initial placement.	99	40	0
235	11/09/12	BB 33	Steel			2:40 PM	3:08 PM	-84.58	10.42	95 ft.	No issues during placement.	28	0	0
236	11/09/12	BB 34	Steel			3:25 PM	3:54 PM	-84.53	10.47	95 ft.	No issues during placement.	29	0	0
237	11/12/12	BB 35	Steel			8:05 AM	8:40 AM	-84.59	10.41	95 ft.	Issues with cables getting caught in leads, 10 min delay.	35	10	0
238	11/12/12	BB 36	Steel			9:00 AM	9:28 AM	-84.57	10.43	95 ft.	Issues with cables getting caught in leads, 10 min delay.	28	10	0
239	11/12/12	BB 37	Steel			10:30 AM	11:00 AM	-83.44	11.56	95 ft.	Blowcounts low. Field call by Jason/Lucas to leave pile high for restrike.	30	0	0
240	11/12/12	BB 38	Steel			11:20 AM	12:00 PM	-	-	95 ft.	Blowcounts low. Field call by Jason/Lucas to leave pile high for restrike.	40	0	0
241	11/12/12	BB 39	Steel			1:20 PM	1:45 PM	-84.63	10.37	95 ft.	Hit obstruction at 20' mark, causing pile to shift to a final postion of 0.7' to the south and 1.9' to the east.	25	0	0
242	11/12/12	CC 32	Steel			2:35 PM	3:52 PM	-84.30	10.70	95 ft.	Pile picked up and replaced, 20 min delay. Send p/b up lead to strap friction strap back on to pile, 20 min delay. Pile out of plumb.	77	40	0
243	11/14/12	CC 33	Steel			7:35 AM	8:47 AM	-	-	95 ft.	Problems during initial placement (30 min delay). Pile left high for restrike due to low blow counts.	72	30	0
244	11/14/12	CC 34	Steel			9:07 AM	9:28 AM	-	-	95 ft.	Pile left high for restrike due to low blow counts.	21	0	0
245	11/14/12	CC 35	Steel			9:46 AM	10:15 AM	-84.32	10.68	95 ft.	No issues during placement.	29	0	0
246	11/14/12	CC 36	Steel			11:15 AM	11:43 AM	-84.27	10.73	95 ft.	No issues during placement.	28	0	0
247	11/14/12	CC 37	Steel			12:55 PM	1:27 PM	-84.31	10.69	95 ft.	No issues during placement.	32	0	0
248	11/14/12	KK 39	Steel	X		2:15 PM	2:30 PM	-	-	95 ft.	Indicator pile, left high for restrike.	15	0	0
249	11/14/12	KK 38	Steel			2:50 PM	3:08 PM	-	-	95 ft.	Pile left high for restrike due to low blow counts.	18	0	0
250	11/14/12	KK 37	Steel			3:36 PM	4:30 PM	-	-	95 ft.	Pile left high for restrike due to low blow counts. Delay during initial pile placement (30 min)	54	30	0
251	11/15/12	KK 36	Steel			7:20 AM	7:53 AM	-84.06	10.94	95 ft.	No issues during placement.	33	0	0
252	11/15/12	DD 31	Concrete			11:20 AM	12:27 PM	-87.11	11.89	99 ft.	No issues during placement.	67	0	0
253	11/15/12	DD 32	Concrete			2:00 PM	2:50 PM	-87.50	11.50	99 ft.	No issues during placement.	50	0	0
RS	11/16/12	AA 36	Steel		X	-	-	-94.71	10.29	105 ft.	Restrike. ABE Load Capacity ~1600kips.	0	0	0
RS	11/16/12	BB 38	Steel		X	-	-	-84.60	10.40	95 ft.	Restrike. ABE Load Capacity ~1500kips.	0	0	0
RS	11/16/12	KK 39	Steel	X	X	7:58 AM	8:23 AM	-84.14	10.81	95 ft.	Restrike indicator pile. ABE Load Capacity ~570-610kips.	25	0	0
RS	11/16/12	KK 38	Steel		X	9:46 AM	9:48 AM	-84.15	10.85	95 ft.	No issues during restrike.	2	0	0
RS	11/16/12	BB 37	Steel		X	9:53 AM	9:55 AM	-84.58	10.42	95 ft.	No issues during restrike.	2	0	0
RS	11/16/12	KK 37	Steel		X	9:59 AM	10:02 AM	-84.20	11.82	95 ft.	No issues during restrike.	3	0	0
RS	11/16/12	CC34	Steel		X	10:23 AM	10:25 AM	-84.34	11.79	95 ft.	No issues during restrike.	2	0	0
RS	11/16/12	CC 33	Steel		X	10:30 AM	10:31 AM	-84.37	10.63	95 ft.	No issues during restrike.	1	0	0
254	11/16/12	DD 33	Concrete			12:45 PM	1:37 PM	-87.34	11.66	99 ft.	No issues during placement.	52	0	0
255	11/16/12	KK 31	Concrete			2:36 PM	3:16 PM	-87.38	11.62	99 ft.	No issues during placement.	40	0	0
256	11/19/12	KK 32	Concrete			8:15 AM	8:47 AM	-87.42	11.58	99 ft.	No issues during placement.	32	0	0
257	11/19/12	KK 33	Concrete			9:23 AM	10:15 AM	-87.08	11.92	99 ft.	Dutra lowered hammer setting at 73' and below. Install come-along (15 min delay)	52	0	0
258	11/19/12	KK 34	Concrete			10:57 AM	11:32 AM	-87.44	11.56	99 ft.	No issues during placement.	35	0	0
259	11/19/12	KK 35	Concrete			12:37 PM	1:51 PM	-87.27	11.73	99 ft.	Problem with initial placement (28 min delay)	74	0	28

MUNICON CONSULTANTS

LETTER OF TRANSMITTAL

August 7, 2012
To: Dutra Construction Company, Steve Hutchison
From: Municon Consultants – Anthony Argyriou JOB#: 831

RE: ~~**BART WARM SPRINGS EXTENSION**~~
~~**CONTRACT NO. 02EE-120**~~

SUBJECT: Sound Monitoring Report

WE ARE SENDING YOU THE FOLLOWING

☐ SUBMITTALS ☒ REPORTS
☐ PHOTOS ☐ CD-ROMs

BY ☒ EMAIL ☐ HAND CARRIED ☐ FED EX

DESCRIPTION

Underwater sound level reports for data collected on July 11 through 24, 2012 at the following locations:

Location	Sound Level Meter
Pier 38	1970

NOTES:

SELs recorded by date, normalized to 24 hours, are:

Date	SEL, dB	Date	SEL, dB
July 11	146.4	July 18	145.4
July 12	146.2	July 19	146.3
July 13	145.6	July 20	146.0
July 14	145.7	July 21	145.7
July 15	145.2	July 22	146.1
July 16	145.1	July 23	149.3
July 17	158.4	July 24	148.0

The sound levels recorded are LZeq, LZSmax, and LZpeak for 15-minute intervals. The 'Z' indicates that sound level measurements are not frequency-weighted (or are "flat-weighted"), which we believe is most appropriate for underwater sound monitoring to protect marine life; A-weighting and C-weighting are for human response to sound.

1300 22nd Street, Suite A, San Francisco, CA 94107
Ph: 415-641-2570 Fax: 415-282-4097

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LZeq is the level of constant sound over the measurement interval that has the same sound energy as the actual sound over the same period, using flat frequency weighting.
LZSmax is the highest RMS sound level using slow (1000ms) response weighting recorded during the measurement interval, using flat frequency weighting.
LZpeak is the highest instantaneous peak sound pressure level recorded during the recording interval, using flat frequency weighting.

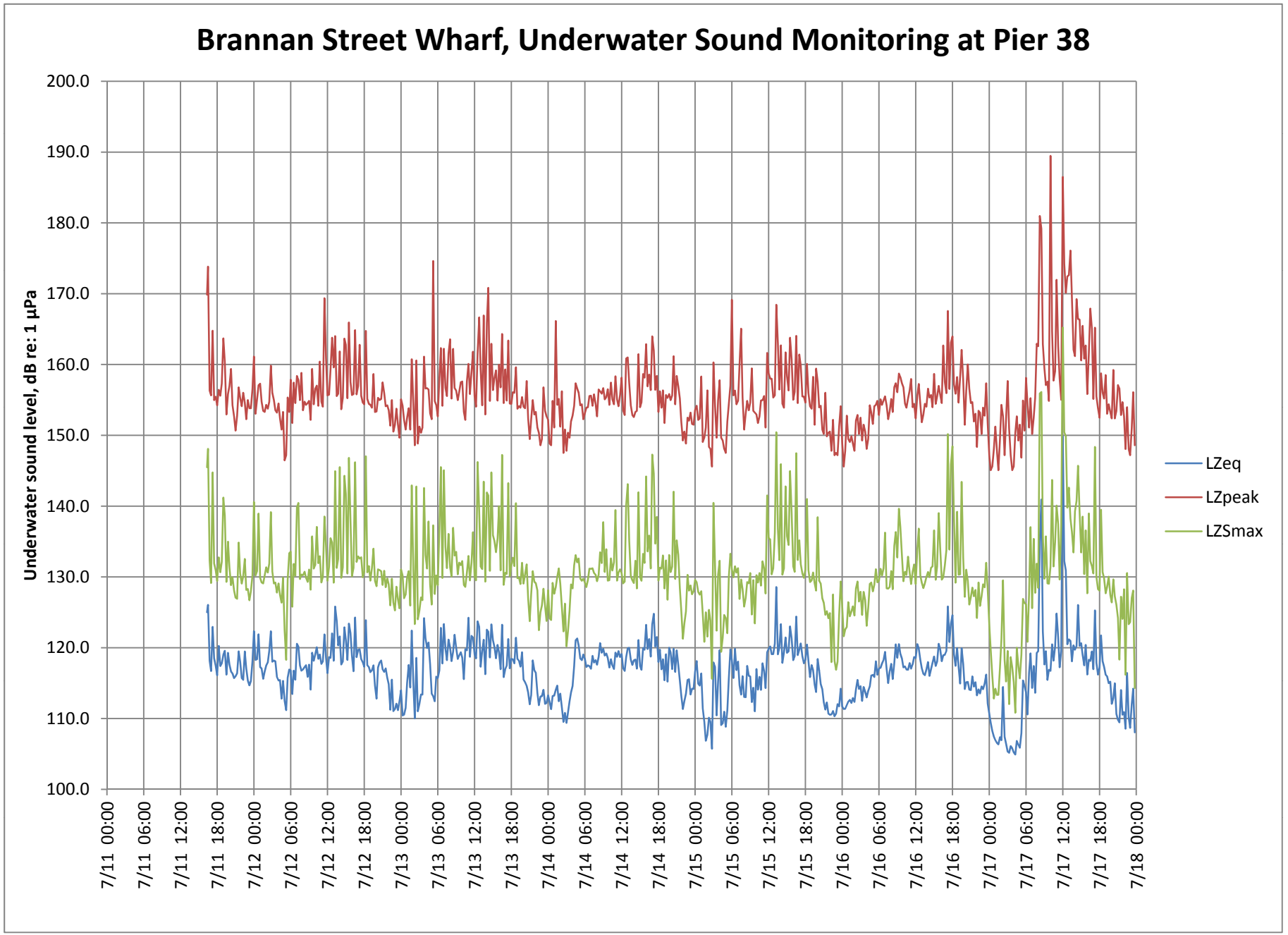
We deployed SLM #2270 with a hydrophone at Pier 30-32 on July 11, 2012. The hydrophone was deployed at a depth of about 22 feet in water 44-½ feet deep. Actual depths will fluctuate due to tides.

We deployed an SLM and hydrophone at Pier 38, but the hydrophone malfunctioned and no usable data was recorded in this period.

Yours Truly,
MUNICON Consultants

Anthony Argyriou, G.E.

1300 22nd Street, Suite A, San Francisco, CA 94107
Ph: 415-641-2570 Fax: 415-282-4097



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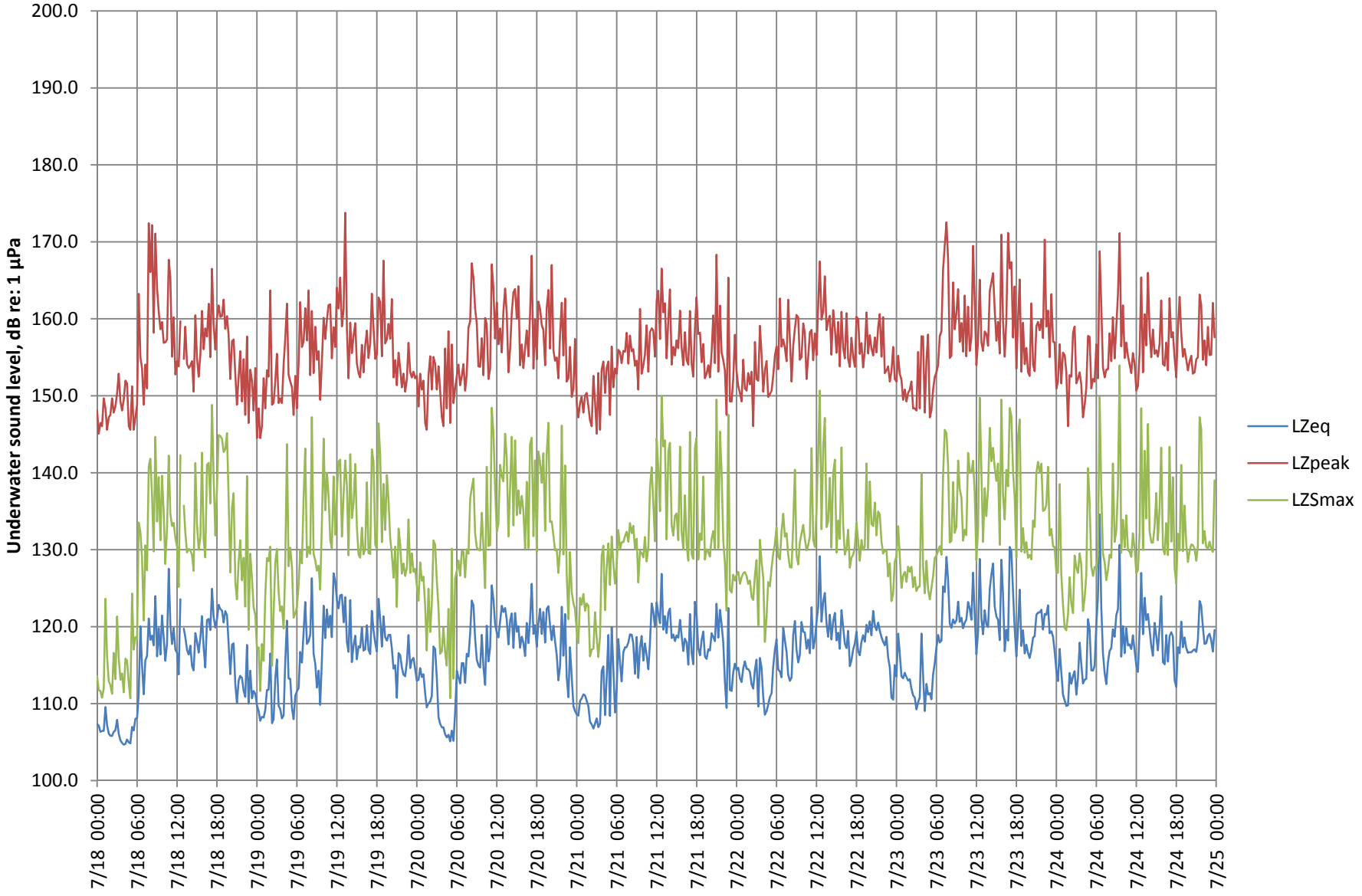
7/26/2012

Brannan Street Wharf, Underwater Sound Monitoring at Pier 38



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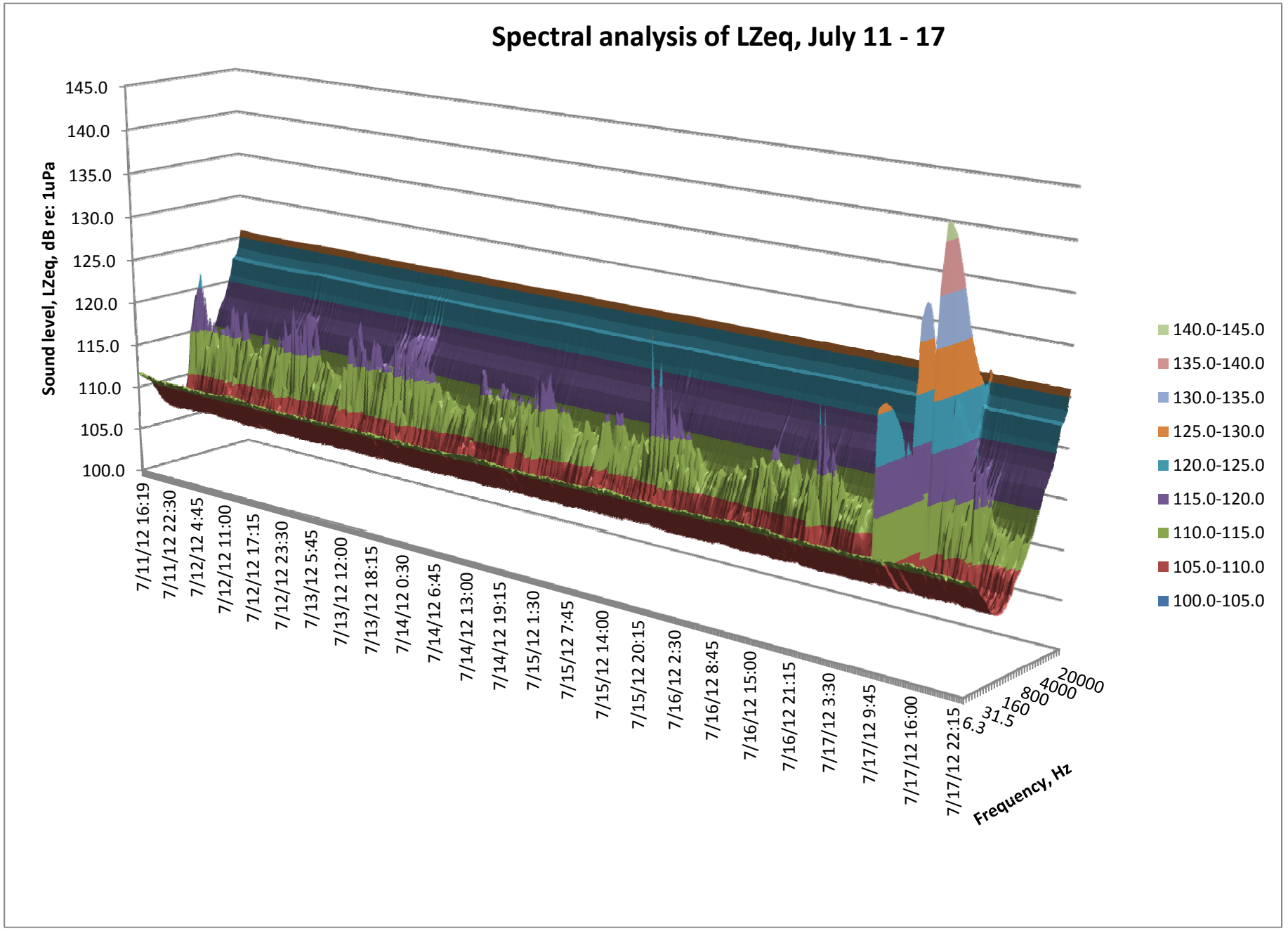
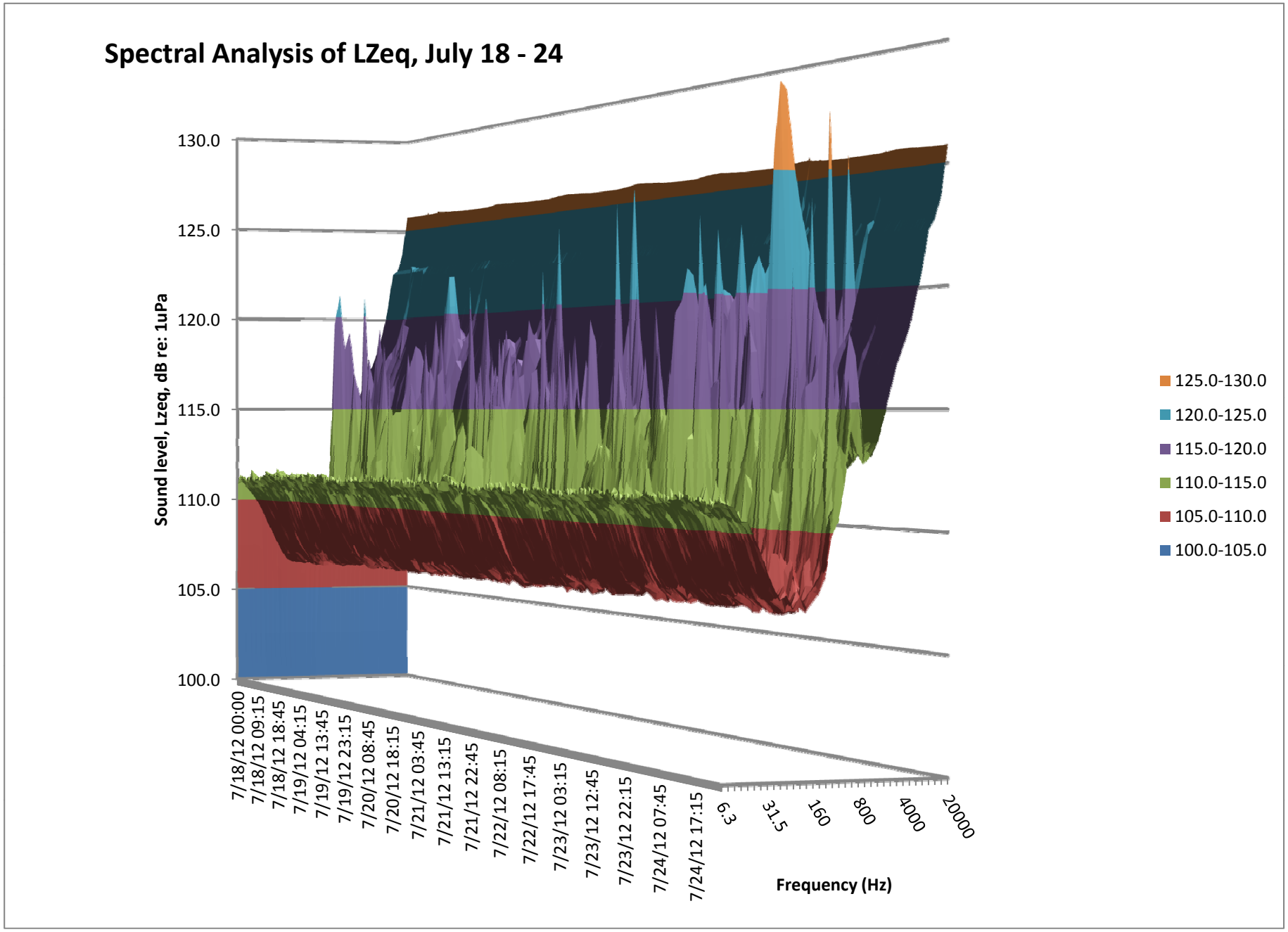
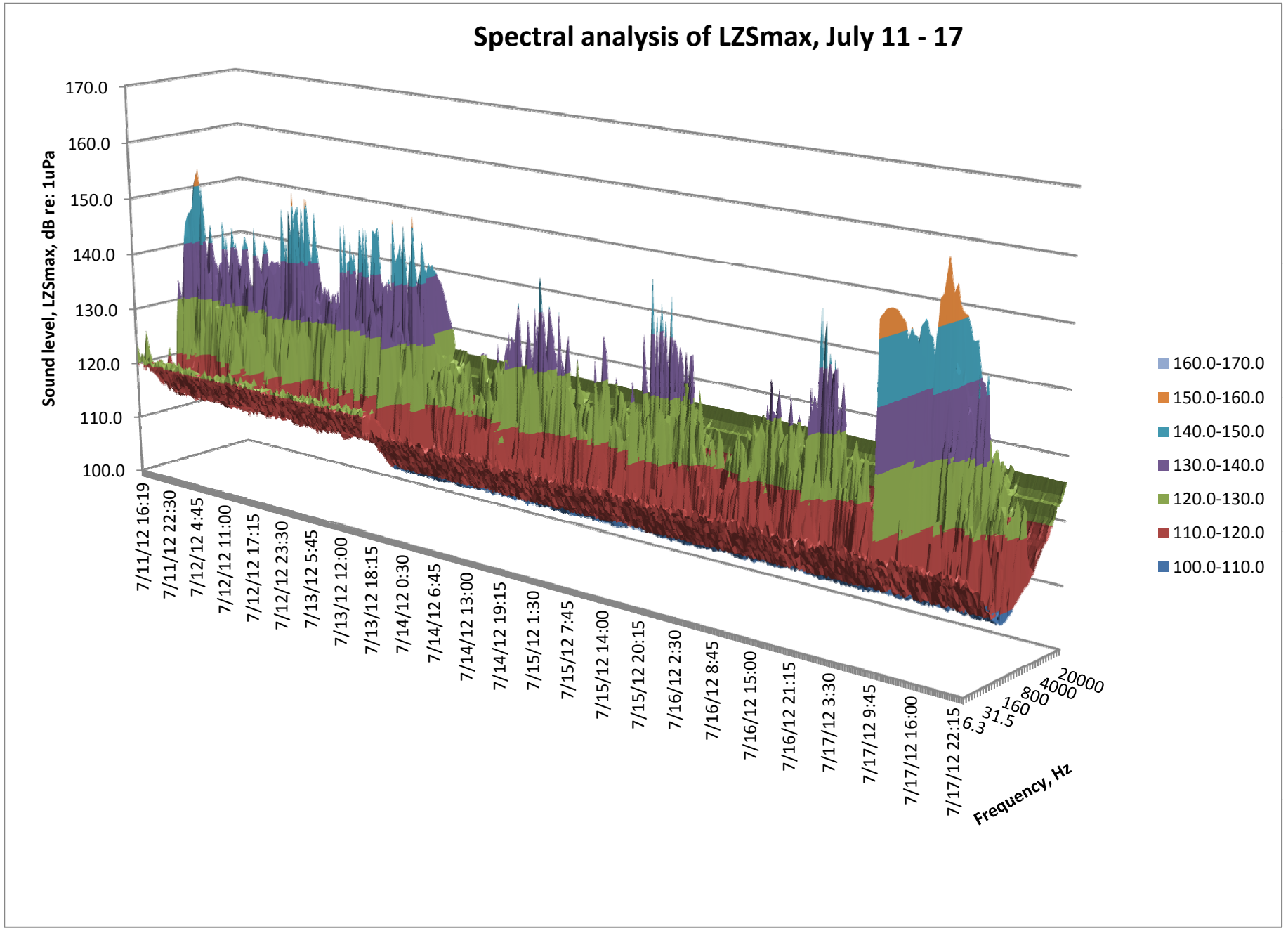
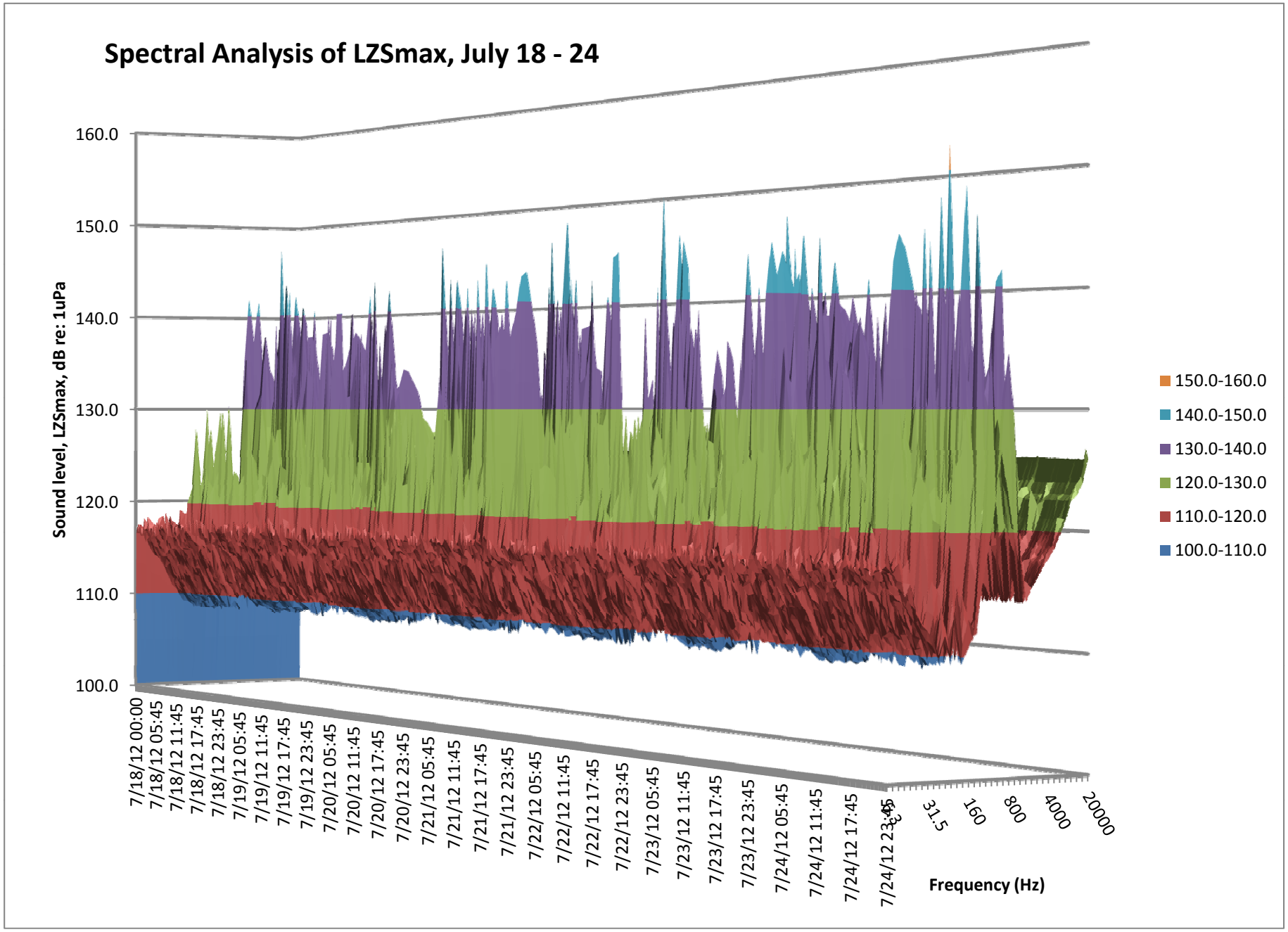
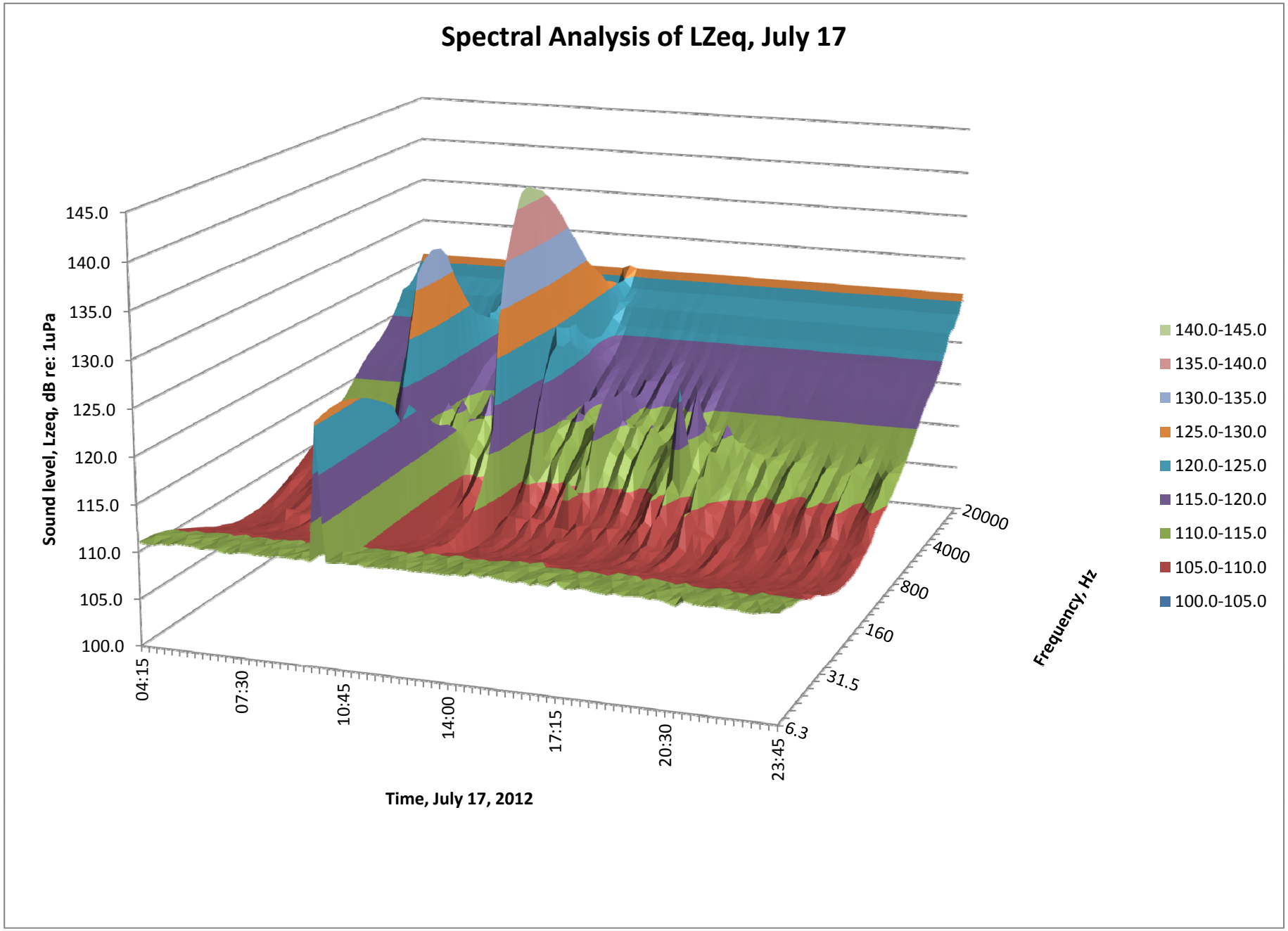
7/26/2012


Spectral analysis of LZeq, July 11 - 17
Sound level, LZeq, dB re: 1uPa
145.0
140.0
135.0
130.0
125.0
120.0
115.0
110.0
105.0
100.0
7/11/12 16:19
7/11/12 22:30
7/12/12 4:45
7/12/12 11:00
7/12/12 17:15
7/12/12 23:30
7/13/12 5:45
7/13/12 12:00
7/13/12 18:15
7/14/12 0:30
7/14/12 6:45
7/14/12 13:00
7/14/12 19:15
7/15/12 1:30
7/15/12 7:45
7/15/12 14:00
7/15/12 20:15
7/16/12 2:30
7/16/12 8:45
7/16/12 15:00
7/16/12 21:15
7/17/12 3:30
7/17/12 9:45
7/17/12 16:00
7/17/12 22:15
6.3
31.5
160
800
4000
20000
Frequency, Hz
140.0-145.0
135.0-140.0
130.0-135.0
125.0-130.0
120.0-125.0
115.0-120.0
110.0-115.0
105.0-110.0
100.0-105.0


Spectral Analysis of LZeq, July 18 - 24
Sound level, Lzeq, dB re: 1uPa
130.0
125.0
120.0
115.0
110.0
105.0
100.0
7/18/12 00:00
7/18/12 09:15
7/18/12 18:45
7/19/12 04:15
7/19/12 13:45
7/19/12 23:15
7/20/12 08:45
7/20/12 18:15
7/21/12 03:45
7/21/12 13:15
7/21/12 22:45
7/22/12 08:15
7/22/12 17:45
7/23/12 03:15
7/23/12 12:45
7/23/12 22:15
7/24/12 07:45
7/24/12 17:15
6.3
31.5
160
800
4000
20000
Frequency (Hz)
125.0-130.0
120.0-125.0
115.0-120.0
110.0-115.0
105.0-110.0
100.0-105.0


Spectral analysis of LZSmax, July 11 - 17
Sound level, LZSmax, dB re: 1uPa
170.0
160.0
150.0
140.0
130.0
120.0
110.0
100.0
7/11/12 16:19
7/11/12 22:30
7/12/12 4:45
7/12/12 11:00
7/12/12 17:15
7/12/12 23:30
7/13/12 5:45
7/13/12 12:00
7/13/12 18:15
7/14/12 0:30
7/14/12 6:45
7/14/12 13:00
7/14/12 19:15
7/15/12 1:30
7/15/12 7:45
7/15/12 14:00
7/15/12 20:15
7/16/12 2:30
7/16/12 8:45
7/16/12 15:00
7/16/12 21:15
7/17/12 3:30
7/17/12 9:45
7/17/12 16:00
7/17/12 22:15
6.3
31.5
160
800
4000
20000
Frequency, Hz
160.0-170.0
150.0-160.0
140.0-150.0
130.0-140.0
120.0-130.0
110.0-120.0
100.0-110.0


Spectral Analysis of LZSmax, July 18 - 24
Sound level, LZSmax, dB re: 1uPa
160.0
150.0
140.0
130.0
120.0
110.0
100.0
7/18/12 00:00
7/18/12 05:45
7/18/12 11:45
7/18/12 17:45
7/18/12 23:45
7/19/12 05:45
7/19/12 11:45
7/19/12 17:45
7/19/12 23:45
7/20/12 05:45
7/20/12 11:45
7/20/12 17:45
7/20/12 23:45
7/21/12 05:45
7/21/12 11:45
7/21/12 17:45
7/21/12 23:45
7/22/12 05:45
7/22/12 11:45
7/22/12 17:45
7/22/12 23:45
7/23/12 05:45
7/23/12 11:45
7/23/12 17:45
7/23/12 23:45
7/24/12 05:45
7/24/12 11:45
7/24/12 17:45
7/24/12 23:45
31.5
160
800
4000
20000
Frequency (Hz)
150.0-160.0
140.0-150.0
130.0-140.0
120.0-130.0
110.0-120.0
100.0-110.0


Spectral Analysis of LZeq, July 17
Sound level, Lzeq, dB re: 1uPa
145.0
140.0
135.0
130.0
125.0
120.0
115.0
110.0
105.0
100.0
04:15
07:30
10:45
14:00
17:15
20:30
23:45
Time, July 17, 2012
20000
4000
800
160
31.5
6.3
Frequency, Hz
140.0-145.0
135.0-140.0
130.0-135.0
125.0-130.0
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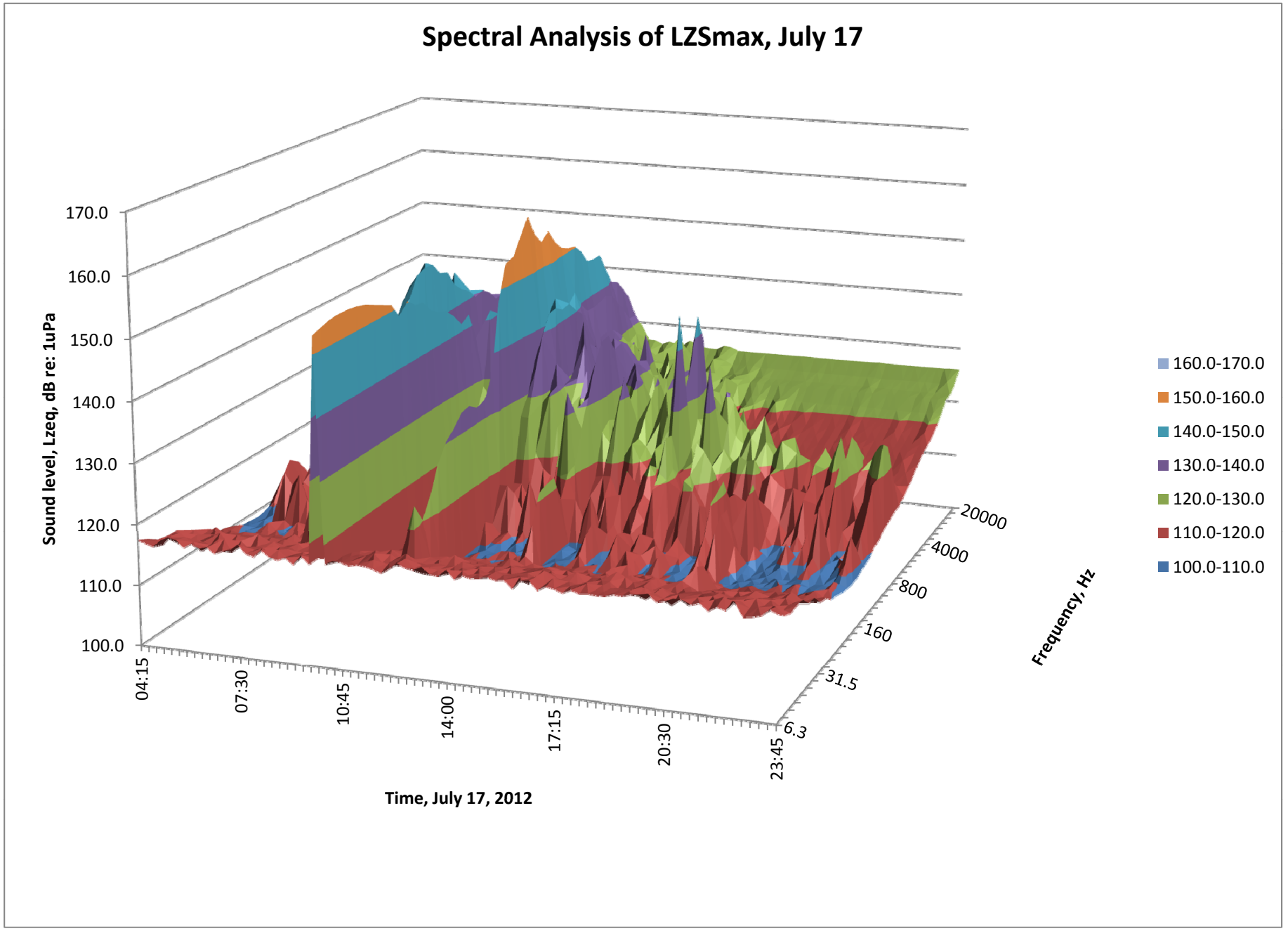
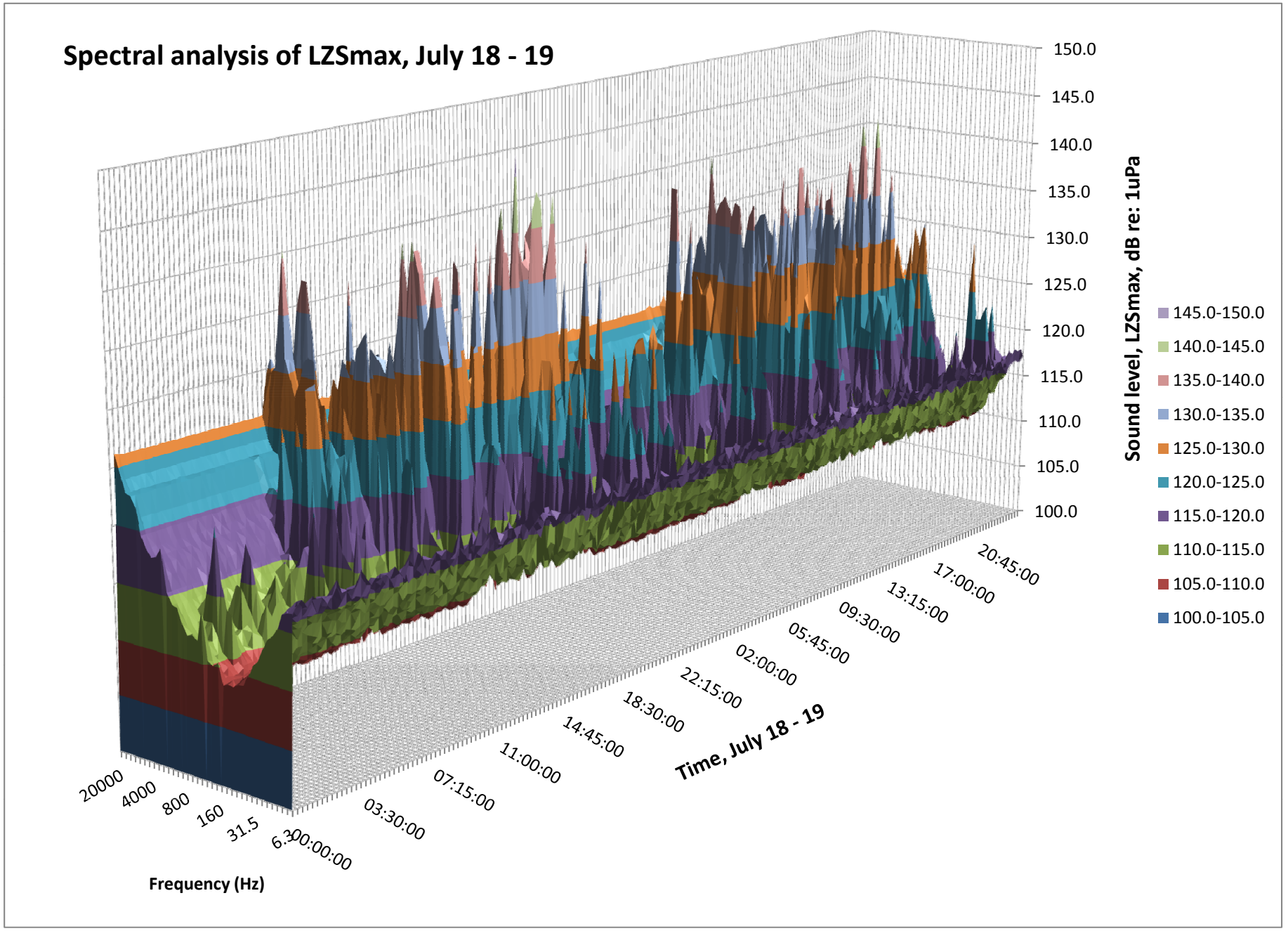
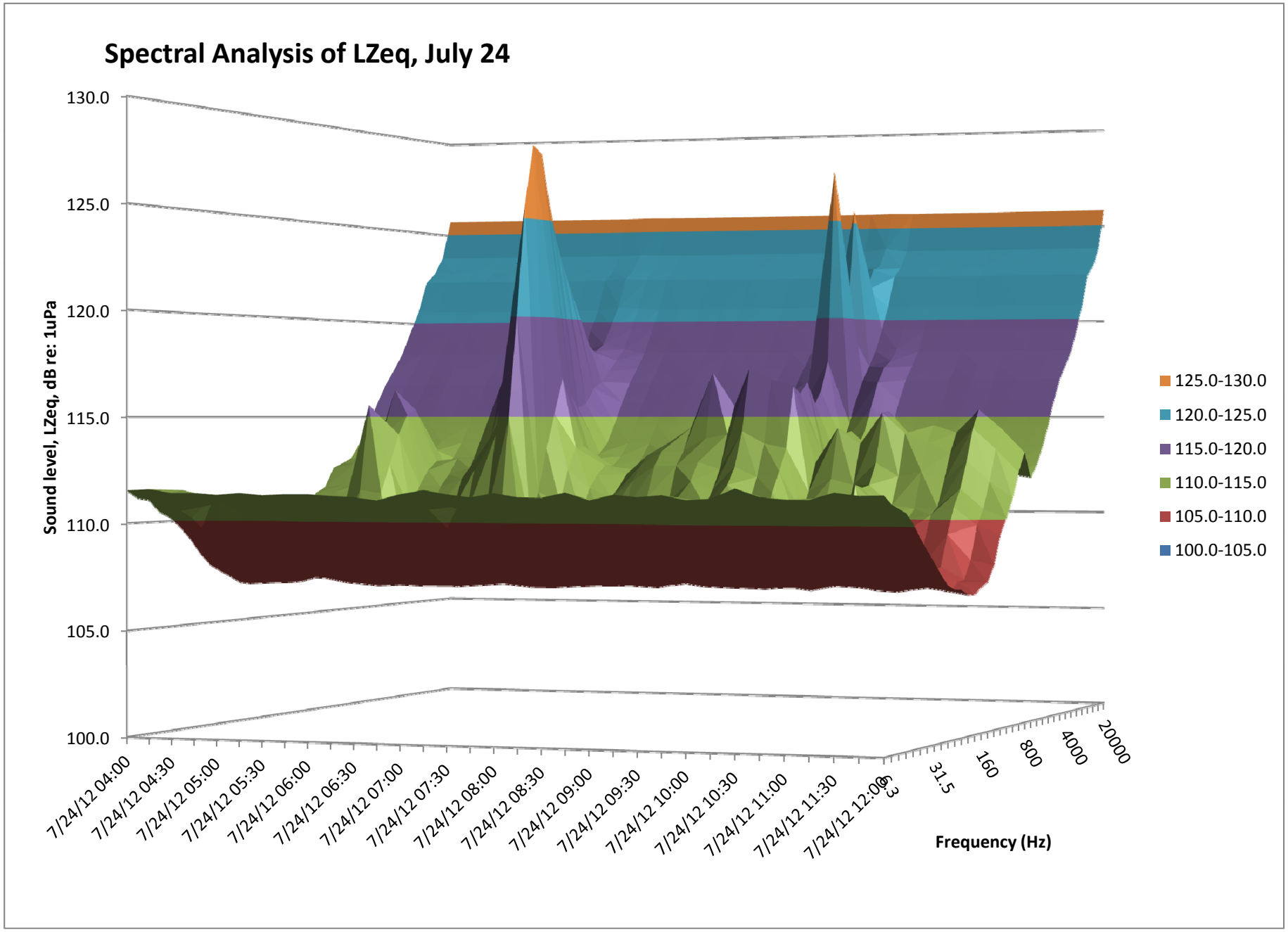
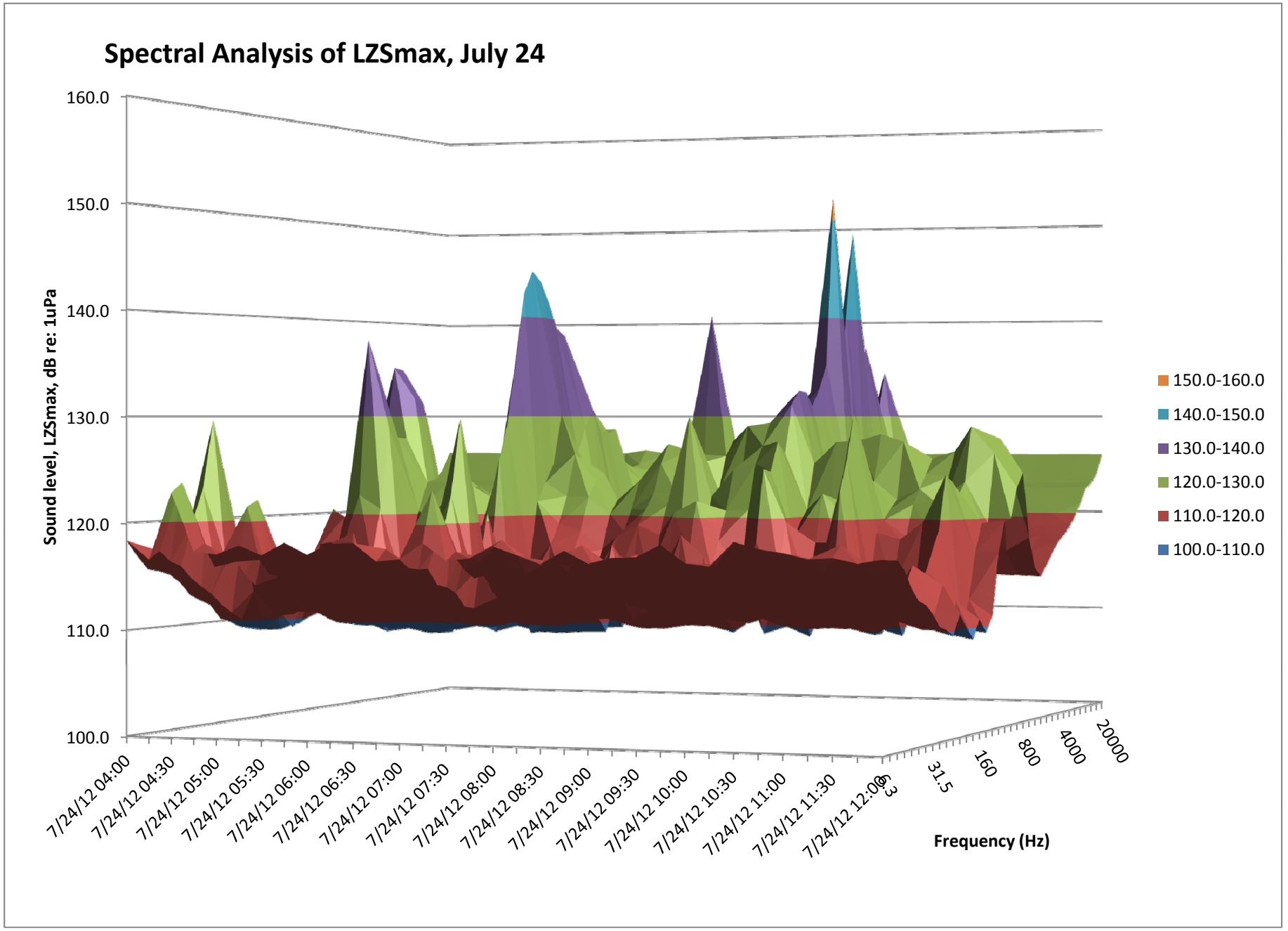
110.0-115.0
105.0-110.0
100.0-105.0


Spectral Analysis of LZSmax, July 17
Sound level, Lzeq, dB re: 1uPa
170.0
160.0
150.0
140.0
130.0
120.0
110.0
100.0
04:15
07:30
10:45
14:00
17:15
20:30
23:45
Time, July 17, 2012
20000
4000
800
160
31.5
6.3
Frequency, Hz
160.0-170.0
150.0-160.0
140.0-150.0
130.0-140.0
120.0-130.0
110.0-120.0
100.0-110.0


Spectral analysis of LZSmax, July 18 - 19
150.0
145.0
140.0
135.0
130.0
125.0
120.0
115.0
110.0
105.0
100.0
Sound level, LZSmax, dB re: 1uPa
145.0-150.0
140.0-145.0
135.0-140.0
130.0-135.0
125.0-130.0
120.0-125.0
115.0-120.0
110.0-115.0
105.0-110.0
100.0-105.0
20:45:00
17:00:00
13:15:00
09:30:00
05:45:00
02:00:00
22:15:00
18:30:00
14:45:00
11:00:00
07:15:00
03:30:00
00:00:00
Time, July 18 - 19
20000
4000
800
160
31.5
6.3
Frequency (Hz)


Spectral Analysis of LZeq, July 24
Sound level, LZeq, dB re: 1uPa
130.0
125.0
120.0
115.0
110.0
105.0
100.0
7/24/12 04:00
7/24/12 04:30
7/24/12 05:00
7/24/12 05:30
7/24/12 06:00
7/24/12 06:30
7/24/12 07:00
7/24/12 07:30
7/24/12 08:00
7/24/12 08:30
7/24/12 09:00
7/24/12 09:30
7/24/12 10:00
7/24/12 10:30
7/24/12 11:00
7/24/12 11:30
7/24/12 12:00
3
31.5
160
800
4000
20000
Frequency (Hz)
125.0-130.0
120.0-125.0
115.0-120.0
110.0-115.0
105.0-110.0
100.0-105.0


Spectral Analysis of LZSmax, July 24
Sound level, LZSmax, dB re: 1uPa
160.0
150.0
140.0
130.0
120.0
110.0
100.0
7/24/12 04:00
7/24/12 04:30
7/24/12 05:00
7/24/12 05:30
7/24/12 06:00
7/24/12 06:30
7/24/12 07:00
7/24/12 07:30
7/24/12 08:00
7/24/12 08:30
7/24/12 09:00
7/24/12 09:30
7/24/12 10:00
7/24/12 10:30
7/24/12 11:00
7/24/12 11:30
7/24/12 12:00
3
31.5
160
800
4000
20000
Frequency (Hz)
150.0-160.0
140.0-150.0
130.0-140.0
120.0-130.0
110.0-120.0
100.0-110.0

MUNICON CONSULTANTS

LETTER OF TRANSMITTAL

August 15, 2012
To: Dutra Construction Company, Steve Hutchison
From: Municon Consultants – Anthony Argyriou JOB#: 831

RE: BRANNAN STREET WHARF
PORT OF SAN FRANCISCO CONTRACT NO. 2726

SUBJECT: Underwater Sound Monitoring Report

WE ARE SENDING YOU THE FOLLOWING ☐ SUBMITTALS ☒ REPORTS ☐ PHOTOS ☐ CD-ROMs

BY ☒ EMAIL ☐ HAND CARRIED ☐ FED EX

DESCRIPTION

Underwater sound level reports for data collected on July 25 through August 2, 2012 at the following locations:

Location	Sound Level Meter
Pier 30-32	2270
Pier 38	1970
Boat near pile barge	2276

We deployed SLM #2270 with a hydrophone along the south side of Pier 30-32, about 165 feet west of the southeast corner of the pier, on July 11, 2012. The hydrophone was deployed at a depth of about 22 feet in water 44-½ feet deep. We deployed SLM #1970 with a hydrophone at the north end of the gangway ramp leading to the floating dock north of Pier 38, on July 11, 2012. The hydrophone was deployed at a depth of about 7 feet in about 13 feet of water. Actual depths will fluctuate due to tides. A plan showing locations of these deployments relative to surrounding features is attached.

We replaced the hydrophone at Pier 30-32 (SLM #2270) due to malfunction on July 26, 2012; records prior to the replacement were not reliable and are not included in this report.

We deployed SLM #2276 with a hydrophone from our boat during piledriving for the first 15 steel piles driven. Distances from hydrophone to pile, and water and hydrophone depth, for each pile driven, are given in the table below:

1300 22nd Street, Suite A, San Francisco, CA 94107
Ph: 415-641-2570 Fax: 415-282-4097

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TABLE 1: Geometry of hydrophone deployments

Pile Number	Date	Driving Times	Distance to boat (ft.)	Depth of hydrophone at boat (ft.)	Depth of water at boat (ft.)	Distance to Pier 38 (ft.)	Distance to Pier 30-32 (ft.)
A-24	July 26	15:57 – 17: 10	60	4 ½	9	585	890
A-24	July 27	12:45 – 13:13	60	4 ½	9	585	890
A-27	July 27	14:58 – 16:05	60	4 ½	9	650	870
A-30	July 30	09:14 – 10:44	60 - 62	4 ½	8 to 9.8	700	840
A-29	July 30	11:53 – 13:33	65	4 ½	10 to 9	685	845
A-28 ½	July 30	14:29 – 15:06	56	4 ½	9 to 7 ½	675	850
A-28	July 31	08:33 – 09:05	52	4 ½	5 ½ to 8	670	860
A-27 ½	July 31	10:18 – 13:06	52	4 ½	8 to 10	660	865
A-27 ½	Aug 1	Before arrival				660	865
A-26 ½	Aug 1	08:54 – 09:23	56	2 ½	4 - 7	645	875
A-26	Aug 1	10:07 – 10:35	60	4 ½	7 - 9	630	880
A-25 ½	Aug 1	11:47 – 13:10	64	4 ½	10	620	890
A-25	Aug 1	13:52 – 14:36	64	4 ½	10	605	895
A-24 ½	Aug 2	10:04 – 10:34	60	4 ½	6	595	885
A-23 ½	Aug 2	11:26 – 11:53	60	4 ½	11	575	900
A-23	Aug 2	13:11 – 13:36	60	4 ½	13	560	910
A-22 ½	Aug 2	14:25 – 14:53	60	4 ½	14	550	915

Note: Distances are approximate. Distances to fixed hydrophone deployments are estimated by scaling plans.

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The work plan calls for use of a bubble curtain to reduce underwater sound levels from piledriving, and for tests of the efficacy of the bubble curtain performed by turning off the bubble curtain for short intervals during piledriving. The bubble curtain was turned on and off during piledriving at the following times:

TABLE 2: Bubble Curtain Test Schedule

Pile Number	Date	Driving Times	Bubble curtain operating times
A-24	July 26	15:57 – 17: 10	15:48 – 15:54 15:56 – 16:23
A-24	July 27	12:45 – 13:13	12:08 – 12:49 12:50 – 13:02
A-27	July 27	14:58 – 16:05	14:58 – 15:04 15:05 – 15:06 15:08 – 15:54
A-30	July 30	09:14 – 10:44	09:44 – 09:45 09:46 – 09:53 10:19 – 10:28 10:34 – 10:44
A-29	July 30	11:53 – 13:33	13:06 – 13:33
A-28 ½	July 30	14:29 – 15:06	14:46 14:47 – 14:49 14:53 – 15:07
A-28	July 31	08:33 – 09:06	08:44 – 09:06
A-27 ½	July 31	10:18 – 13:06	10:23 – 10:49 11:24 – 11:40 12:48 – 13:06
A-27 ½	Aug 1	Before arrival	unknown
A-26 ½	Aug 1	08:54 – 09:23	09:02 – 09:24
A-26	Aug 1	10:07 – 10:35	10:11 – 10:12 10:13 – 10:17 10:23 – 10:35
A-25 ½	Aug 1	11:47 – 13:10	12:45 – 13:09
A-25	Aug 1	13:52 – 14:36	14:10 – 14:37
A-24 ½	Aug 2	10:04 – 10:34	10:20 – 10:34
A-23 ½	Aug 2	11:26 – 11:53	11:38 – 11:54
A-23	Aug 2	13:11 – 13:36	13:22 – 13:37
A-22 ½	Aug 2	14:25 – 14:53	14:37 – 14:54

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We recorded daily SELs at each of our SLM/hydrophone deployments; results are given below. SELs recorded from the boat are for the times listed, SELs recorded at the two fixed location deployments are normalized to 24 hours duration.

TABLE 3a: Sound Exposure Levels

Pile Number	Date	Driving Times	Total blows during driving	Depth of pile into substrate (ft.)	Distance to boat (ft.)	SEL and duration at boat for **pile** (dBZ)	SEL and duration at boat for **day** (dBZ)	SEL at Pier 38 for **day** (dBZ)	SEL at Pier 30-32 for **day** (dBZ)
A-24	July 26	15:57 – 17: 10	1705	90.0	60	191.3 1:22:17	191.3 – 1:22:17	167.5	176.7
A-24	July 27	12:45 – 13:13			60	192.5 1:05:29	193.0 2:42:31	166.3	175.4
A-27	July 27	14:58 – 16:05	591	90.4	60	183.6 1:37:03			
	July 28							167.5	176.7
	July 29							166.3	175.4
A-30	July 30	09:14 – 10:44	555	89.2	60 - 62	192.5 1:29:23	194.7 3:46:25	171.3	177.1
A-29	July 30	11:53 – 13:33	653	86.9	65	188.2 1:33:43			
A-28 ½	July 30	14:29 – 15:06	541	87.5	56	186.8 0:42:12			

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TABLE 3b: Sound Exposure Levels, continued:

Pile Number	Date	Driving Times	Total blows during driving	Depth of pile into substrate (ft.)	Distance to boat (ft.)	SEL and duration at boat for **pile** (dBZ)	SEL and duration at boat for **day** (dBZ)	SEL at Pier 38 for **day** (dBZ)	SEL at Pier 30-32 for **day** (dBZ)
A-28	July 31	08:33 – 09:06	498	90.1	52	191.0 0:32:51	192.1 1:58:48	169.1	174.8
A-27 ½	July 31	10:18 – 13:06	500	89.6	52	185.6 1:25:57			
A-27 ½	Aug 1	Before arrival			n/a		191.5 3:05:27	167.6	175.3
A-26 ½	Aug 1	08:54 – 09:23	458	88.7	56	178.9 0:47:58			
A-26	Aug 1	10:07 – 10:35	457	90.3	60	181.3 0:37:43			
A-25 ½	Aug 1	11:47 – 13:10	466	92.5	64	186.6 0:45:29			
A-25	Aug 1	13:52 – 14:36	499	82.1	64	188.7 0:54:16			
A-24 ½	Aug 2	10:04 – 10:34	477	90.1	60	186.2 0:53:27	195.9 3:00:22	185.1	178.1
A-23 ½	Aug 2	11:26 – 11:53	536	90.2	60	191.8 0:45:45			
A-23	Aug 2	13:11 – 13:36	512	92.2	60	191.1 0:42:02			
A-22 ½	Aug 2	14:25 – 14:53	559	91.8	60	188.1 0:39:09			

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NOTES:

The sound levels recorded are LZ_{eq}, LZI_{max}, and LZ_{peak} for 15-minute intervals. The 'Z' indicates that sound level measurements are not frequency-weighted (or are "flat-weighted"), which we believe is most appropriate for underwater sound monitoring to protect marine life; A-weighting and C-weighting are designed for human response to airborne sound.

LZ_{eq} is the level of constant sound over the measurement interval that has the same sound energy as the actual sound over the same period, using flat frequency weighting.
LZI_{max} is the highest RMS sound level using impulse (35ms) response weighting recorded during the measurement interval, using flat frequency weighting. LZI_{max} is used to approximate the $RMS_{90\%}$ sound level.
LZ_{peak} is the highest instantaneous peak sound pressure level recorded during the recording interval, using flat frequency weighting.

We have attached plots of the recorded sound levels over time. The electronic version of this report is being sent with copies of all the SLM data export files. Sound levels in the data from SLMs #1970 and #2270 through August 2 were off due to a configuration issue: the SLM was calibrated to a sound level referenced to 20µPa instead of 1µPa (for a difference of 26 dB), and the calibrator has an offset of -4.13 dB. Thus, actual sound levels are 21.87 dB higher than those recorded. The data used to generate our plots was adjusted for this difference; the SLM data export files have not been adjusted.

Yours Truly,
MUNICON Consultants

Anthony Argyriou, G.E.

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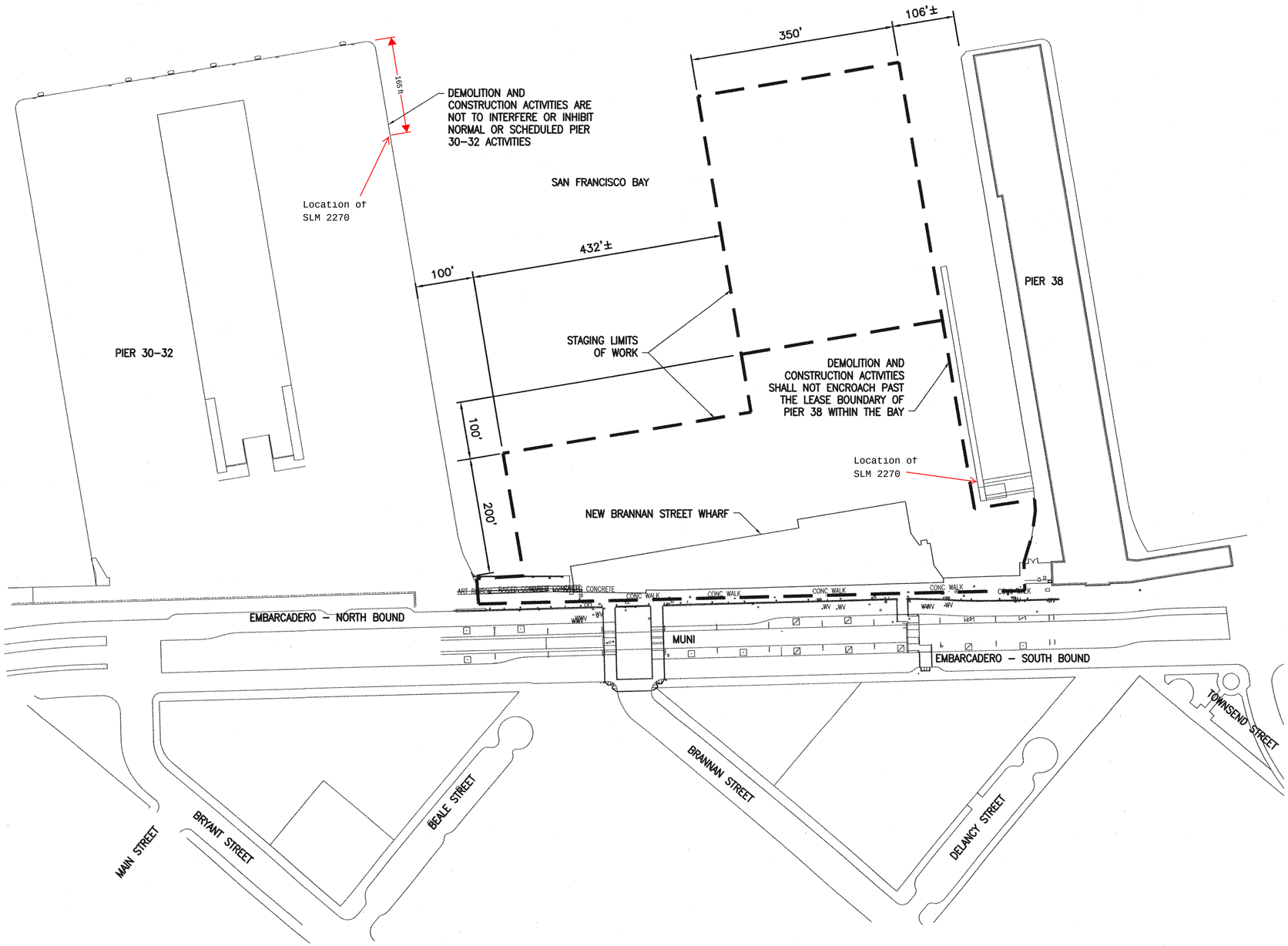
Ph: 415-641-2570 Fax: 415-282-4097



1 / C-111 **STAGING AREAS**
SCALE: 1"=100'

Locations of fixed hydrophone monitoring stations

100 0 100 200
SCALE IN FEET

STAGING SHEET NOTES:

1. THE EMBARCADERO IS TYPICALLY OPEN WITHOUT LANE CLOSURES FROM 7:00 AM TO 7:00 PM. CONTRACTOR TO FILE SPECIAL TRAFFIC PERMIT APPLICATION WITH DEPARTMENT OF PARKING AND TRAFFIC (DPT). CONTACT THE PORT OF SAN FRANCISCO PRIOR TO WORK ALONG THE EMBARCADERO.
2. WORK HOURS: 8:00 AM TO 4:00 PM MONDAY THROUGH FRIDAY.
3. NOTIFY PORT OF SAN FRANCISCO PRIOR TO COMMENCEMENT OF WORK.
4. STAGING AREA IS LIMITED TO PROJECT AREA.

STAGING LEGEND:

NO.	DATE	DESCRIPTION	BY	APP.

TABLE OF REVISIONS
CHECK WITH TRACING TO SEE IF YOU HAVE LATEST REVISION

REFERENCE INFORMATION & FILE NO. OF SURVEYS

SAN FRANCISCO PORT COMMISSION
PORT OF SAN FRANCISCO
DEPARTMENT OF ENGINEERING
PORT OF SAN FRANCISCO

WINZLER & KELLY
A Joint Venture
Structus, Inc.

REGISTERED PROFESSIONAL ENGINEER
CRAIG R. HEITZ
No. 058705
Exp. 12/31/12
Civil
STATE OF CALIFORNIA
11-14-11

DESIGNED: MLK	DATE: 11/14/11
DRAWN: MLK	DATE: 11/14/11
CHECKED: CL	DATE: 11/14/11

APPROVED BY
SAN FRANCISCO PORT COMMISSION
DATE: 11/17/11
CHIEF HARBOR ENGINEER

SCALE: AS NOTED
SHEET OF SHEETS: 20 OF 194

BRANNAN STREET WHARF
TRAFFIC CONTROL PLAN
STAGING AREAS

CONTRACT NO. 2726
DRAWING NO. C-111
FILE NO.
REV. NO. 0

VIEW: PLOT1

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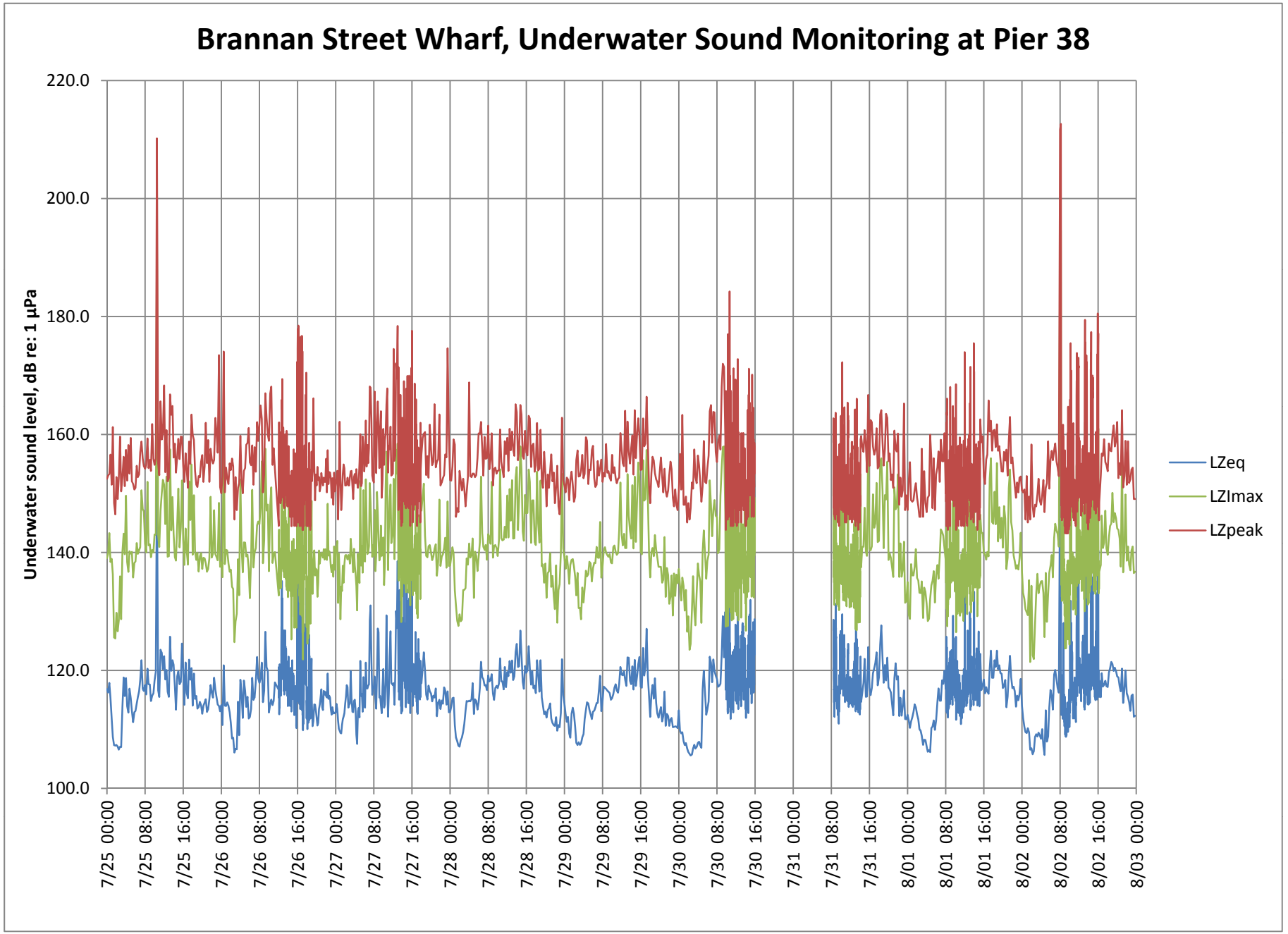

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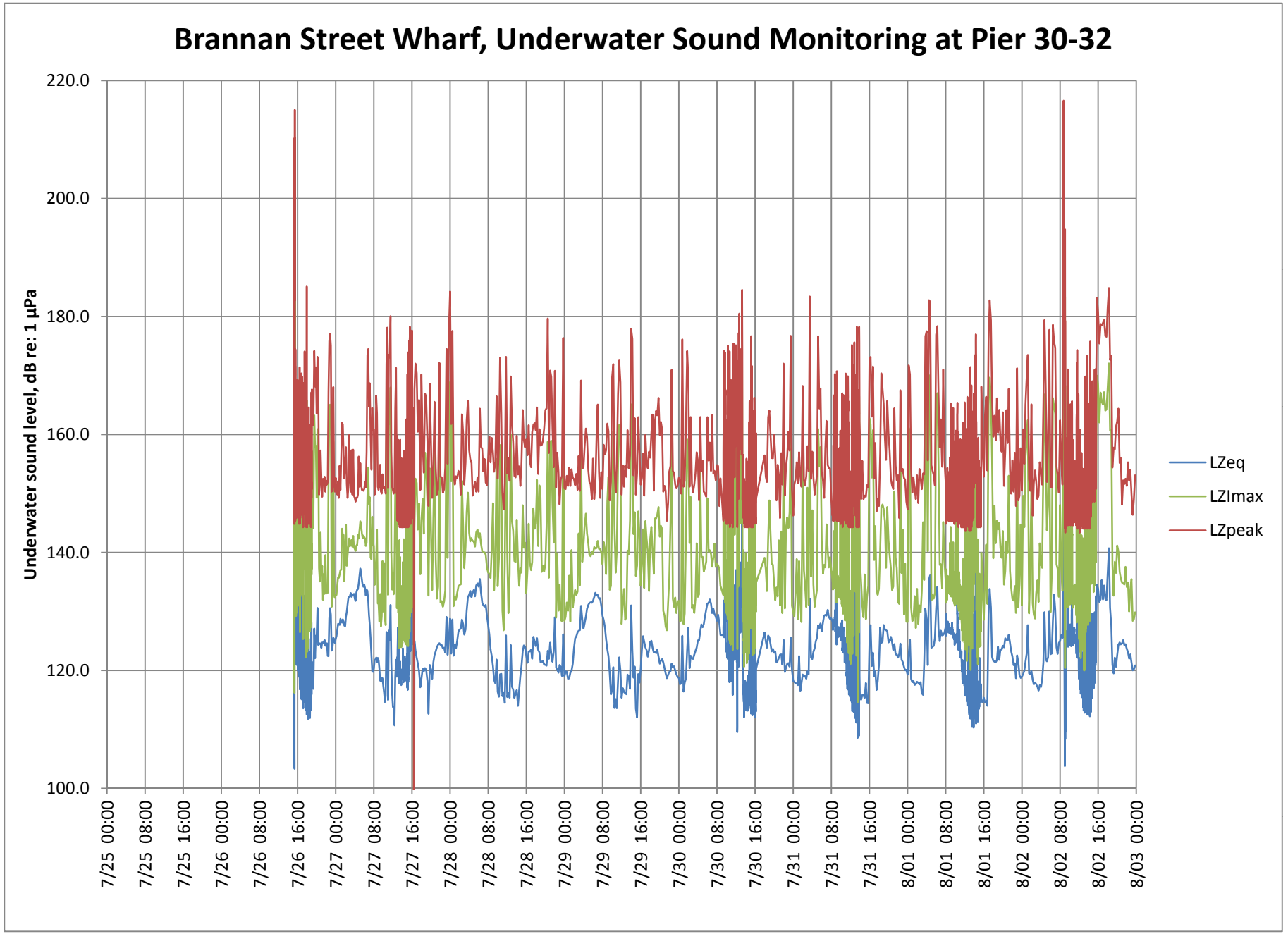
8/15/2012



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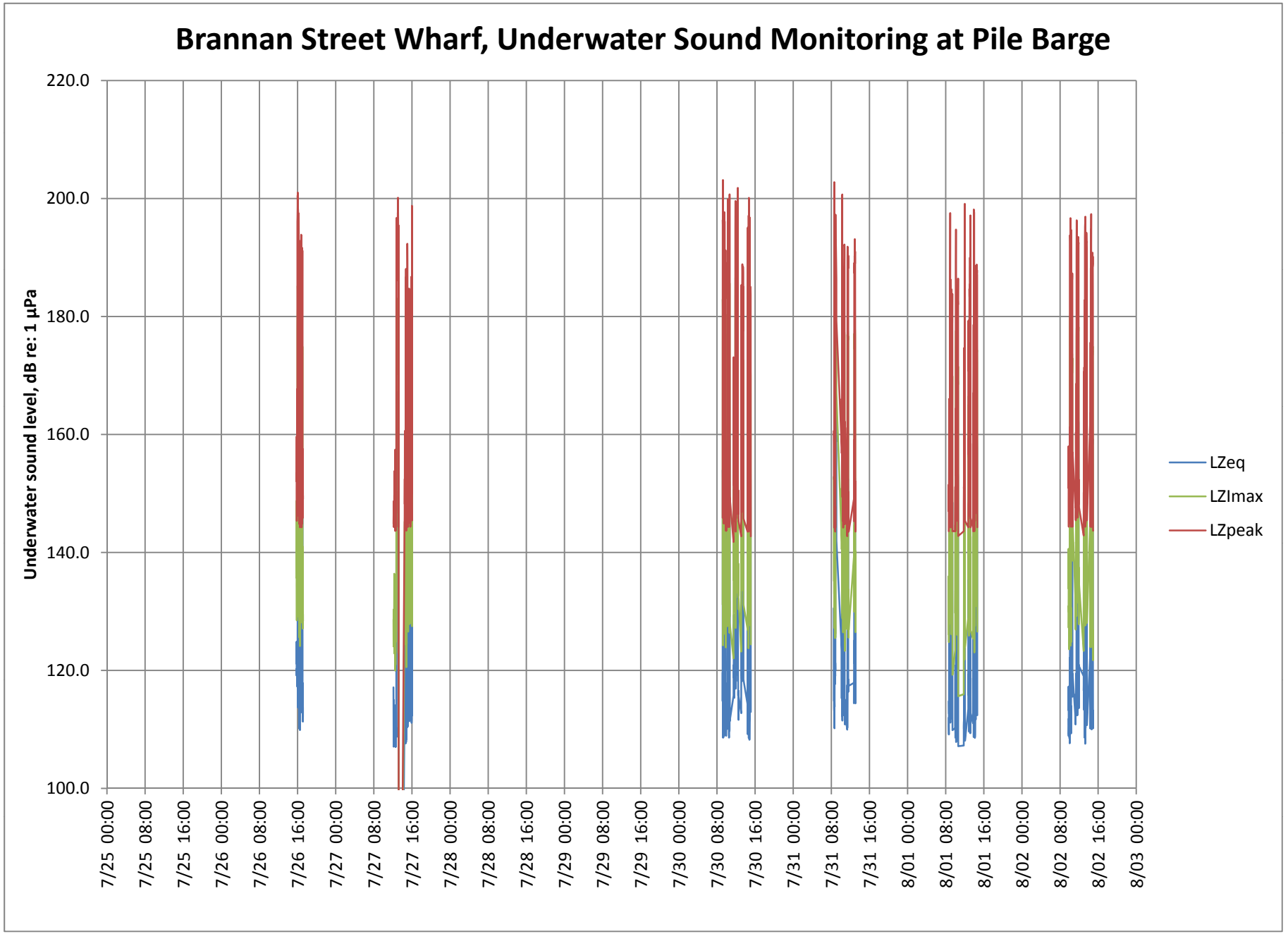

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8/15/2012

MUNICON CONSULTANTS

LETTER OF TRANSMITTAL

September 19, 2012
To: Dutra Construction Company, Steve Hutchison
From: Municon Consultants – Anthony Argyriou JOB#: 831

RE: BRANNAN STREET WHARF
PORT OF SAN FRANCISCO CONTRACT NO. 2726

SUBJECT: Underwater Sound Monitoring Report

WE ARE SENDING YOU THE FOLLOWING ☐ SUBMITTALS ☒ REPORTS ☐ PHOTOS ☐ CD-ROMs

BY ☒ EMAIL ☐ HAND CARRIED ☐ FED EX

DESCRIPTION

Underwater sound level reports for data collected on August 3 through 10, 2012 at the following locations:

Location	Sound Level Meter
Pier 30-32	2270
Pier 38	1970

SELs recorded by date, normalized to 24 hours, are:

Date	SEL, dB, at Pier 30-32	SEL, dB, at Pier 38
August 3	174.2	174.6
August 4	172.8	164.6
August 5	171.9	164.2
August 6	177.7	170.7
August 7	174.1	166.0
August 8	173.2	171.3
August 9	174.8	174.2

We deployed SLM #2270 with a hydrophone along the south side of Pier 30-32, about 165 feet west of the southeast corner of the pier, on July 11, 2012. The hydrophone was deployed at a depth of about 22 feet in water 44-½ feet deep. We deployed SLM #1970 with a hydrophone at the north end of the gangway ramp leading to the floating dock north of Pier 38, on July 11, 2012. The hydrophone was deployed at a depth of about 7 feet in about 13 feet of water. Actual depths will fluctuate due to tides.

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NOTES:

The sound levels recorded are LZ_{eq}, LZI_{max}, and LZ_{peak} for 15-minute intervals. The 'Z' indicates that sound level measurements are not frequency-weighted (or are "flat-weighted"), which we believe is most appropriate for underwater sound monitoring to protect marine life; A-weighting and C-weighting are designed for human response to airborne sound.

LZ_{eq} is the level of constant sound over the measurement interval that has the same sound energy as the actual sound over the same period, using flat frequency weighting.
LZI_{max} is the highest RMS sound level using impulse (35ms) response weighting recorded during the measurement interval, using flat frequency weighting. LZI_{max} is used to approximate the $RMS_{90\%}$ sound level.
LZ_{peak} is the highest instantaneous peak sound pressure level recorded during the recording interval, using flat frequency weighting.

We have attached plots of the recorded sound levels over time.

Yours Truly,
MUNICON Consultants

Anthony Argyriou, G.E.

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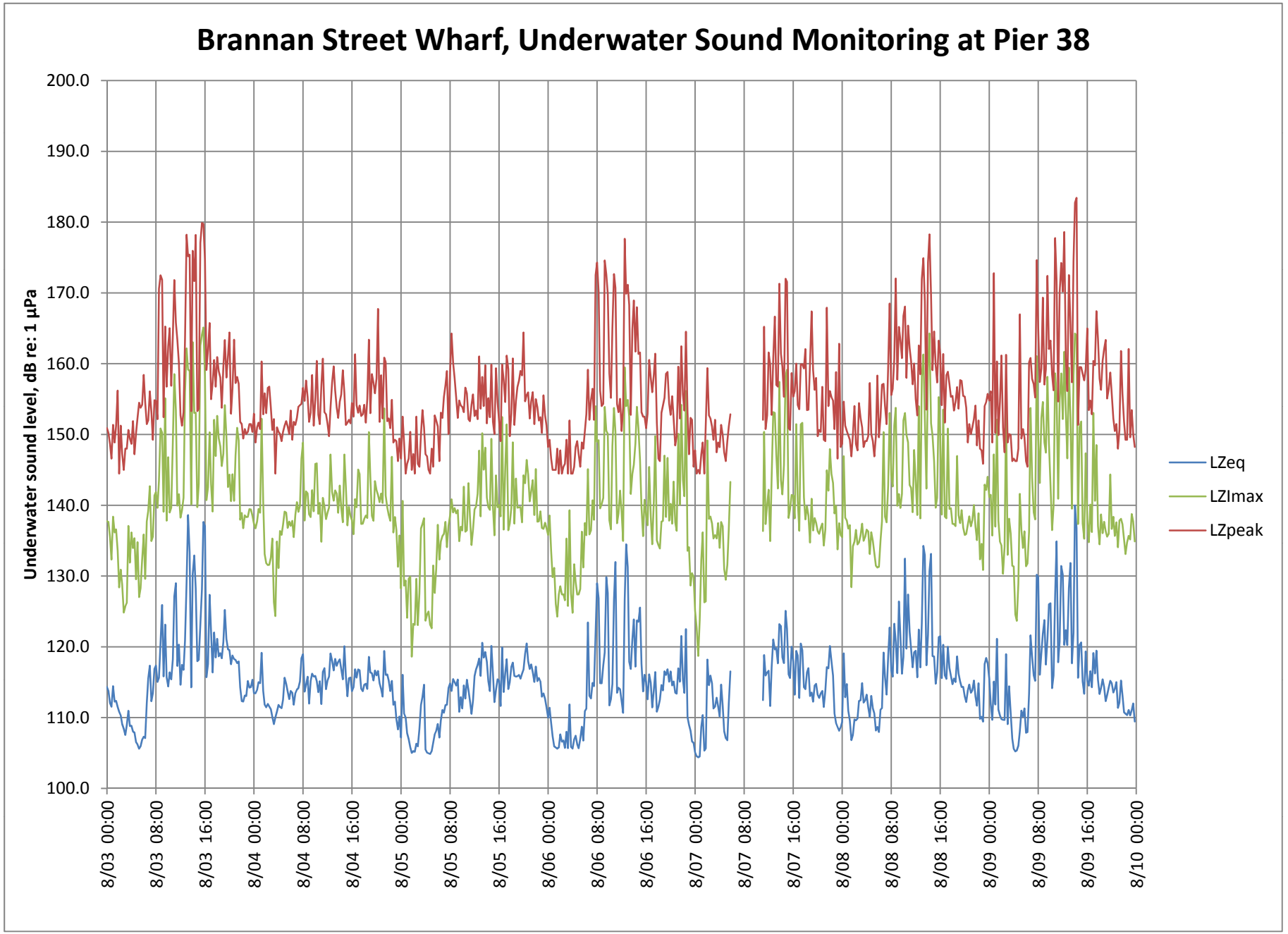
Ph: 415-641-2570 Fax: 415-282-4097



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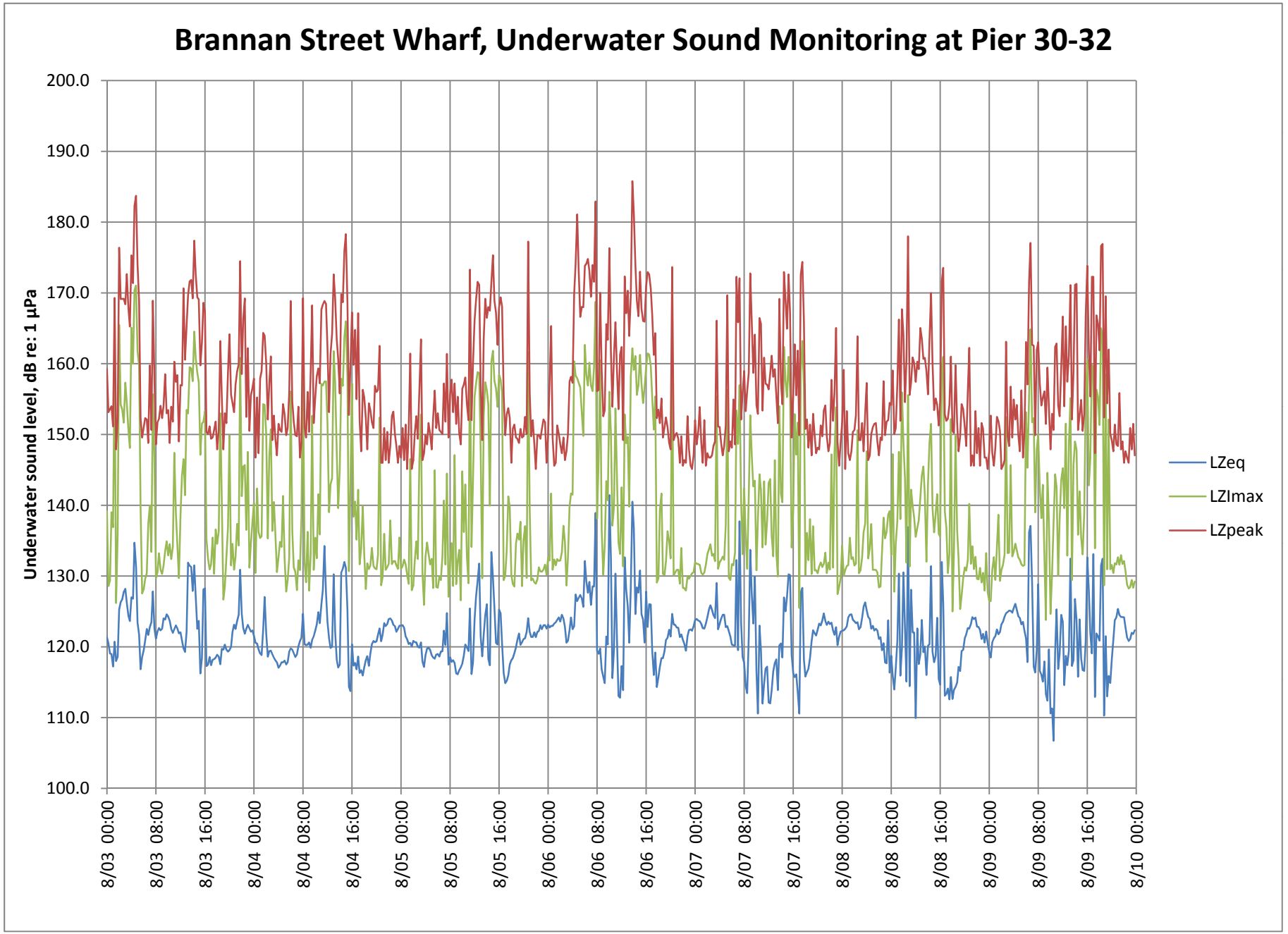
9/19/2012



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9/19/2012

MUNICON CONSULTANTS

LETTER OF TRANSMITTAL

August 28, 2012
To: Dutra Construction Company, Steve Hutchison
From: Municon Consultants – Anthony Argyriou JOB#: 831

RE: BRANNAN STREET WHARF
PORT OF SAN FRANCISCO CONTRACT NO. 2726

SUBJECT: Underwater Sound Monitoring Report

WE ARE SENDING YOU THE FOLLOWING ☐ SUBMITTALS ☒ REPORTS ☐ PHOTOS ☐ CD-ROMs

BY ☒ EMAIL ☐ HAND CARRIED ☐ FED EX

DESCRIPTION

Underwater sound level reports for data collected on August 10 through 16, 2012 at the following locations:

Location	Sound Level Meter
Pier 30-32	2270
Pier 38	1970
Boat near pile barge	2276

We deployed SLM #2270 with a hydrophone along the south side of Pier 30-32, about 165 feet west of the southeast corner of the pier, on July 11, 2012. The hydrophone was deployed at a depth of about 22 feet in water 44-½ feet deep. We deployed SLM #1970 with a hydrophone at the north end of the gangway ramp leading to the floating dock north of Pier 38, on July 11, 2012. The hydrophone was deployed at a depth of about 7 feet in about 13 feet of water. Actual depths will fluctuate due to tides. A plan showing locations of these deployments relative to surrounding features is attached.

We deployed SLM #2276 with a hydrophone from our boat during piledriving for the first 12 concrete piles driven. Distances from hydrophone to pile, and water and hydrophone depth, for each pile driven, are given in the table below:

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TABLE 1: Geometry of hydrophone deployments

Pile Number	Date	Driving Times	Distance to boat (ft.)	Depth of hydrophone at boat (ft.)	Depth of water at boat (ft.)	Distance to Pier 38 (ft.)	Distance to Pier 30-32 (ft.)
J-29	Aug 13	12:24 – 13:39	85	6	10	700	820
K-30	Aug 14	08:32 – 09:15	90	4	6 ½	710	800
J-28	Aug 14	10:39 – 11:07	52	5	9 ½	675	825
J-27	Aug 14	13:15 – 13:37	50	5	9	655	830
H-25	Aug 14	15:11 – 15:46	50	5	10	620	850
H-24	Aug 15	08:44 – 08:57	65	4 ½	8	585	875
H-23	Aug 15	10:12 – 10:39	67	5 ½	11	560	885
H-22	Aug 15	11:37 – 12:02	66	6	12 ½	540	890
G-20	Aug 15	13:44 – 14:02	66	6	12 ½	500	920
G-19	Aug 16	08:02 – 08:55	66	5	8	490	915
G-17	Aug 16	09:40 – 10:40	68	6	11	420	960
F-15	Aug 16	12:19 – 12:48	45	6	12	375	990

Note: Distances are approximate. Distances to fixed hydrophone deployments are estimated by scaling plans.

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We recorded daily SELs at each of our SLM/hydrophone deployments; results are given below. SELs recorded from the boat are for the times listed, SELs recorded at the two fixed location deployments are normalized to 24 hours duration.

TABLE 2: Sound Exposure Levels

Pile Number	Date	Driving Times	Total blows during driving	Depth of pile into substrate (ft.)	Distance to boat (ft.)	SEL and duration at boat for **pile** (dBZ)	SEL and duration at boat for **day** (dBZ)	SEL at Pier 38 for **day** (dBZ)	SEL at Pier 30-32 for **day** (dBZ)
	Aug 10							180.7	173.7
	Aug 11							165.6	171.1
	Aug 12							165.3	170.6
J-29	Aug 13	12:24 – 13:39	587	74.4	85	183.0 1:57:21	183.0 1:57:21	165.6	171.7
K-30	Aug 14	08:32 – 09:15	553	84.5	90	177.2 1:03:48	188.6 3:18:34	165.8	172.2
J-28	Aug 14	10:39 – 11:07	400	82.7	52	184.3 0:39:41			
J-27	Aug 14	13:15 – 13:37	348	85.1	50	183.3 0:34:23			
H-25	Aug 14	15:11 – 15:46	480	84.4	50	182.5 0:49:57			
H-24	Aug 15	08:44 – 08:57	628	85.2	65	182.7 1:01:07	188.1 3:15:00	167.5	174.7
H-23	Aug 15	10:12 – 10:39	484	82.5	67	182.9 0:46:24			
H-22	Aug 15	11:37 – 12:02	525	83.0	66	180.9 0:41:16			
G-20	Aug 15	13:44 – 14:02	479	81.9	66	181.3 0:46:13			

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Pile Number	Date	Driving Times	Total blows during driving	Depth of pile into substrate (ft.)	Distance to boat (ft.)	SEL and duration at boat for **pile** (dBZ)	SEL and duration at boat for **day** (dBZ)	SEL at Pier 38 for **day** (dBZ)	SEL at Pier 30-32 for **day** (dBZ)
G-19	Aug 16	08:02 – 08:55	1211	79.0	66	189.0 1:19:44	190.8 3:29:39	170.3	177.3
G-17	Aug 16	09:40 – 10:40	695	80.9	68	180.8 1:18:09			
F-15	Aug 16	12:19 – 12:48	700	79.4	45	184.7 0:51:47			

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NOTES:

The sound levels recorded are LZ_{eq}, LZI_{max}, and LZ_{peak} for 15-minute intervals. The 'Z' indicates that sound level measurements are not frequency-weighted (or are "flat-weighted"), which we believe is most appropriate for underwater sound monitoring to protect marine life; A-weighting and C-weighting are designed for human response to airborne sound.

LZ_{eq} is the level of constant sound over the measurement interval that has the same sound energy as the actual sound over the same period, using flat frequency weighting.
LZI_{max} is the highest RMS sound level using impulse (35ms) response weighting recorded during the measurement interval, using flat frequency weighting. LZI_{max} is used to approximate the $RMS_{90\%}$ sound level.
LZ_{peak} is the highest instantaneous peak sound pressure level recorded during the recording interval, using flat frequency weighting.

We have attached plots of the recorded sound levels over time. The electronic version of this report is being sent with copies of all the SLM data export files.

Yours Truly,
MUNICON Consultants

Anthony Argyriou, G.E.

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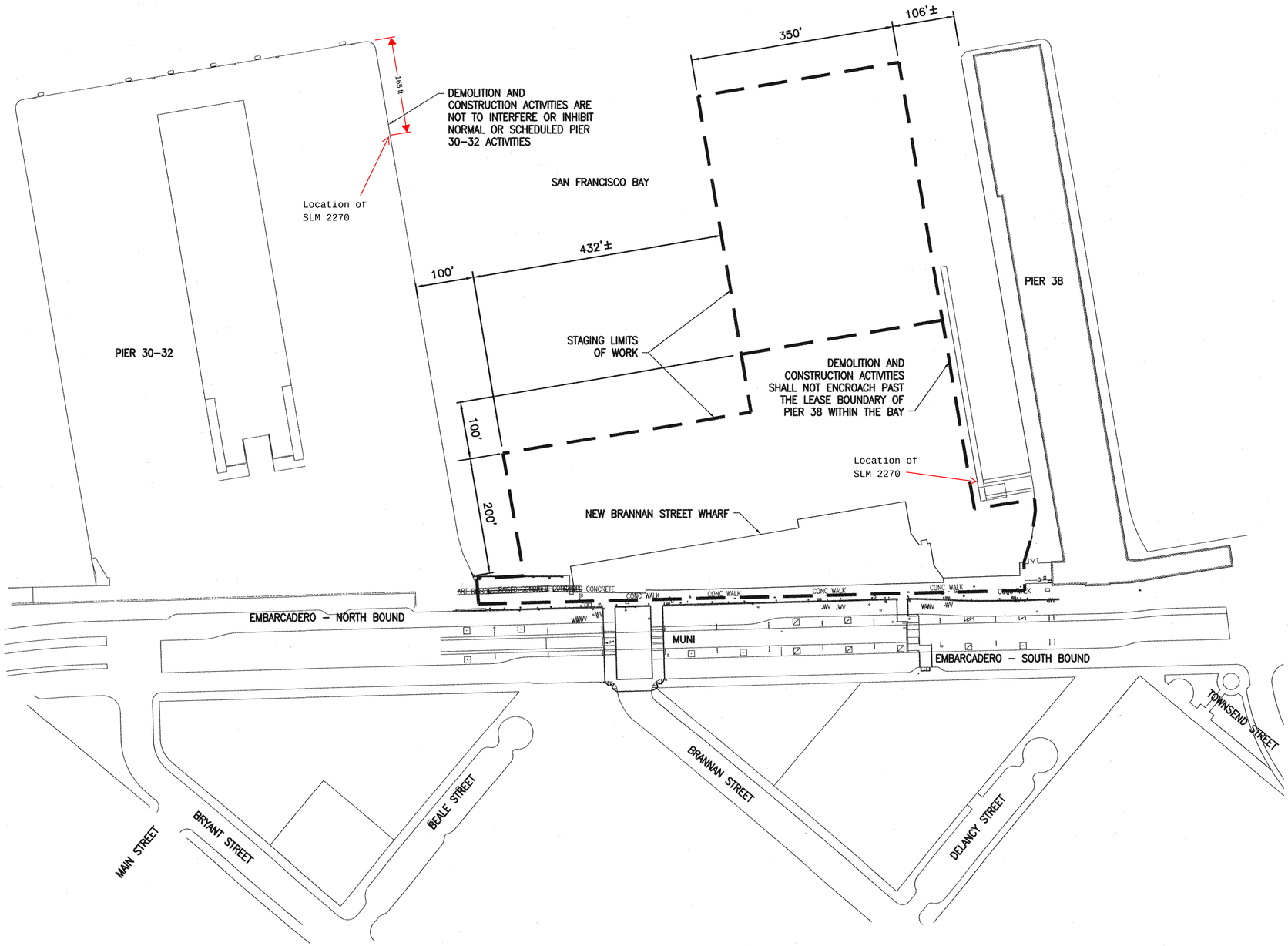
Ph: 415-641-2570 Fax: 415-282-4097



1 / C-111 **STAGING AREAS**
SCALE: 1"=100'

Locations of fixed hydrophone monitoring stations

100 0 100 200
SCALE IN FEET

STAGING SHEET NOTES:

1. THE EMBARCADERO IS TYPICALLY OPEN WITHOUT LANE CLOSURES FROM 7:00 AM TO 7:00 PM. CONTRACTOR TO FILE SPECIAL TRAFFIC PERMIT APPLICATION WITH DEPARTMENT OF PARKING AND TRAFFIC (DPT). CONTACT THE PORT OF SAN FRANCISCO PRIOR TO WORK ALONG THE EMBARCADERO.
2. WORK HOURS: 8:00 AM TO 4:00 PM MONDAY THROUGH FRIDAY.
3. NOTIFY PORT OF SAN FRANCISCO PRIOR TO COMMENCEMENT OF WORK.
4. STAGING AREA IS LIMITED TO PROJECT AREA.

STAGING LEGEND:

NO.	DATE	DESCRIPTION	BY	APP.

TABLE OF REVISIONS
CHECK WITH TRACING TO SEE IF YOU HAVE LATEST REVISION

REFERENCE INFORMATION & FILE NO. OF SURVEYS

SAN FRANCISCO PORT COMMISSION
PORT OF SAN FRANCISCO
DEPARTMENT OF ENGINEERING
PORT OF SAN FRANCISCO

WINZLER & KELLY
A Joint Venture
Structus, Inc.

REGISTERED PROFESSIONAL ENGINEER
CRAIG R. HEITZ
No. 058705
Exp. 12/31/12
Civil
STATE OF CALIFORNIA
11-14-11

DESIGNED: MLK	DATE: 11/14/11
DRAWN: MLK	DATE: 11/14/11
CHECKED: CL	DATE: 11/14/11

APPROVED BY
SAN FRANCISCO PORT COMMISSION
DATE: 11/17/11
CHIEF HARBOR ENGINEER

SCALE: AS NOTED
SHEET OF SHEETS: 20 OF 194

BRANNAN STREET WHARF
TRAFFIC CONTROL PLAN
STAGING AREAS

CONTRACT NO. 2726
DRAWING NO. C-111
FILE NO.
REV. NO. 0

VIEW: PLOT1

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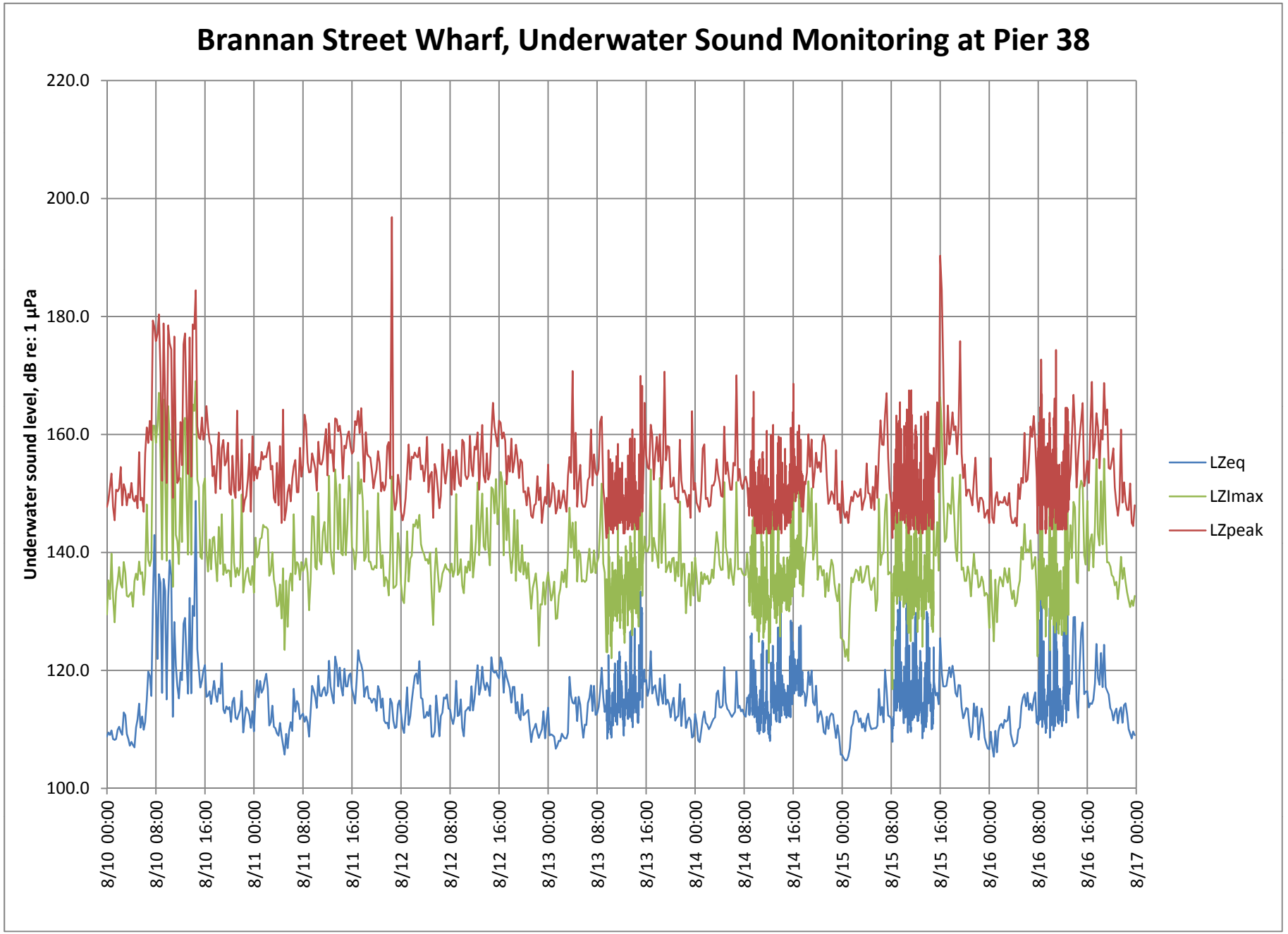
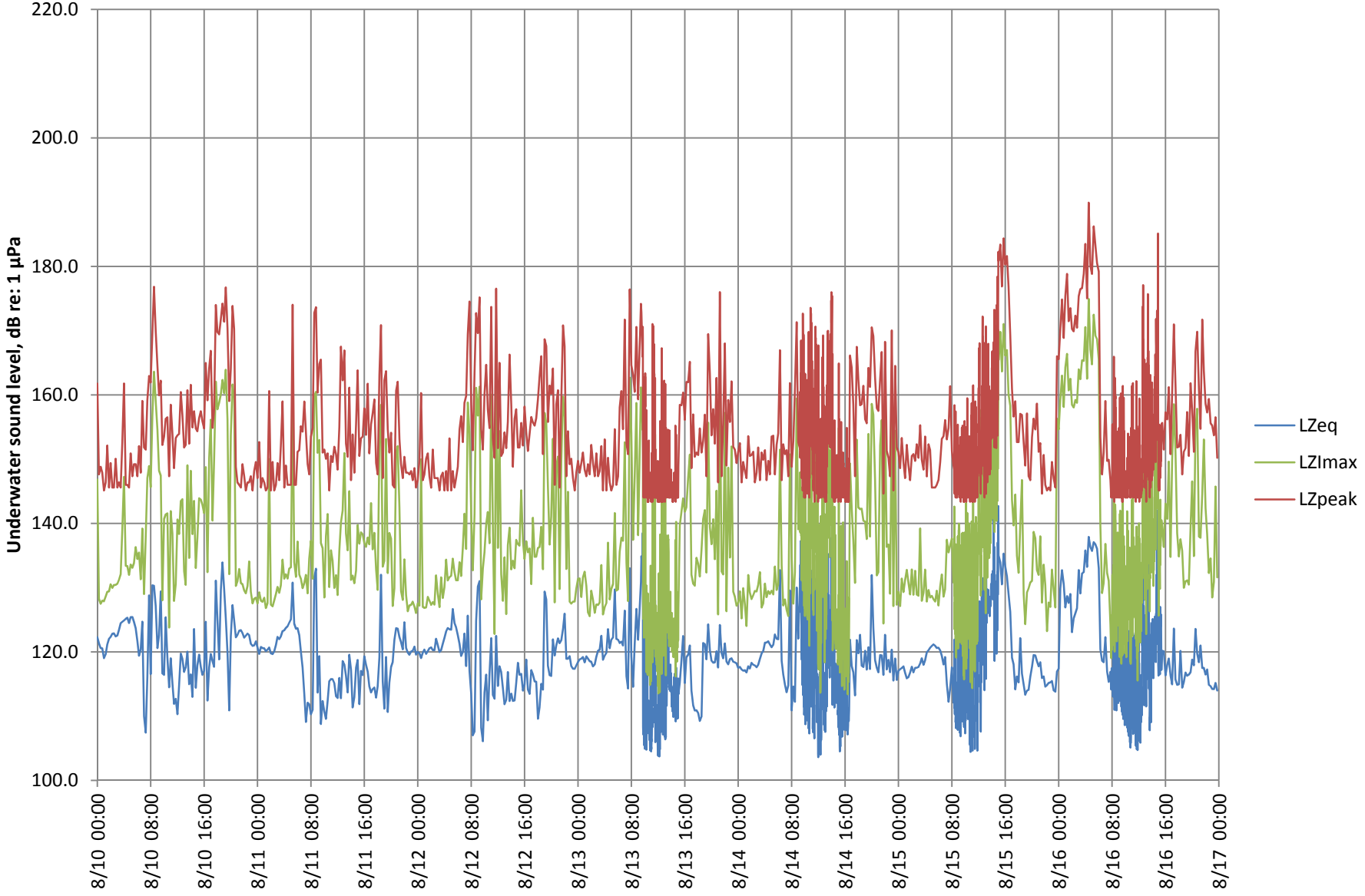
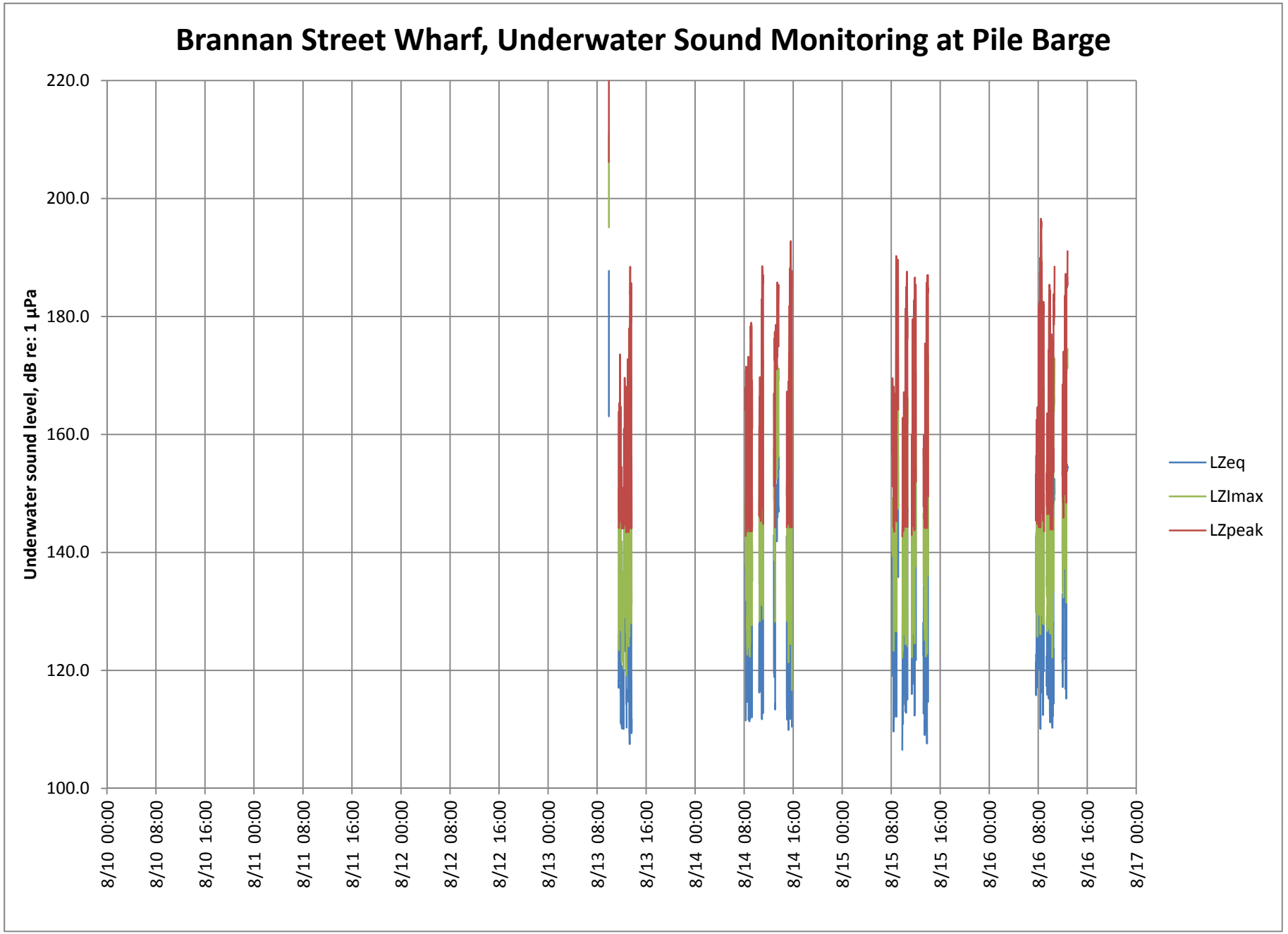


Municon Consultants
8/28/2012

Brannan Street Wharf, Underwater Sound Monitoring at Pier 30-32



Municon Consultants
8/28/2012



Municon Consultants
8/28/2012

APPENDIX C

MONITORING PROTOCOL

Biological Monitoring Protocol

Brannan Street Wharf
Port of San Francisco
San Francisco, California

August 2012

Prepared for:

Port of San Francisco, Pier 1
Planning & Development Division
San Francisco, California 94111

Prepared by:

Tetra Tech Inc. and AEW Engineering, a Joint Venture
1999 Harrison Street, Suite 500
Oakland, California 94612

In association with:

A.A. Rich and Associates
150 Woodside Drive
San Anselmo, California 94960

CONTENTS

Section **Page**

I. INTRODUCTION

The U.S. Army Corps of Engineers (USACE) and the Port of San Francisco (Port) are undertaking the Pier 36 Demolition/Brannan Street Wharf Project. This project will demolish and remove the existing Pier 36 along the San Francisco Embarcadero and construct a 57,000 square-foot open space, pile-supported park (the Brannan Street Wharf) in its place. The Brannan Street Wharf will provide a new public open space atop a pile-supported deck over the San Francisco Bay.

As a part of this project, biological monitoring is required by the National Oceanic and Atmospheric Administration's (NOAA) National Marine Fisheries Service (NMFS) (NMFS 2011, 2012). The effects of pile driving on certain species will be monitored; these include two federally listed threatened fish species and four Marine Mammal Protection Act (MMPA) listed marine mammal species. Bird predation on the threatened fish species will also be monitored. The species covered in this study include the fish species steelhead (*Oncorhynchus mykiss)* and Northern American green sturgeon (*Acipenser medirostris)*; and the marine mammal species Pacific harbor seal (*Phoca vitulina richardii*), California sea lion (*Zalophus californianus),* harbor porpoise (*Phocoena phocoena),* and gray whale (*Eschrichtius robustus*).

Reasonable and Prudent Measures in the NMFS (2011) Biological Opinion (BO) include:

(1) Ensuring that the fisheries and hydroacoustic monitoring program minimizes harm and mortality of steelhead and green sturgeon, and assists in the evaluation of project effects on salmonids and green sturgeon;

(2) Preparing and submitting reports, regarding the results of the fisheries and hydroacoustic monitoring program;

(3) Evaluating fish mortality and injury rates through visual observations during pile driving;

(4) Observing bird predation on fishes, and behavior; and,

(5) Preparing a report that will include a discussion of any unanticipated effects or levels of effects, on steelhead and green sturgeon, the number of fish killed, or injured during the pile driving, and any observed bird predation and behavior.

In accordance with the NMFS (2012) Incidental Harassment Authorization (IHA), monitoring and mitigation measures include:

(1) Monitoring the Level B harassment zone for marine mammals 30 minutes before, during, and 30 minutes after pile driving;

(2) Observing the number, type(s), location(s) and behavior of marine mammals in designated exclusion zones; and

(3) Notifying NMFS immediately of any changes to the monitoring plan.

II. PROTOCOL FOR BIOLOGICAL RESOURCES MONITORING

A. RESOURCE OVERVIEW

Tetra Tech (Tt) and AEW as a Joint Venture (JV) (Tt/AEW JV) is responsible for the biological monitoring for this project. The monitoring is divided into three species categories (fish, bird, and marine mammal monitoring).

Fish Mortality Monitoring

During pile driving, the subcontractor A.A. Rich and Associates (AAR) will do biological monitoring of the fishery resources, steelhead and North American sturgeon. The AAR biologist will be prepared to identify the species and size of any dead or moribund fish, through observation with binoculars, or by dip-net collection and release of specimens. Any salmonids or sturgeon found dead will be collected and processed as described in the Project BO. The AAR biologist will record fish findings and related data on standardized data sheets.

Bird Predation Monitoring

Bird predation monitoring will be done by a Tt/AEW JV biologist with support from the AAR biologist during all pile driving and will include observation and recording of any occurrence of birds feeding on fish during and immediately following pile driving. The Tt/AEW JV biologist will record bird data on standardized data sheets. These data will assist in meeting the Port's objectives to: (1) confirm the presence or absence of bird predation, and (2) gauge the magnitude of predation by quantifying bird strikes. The biologist will record bird feeding activity during pile driving on standardized data sheets. General bird activity and behavior during pile driving and throughout the day will be noted and recorded.

Marine Mammal Monitoring

To assist the Port with IHA compliance, Tt/AEW JV and AAR biologists will monitor for the presence and behavior of marine mammals during pile driving. The biologists will comply with IHA mitigation requirements 7b and 7c that require: (1) monitoring of the exclusion zone to ensure that no marine mammals enter, and (2) notification of the on-site engineer if a marine mammal is seen in or approaching the exclusion zone prior to the start of impact pile driving. The biologist will monitor for marine mammals 30 minutes before, during, and 30 minutes after all impact pile driving. The biologists will observe and record the number, type(s), location(s), and behavior(s) of any marine mammal in the designated exclusion zone. Per the IHA, if Tt/AEW JV or AAR biologists see a marine mammal in or approaching the exclusion zone prior to the start of pile driving, the observer will notify the on-site engineer (Dutra) who will delay pile driving until the marine mammal has moved outside the exclusion zone or has not been re-sighted within 15 minutes for pinnipeds or 30 minutes for cetaceans. If a marine mammal is sighted in or on the path toward the exclusion zone during pile driving, pile driving will cease until the animal has cleared the area or until 15/30 (pinnipeds/cetaceans) minutes has lapsed since last sighting. The Tt/AEW JV biologist will record marine mammal data on standardized data sheets.

Tt/AEW JV and AAR will follow the field monitoring protocol as follows:

- For concrete pile driving: 10 days with two biological monitors—one fish monitor and one marine mammal/bird monitor;
- For steel pile driving: 30 days with 10 days of two biological monitors—one fish monitor and one marine mammal/bird monitor. Then, 20 days with one monitor—the marine mammal monitor.
- A boat will be needed for 10 days of monitoring. The fish monitor will not be on the boat; fish monitoring will occur from shore.

Should alternative field techniques be proposed and agreed upon during the planning meeting, these will be submitted to NMFS in writing for pre-approval prior to initiation. NMFS will approve the data sheets prior to use (see Appendix A for NMFS approved data sheets, along with project supplemental data sheets).

B. DAILY MONITORING OPERATIONS

All project biologists will work together when on watch, working with the various species and completing the required data sheets. The breakdown of responsibility in field operations is: AAR will be responsible for ensuring the fish data sheets are completed and Tt/AEW JV biologists are responsible for completing the bird and marine mammal data sheets.

AAR will monitor steelhead and North American green sturgeon, and general monitoring of fishery resources during pile driving. Tt/AEW JV biologists will monitor for all seabird interactions and for the presence and activities of any marine mammal in the limits of the exclusion zone, and on a boat, as needed. All monitors will complete the data sheets designed for this project.

The monitors will be staged on various platforms depending on accessibility, location of pile driving, direction from the Port or the contractors, or other factors. Land observation platforms would be on the seawall and Piers 30, 32, or 38. Other platforms include an elevated platform on the pile driving barge or a chartered vessel that will take a monitor out to the San Francisco Bay.

Fish Mortality Monitoring

The AAR fisheries biologist will identify the species and length of any dead or moribund fish, through observation with binoculars, or by dip-net collection and release of specimens. If any injured or dead salmonids or green sturgeon are found, the Port will be contacted immediately. See additional detail in Section III: Incident Reporting Protocol.

Bird Predation Monitoring

Tt/AEW JV and AAR biologists will monitor for the occurrence of bird predation during pile driving. Biologists will observe and record any incidence of birds feeding on fish during or immediately after pile driving. Biologists will record the number of bird strikes per minute and the duration of each event. The size and species of each fish affected will be identified and recorded. Per fisheries protocol, any dead green sturgeon or salmonid will be collected and

transferred to NMFS. Following two weeks of monitoring, if no bird predation or dead fish are observed, the cessation of bird monitoring will be considered by NMFS. Tt/AEW JV and AAR biologists will be informed of any protocol direction changes.

Marine Mammal Monitoring

Tt/AEW JV and AAR biologists will monitor for the presence and behavior of marine mammals during pile driving. The biologists will comply with IHA mitigation requirements 7b and 7c as delineated in Section II: A. Resource Overview.

1. Before Proceeding into the Field—Project Outset

Before going into the field at the project outset, the biological monitors will review the fishes, birds, and marine mammals that are anticipated to be seen in the area during this project.

All monitors will be responsible for reviewing the following materials before field work begins:

- Proposal submitted to the Port of San Francisco;
- Brannan Street Wharf Biological Monitoring Protocol;
- Brannan Street Wharf Biological Monitoring Data Sheets;
- Pier 36 Demolition/Brannan Street Wharf Project Hydroacoustic Monitoring Plan;
- NOAA-NMFS Incidental Harassment Authorization for the Pier 36/Brannan Street Wharf Project;
- NMFS Biological Opinion for the Pier 36 Demolition/Brannan Street Wharf Project;
- Health and Safety Plan; and
- Municon Work Plan for Underwater Sound Monitoring

Specific data sheets for fish, birds, and marine mammals will be used by AAR and Tt/AEW JV biologists. These data sheets have been pre-approved by NMFS ensuring all required and valuable information is captured (Appendix A). In the event of a reportable occurrence, AAR and Tt/AEW JV biologists will complete an Incident Report (Appendix A) to ensure all pertinent information is provided to NMFS following an observation of a dead, injured, or disoriented animal.

2. Contact List

Each monitor will carry a Contact List (Appendix B) that includes all participants that they may need to contact for the duration of the project.

3. Meeting at the Project Site

Biological monitors will arrive on the site each field day no later than 6:45 a.m. to meet with the pile driver operator (Dutra), and Municon employees to discuss the day's activities. Each

monitor must have the necessary equipment and supplies from the equipment list in Section II: B. 4. before beginning monitoring each day.

The following data can be recorded before pile driving begins:

- Date;
- Monitor;
- Monitoring Locale (s) for the day (i.e., pier number, or boat);
- Pile type (i.e., concrete or steel)—note: only one pile type is expected to be installed on any given day;
- Pile Driver (Impact or Vibratory—note: concrete piles use impact driver; steel shell piles driven using combination of impact and vibratory driving methods;
- Bubble curtain (attenuation device) use and status;
- Sea state (Beaufort Scale)
- Weather/Visibility

4. Equipment List

Equipment and supplies: use before going out daily or night before and "check off" before going to the site for the following gear:

FISH MONITORING ONLY

- ☐ alcohol ("pickle" any dead fish collected)
- ☐ field guide books (e.g., *Field Guide to Pacific Coast Fishes of North California, Marine Food and Game Fishes*, etc.)
- ☐ fish identification cards
- ☐ buckets (for dead fish)
- ☐ graduated cylinder (for measuring alcohol/water percentage for fish preservation)
- ☐ collecting jars with water proof labels
- ☐ measuring boards (for injured or dead steelhead or green sturgeon, or any other fish)
- ☐ dip-nets (for collecting fish)

ALL **MONITORING**

- ☐ appropriate clothing (rain gear, hats, coats, layers)
- ☐ binoculars (one per monitor)
- ☐ field guide books (e.g., birds and marine mammals)
- ☐ boots (steel-toed preferred)
- ☐ life jackets (work vests)
- ☐ business cards

- digital camera (and a second "back-up" camera), fully charged, and including a second card and spare batteries
- cell phone (charged)
- chapstick and sunscreen
- clipboard
- pens, pencils, Sharpie
- compass, if needed
- dark, polarized sunglasses
- waterproof data sheets
- ear plugs
- flashlight
- food and water
- hard hat
- knapsack with belongings (wallet, keys, etc.)
- range finder, if needed
- spotting scope, if needed
- 200-foot measuring tape
- VHF radios (2)
- high visibility vest

5. Weekly Reporting Requirements

AAR will be responsible for submitting fisheries data sheets and a weekly summary to Tt/AEW JV every Monday morning by 9 a.m. for inclusion in the weekly submission to the Port via the Port's representative and Project Manager Ms. Lauren Eisele. AAR will provide scanned-in daily fish data sheets and a text overview of the weekly fish findings (a brief summary report) to the Tt/AEW JV Project Manager at this time or before. All original daily fish data sheets will be provided each week by AAR to Tt/AEW JV. The Tt/AEW JV biologists will complete daily data sheets for birds and marine mammals and the associated weekly summary reports for bird and marine mammal observations.

Weekly monitoring reports will be submitted to the Port's representative by Tt/AEW JV on each Monday following monitoring. All data sheets and weekly summaries will be provided in a single submission to the Port on the Monday following the previous week's monitoring.

6. Day to Day Goals for Biological Monitoring

(a) **Communication.** To improve data gathering throughout the day, all monitors will be in contact with one another, and share with one another information on sightings of fish, birds, and marine mammals. A final text, email, or phone call will be made to the Tt/AEW JV Project Manager each day to confirm "end of day" and "all is well", and to inform of any events of the day. Anything outside of the ordinary will be reported to the Tt/AEW JV Project Manager immediately. She will subsequently notify the Port's representative. The Port is responsible for informing the Tt/AEW JV Project Manager of an alternate point of contact, and contact protocols before 9 a.m.

In addition, a component of this project involves ongoing communication and coordination with adjacent construction activities (e.g. America's Cup Event Authority [ACEA], pile driving activities, etc.). The Tt/AEW JV team in conjunction with AAR, when needed, will maintain clear communications with all relevant entities as well as access to data sharing. The contacts for communication with entities known at this time are provided in Appendix B.

(b) **Preliminary Data Gathering.** All monitors will fill in data sheets with the information pertaining to weather, sea state, pile type etc. prior to the commencement of pile driving on that day. Additional information about the pile driving can be obtained from Steve Hutchinson of Dutra Construction (phone 415-254-4410; email: shutchinson@dutragroup.com).

(c) **Data Collection.** Biological monitors will begin collected pertinent observation data when pile driving begins. All information regarding pile type, start/end time and method will be recorded for each pile. All relevant data accompanying each fish, bird or mammal observation will be recorded in the appropriate section of the data sheet. Additional information may be added to the comments section of the data sheets.

(e) **Photos and Diagram.** Photos will be taken throughout the day and logged on the data sheet in the space provided. A diagram of the project site will be included in the data sheet each day.

(f) **Additional Data Sheets.** If additional space is needed, extra data sheets will be on hand and inserted in the appropriate order. Supplemental data sheets have been developed for this project and are in Appendix A.

(g) **Dead/Injured Fish.** Any injured steelhead or green sturgeon observed will be noted on the data sheets. Length (fork length for salmonids) will be recorded in millimeters, photos taken, and any descriptive comments will be provided. In addition, the location of the dead fish, relative to the monitoring locale, will be noted. See Section III: Incident Reporting Protocol for specific actions to be taken if a dead or injured fish is observed.

(h) **Marine Mammals.** If a monitor observes a marine mammal in or approaching the exclusion zone *prior to the start of pile driving*, the monitor will notify the on-site engineer or other authorized personnel to delay pile driving until the marine mammal has moved outside the exclusion zone or has not been resighted within 15 minutes for pinnipeds or 30 minutes for cetaceans. If a marine mammal is sighted in or coming toward the exclusion zone *during pile driving*, the monitor will notify personnel to cease pile driving until the animal has cleared and is on a path away from the exclusion zone, or 15/30 minutes has lapsed since the last sighting. If pile driving activities clearly cause the take of a marine mammal such as an injury (Level A harassment), serious injury, or mortality, the monitor will notify personnel to cease pile driving immediately. The incident will be reported to the Port's representative Ms. Lauren Eisele first (see Section III: Incident Reporting Protocol below for contact information), then to NMFS biologist Amanda Morrison (707-575-6083) and to the Acting Chief of the Permits and Conservation Division, Office of Protected Resources (OPR), NMFS (301-427-8401). Email notifications will be sent to the addresses provided in the Incidental Harassment Authorization document.

7. End of Day

At the end of the day, biological monitors will meet with each other, Dutra, and Municon employees, to discuss tasks for the next day. The biological monitors will review their data to make sure that there are no discrepancies or missing data on any of the data sheets. All data sheets are to be reviewed at the end of each work day by the appropriate field biologist and edited for any errors.

The Tt/AEW JV field monitor will communicate at end of each day to the Project Manager (Ann Zoidis) or to the Deputy Project Manager (Mandi McElroy) before leaving the project site.

At the end of the each day of monitoring, the fisheries biologist will scan the data sheets and email a copy to Tt/AEW JV.

If time is available, all data that can be recorded prior to pile driving for the next day should be recorded on a new set of data sheets.

8. Week End

Weekly data sheets will be reviewed, edited, scanned, and emailed to Ann Zoidis, (or a Tt/AEW JV representative), no later than 9 Monday. Each monitor will be responsible for writing up a brief summary paragraph of the week's activities. Completed weekly data sheets and summaries from all monitoring activities (fish, bird, marine mammal) will be compiled by Tt/AEW JV the following Monday morning and submitted to the Port by close of business.

III. INCIDENT REPORTING PROTOCOL FOR BIOLOGICAL RESOURCES MONITORING

A. SPECIES INCIDENT REPORTING

If that pile driving activities clearly cause the take of a marine mammal in a manner prohibited by the IHA (NMFS 2012), the Tt AEW/JV biological monitor will immediately call for a shutdown of pile driving activities and report the event to Ann Zoidis who will contact the Port's representative Ms. Lauren Eisele first at 415-274-0226 (office) or 415-725-1593 (cell). Ms. Eisele is the Point of Contact prior to July 31st and through Aug 3rd, as well as after August 20th. From August 6th through August 17th, while Ms. Eisele may not be immediately available, the Port representative to be contacted is Mr. Steven Reel at 415-274-0574 (office) or 415-793-5352 (cell). If Ms. Zoidis cannot be reached immediately, the Port will be contacted directly by the Tt AEW/JV field biologist to report any such injury or mortality (Level A harassment). The Port will immediately contact the Acting Chief of the Permits and Conservation Division, OPR, NMFS, at 301-427-8401 or by email to jolie.harrison@noaa.gov and michelle.magliocca@noaa.gov and the Southwest Regional Stranding Coordinator at sarah.wilkin@noaa.gov.

Tt/AEW JV biologists will provide the following information in an Incident Report:

- Time, date, location of incident
- Name, type of vessel involved
- Vessel's speed leading up to the incident
- Description of incident
- Status of all sound source use in the 24 hours preceding the incident
- Water depth
- Environmental conditions (wind speed and direction, Beaufort sea state, cloud cover, visibility)
- Description of marine mammal behaviors in the 24 hours preceding the incident
- Fate of marine mammal
- Photos or video of the animal

Activities shall not resume until NMFS is able to review the circumstances of the prohibited take. The Port may not resume their activities until notified by NMFS by letter, phone, or email.

If any injured or dead fish are found, the Tt AEW/JV biological monitor will report the event to Ann Zoidis who will contact the Port's representative Ms. Lauren Eisele first at 415-274-0226 (office) or 415-725-1593 (cell). Ms. Eisele is the Point of Contact prior to July 31st and through Aug 3rd, as well as after August 20th. From August 6th through August 17th, while Ms. Eisele may not be immediately available, the Port representative to be contacted is Mr. Steven Reel at 415-274-0574 (office) or 415-793-5352 (cell). If Ms. Zoidis cannot be reached immediately, the Port's representative will be contacted directly by the Tt AEW/JV biologist to report any such event. The Port's representative will immediately contact the Acting Chief of the Permits and Conservation Division, OPR, NMFS, at 301-427-8401 or by email to jolie.harrison@noaa.gov and

michelle.magliocca@noaa.gov and the Southwest Regional Stranding Coordinator at sarah.wilkin@noaa.gov. Ann Zoidis will also contact the AAR Project Manager Dr. Rich. If any injured or dead fish are salmonids or sturgeon, the Port's representative will immediately contact NMFS biologist Amanda Morrison (707-575-6083) or the NMFS Santa Rosa Area Office at 707-575-6050.

Any dead fish will be labeled with the date and location of collection, length (fork length of all salmonids) and given to Dr. Rich as soon as possible. Dr. Rich will wait for NMFS' specific instructions for the sample(s). Dr. Rich may not transfer biological samples to anyone other than the NMFS Santa Rosa Area Office without obtaining prior written approval from the NMFS Santa Rosa Area Office, Supervisor of the Protected Resources Division.

B. CONSTRUCTION CONTRACTOR INCIDENT REPORTING

If there is a contractor incident (i.e., driving piles without biological monitors present), the Tt AEW/JV biological monitor will report the event to Ann Zoidis, who will contact the Port's representative Ms. Lauren Eisele first at 415-274-0226 (office) or 415-725-1593 (cell). Ms. Eisele is the Point of Contact prior to July 31st and through Aug 3rd, as well as after August 20th. From August 6th through August 17th, while Ms. Eisele may not be immediately available, the Port representative to be contacted is Mr. Steven Reel at 415-274-0574 (office) or 415-793-5352 (cell). If Ms. Zoidis cannot be reached immediately, the Port's representative will be contacted directly by the Tt AEW/JV field biologist to report any such events. Written documentation of the incident will be included in the weekly summaries provided to the Port each Monday to be submitted to NMFS.

LITERATURED CITED

National Marine Fisheries Service (NMFS). 2011. Pier 36 Demolition/Brannan Street Wharf Project in San Francisco, California-Biological Opinion. September 16, 2011. 45 pages.

NMFS. 2012. Incidental Harassment Authorization (IHA) to the Port of San Francisco. March 29, 2012. 6 pages.

APPENDIX A: DATA SHEETS

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

FISHERY RESOURCES

Date _____ **Monitor** _____ **Visibility** _____

Tide Level[1]

Date	Low		High		Low		High	
	Time	Tide (ft)	Time	Tide (ft)	Time	Tide (ft)	Time	Tide (ft)

Human Activity in the Area _____

Latitude _____ **Longitude** _____

Monitoring Locale: Pier 30 ☐ **Pier 32** ☐ **Pier 38** ☐ **178m from pile driving** ☐ **129m from pile driving** ☐

Pile Type: 24-inch octagonal concrete ☐ **24-inch steel shell** ☐

Piles/Day (1-8): ☐ **Pile Driver: Impact** ☐ **Vibratory/Impact** ☐ **Attenuation Device: None** ☐

Bubble Curtain: On ☐ **Off** ☐ **Minutes of Vibratory Driving : n/a** ☐ **8:00** ☐

Impact Blows per Pile: 800 ☐ **300** ☐

Pile No.	Pile Driver (Impact, Vibratory)[2]	Pile Driving Start/End Time	Observer Start/End Time	Dead/Injured Fish Observed (Number/Species)[3] and Time		Dead/Injured Fish Collected (Number/Species) and Time		Comment: Reference Number

[1] At Golden Gate Bridge, NOAA Fisheries data
[2] Steel shell pile driving will include both vibratory (up to the last 10 feet) and impact (last 10 feet) pile drivers
[3] SH=Steelhead; GS=North American Green Sturgeon; O=Other

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

FISHERY RESOURCES

Pile No.	Pile Driver (Impact, Vibratory)[4]	Pile Driving Start/End Time	Observer Start/End Time	Dead/Injured Fish Observed (Number/Species)[5] and Time		Dead/Injured Fish Collected (Number/Species) and Time		Comment: Reference Number

[4] Steel shell pile driving will include both vibratory (up to the last 10 feet) and impact (last 10 feet) pile drivers
[5] SH=Steelhead; GS=North American Green Sturgeon; O=Other

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

FISHERY RESOURCES

Comment: Reference No.	Fish Species	Life Stage and Status (A,J,L,E,FT,ST, FE,SE,CF, CS)	Time of observation	Comments

A=adult; J=juvenile; L=larva; E=egg; FT = federal threatened; ST=state threatened; FE=federal endangered SE=state endangered; CF = federal candidate; CS=state candidate

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

FISHERY RESOURCES

PHOTOS

Comment: Reference No.	Photo Number	Time of Photo	Photo Taken Before (B), During (D) or After (A) Pile Driving	Description

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

FISHERY RESOURCES

ADDITIONAL COMMENTS

Comment: Reference No.	Additional Comments

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

BIRDS[8]

Date _____ Monitor _____ Weather _____

Monitoring Locale: Pier 30 ☐ Pier 32 ☐ Pier 38 ☐ 178m from pile driving ☐ 120m from pile driving ☐

1900 m from pile driving on vessels ☐

Pile Type: 24-inch octagonal concrete ☐ 24-inch steel shell ☐ Ambient Conditions ☐ Piles/Day (1-8): ☐

Pile Driver: Impact ☐ Vibratory/Impact ☐ Attenuation Device: None ☐ Bubble Curtain: On ☐ Off ☐

Minutes of Vibratory Driving : n/a ☐ 8:00 ☐ 15:00 ☐ Impact Blows per Pile: 800 ☐ 300 ☐ 600 ☐

Pile No.	Pile Driver (Impact, Vibratory)[9]	Pile Driving Start/End Time	Observer Start/End Time	Bird Predation on Fish Observed (Y/N) and Time		General Bird Activity/Behavior	Comment: Reference Number

[8] The bird monitor will have to work closely with the fish monitor because the monitor must attempt to determine the amount of bird predation on fishes, including the size and species of fish affected.

[9] Steel shell pile driving will include both vibratory (up to the last 10 feet) and impact (last 10 feet) pile drivers.

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

BIRDS

Comment: Reference No.	Predation[10]		Dead/Injured Fish Observed[11]		Dead/Injured Fish Collected[8]	
	Bird Strikes Per Minute	Duration	Species	Size	Species	Size

[10] Diving birds that may be present, but which cannot be confirmed to scavenge on injured fish while diving, will be noted on the data sheet, but are not included in the count of bird strikes.

[11] SH = steelhead; G=North American Green Sturgeon; O=Other

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

BIRDS

PHOTOS

Comment: Reference No.	Photo Number	Time of Photo	Photo Taken Before (B), During (D) or After (A) Pile Driving	Description

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

BIRDS

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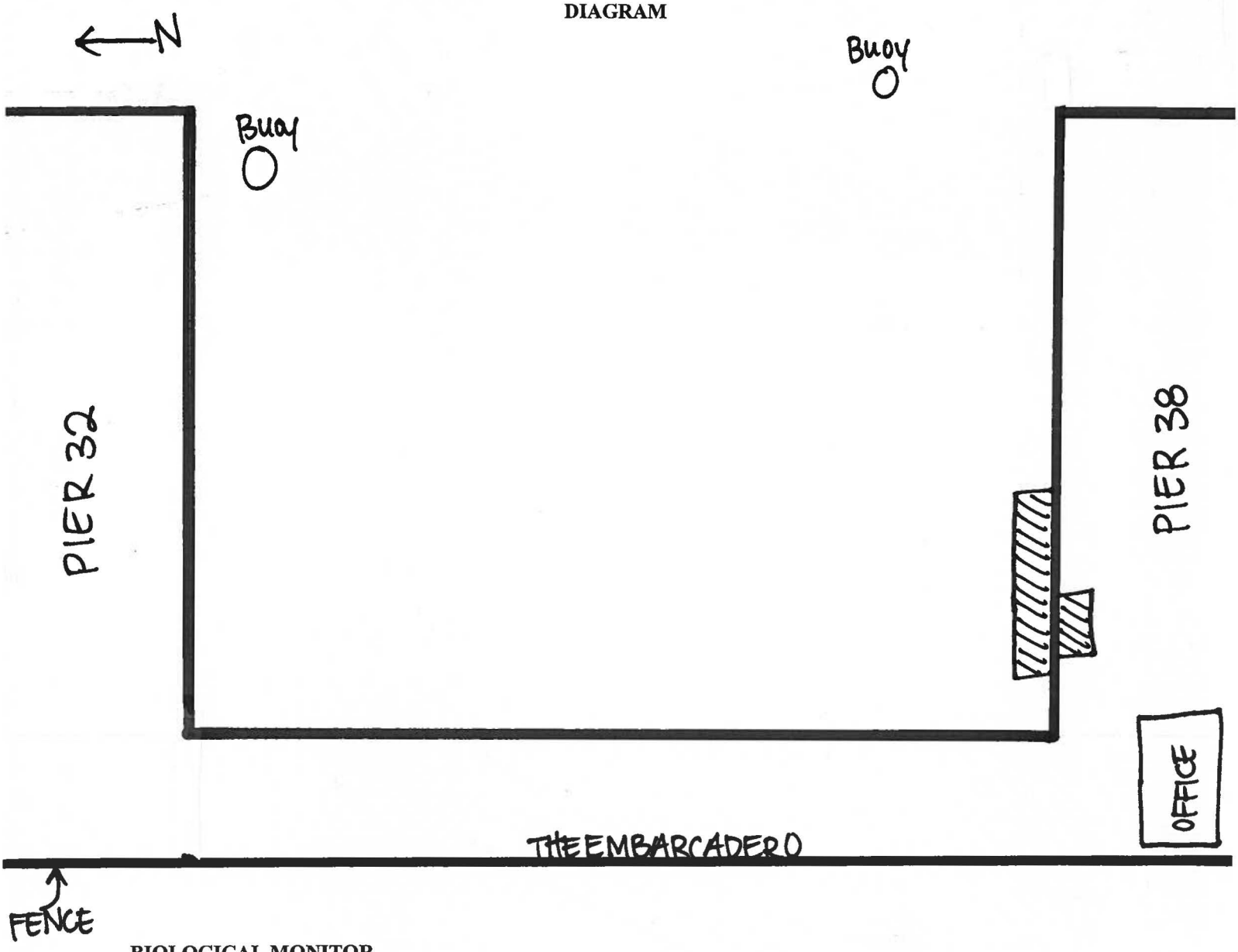
ADDITIONAL COMMENTS

Comment: Reference No.	Additional Comments

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

BIRDS

DIAGRAM



BIOLOGICAL MONITOR _____ _____

Signature **Print Name**

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

FISHERY RESOURCES

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DIAGRAM

BIOLOGICAL MONITOR _____ _____

Signature **Print Name**

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

Date _____ Monitor (s) _____ Visibility _____

Tide Level _____ Human Activity in the Area _____

Monitoring Locale: Pier 30 ☐ Pier 32 ☐ Pier 38 ☐ Boat ☐ 178 m from pile driving ☐

129 m from pile driving ☐ 1900 m from pile driving on vessels ☐

Pile Type: 24-inch octagonal concrete ☐ 24-inch steel shell ☐ Ambient Conditions ☐

Piles/Day (1-8): ☐ Pile Driver: Impact ☐ Vibratory/Impact ☐

Attenuation Device: None ☐ Bubble Curtain: On ☐ Off ☐

Minutes of Vibratory Driving : n/a ☐ 8:00 ☐ 15:00 ☐ Impact Blows per Pile: 800 ☐ 300 ☐ 600 ☐

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

Pile No.	Pile Driver (Impact, Vibratory)[5]	Pile Driving Start/End Time	Observation Start/End Time	Mammal Species[6]			Comments: Reference Number
				Species	No.	Time	

[5] Steel shell pile driving will include both vibratory (up to the last 10 feet) and impact (last 10 feet) pile drivers

[6] HS=Harbor Seal; SL = Sea Lion; HP=Harbor Porpoise; GW=Gray Whale; O = Other

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

Comments: Reference No.	Monitor's Distance from Pile Driving Activity	Initial Behavior of Marine Mammal	Changes in Marine Mammal Behavior (e.g., orientation, speed, diving, respiration rate, etc.)[7]

[7] **Note:** If a monitor sees a marine mammal within or approaching the Exclusion Zone prior to the start of impact pile driving, the monitor will notify the on-site resident engineer (or other authorized individual), who will then be required to delay pile driving until the marine mammal has moved outside of the Exclusion Zone, or if the animal has not been re-sighted within 15 minutes for pinnipeds or 30 minutes for cetaceans. If a marine mammal is sighted within or on a path toward the Exclusion Zone, pile driving will cease until that animal has cleared and is on a path away from the Exclusion Zone, or 15/30 minutes (pinnipeds/cetaceans) has lapsed since the last sighting.

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

PHOTOS

Comment: Reference No.	Photo Number	Time of Photo	Photo Taken Before (B), During (D) or After (A) Pile Driving	Description

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

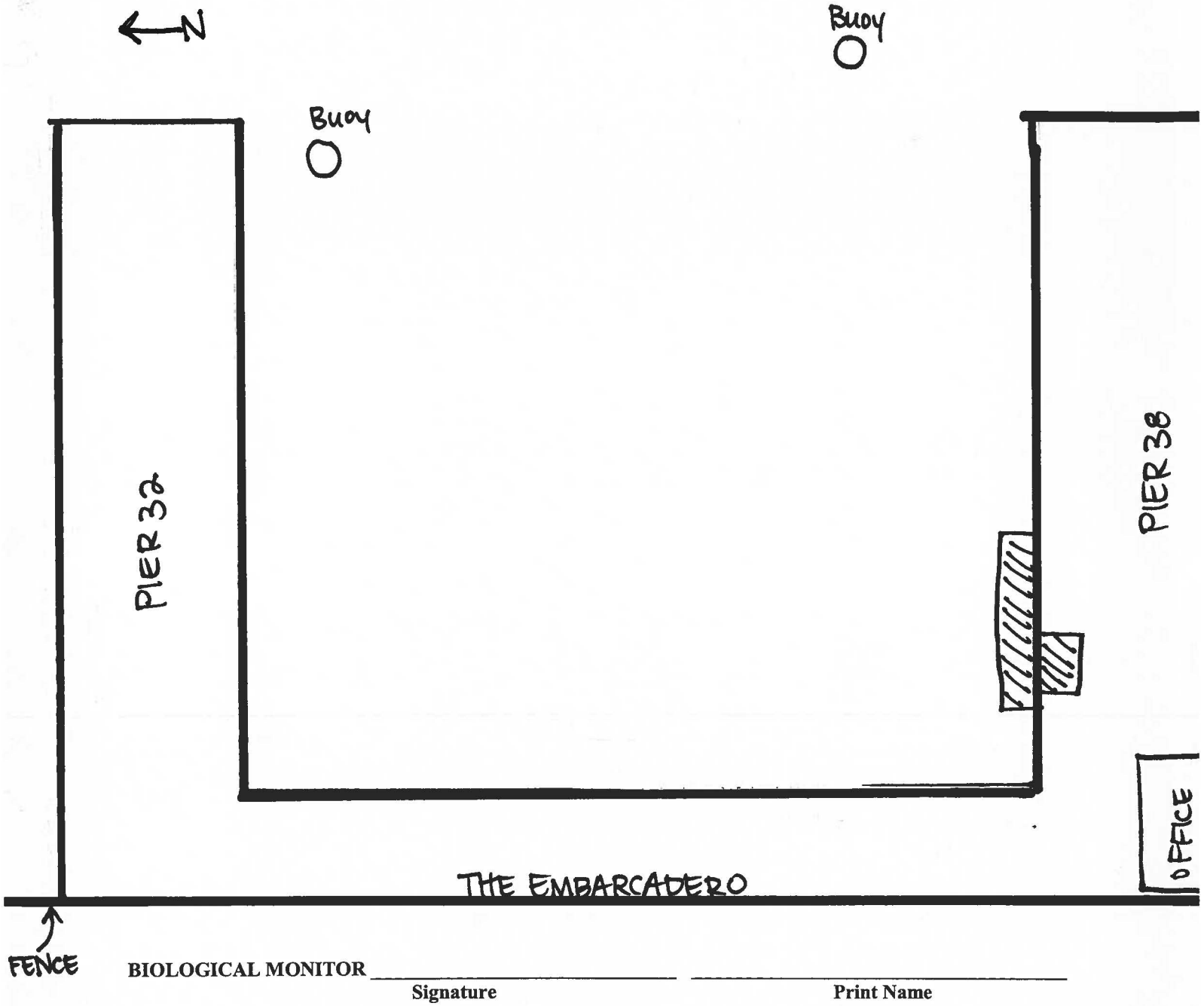
ADDITIONAL COMMENTS

Comment: Reference No.	Additional Comments

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

DIAGRAM



BIOLOGICAL MONITOR _____ _____

Signature **Print Name**

BSW Weather Log

Date_____Monitor_____

Vessel/ Pier/Barge_____Time_____
24-hour clock

Sky#_____Clouds_____Visibility_____
0-10: 0 = no clouds; 10 = 100% Type: e.g., fog, high thin clouds, etc. ; Viz: m and NM

Wind_____Velocity_____
Direction coming from In knots
Wind Beaufort sea state (1-5): _____

Swell_____Height_____
Direction coming from In feet

Date_____Monitor_____

Vessel/ Pier/Barge_____Time_____
24-hour clock

Sky#_____Clouds_____Visibility_____
0-10: 0 = no clouds; 10 = 100% Type: e.g., fog, high thin clouds, etc. ; Viz: m and NM

Wind_____Velocity_____
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Date_____Monitor_____

Vessel/ Pier/Barge_____Time_____
24-hour clock

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Wind_____Velocity_____
Direction coming from In knots
Wind Beaufort sea state (1-5): _____

Swell_____Height_____
Direction coming from In feet

Weather Log **Page**_____**of**_____

Date_____Monitor_____

Vessel/ Pier/Barge_____Time_____
24-hour clock

Sky#_____Clouds_____Visibility_____
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Wind_____Velocity_____
Direction coming from In knots
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Swell_____Height_____
Direction coming from In feet

Date_____Monitor_____

Vessel/ Pier/Barge_____Time_____
24-hour clock

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Wind_____Velocity_____
Direction coming from In knots
Wind Beaufort sea state (1-5): _____

Swell_____Height_____
Direction coming from In feet

Date_____Monitor_____

Vessel/ Pier/Barge_____Time_____
24-hour clock

Sky#_____Clouds_____Visibility_____
0-10: 0 = no clouds; 10 = 100% Type: e.g., fog, high thin clouds, etc. ; Viz: m and NM

Wind_____Velocity_____
Direction coming from In knots
Wind Beaufort sea state (1-5): _____

Swell_____Height_____
Direction coming from In feet

BEAUFORT WIND FORCE SCALE:
Specifications and equivalent speeds for use at sea

FORCE	Equivalent Speed		Wave Height		Description	Map Symbols	U.S. Advisory Flags	SPECIFICATIONS FOR USE AT SEA
	miles/hr	knots	m	ft				
0	0-1	0-1	0	0	Calm			Sea like a mirror
1	1-3	1-3	.1	.33	Light Air			Ripples with the appearance of scales are formed, but without foam crests.
2	4-7	4-6	.2	.66	Light Breeze			Small wavelets, still short, but more pronounced. Crests have a glassy appearance and do not break.
3	8-12	7-10	.6	2	Gentle Breeze			Large wavelets. Crests begin to break. Foam of glassy appearance. Perhaps scattered white horses.
4	13-18	11-16	1	3.3	Moderate Breeze			Small waves, becoming larger; fairly frequent white horses.
5	19-24	17-21	2	6.6	Fresh Breeze			Moderate waves, taking a more pronounced long form; many white horses are formed. Chance of some spray.
6	25-31	22-27	3	9.9	Strong Breeze		Small Craft Advisory	Large waves begin to form;

								the white foam crests are more extensive everywhere. Probably some spray.
7	32-38	28-33	4	13	Near Gale			Sea heaps up and white foam from breaking waves begins to be blown in streaks along the direction of the wind.
8	39-46	34-40	5.5	18	Gale		Gale Warning 	Moderately high waves of greater length; edges of crests begin to breakinto spindrift. The foam is blown in well-marked streaks slong the direction of the wind.
9	47-54	41-47	7	23	Severe Gale			High waves. Dense streaks of foam along the direction of the wind. Crests of waves begin to topple, tumble and roll over. Spray may affect visibility.
10	55-63	48-55	9	30	Storm		Storm Warning 	Very high waves with long over-hanging crests. The resulting foam, in great patches, is blown in dense white streaks along the direction of the wind. On the whole the surface of the sea takes on a white appearance.

								The 'tumbling' of the sea becomes heavy and shock-like. Visibility affected.
11	64-72	56-63	11.5	38	Violent Storm			Exceptionally high waves (small and medium-size ships might be for a time lost to view behind the waves). The sea is completely covered with long white patches of foam lying along the direction of the wind. Everywhere the edges of the wave crests are blown into froth. Visibility affected.
12	73-83	64-71	14+	46+	Hurricane		Hurricane Warning 	The air is filled with foam and spray. Sea completely white with driving spray; visibility very seriously affected.

"The scale was created in 1806 by Sir Francis Beaufort, a British naval officer. The initial scale did not have wind speeds, but listed a set of qualitative conditions

BSW - Behavior Codes
Marine Mammals, Sea Otters and Sea Turtles
(can use more than one code)

Associated bird activity	BA
Whale or Seal behaviors:	
Bow riding	BO
Breaching	BR
Diving*	DI
Fast travel	FT
Slow travel	ST
Change in direction of travel (abrupt)	CDT
Change in respiration rates (increase/decrease)	CRR (inc. or dec.)
Avoidance	AV
Feeding	FE
Flipper slapping	FS
Lobtailing (Fluke or tail slaps)	LO
Mating behaviors**	MA
Nursing	NU
Milling	MI
Resting, logging or rafting	RE
Spyhopping	SP
Seal behaviors:	
Jughandling (*Northern fur seal only*)	JH
Porpoising	PP
Haul out	HA

**note on sheets any changes in dive intervals i.e. respiration rates increase, decrease, etc. Or any sudden dives*

***describe (visible body parts; mounting; etc)*

INCIDENT REPORT

Date

Monitor's name(s)

Position: Approximate location (Pier, barge, etc).

Position: N. latitude W. longitude

Time animal(s) sighted:

Genus and species:

Number of animal(s):

Behavior

Type of Take* or harassment**:

Injury or Mortality?

Distance of animal from potential hazard (meters):

Type of potential hazard:

Time crew notified:

Name(s) of crew notified:

Person's title:

All-stop requested?

Time all-stop requested:

Observer(s) with radios on work vessel requested?

Position of observer(s):

If observer(s) not posted, reason why not:

Time animal(s) definitely clear of hazard :

Time all-stop completed:

Effectiveness of all-stop:

If animal entangled or struck, immediate action taken:

Time NMFS notified of incident:

Person who notified NMFS:

Recommended action:

Action taken:

Photos taken, by whom, # of frames:

Remarks (Use extra pages or back of this page if needed.)

*Take: harass, hunt, capture, kill or collect or attempt to harass, hunt, capture, kill or collect.
**Harassment – Level A or Level B.
(to harass = any act of pursuit, torment or annoyance which has the potential to either A. injure or kill a marine mammal in the wild, or B. disturb a marine mammal by causing disruption of behavioral patterns, which includes, but is not limited to, migration, breathing, nursing, breeding, feeding, or sheltering.

Species Codes

Marine Mammals, Sea Otters and Sea Turtles

(note: grey highlighted specie would be highly unlikely in this area)

Cetaceans:

Right whales	
North Pacific right whale *(Eubalaena japonica)*	Ej
Bowhead whale *(Balaena mysticetus)*	Bm 2
Rorquals	
Blue whale *(Balaenoptera musculus)*	Bm
Bryde's whale *(Balaenoptera edeni)*	Be
Fin whale *(Balaenoptera physalus)*	Bp
Humpback whale *(Megaptera novaeangliae)*	Mn
Minke whale *(Balaenoptera acutorostrata)*	Ba
Sei whale *(Balaenoptera borealis)*	Bb
Gray whales	
California gray whale *(Eschrichtius robustus)*	Er
Sperm whales	
Pygmy sperm whale *(Kogia breviceps)*	Kb
Dwarf sperm whale *(Kogia simus)*	Ks
Sperm whale *(Physeter macrocephalus)*	Pm
Beaked whales	
Baird's beaked whale *(Berardius bairdii)*	Bb Z
Cuvier's beaked whale *(Ziphius cavirostris)*	Zc Z
Mesoplodons	
Blainville's beaked whale *(Mesoplodon densirostris)*	Md
Ginkgo-toothed beaked whale *(Mesoplodon ginkgodens)*	Mg
Hubbs' beaked whale *(Mesoplodon carlhubbsi)*	Mc
Hectors' beaked whale *(Mesoplodon hectori)*	Mh
Oceanic dolphins	
Short-finned pilot whale *(Globicephala macrorhynchus)*	Gm
Coastal bottlenose dolphin *(Tursiops truncatus)*	Tt
False killer whale *(Pseudorca crassidens)*	Pc
Killer whale or orca *(Orcinus orca)*	Oo
Northern right whale dolphin *(Lissodelphis borealis)*	Lb
Pacific white-sided dolphin *(Lagenorhynchus obliquidens)*	Lo
Risso's dolphin *(Grampus griseus)*	Gg
Rough-toothed dolphin *(Steno bredanensis)*	Sb
Short-beaked common dolphin *(Delphinus delphis)*	Dd
Long-beaked common dolphin *(Delphinus capensis)*	Dc
Short-finned pilot whale *(Globicephala macrorhynchus)*	Gm
Striped dolphin *(Stenella coeruleoalba)*	So
True porpoises	
Dall's porpoise *(Phocoenoides dalli)*	Pd
Harbor porpoise *(Phocoena phocoena)*	Pp

Pinnipeds

Phocids	
Harbor seal *(Phoca vitulina richardsi)*	Pv
Northern elephant seal *(Mirounga angustirostris)*	Ma

Otariids

California sea lion *(Zalophus californianus c.)*	Zc
Steller or northern sea lion *(Eumetopias jubata)*	Ej
Northern or Alaska(n) fur seal *(Callorhinus ursinus)*	Cu
Guadalupe fur seal *(Arctocephalus philippii townsendi)*	Ap

Mustelids

Sea otters

Sea otter *(Enhydra lutris)*	El

Reptiles

Sea turtles

Green sea turtle *(Chelonia mydas)*	Cm T
Loggerhead sea turtle *(Caretta caretta)*	Cc T
Olive ridley sea turtle *(Lepodochelys olivacea)*	Lo T
Leatherback sea turtle *(Dermochelys coriacea)*	Dc T

Key to Identifying Seals, Sea Lions and Sea Otters

Seals:

No external earlobes; heads smooth

Dive by descending vertically, tail first, until snout disappears

Very short, stubby tails

Swim with hind flippers; move on land like caterpillars

Pacific harbor seal *Phoca vitulina richardsi*

Round head profile

Ear holes

Long whiskers

Short fore flippers with claws

Short hind flippers with claws

Mottled coat: silver, tan, brown, and/or black

Coastal

Sometimes rafts in kelp with hind flippers out of water

Northern elephant seal *Mirounga angustirostris*

Round head profile

Smooth head; no visible ear holes

Long black whiskers

Short fore flippers with claws

Short hind flippers without claws

Uniform tan or brown

Coastal and pelagic

Males and females:

Very little difference in size, shape, length, or weight

Both up to about 250-300 pounds and 6 feet

Male:

Massive head

Pronounced snout

Up to 5000 pounds

Female:

Large, wide skull

Up to 2000 pounds

Notes: The main differences between the two species are the massive size, thicker head and uniform color of the northern elephant seal.

Key to Identifying Seals, Sea Lions and Sea Otters

Sea lions:

External earlobes

Dive by swimming forward, then submerging headfirst

Yellowish tan, brown or black coat

Very short, stubby tails

Swim with fore flippers; move on all four flippers on land

Coastal out to about 200 miles; sometimes raft in kelp or float on surface with front and/or hind flippers out of water

California sea lion *Zalophus californianus c.*

Concave head profile, long head
Short, stubby ears
Tan to black whiskers about length of snout
Long fore flippers edged with black
Short hind flippers

Male:	*Female:*
Prominent crest on head	Long, streamlined head
Crest white or light tan	Yellowish tan to brown
Very dark brown or black body	175-350 pounds
600-1200 pounds	5-6 feet long
6-8 feet long	

Steller sea lion *Eumetopias jubatus*

Concave head profile, boxlike, thicker head features
Short, stubby ears
Tan to black whiskers about length of snout
Long fore flippers edged with black
Short hind flippers

Male:	*Female:*
Massive shoulders & head	Large, wide skull
Thicker fur around shoulders	Yellow or tan fur
Yellow or tan fur	To 750 pounds
To 2450 pounds	To 9 feet
To 10 feet	

Notes: The main differences between the two species are the massive size, thicker, boxier head, and yellow to tan color of the Steller sea lion.

Key to Identifying Seals, Sea Lions and Sea Otters

Fur Seals:

External earlobes

Dive by swimming forward, then submerging headfirst

Reddish brown, brown or black coat

Very short, stubby tails

Swim with fore flippers; move on all four flippers on land

Pelagic; sometimes raft in kelp or float on surface with front and/or hind flippers out of water

Often roll and rub themselves with flippers

Northern fur seal *Callorhinus ursinus*

Convex head profile

Short, stubby snout

Very long, down-turned ears

Very long, often white whiskers

White patches on cheeks and breast

Large, round eyes

Hind flippers long and flexible; equal to 1/3 body length

Skin of fore flippers ends abruptly in sharp horizontal line

Male:	*Female:*
Thick neck and shoulders	125-175 pounds
Up to 450 pounds	5 feet
6 feet	

Guadalupe fur seal *Arctocephalus townsendi*

Concave head profile

Long, collie-like snout

Medium length ears

Long tan whiskers

Generally similar to California sea lion

Hind flippers short

Skin of fore flippers merges gradually into pelt

Male:	*Female:*
Thick neck and shoulders	125-175 pounds
350 pounds	5 feet
6 feet	

Notes: The main differences between the two species are the short, stubby snouts and very long whiskers and hind flippers of the northern fur seal, which contrast with the collie-like snout and shorter hind flippers of the Guadalupe fur seal.

Key to Identifying Seals, Sea Lions and Sea Otters

Southern sea otters:

Enhydra lutris nereis

External earlobes

Dive by swimming forward, then submerging headfirst

Brown or black coat; white heads in older animals

Long, bushy tails

Swim with hind flippers; very rarely go ashore in California

Stay very close to coast; sometimes raft in kelp or float on surface with front and/or hind flippers out of water

Often roll and rub themselves with flippers

Often place prey on bellies

Whiskers end in horizontal line beneath snouts

Male:	*Female:*
Up to 80 pounds	Up to 50 pounds or so
Up to 5 feet	Up to about 4 feet

Notes: The main difference between sea otters and pinnipeds is the small size of the otter. Also, sea otters only stay down from a few seconds to a few minutes at most; pinnipeds can remain submerged much longer. Finally, sea otters generally remain very close to shore in water 120 feet in depth or less.

Key to Identifying Large Whales off California

Species	Blow	Dorsal	Flukes	Habitat	Key features
Blue	Tall and straight	Very small (up to 1 foot), very far back, appears after blow	Huge, straight when seen from rear	Near escarpments; open sea; subtemperate in CA	Glows turquoise, mottled blue-gray, wide, flat head
Fin	Similar to above, smaller	Larger (18 to 24”); appears with blow or immediately afterward	Virtually never seen	Near escarpments & open ocean; subtemperate & temperate in CA	Lower right jaw white, rest gray or black, sometimes gray or white chevron behind head.
Sei	Medium, bushy	Large (24” or more), 1/3 forward of flukes	Virtually never seen	Tropical to subtemperate; rare off CA	Dorsal large, third of length forward from flukes, gray with oval white patches
Bryde’s	Short, bushy	Medium (18-24”) appears to sink when diving	Virtually never seen	Tropical to temperate; extremely rare off CA	Three ridges on snout
Minke	Short, bushy	Small (12-18”)	Virtually never seen	Fairly common near escarpments and plains	Smallest rorqual whale (35’); white stripe on each flipper, sharp, pointed snout
Humpback	Tall and straight, sometimes bushy	Misshapen, bumpy	Large, down-turned at tips	Common near escarpments	Down-turned tips of flukes, long flippers, warty snout
Gray	Heart-shaped	None, but bumpy ridges	Straight when diving	Coastal	Mottled gray color, heart-shaped blow
North Pacific right	Short, bushy	None	Large	Extremely rare off CA	No dorsal, high arch to lower jaw
Sperm	Short, bushy, forward and to left	None, but bumpy	Hang straight up for long time	Offshore canyons and seamounts	Boxy head shape; blow forward and to left
Baird’s beaked	Short, bushy	Triangular; 1/3 forward of flukes	Sometimes shown	Continental borderline; rare	Bulbous head; dolphinlike snout

APPENDIX B: CONTACT LIST

The Brannan Street Wharf - Job #226

Agency	Name	Office Phone	Cell	Email	Project Role
Port	Steven Reel	415-274-0574	415-793-5352	steven.reel@sfport.com	Port Alternate POC
Port	Lauren Eisele	415-274-0226	415-725-1593	Lauren.Eisele@sfport.com	Port Project Manager
Port	Redgy Ramirez		510-816-4969	redgy@baseline-emv.com	Port's AC34 Env. Inspector
Port	Matt Weinand		650-302-4433	mweinand@sfwater.org	Port's AC34 Env. Coordinator
DPW	Laura Lombardi	415-554-8254	415-994-7293	laura.lombardi@sfdpw.org	
DPW	John O'Sullivan		415-203-1530	john.o'sullivan@sfdpw.org	
DPW	Hua Mei		415-309-5813	hua.mei@sfpdw.org	
DPW	Carl Lucas Yee		415-548-0180	carl.yee@sfdpw.org	
Dutra Construction	Steve Hutchison	415-254-4410		shutchison@dutragroup.com	
Dutra Construction	Bryan O'Sullivan		415-686-3938	bosullivan@dutragroup.com	
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Municon Consultants	Anthony Argyriuo	415-641-2570	415-937-4686	anthony@municon.net	
Municon Consultants	Emaneab Hailezghi		415-690-5583		
Tetra Tech	Shannon Lindquist	510-302-6331	925-997-1894	shannon.lindquist@tetratech.com	Field Monitor
Tetra Tech	Mandi McElroy	510-302-6336	706-254-8717	mandi.mcelroy@tetratech.com	Deputy Project Manager
Tetra Tech	Ann Zoidis	510-302-6358 or 207-288-0976	510-393-5906	ann.zoidis@tetratech.com	Project Manager
A.A. Rich and Associates	Alice Rich	415-485-2937	415-999-4052	alice@aarichandassociates.com	AAR Principle
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A.A. Rich and Associates	Ian Cole	415-485-2937	650-575-9813	cole.ian.m@gmail.com	Field Monitor
		America's Cup Contacts			
ACEA	Bob Billingham		530-913-4597	Bob.billingham@americascup.com	ACEA construction manager
ACEA	Chip Nilsen			chip@nilsenonline.com	ACEA construction management contractor
Premier Structures, Inc.	Paul Osmundson	415.778.8000	415.200.6939	paul@premierstructuresinc.com	ACEA construction managment contractor
Contractor	Peter Clark		401-595-7756	peterclarkh@gmail.com	Dock contractor

APPENDIX D

MARINE AND NOISE MONITORING PLAN FOR THE 34TH AMERICA'S CUP/CRUISE TERMINAL PROJECT

MARINE AND NOISE MONITORING PLAN
FOR THE
34TH AMERICA'S CUP/ CRUISE TERMINAL PROJECT

July 2012

Prepared for
Port of San Francisco
Pier 1
San Francisco, CA 94111

Prepared by
Boudreau Associates LLC
327 Jersey Street
San Francisco, CA 94114

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1.0 INTRODUCTION

The 34th America's Cup (AC34)/James R. Herman Cruise Terminal (cruise terminal) project consists of hosting 34th America's Cup race events in San Francisco Bay, constructing improvements along the San Francisco waterfront to establish necessary support facilities for race events and construction for the cruise terminal at Piers 27-29 in San Francisco.

The project sponsors (the America's Cup Event Authority (ACEA) and the Port of San Francisco (Port) either have obtained or are in the process of obtaining several natural resource permits to authorize the construction of proposed temporary and permanent improvements along with the AC34 race events. Some of these permits trigger monitoring requirements to protect marine biological resources. Specifically, the project sponsors have applied for the following permits which in addition to the Environmental Impact Report (EIR) prepared for this project under the California Environmental Quality Act (CEQA), include marine monitoring requirements:

- Section 10 permit from the U.S. Army Corps of Engineers (USACE) under the Rivers and Harbors Act to place temporary structures within San Francisco Bay;
- Marine Event Permit from the U.S. Coast Guard (USCG) to hold the AC34 race events;
- Biological Opinion from the National Marine Fisheries Service (NMFS) under the Federal Endangered Species Act (ESA), which includes review of Essential Fish Habitat under Section 305(b) of the Magnuson-Stevens Fishery Conservation and Management Act;
- Incidental Harassment Authorization (IHA) from NMFS pursuant to Section 101(a)(5)(D) of the Marine Mammal Protection Act (MMPA) of 1972; and
- Take assessment for review by California Department of Fish and Game (CDFG) pursuant to the California Endangered Species Act.

Project activities that require monitoring to ensure the protection of biological resources include pile driving (both vibratory and impact), boat race events, helicopter operations and fireworks displays. Accordingly, monitoring will need to be conducted both during construction and race event activities, as applicable.

Monitoring will not be conducted during pile, floating dock and mooring removal activities.

This plan consolidates applicable regulatory requirements associated with marine biological and noise monitoring and details the monitoring proposed for each applicable project component.

1.1 Regulatory Requirements

Marine Mammal Regulations

The MMPA prohibits the intentional harassment of marine mammals. NMFS defines harassment as "any act of pursuit, torment, or annoyance which has the potential to injure a marine mammal or marine mammal stock in the wild (Level A harassment) or has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption to behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering (Level B harassment).NMFS currently believes that underwater sound pressure levels (SPLs) above 190 decibels (dB) root mean square (rms) could cause injury (Level A harassment) in pinnipeds and SPLs above 180 dB rms could cause injury (Level A harassment) in cetaceans.. Federal Register Notice (Vol. 70 pp. 1871-1875) established thresholds for behavioral harassment of marine mammals (Level B harassment) at 160 dB rms for pulsed sounds, such as are produced by impact pile driving, and at 120 dB rms for continuous sounds, such as are produced by vibratory pile driving. Table 1-1 provides the sound thresholds and estimated distances related to marine mammal injury and disturbances from vibratory and impact pile driving as per the Incidental Harassment Authorization (IHA) for this project.

To comply with the MMPA, the ACEA and Port have submitted an IHA application to authorize the potential Level B harassment to the following four marine mammal species in San Francisco Bay; harbor seal (*Phoca vitulina richardii*), California sea lion (*Zalophus californius*), harbor porpoise (*Phocoena phocoena*), and elephant seal (*Mirounga angustirostris*) associated with the project. The IHA application included a measure to prepare a marine mammal monitoring plan. This plan is being created in part to comply with this proposed measure.

Endangered Species Act and Essential Fish Habitat Regulations

As referenced above, the project sponsors have prepared a biological assessment (BA) to complete formal consultation with the NMFS under Section 7 of the Endangered Species Act (ESA), and to address Essential Fish Habitat (EFH) under the Magnuson-Stevens Fishery Conservation and Management Act (MCMA), for the AC34 and Cruise Terminal projects. The BA addressed potential impacts to federally listed fish species and EFH from pile driving.

Table 1-1 Estimated distances to marine mammal sound thresholds during pile driving

Threshold	Distance (meters/feet)
IMPACT PILE DRIVING	
Pinniped Injury 190dB	n/a
Cetacean Injury 180 dB	2.2 m / 7 ft
Disturbance 160 dB	46 m / 151 ft
Airborne Disturbance 100 dB	5.3 m / 17 ft
Airborne Disturbance 90 dB	17 m / 56 ft
VIBRATORY PILE DRIVING	
Pinniped Injury 190 dB	n/a
Cetacean Injury 180 dB	n/a
Disturbance 133 dB [a]	926 m / 3038 ft
Airborne Disturbance 100 dB	6.8 m / 22 ft
Airborne Disturbance 90 dB	22 m / 72 ft

Note:
a - 133 dB is an interim proxy for ambient sound, not the threshold (i.e., 120 dB)

In addition, an informal biological assessment (take assessment) was produced to address state listed species under the California ESA, which was reviewed and approved by CDFG. CDFG agreed that with the implementation of proposed conservation measures, which included monitoring for listed fish species, the project would not result in state level take of state listed fish species.

The Fisheries Hydroacoustic Working Group (FHWG), whose members include NMFS' Southwest and Northwest, California, Washington, and Oregon departments of transportation, CDFG, and the U.S. Federal Highway Administration, issued an agreement to establish interim threshold criteria to determine the effects of high-intensity sound on fish. While these criteria are not formal regulatory standards, they are generally accepted as viable criteria for underwater noise effects on fish. These criteria were established after extensive review of the most recent analysis of the effect of underwater noise on fish. The agreed-upon threshold criteria for impulse-type noise to harm fish have been set at 206 dB peak, 187 dB accumulated SPL for fish over 2 grams, and 183 dB for fish less than 2 grams

(CalTrans, 2009). The conservation measures identified in the Section 7 BO with NMFS will be enforced through the Section 10 USACE Permit and the MEP issued by the USCG

The purpose of this Monitoring Plan is to establish protocols to ensure compliance with permit requirements. Based on the regulations and permits cited above, the following provides a general overview of the standards and requirements that project sponsors must follow during pile driving, helicopter operations, and fireworks displays to avoid and reduce impacts to marine mammals and sensitive fish species:

1) Monitoring during pile driving activities:
    a) Vibratory Pile Driving:
        i) There are no restrictions on concurrent vibratory pile driving (i.e., multiple locations and/or multiple rigs)
        ii) See Table 1-1 for relevant acoustic thresholds and estimated distances to thresholds. Note that for Level B harassment associated with vibratory pile driving, estimated distance is for sound attenuation to the level of ambient sound (133 dB) rather than to threshold (120 dB).
        iii) FHWG established sound thresholds of 183 dB for potential impact to fish < 2 grams and 187 dB for fish > 2 grams.
        iv) Noise monitoring during vibratory pile driving will include baseline measurements of ambient noise for up to three consecutive days before pile driving at each location and noise monitoring during the first two days (out of a maximum of seven) of vibratory pile driving in each location to confirm/establish zones of influence related to the sound thresholds.
        v) Visual monitoring of all marine mammals observed within proximity and within zones of influence during pile driving activities.
    b) Impact Pile Driving:
        i) Impact pile driving will not occur concurrently with any other impact pile driving activities.
        ii) Federal Register Notice (Vol. 70 pp. 1871-1875) established thresholds for behavioral harassment of marine mammals (Level B harassment) at 160 dB rms for pulsed sounds, such as are produced by impact pile driving. NMFS currently believes that underwater sound pressure levels (SPLs) above 190 decibels (dB) root mean square (rms) could cause injury (Level A harassment) in pinnipeds and SPLs above 180 dB rms could cause injury (Level A harassment) in cetaceans. Table 1-1 provides the sound thresholds and estimated distances related to marine mammal injury and disturbances from impact pile driving.
        iii) FHWG established sound threshold of 183 dB for potential impact to fish < 2 grams and 187 dB for fish > 2 grams.
        iv) Noise monitoring for impact pile driving will include a baseline survey of ambient noise for three consecutive days at Pier 19 prior to pile driving and measurements during the first five days (of impact pile driving to ensure a sufficient number of piles have been monitored to confirm/establish zones of influence related to the sound thresholds.
        v) Visual monitoring of all marine mammals observed in proximity and within zones of influence during pile driving activities.

2) Monitoring during helicopter operations.

    Race events will be held in August and October in 2012 and July – September in 2013. During race events approximately three helicopters will perform coverage of the races. It is anticipated

that a total of approximately 52 days of racing will be covered by helicopter operations during both the World Series events in 2012 and AC34 events in 2013. As detailed in Section 3, Pier 39 will be monitored for disturbances to California sea lion from the presence of helicopters.

The helicopters following each race will fly between 100 and 400 feet above sea level (asl) within the race area. The helicopters will normally perform coverage operations for up to three hours on a tank of fuel and will require refueling once per day. The helicopters will refuel at a secure airport or helipad and be secured there overnight between race days. All helicopter fueling and overnight landing and storage will occur at one or more existing regional airports or approved helipads. The coordination of the helicopters during race events will be such that one or two will stay above 400 feet asl and other helicopters will fly between 100-400 feet asl to more closely cover the racing action. The helicopters will be choreographed and move around the racecourse to anticipate the next important stage of each race for filming.

To protect avian sensitive species, the project sponsors will restrict helicopter operations such that they would avoid the air space within at least 1,000 feet (vertically and horizontally) around Alcatraz Island. This air space restriction distance of at least 1,000 feet (vertically and horizontally) will also be applied for race-related helicopter flight patterns above Crissy Beach Wildlife Protection Area. During flight operations, helicopters will minimize impacts to pinnipeds by avoiding low flying (< 100ft asl) over pinniped haul out areas at Pier 39.

An existing helipad on the southeastern corner of Treasure Island is proposed to serve as a temporary staging location for these helicopters, such as between individual races on a race day. Final details of helicopter operations will be provided in the Water and Air Traffic Plan that will be developed and implemented for AC34.

3) Monitoring during fireworks displays.
Approximately four fireworks displays are planned for AC34 race events (two – 30 minute displays and two -45 minute displays) during 2013. Pre and Post event surveys will be conducted within the acute fireworks impact area. Section 6provides greater detail on the monitoring procedures associated with fireworks.

4) Monitoring during race events.
As proposed by the project sponsors, the Course Marshal would establish a race course for each racing day within the conditions and parameters established under the USCG's Special Local Regulations (SLR), final CEQA and NEPA documents, and various regulatory approvals and permits. Attendants will be at the starting line and each turning mark, umpires (two) and several support boats will be out on the course. All race management personnel are tasked with scanning for debris or other obstructions that could possibly damage or impede fair play. Although unlikely, in the event that a large marine mammal, such as a whale is observed, the Course Marshal would notify all the other course marshals and officials via radio and postpone or abandon the race depending on the direction the whale is moving or its presence within or near the race course. These actions would be taken to ensure the safety of the marine mammals as well as the racing boats and crews. Obstructions and debris would also be managed or removed by race management personnel.

1.2 Program Objectives

The objectives of this program are to:

- Measure sound pressure levels from vibratory and impact pile driving to establish zones of influence related to sound thresholds for fish and marine mammals.
- Avoid injury to marine mammals through visual monitoring of identified zones of influence and cease pile driving activities if any animals enter the shutdown zone (e.g., impact pile driving area).

- Establish parameters to monitor site locations for the disturbance of marine mammals during pile driving activities, helicopter operations, and firework displays.
- Conduct field operations to obtain data as follows:
  1) Using sound meters, measure baseline of ambient noise in the vicinity of pile driving locations.
  2) Measure noise from vibratory and impact pile driving to establish/confirm threshold distances in Table 1-1.
  3) Make daily observations and record presence or absence of fish and marine mammals.

These objectives will be accomplished in accordance with the IHA, NMFS Biological Opinion, and pertinent permit conditions for the AC34 Project.

2.0 PILE INSTALLATION MONITORING

Piles will be driven using a vibratory hammer to install floating docks at the following locations: Pier 80, 30-32, 14 North, 9, 23 North and South, 27, 29 and offshore of Marina Green (See Figure 1 at end of document). Wood piles will be installed using an impact hammer at Pier 19 to improve and support the improvements made to the apron. Table 2-1 provides the proposed maximum number of piles to be driven at each location, production rate and projected construction time.

Table 2-1 Pile driving locations and number of piles for AC34 Project

Location	Number of Piles	Installation	Anticipated production rate (piles/day)	Anticipated Construction Timeframe
Vibratory Hammer Installation of Steel Piles (18 inch)				
Pier 80	26	Vibratory	8	August 2012
Pier 32 South	27	Vibratory	8	August 2012
Pier 14 North	44	Vibratory	8	June 2013
Pier 9	15	Vibratory	8	June 2013
Pier 23 North	21	Vibratory	8	May – June 2013
Pier 23 South	16	Vibratory	8	May – June 2013
Pier 27	55	Vibratory	8	May – June 2013
Pier 29 East	5	Vibratory	8	May – June 2013
Pier 29	21	Vibratory	8	November 2012
Marina Green Offshore	14	Vibratory	8	August 2012
Impact Hammer Installation of Wood Piles (12 inch)				
Pier 19	224	Impact	8	August 2012 – December 2012

2.1 Construction Methods

A vibratory hammer APE Model 100 or similar will be used to install 18 inch steel piles for floating docks. An impact hammer DELMAG D25-32 to D30-32 or similar type will be used to install the 12 inch wood piles for apron repairs at Pier 19. Depending on the location and logistics, piles will be installed from the existing deck structure using land based pile driving equipment or from a marine derrick barge. All construction equipment for pile driving will comply with all applicable equipment sound standards. If any equipment has been modified from its original factory installation the equipment utilized will have sound control devices no less effective than those provided on the original factory installation.

A "ramp up" process will be implemented for all pile driving activities. A ramp-up process includes various types of slow-start pile driving techniques to alert any animals close to the activity and allow them time to move away from impending construction. This process is intended to reduce exposure of animals to elevated sounds. The following ramp-up and sound minimizing procedures will be used for in-water pile installation:

a) A ramp-up technique (see b and c below) will be used at the beginning of each day's pile driving activities or when pile driving has ceased for more than 30 minutes.

b) During vibratory pile driving, contractors will initiate sound from vibratory hammers for 15 to 30 seconds at reduced energy followed by a 30 second waiting period. This procedure will be repeated two additional times before full energy may be achieved for each pile driven.

c) For impact pile driving at Pier 19, contractors will conduct soft starts followed by a 30 second waiting period then two subsequent sets.

d) Only one impact pile driver may be operated at a time for any AC34 construction activities at Pier 19. Impact pile driving may only occur in daylight hours.

e) When using an impact hammer, a cushion block or similar device will be used for sound attenuation at all times.

2.2 Measurement of Sound Pressure Levels

Sound monitoring data are needed to determine source sound pressure levels within construction areas and to verify estimated distances to the sound thresholds identified above in Section 1.

2.2.1 Ambient Sound Monitoring

Monitoring in the absence of construction activities will be conducted continuously for three consecutive days to determine ambient underwater noise levels in representative locations for impact and vibratory pile driving, such as Pier 32 South, Pier 19, and Pier 23 during hours that pile driving will occur (6am – 6pm). The meters will be placed at two depths: approximately mid water column and at a depth near the bottom of the water column but at least 1 m (3 ft) above the bottom. Data will be used to calculate an average Root Mean Square (RMS) value representative of the ambient conditions in the proposed pile driving locations in the absence of AC34 related construction activities.

2.2.2 Sound Monitoring During Vibratory Pile Driving

Monitoring for Sound Impacts to Marine Mammals

As shown in Table 1-1, estimated distances to various sound thresholds will be used to establish zones of influence (ZOIs) for marine mammals. NMFS currently recommends a preliminary 926-m (3,038 ft) radius zone of influence (ZOI) around a vibratory pile-driving site for marine mammals (77 Fed Reg No. 106 pg. 32573 - 32578 Friday June 1, 2012). The disturbance zone is intended to include all areas where the underwater noise levels are anticipated to exceed ambient sound levels and/or the 120dB threshold. Once pile driving begins, SPLs will be recorded at the 926-m (3,038-ft) contour. The safety zone radius for

marine mammals will then be enlarged or reduced, depending on the actual recorded sound levels. On the first two days of vibratory pile driving (during an anticipated maximum of seven days) of pile driving at each location; field staff will measure SPLs at four distances from the pile being driven at 10 meters, 100 meters, 500 meters and 926 meters. Real time data from these measurements will be evaluated within 72 hours and mean values established and translated to the field personnel via phone for field interpretation and clarification of the boundaries of the disturbance zones. Noise levels will be measured during the entire driving session at these distances for each pile driven the first two days at the first floating dock installation location. It is assumed that the same vibratory pile driving technique will be used in the same substrate at the other floating dock installation locations, therefore a similar ZOI can be used at these other locations.

Measurements will be conducted at two depths: approximately mid water column and a depth near the bottom of the water column but at least 1 m (3 ft) above the bottom

Once the disturbance zone has been established during the first two days of vibratory pile driving, the remainder of pile driving will utilize this established distance for visual monitoring. Additional sound monitoring will not be conducted for marine mammal monitoring, only visual observations as detailed in Section 2.2.4 will be conducted on a daily basis during any vibratory pile driving based on the established ZOI. It is assumed that the same vibratory pile driving technique will be used at the other floating dock installation locations, accordingly the same distance established for the ZOI in one location will be utilized to visually monitor at the other pile driving locations.

Monitoring for Sound Impacts to Fish

Monitoring will include underwater sound measurements within and at the threshold boundary at which lethal sound impacts are anticipated. As stated above, the FHWG established sound threshold of 183 dB for potential impact to fish < 2 grams and 187 dB for fish > 2 grams. The disturbance thresholds are lower for marine mammals than threshold levels for impacts to fish. Accordingly, the sound monitoring the ZOIs for marine mammal monitoring will subsume or contain the calculated injury zones related to fish. Sound measurements taken the first two days will verify whether SPLs are below impact thresholds for fish. Accordingly, additional fish specific sound monitoring is not proposed since the marine mammal thresholds are lower and more protective.

If any dead or moribund fish are observed during pile driving, they will be collected and identified. NMFS and CDFG will be notified immediately and pile driving operations will be halted for the remainder of the day. Sound monitoring measurements will be initiated the following day when pile driving is initiated within and at the threshold boundary of where lethal sound impacts are anticipated.

2.2.3 Sound Monitoring During Impact Hammer Pile Driving

Monitoring for Sound Impacts to Marine Mammals

Preliminary zones of influence (ZOI) shall be established around the pile-driving site (Federal Register /Vol. 77, No. 106 Friday June 1, 2012) during impact hammer pile driving as shown in Table 1-1. These ZOIs are intended to include all areas where the SPLs are anticipated to exceed 180 dB RMS (2.2 meters/7 feet) for injury to cetaceans and 160 dB RMS (46 meters/151 feet) for disturbance to pinnipeds. Once pile driving begins, SPLs will be recorded at the 10 m (33 ft) and 50 meter (151 feet) contours. The safety zones for marine mammals will then be enlarged or reduced, depending on the actual recorded SPLs. On the first five days of pile driving; field staff will set meters at three distances from the piles being driven at 10 m, 50 m and 100 m. Noise levels will be measured during the entire driving session at these distances for each pile driven the first five days of impact hammer installation of 12 inch wood piles at Pier 19.

Bathymetry for the Pier 19 apron area is relatively consistent showing similar depths across the area where piles will be driving. Measurements will be conducted at two depths: approximately mid water column and a depth near the bottom of the water column but at least 1 m (3 ft) above the bottom. Measurements will be made at other locations either nearer or farther as necessary to establish the approximate distances for the 160 dB and 180 dB ZOIs.

Once the 160 dB and 180 dB ZOIs have been established during the first five days of impact pile driving, the remainder of pile driving will utilize the established distances for visual monitoring of marine mammals. Additional sound monitoring will not be conducted for marine mammal monitoring; only visual observations will be conducted on a daily basis during the remainder of impact pile driving of 12 inch wood piles.

Monitoring for Sound Impacts to Fish

Monitoring will include underwater sound measurements within and at the threshold boundary at which lethal sound impacts are anticipated. As previously stated, the FHWG established sound threshold s are 183 dB for potential impact to fish < 2 grams and 187 dB for fish > 2 grams. The marine mammal monitoring ZOI is significantly less than thresholds set for fish. The sound monitoring to establish ZOIs for marine mammal monitoring will subsume the calculated injury zones related to fish. Sound measurements the first two days will verify whether SPLs are below impact thresholds for fish. Therefore, no additional sound monitoring of impact pile driving will be conducted for fish thresholds as the marine mammal thresholds are lower and more protective.

If any dead or moribund fish are observed during pile driving, they will be collected and identified. NMFS and CDFG will be notified immediately and pile driving operations will be halted for the remainder of the day. Sound monitoring measurements will be initiated the following day when pile driving is initiated within and at the threshold boundary of where lethal sound impacts are anticipated.

2.3 Visual Monitoring of Marine Mammals

ZOI monitoring will be conducted during a minimum of 1/3 of the total vibratory pile driving days and for each day that impact driving occurs. Monitoring of the pinniped and cetacean disturbance zones will be conducted by a qualified NMFS-approved marine mammal observer (MMO). One MMO will be required for the safety zones around each pile-driving site. Accordingly, multiple MMOs will be required if vibratory pile-driving is occurring at multiple locations simultaneously. The MMOs will begin monitoring at least 30 minutes prior to initiation of the pile-driving activities. MMOs likely will conduct monitoring from small boats, existing piers or construction barges. MMOs must be in a location where the full radius of the ZOI is visible (unless part of the radius is under a pier structure).

Observers will survey each shutdown zone to ensure that no marine mammals are seen within the zone before pile-driving of a pile segment begins. If marine mammals are found within the ZOI, pile-driving of the segment will be delayed up to 15 minutes to allow them to move out of the area. If a marine mammal is seen above water and then dives below, the contractor will wait 15 minutes and if no marine mammals are observed in that time it will be assumed that the animal has moved beyond the ZOI.

Monitoring will continue through the pile-driving period and will end approximately 30 minutes after pile-driving have been completed. Observations will be made using binoculars and the naked eye during daylight hours. Marine mammal observers will have night-time infrared scopes or other tools to conduct monitoring during low-light conditions (all impact pile driving will occur during the day). Each member of the monitoring team will have a marine radio or cell phone to contact other observers and work crews. A range finder will be used by the MMO to determine the observation location and distance to marine mammals, boats, and construction equipment.

Data on all observations will be recorded and will include to the extent available, information regarding species, numbers, sex and age class, behavior, time of observation, relative locations of animals to the monitor, and the pile being driven, time that the pile driving begins and ends, any mitigations implemented and other acoustic or visual disturbances. The reactions of marine mammals will be recorded based on the following classifications: 1) no response, 2) head alert (looks towards the source of disturbance), 3) approach water (but does not leave), and 4) flush (leaves a haul-out site). The number of marine mammals under each disturbance reaction will be recorded, as well at the time when seals re-haul after a flush. Appendix A provides the biological data sheets to be used for recording observations.

Visual Monitoring During Vibratory Pile Driving

Once the disturbance zone has been established, MMOs will use this radius for visual monitoring as detailed above. The primary purpose of monitoring the disturbance zone is to document incidents of Level B harassment.

Visual Monitoring During Impact Pile Driving

For all impact pile driving a 10 m radius shutdown zone will be implemented around each pile to avoid exposure of marine mammals to SPLs that could potentially cause injury. This distance subsumes the calculated injury zone of 180 dB for cetaceans (harbor porpoise). This shutdown zone will be monitored by MMOs during all impact pile driving. If a marine mammal enters the shutdown zone (within 10 m), pile driving operations must cease and desist until the marine mammal moves out of the shutdown zone. Pile driving may resume when the marine mammal leaves the shutdown area

As previously stated, the disturbance ZOI of 160 dB will be measured and is anticipated to be an approximately 50 m radius around each pile. MMOs will monitor the disturbance zone and can communicate the presences of marine mammals in the project area but outside the shutdown zone and thus prepare for potential shutdowns of activity. The primary purpose of monitoring the disturbance zone is to document incidents of Level B harassment.

3.0 MONITORING OF RACE EVENTS

America's Cup Race Management will conduct visual monitoring for marine mammals. During 2012 race events and 2013 race events with less than 500 spectator boats (> 50% of expected peak # of spectator boats) monitoring will be conducted by trained AC34 course marshals. During 2013 race events with greater than 500 spectator boats, monitoring will be conducted by course marshals and NMFS approved Marine Mammal Observers (MMO).

Monitoring for cetaceans, will include training, pre-race surveys (60 minutes prior to first race) on days with greater than 500 spectator boats, monitoring during races, post-race surveys (60 minutes after last race) on days with greater than 500 spectator boats, and reporting. With concurrence, America's Cup Race Management will coordinate with Golden Gate Cetacean Research (GGCR) on the following monitoring program.

America's Cup Race Management will coordinate with a senior GGCR staff to advise on the monitoring of cetaceans specifically the harbor porpoise and bottlenose dolphin during 2013 racing events with greater than 500 spectator boats.

Coordination will include the following:

GGCR has trained 94 course marshals for AC34. Any new course marshals shall receive training.

Course marshal training includes education regarding how to identify marine mammals and typical transit or feeding patterns within the race course area and spectator areas.

GGCR to provide one senior staff person to attend weekly briefings during 2013 racing event and provide pertinent information to course marshals for that week. Information may include areas of specific concern related to transit and feeding activities of cetaceans within the proposed race and spectator areas.

A MMO, from the pool of NMFS approved qualified staff, will be positioned on the Golden Gate Bridge during 2013 race events with greater than 500 spectator boats with binoculars during each race (60 minutes before and after racing) to record and report any siting of any cetacean activity.

During 2013 race events with greater than 500 spectator boats at least 10% of those Course Marshals that took the course will be on the water amounting to a minimum of 8 trained AC34 staff on as many marshal boats.

Course marshals will report any dense activity within the 2012 or 2013 race course to GGCR senior staff. GGCR staff will advise as needed on the recommended course of action.

The course marshals and MMOs will communicate observations of cetacean activity within and around the race area to all other race participants and observers via a designated VHF radio Channel 20. For any large whales, observations will be communicated to and amongst course marshals and to relevant advisory staff and a decision will be made regarding delay or postponement of race event. For any small cetaceans, observations will be communicated to and amongst course marshals and to relevant advisory staff and a decision will be made regarding advisory notices to mariners. Any observations of interest (e.g., unusual behaviors) for any marine mammals (including pinnipeds) will be recorded and communicated to GGCR and included in any final reporting. All observations and information will be noted on the attached data sheets.

America's Cup Race Management will submit a report at the conclusion of the 2013 racing events documenting all marine mammal observations. The report will be submitted to the Port, GGCR and NMFS.

4.0 MONITORING OF HELICOPTER OPERATIONS

During helicopter operations at least one MMO will monitor the California sea lion haul-out at Pier 39. Monitoring will be conducted for five days when the helicopter flight patterns are most likely to affect Pier 39 to confirm the estimated Level B Harassment of 250 sea lions per day. If pinnipeds are being disturbed by helicopter operations to a degree similar to that assumed here, additional monitoring must be implemented for at least 1/3 of the total helicopter operation days or 17 days. If pinnipeds at Pier 39 are not being disturbed, or are being disturbed to a much lesser degree than what was assumed in the IHA, monitoring may cease after the first five days of helicopter operations with NMFS concurrence.

As previously stated in Section 1.1 No. 2, helicopter flight restrictions to protect sensitive species will be implemented. Air space within at least 1,000 feet (vertically and horizontally) around Alcatraz Island and above Crissy Beach Wildlife Protection Area as well as avoiding low flying (< 100ft asl) over pinniped haul out areas at Pier 39.

Flight Operations at Treasure Island have specific flight restrictions and approach protocols to avoid impacts to the Yerba Buena haul out for harbor seals.

5.0 MONITORING OF FIREWORKS DISPLAYS

A pre- and post- event census of marine mammals within the acute fireworks impact area (the area where sound, light, and debris effects may have direct impacts on marine organisms and habitats – 500m around fireworks barge; and the California sea lion haul-out at Pier 39.) will be performed. The pre-firework survey will be conducted as close to the actual fireworks display time as possible and must be conducted for no less than 30 minutes and must describe all observed marine mammals and locations.

During each firework display event a MMO will observe pinnipeds at the Pier 39 haul-out and will record any Level B Harassment.

Post-event survey monitoring in the same impact area will occur no later than the morning following the fireworks display and for no less than 30 minutes in duration to record any injured or dead marine mammals.

There are no direct effects anticipated for the least tern as major nesting areas do not occur within the project area.

6.0 PROJECT ORGANIZATION AND RESPONSIBILITIES

Successful execution of this monitoring program will involve close coordination among the Port, ACEA, and the construction contractors, MMOs, and other field personnel. Each project sponsor will hire the appropriately trained field inspectors, and specialty monitors and be responsible for the timely review and reporting of monitoring data to pertinent regulatory agencies and their staff. Because the monitoring program is expected to span several months and possibly up to two years, the procedures for coordinating efforts and exchanging information and data among the regulatory agencies, the Port, ACEA, and other contractors may be refined as more experience is gained throughout the project.

6.1 Qualifications for Sound Measurement Contractor

Any personnel or contractor conducting sound monitoring must have an appropriate bachelor's degree and a minimum of 3 years' experience in noise monitoring and analysis (Experience in the San Francisco Bay is preferred).

6.2 Qualifications for Marine Mammal Observers

In order to be considered qualified to record observations of marine mammals for this monitoring project observers must meet the following criteria:

1) Visual acuity in both eyes (correction is permissible) sufficient for discernment of moving targets at the water's surface with ability to estimate target size and distance; use of binoculars may be necessary to correctly identify the target.
2) Experience and ability to conduct field observations and collect data according to assigned protocols (this may include academic experience)
3) Experience or training in the field identification of marine mammals, including the identification of behaviors.
4) Sufficient training, orientation, or experience with the construction operation to provide for personal safety during observations
5) Writing skills sufficient to prepare a report of observations including but not limited to the number and species of marine mammals observed: dates and times when in water construction activities were documented dates and times when in water construction activities were suspended to avoid potential incidental injury from construction sound of marine mammals observed within a defined shutdown zone and marine mammal behavior.
6) Ability to communicate orally, by radio or in person with project personnel to provide real-time information on marine mammals observed in the area as necessary.

All MMOs must meet at least once for a training session sponsored by the Port and ACEA to discuss implementation of the protocols, identification of marine mammals and reporting requirements. All monitoring personnel will be provided a copy of this monitoring plan and the IHA. Monitoring personnel must read and understand the contents of this plan as well as the IHA as they relate to coordination, communication, and identification and reporting incidental harassment of marine mammals.

6.3 Qualifications for Fish Impact Observers

In order to be considered qualified to record observations of fish for this monitoring project observers must meet the following criteria:

1) Visual acuity in both eyes (correction is permissible) sufficient for discernment of moving targets at the water's surface with ability to estimate target size and distance; use of binoculars may be necessary to correctly identify the target.

2) Experience and ability to conduct field observations and collect data according to assigned protocols (this may include academic experience)

3) Experience or training in the field identification of marine fish, including the identification, sizing, and capture of floating fish.

4) Sufficient training, orientation, or experience with the construction operation to provide for personal safety during observations.

5) Writing skills sufficient to prepare a report of observations including but not limited to the number and species of fish observed: dates and times when in water construction activities were documented dates and times when in water construction activities were suspended.

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

Qualifications of fish observers shall be approved by the CDFG prior to field monitoring.

6.4 Briefings

Prior to the start of any pile-driving activity, a briefing will be held between the construction supervisors and crews, the marine mammal and fish monitoring teams, acoustical monitoring team, and Port or ACEA staff. The purpose of the briefing will be to establish responsibilities of each party, define the chains of command, discuss communication procedures, provide an overview of monitoring purposes, and review operational procedures. The Resident Engineer will have the authority to stop or delay any construction activity, if deemed necessary by the MMOs, noise or fish monitors. New personnel will be briefed before they join the work in progress.

7.0 FIELD SAMPLING AND DOCUMENTATION PROCESSING

This section summarizes the field equipment needed and procedures to be followed for collecting sound data, visual monitoring, and reporting.

7.1 Marine Monitoring Equipment

The following equipment will be used by the MMOs:

- Global positioning system (DGPS) for determining pile location
- A rangefinder capable of achieving an accuracy of ± 5 feet at a range of 100 feet;
- Binoculars;
- Radio or cell phone;
- Field Data Sheets;
- Fish catch net.

The MMOs will set up communications and logistics protocols with the noise monitors and pile driving crews on a site by site basis, to ensure that the ZOIs are clearly defined to all parties, and the shut down notification protocols are well understood.

7.2 Sound Monitoring Equipment

As recommended by CalTrans (2009), measurements are anticipated to be made using hydrophones that have a flat frequency response and are omni-directional over a frequency range of 25 to 10,000 Hz. For example, CalTrans (2009) suggests Reson Model TC-4013 or Model TC-4033 hydrophones with PCB in-line charge amplifiers (Model 422E13) and PCB Multi-Gain Signal Conditioners (Model 480M122) or equivalent systems be used to adjust the received signals to appropriately measure and record the large range of sound pressures that pile driving could generate.

The signals are anticipated to be fed into Integrating Sound Level Meters (SLM) which will measure peak pressure and SEL. Quality recordings using a digital audio recorder (either solid state or tape) would be made at times during attended measurements. As recommended by CalTrans (2009), the SLM is expected to have the ability to measure the un-weighted peak sound pressure levels over relative short periods and is expected to be used to approximate the un-weighted SEL of each pile strike by measuring the one-second equivalent sound energy level (Leq [1-sec]) using the C-weighting network setting or equivalent. All measurement equipment will be required to have a frequency response of +1dB from 10 Hz to 10,000 Hz over the anticipated measurement range and hydrophones of different sensitivities may be required depending on the acoustic environment.

Alternative equipment or measurement procedures may be proposed by the contractor performing the sound monitoring. In this case descriptions and specifications of such equipment/measurement procedures would be provided to NMFS for pre-approval prior to implementation.

7.2.1 Quality Control

Calibration of the sound measurement systems would be established prior to use in the field. Calibration would be performed using the following techniques described by CalTrans (2009) or by alternative techniques that provide the same level of data at the same level of accuracy as proposed by the contractor performing the sound monitoring:

1. Use an acoustically certified piston phone and hydrophone coupler that fits the hydrophone to directly calibrate the measurement system. In this case, the volume correction of the hydrophone coupler using the hydrophone is known so that the piston phone produces a known signal that can be compared against the measurement system response. The response of the measurement system is noted in the field book and applied to all measurements.
2. Use the procedure described in 1 above to calibrate a “reference” hydrophone. The reference hydrophone is then replaced with the field hydrophone used to make actual measurements. Both the field and reference hydrophones would be required to have manufacturer calibration certifications that would include the hydrophone sensitivities. The sensitivity of the field hydrophone would be compared with the sensitivity of the “reference” hydrophone. The difference between the two hydrophones is the offset that would be applied to the measurements made using the “field” hydrophone. With this method, the response of the reference system to the calibration tone is noted in the field book along with the calculated “offset.” The calibration is applied to all measurements made using the “field” hydrophone. This procedure is useful for different model hydrophones that do not fit the piston phone coupler. These types of hydrophones are typically more rugged, and therefore, may be preferable in construction environments.

The SLMs will be calibrated to the calibration tone prior to use in the field. The tone is then measured by the SLM and is recorded on to the beginning of the digital audio recordings that will be used. The system calibration status would be checked by measuring the calibration

tone and recording the tones. The recorded calibration tones are used for subsequent detailed analyses of recorded pile strike sounds.

Field notes will be recorded during all measurements in a water-resistant field notebook and are expected to include calibration notes, measurement positions, pile-driving information, system gain setting, and equipment used to make each measurement.

7.3 Field Documentation

The Port Environmental Compliance Monitor will be responsible for ensuring that field documentation is complete. Documentation of field activities will consist of maintaining a field logbook and completing the appropriate field recording forms associated with the field activities. The field logbook will consist of bound, numbered pages and is intended to provide sufficient data and observations to enable readers to reconstruct events that occurred during the monitoring project.

The field recording forms are intended to provide an efficient means of recording detailed information specific to making observations.

7.3.1 Procedures for Sound Measurement Documentation

Daily sound measurement information should document the following information. The results will be summarized in graphical form and include summary statistics and time histories of impact sound values for each pile. The sound monitoring logs shall include but not be limited to:

a) Size and type of piles.

b) The hammer energy rating used to drive the piles, make and model of the hammer.

c) A description of the sound monitoring equipment.

d) The distance between hydrophone*(s)* and pile.

e) The depth of the hydrophone*(s)* and depth of water at hydrophone locations.

f) The distance from the pile to the water's edge.

g) The depth of water in which the pile was driven.

h) The depth into the substrate that the pile was driven.

i) The physical characteristics of the bottom substrate into which the piles were driven.

j) The total number of strikes to drive each pile and for all piles driven during a 24-hour period.

k) The ambient sound pressure level reported as the 50% CDF.

The results of the hydroacoustic monitoring, ranges and means including standard deviation/error for peak and RMS SPL's, single-strike and cumulative SEL, an estimation of the number of strikes that exceeded the cumulative SEL threshold and an estimation of the distance at which the peak and cumulative SEL values reach the respective thresholds and the distance at which the RMS values reach the relevant fish and marine mammal thresholds and ambient sound levels. Vibratory monitoring results will include the maximum and overall average RMS calculated from 30-second RMS values during the drive of the pile. Values for max/avg rms values for vibratory and peak/avg rms values for impact will be reported for full-power driving only and comparative values from soft starts will also be identified in the reports.

After completion of all pile driving for AC34 project, a final sound monitoring report will be prepared and submitted to the Port for inclusion in the program final report. It will include a summary of all data collected during monitoring activities and will provide the daily field logs

as an attachment. This report will be integrated into the larger final report for this monitoring program.

7.3.2 Procedures for Visual Monitoring Documentation

MMOs will document when Level B Harassment has occurred. Disturbance at haul outs associated with fireworks and helicopter operations can be defined according to a 3-point scale indication severity of behavioral reaction as shown in Table 6-1. The time, source, and duration of the disturbance, and an estimated distance between the source and haul-out should be documented. Only responses falling into Levels 2 and 3 would be considered as harassment under the MMPA under the terms of the IHA.

Table 6-1 – Pinnipeds Response to Disturbance

Level	Type of Response	Definition
1	Alert	Head orientation in response to disturbance. This may include turning head towards the disturbance, craning head and neck while holding the body rigid in a u-shaped position, or changing from a lying to a sitting position. May include slight movement of less than 1 meter.
2	Movement	Movements in response to or away from disturbance, typically over short distances 1-3 meter
3	Flight	All flushes to the water as well as lengthier retreats (> 3 meters)

Source: from Federal Register Vol. 77. No. 106 pg 32588 June 1, 2012
Note: This scale is for monitoring of pinniped disturbance from airborne sound/visual stimuli at haul-outs

Disturbance associated with pile driving can be determined by a comparison of the location of an observed animal, its response behavior and the distance to the relevant threshold as determined by acoustic monitoring.

MMO tasks associated with monitoring and reporting requirements for each of the ongoing project activities are summarized below:

Pile Driving

The following tasks will be conducted by each MMO or MMO team:

- Monitor any marine mammal activity in the vicinity of the pile driving activity
- Establish ZOI distances from pile to be driven
- Monitor shutdown ZOI 30 minutes before pile driving is initiated to ensure marine mammals are not present.
- Observe ZOIs for complete duration of pile drive
- If a marine mammal is within the shutdown zone, pile driving will not be initiated until the marine mammal leaves the shutdown zone of their own volition or until 15 minutes elapse without re-sighting the animal.
- If a marine mammal is seen approaching or entering the shutdown zone during pile driving operations must be discontinued until the animal has moved outside the shutdown zone or until 15 minutes has elapse without re-sighting the animal.
- If a marine mammal is observed within the disturbance zone, a take should be recorded and behaviors documented. (Pile driving may continue if marine mammal is observed within the disturbance zone).
- If marine mammal is observed within the shutdown zone all pile driving must cease until the animal has moved outside the shutdown zone or until 15 minutes has elapse without re-sighting the animal.

- If poor weather conditions affect visibility such that the radius of the shutdown zone (not including under pier area) is obscured, pile driving cannot be initiated until the shutdown zone is visible. Work that has been initiated in conditions of good visibility may continue during poor visibility.

Helicopter Operations

The following tasks will be conducted by the MMO observing Pier 39 during helicopter operations:

- Ensure that a vantage point is established to observe the Pier 39 haul out for the duration of helicopter operations.
- Record all incidents of behavioral responses.

Firework Displays

The following tasks will be conducted by the MMO observing Pier 39 during fireworks displays:

- Conduct pre-survey in potential impact area (500 m radius surrounding firework barge location).
- Ensure that a vantage point is established to observe the Pier 39 haul out for the duration of firework displays.
- Record all incidents of behavioral responses of pinnipeds at Pier 39
- Conduct post survey in potential impact area (500 m radius surrounding firework barge location).

7.3.3 Procedures for Fish Monitoring

Fish monitoring will be performed during all impact pile driving activities for the first 2 weeks of pile driving and will include observation and recording of any occurrence of dead or moribund fish. . The objectives of such monitoring will be to:

- Confirm the presence or absence of dead or moribund fish;
- Document the specific construction activity, location and time occurring;
- Identify size and species of fish affected; and
- Collect and transfer of any dead green sturgeon or salmonids to NOAA-Fisheries.

If after 2 weeks of monitoring, no bird predation or dead fish are observed, the Port will consult with NMFS and CDFG to consider cessation of monitoring.

In accordance with the Terms and Conditions of the project Biological Opinion (NMFS 2012), if any salmonids or sturgeon are found dead or injured during visual observations, NMFS biologist Gary Stern will be contacted immediately by phone at (707) 575-6060 or at the NMFS North Central Coast Office at (707) 575-6050. In addition, Mr. Eric Wilkins at CDFG should be notified at (831) 649-2813. All sturgeon mortalities shall be retained, placed in an appropriately-sized sealable plastic bag, labeled with the date and location of collection, fork length, and be frozen as soon as possible. Frozen samples shall be retained by the monitors or project biologist until specific instructions are provided by NMFS. The biological samples may not be transferred to anyone other than the NMFS Santa Rosa Area Office without obtaining prior written approval from the NMFS North Central Coast Office, Supervisor of the Protected Resources Division. Any such transfer will be subject to such conditions as NMFS deems appropriate.

7.3.4 Daily Reporting Logs

Information will be recorded and submitted to the Port's Environmental Compliance Monitor on a daily basis by either the sound monitoring team and/or the MMOs when pertinent. Each log will provide the following information:

a) Date and location

b) Activity being monitored (e.g., Construction – pile driving for ACEA or Port, helicopter operation or firework display)

c) For pile driving, record the following additional information:

   i. Identify contractor – (Port or ACEA)

   ii. Pile type and size

   iii. Type of driving

   iv. Attenuation device

   v. Duration of drive – time that pile driving begins and ends

   vi. Sound data

   vii. Distances to thresholds

d) Count of all marine mammals observed by species, sex, and age class

e) Marine mammal location within or in relation to the zone

f) Marine mammal reaction (if any) to activities, including direction of movement, and type of activity that is occurring

g) Observations of dead or moribund fish

h) Any acoustic or visual disturbance

i) Environmental conditions (e.g. tide, wind speed, wind direction, visibility, temperature)

j) Finalize Daily Log and submit to Port PM

k) Any mitigations implemented

8.0 FINAL REPORTING

A draft report of all activities, sound measurements fish and marine mammal monitoring results will be submitted to the NMFS offices of Protected Resources and Southwest Regional Administrator and the California Department of Fish and Game within 90 days of the expiration of the IHA or 60 days after all project components are completed. Relevant data from other research agencies may also be included in the report. A final report will be prepared and submitted to NMFS within 30 days following receipt of any NMFS' comments on the draft report. Copies of the final report will be issued to all pertinent regulatory agencies by the project sponsors. The final report will include a description of the materials and methods used in monitoring, an overall summary of the project results, and a discussion of the compliance record over the course of the entire program, and a discussion of the effectiveness of monitoring methods.

9.0 REFERENCES

California Department of Transportation (CalTrans). 2009. Final Hydroacoustic Monitoring Plan for Driving of Temporary Access Trestle Piles for the Self-Anchored Suspension Span. File Number EA 0120F3, 04-SF-80 KP 12.2/KP 14.3, 04-ALA-80 KP 0.0/KP 2.1

California Department of Transportation (Caltrans). 2009. Technical Guidance for Assessment and Mitigation of the Hydroacoustic Effects of Pile Driving on Fish. Prepared by ICF Jones and Stokes and Illingworth and Rodkin. Retrieved from http://www.dot.ca.gov/hq/env/bio/files/Guidance_Manual_2_09.pdf.

SOURCE: Google Maps; ESA

Figure 1
Proposed Facility Improvement Sites

APPENDIX A

AC34/CRUISE TERMINAL BIOLOGICAL MONITORING DATA SHEET

FISHERY RESOURCES

Date _____ **Monitor** _____ **Visibility** _____

Tide Level _____ **Human Activity in the Area** _____

Latitude _____ **Longitude** _____

Monitoring Locale: _____

Pile Type: _____

Piles/Day (1-8): ☐ **Pile Driver: Impact** ☐ **Vibratory/Impact** ☐ **Attenuation Device: None** ☐

Minutes of Vibratory Driving : _____

Impact Blows per Pile: _____

Pile No.	Pile Driver (Impact, Vibratory)	Pile Driving Start/End Time	Observer Start/End Time	Dead/Injured Fish Observed (Number/Species)[1]	Dead/Injured Fish Collected (Number/Species/length)	Comment: Reference Number

[1] SH=Steelhead; GS=North American Green Sturgeon; O=Other

AC34/CRUISE TERMINAL BIOLOGICAL MONITORING DATA SHEET

FISHERY RESOURCES

Comment: Reference No.	Fish Species	Life Stage and Status (A,J,L,E,FT,ST, FE,SE,CF, CS)	Comments

A=adult; J=juvenile; L=larva; E=egg; FT = federal threatened; ST=state threatened; FE=federal endangered SE=state endangered; CF = federal candidate; CS=state candidate

AC34/CRUISE TERMINAL BIOLOGICAL MONITORING DATA SHEET

PHOTOS

Comment: Reference No.	Photo Number	Photo Taken Before (B), During (D) or After (A) Pile Driving	Description

AC34/CRUISE TERMINAL BIOLOGICAL MONITORING DATA SHEET

ADDITIONAL COMMENTS

Comment: Reference No.	Additional Comments

AC34/CRUISE TERMINAL BIOLOGICAL MONITORING DATA SHEET

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DIAGRAM

BIOLOGICAL MONITOR _____ _____

Signature **Print Name**

AC34/CRUISE TERMINAL BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

Date _____ Monitor (s) _____ Visibility _____

Tide Level _____ Human Activity in the Area _____

Monitoring Locale: _____

Pile Type: _____

Piles/Day (1-8): ☐ **Pile Driver: Impact** ☐ **Vibratory** ☐

Minutes of Vibratory Driving : _____

Impact Blows per Pile: _____

AC34/CRUISE TERMINAL BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

Pile No.	Pile Driver (Impact, Vibratory)	Pile Driving Start/End Time	Observation Start/End Time	Mammal Species[2]		Comments: Reference Number
				Species	No.	

[2] HS=Harbor Seal; SL = Sea Lion; HP=Harbor Porpoise; GW=Gray Whale; O = Other

AC34/CRUISE TERMINAL BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

Comments: Reference No.	Monitor's Distance from Pile Driving Activity	Initial Behavior of Marine Mammal	Changes in Marine Mammal Behavior (e.g., orientation, speed, diving, respiration rate, etc.)[3]

[3] **Note:** If a monitor sees a marine mammal within or approaching the shut down zone prior to the start of impact pile driving, the monitor will notify the on-site resident engineer (or other authorized individual), who will then be required to delay pile driving until the marine mammal has moved outside of the shut down zone, or if the animal has not been re-sighted within 15 minutes for pinnipeds or 30 minutes for cetaceans. If a marine mammal is sighted within or on a path toward the shut down zone, pile driving will cease until that animal has cleared and is on a path away from the shut down zone, or 15/30 minutes (pinnipeds/cetaceans) has lapsed since the last sighting.

AC34/CRUISE TERMINAL BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

PHOTOS

Comment: Reference No.	Photo Number	Photo Taken Before (B), During (D) or After (A) Pile Driving	Description

AC34/CRUISE TERMINAL BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

ADDITIONAL COMMENTS

Comment: Reference No.	Additional Comments

AC34/CRUISE TERMINAL BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

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DIAGRAM

BIOLOGICAL MONITOR _____ _____

Signature **Print Name**

APPENDIX E

COMPLETED DATA SHEETS AND DATA SUMMARIES (Pile Driving Monitoring)

Brannan Street Wharf – Biological Monitoring
Weekly Summary – July 23, 2012 through July 27, 2012

Monday, July 23, 2012

- N/A

Tuesday, July 24, 2012

- N/A

Wednesday, July 25, 2012

- N/A

Thursday, July 26, 2012

- N/A

Friday, July 27, 2012

Biological monitoring at the Brannan Street Wharf began at 0700 and continued until 1635. One steel pile had been driven on Thursday, July 26, 2012 without the knowledge of the biological monitors. One steel pile was driven on Friday, July 27. Pile driving activities occurred from 1248 to 1308. Bubble initially malfunctioned and was repaired. No negative impacts on any animal species were observed.

Biological Monitors-Marques Humpal, Ian Cole and Mandi McElroy

- **Fish:** No dead or injured fish were observed.
- **Birds:** One cormorant was observed swimming and diving approximately 200 feet southeast of the barge prior to the start of pile driving activity. No predation was observed. The cormorant flew away before pile driving began and was not observed again.
- **Marine Mammals:** Three marine mammals were observed throughout the monitoring period. All were observed outside of the exclusion zone. None were observed to exhibit any change in behavior as a result of project activities.
    - 0835-One harbor seal was observed approximately 300 feet from the barge prior to the start of pile driving. No change of behavior was exhibited and the harbor seal was not observed again after pile driving began.
    - 0840-One harbor seal was observed approximately 1,000 feet from the barge. The animal moved east and out of sight.
    - 1457-One California sea lion was observed approximately 500 feet northeast of the barge. The animal submerged and was not sighted again.

work start: 0650
work end: 1635

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

Date 7/27 Monitor (s) Mandi, Marques, Ian Visibility AM cloud/fog, then clear ~12:30

Tide Level BSS 1 Human Activity in the Area kayaker, pedestrians, other boats

Monitoring Locale: Pier 30 ☐ Pier 32 ☐ Pier 38 ☐ Boat ☐ 178 m from pile driving ☐

129 m from pile driving ☐ 1900 m from pile driving on vessels ☐ (on barge)

Pile Type: 24-inch octagonal concrete ☐ 24-inch steel shell ☒ Ambient Conditions ☐

Piles/Day (1-8): 1 Pile Driver: Impact ☒ Vibratory/Impact ☐

Attenuation Device: None ☐ Bubble Curtain: On ☒ Off ☐

Minutes of Vibratory Driving : n/a ☒ 8:00 ☐ 15:00 ☐ Impact Blows per Pile: 800 ☐ 300 ☒ 600 ☐

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

Pile No.	Pile Driver (Impact, Vibratory)[5]	Pile Driving Start/End Time	Observation Start/End Time	Mammal Species[6]			Comments: Reference Number
				Species	No.	Time	
n/a	n/a	pre-start	0835-1220	HS	1	0835	HS1
n/a	n/a	pre-start	0840-0905	HS	2	0840	HS2
2	impact	1447-1551	1457-1459	SL	1	1457	SL1

[5] Steel shell pile driving will include both vibratory (up to the last 10 feet) and impact (last 10 feet) pile drivers
[6] HS=Harbor Seal; SL = Sea Lion; HP=Harbor Porpoise; GW=Gray Whale; O = Other

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

Comments: Reference No.	Monitor's Distance from Pile Driving Activity	Initial Behavior of Marine Mammal	Changes in Marine Mammal Behavior (e.g., orientation, speed, diving, respiration rate, etc.)[7]
HS 1	100 ft	slow travel	no change
HS 2	100 ft	slow travel	no change
SL1	100 ft	slow travel, diving	no change

[7] **Note:** If a monitor sees a marine mammal within or approaching the Exclusion Zone prior to the start of impact pile driving, the monitor will notify the on-site resident engineer (or other authorized individual), who will then be required to delay pile driving until the marine mammal has moved outside of the Exclusion Zone, or if the animal has not been re-sighted within 15 minutes for pinnipeds or 30 minutes for cetaceans. If a marine mammal is sighted within or on a path toward the Exclusion Zone, pile driving will cease until that animal has cleared and is on a path away from the Exclusion Zone, or 15/30 minutes (pinnipeds/cetaceans) has lapsed since the last sighting.

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

PHOTOS

Comment: Reference No.	Photo Number	Time of Photo	Photo Taken Before (B), During (D) or After (A) Pile Driving	Description

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

ADDITIONAL COMMENTS

Comment: Reference No.	Additional Comments
HS1	remained ~300 ft from barge most of
	the morning w/no change in behavior.
	last seen surfacing @ 1220 (before pile
	driving) + was not observed again
	for the remainder of observation time.
HS2	sighted ~1000 ft away, moved east (out of
	sight) after 25 minutes.
SL1	on south side of pier 32 near buoy
	~500 ft NE of barge. facing east,
	submerged, did not re-surface.

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

DIAGRAM

BIOLOGICAL MONITOR _____ Mandi McElroy

Signature **Print Name**

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

BIRDS[8]

Date 7/27/12 Monitor Mandi Weather overcast / fog until 1230, then clear

Monitoring Locale: Pier 30 ☐ Pier 32 ☐ Pier 38 ☐ 178m from pile driving ☐ 120m from pile driving ☐

1900 m from pile driving on vessels ☐ on barge - elevated platform 360° view

Pile Type: 24-inch octagonal concrete ☒ 24-inch steel shell ☐ Ambient Conditions ☐ Piles/Day (1-8): 1

Pile Driver: Impact ☒ Vibratory/Impact ☐ Attenuation Device: None ☐ Bubble Curtain: On ☒ Off ☐

Minutes of Vibratory Driving: n/a ☒ 8:00 ☐ 15:00 ☐ Impact Blows per Pile: 800 ☐ 300 ☒ 600 ☐

Pile No.	Pile Driver (Impact, Vibratory)[9]	Pile Driving Start/End Time	Observer Start/End Time	Bird Predation on Fish Observed (Y/N) and Time		General Bird Activity/Behavior	Comment: Reference Number
n/a	n/a	pre-start	0700 start	N	0920	cormorant swimming/dive	1
1	impact	1248-1306	↓	N	1248	none	
1	impact	1307-1308	1635 end	N	1307	none	

[8] The bird monitor will have to work closely with the fish monitor because the monitor must attempt to determine the amount of bird predation on fishes, including the size and species of fish affected.

[9] Steel shell pile driving will include both vibratory (up to the last 10 feet) and impact (last 10 feet) pile drivers.

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

BIRDS

Comment: Reference No.	Predation[10]		Dead/Injured Fish Observed[11]		Dead/Injured Fish Collected[8]	
	Bird Strikes Per Minute	Duration	Species	Size	Species	Size

[10] Diving birds that may be present, but which cannot be confirmed to scavenge on injured fish while diving, will be noted on the data sheet, but are not included in the count of bird strikes.

[11] SH = steelhead; G=North American Green Sturgeon; O=Other

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

BIRDS

PHOTOS

Comment: Reference No.	Photo Number	Time of Photo	Photo Taken Before (B), During (D) or After (A) Pile Driving	Description

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

BIRDS

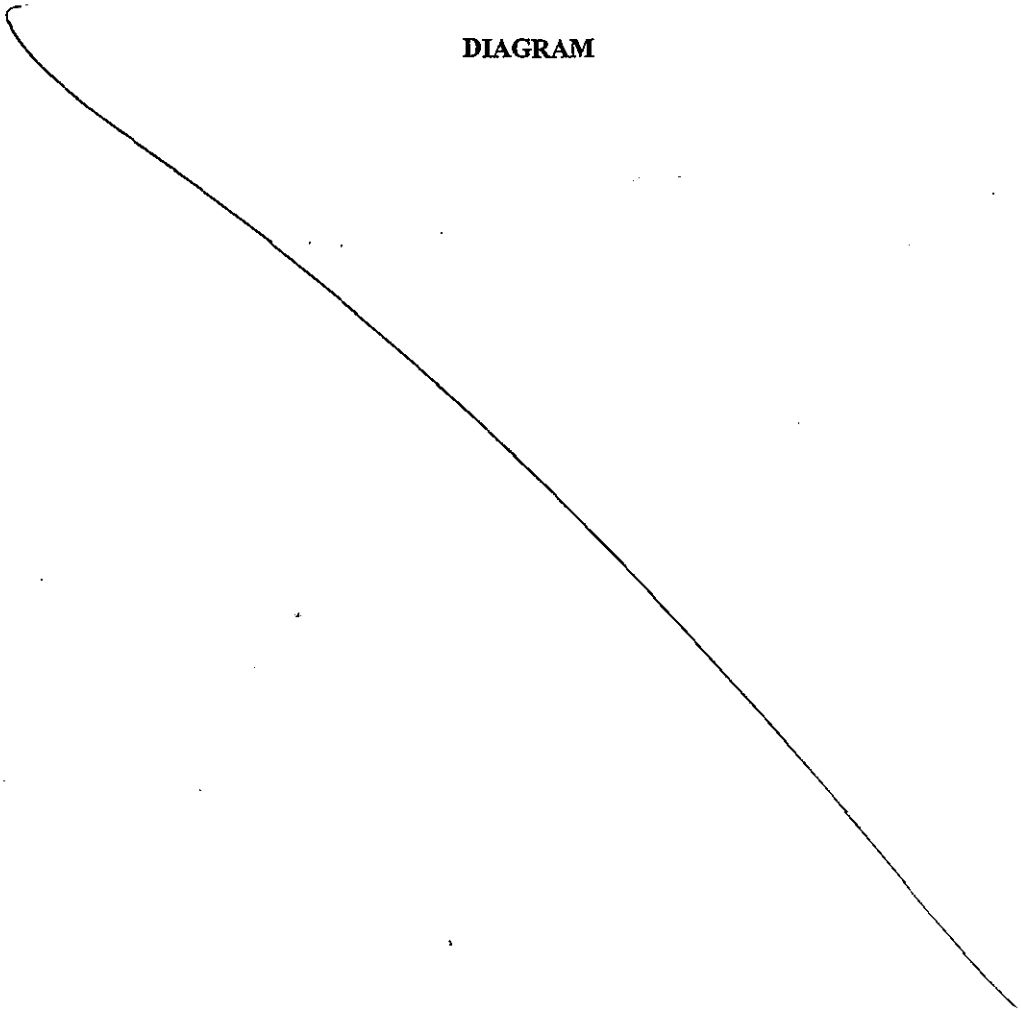
ADDITIONAL COMMENTS

Comment: Reference No.	Additional Comments
1	cormorant swimming / diving ~200 ft
	SE of barge for most of the morning. No
	predation observed. Flew out of area ~12:30
	before pile driving started, did not return
	for remainder of observation time.

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

BIRDS

DIAGRAM



BIOLOGICAL MONITOR _____ Mandi McElroy

Signature **Print Name**

Brannan Street Wharf – Biological Monitoring
Weekly Summary – July 30, 2012 through August 3, 2012

Monday, July 30, 2012

Biological monitoring at the BSW began at 0715 and continued until 1545. Three steel piles (A30, A29, A28.5) were driven. No negative impacts on any marine mammals were observed.

Biological Monitors- Ian Cole and Mandi McElroy

- **Birds:** Cormorants and gulls were observed in the area throughout the day, before, during and after pile driving. No feeding was observed; no bird strikes were observed.
- **Marine Mammals:** Three harbor seals were observed throughout the monitoring period. All were observed outside of the exclusion zone. None were observed during active pile driving. None exhibited a change in behavior as a result of project activities.
    - 0920-One harbor seal was observed approximately 1000 feet southeast of the pile driving location, 5 minutes after the soft start of Pile A30. The seal surfaced briefly while moving south and did not resurface in our field of view. No pile driving occurred from 0920-0935. Second "tap" occurred at 0935, then no activity until 0947. No change of behavior was exhibited and the harbor seal was not observed again.
    - 1119-One harbor seal was observed approximately 1000 feet east of the pile driving location, 51 minutes after the completion of Pile A30 and 33 minutes before the soft-start of Pile A29. No change of behavior was exhibited and the harbor seal was not observed again.
    - 1421-One harbor seal was observed approximately 1100 feet east of the pile driving location, 47 minutes after the completion of Pile A29 and 8 minutes before the soft-start of Pile A28.5. No change of behavior was exhibited and the harbor seal was not observed again after pile driving began.

Tuesday, July 31, 2012

Biological monitoring at the BSW began at 0720 and continued until 1400. One steel pile (A28) was driven and a second (A27.5) was began, but due to a problem with the equipment this pile was not completed and work ceased until August 1 when equipment could be repaired. Pile driving for Pile A27.5 was intermittent from 1020 to 1300 due to the equipment trouble. No negative impacts on any animal species were observed.

Biological Monitors- Ian Cole and Shannon Lindquist

- **Birds:** Cormorants and gulls were observed in the area throughout the day, before, during and after pile driving. The birds were observed feeding on small fish. No bird strikes were observed.

- **Marine Mammals:** Two marine mammals were observed throughout the monitoring period. All were observed outside of the exclusion zone. None were observed to exhibit any change in behavior as a result of project activities.
    - 0915-One harbor seal was observed approximately 600 feet east of the barge 10 minutes after the completion of Pile A28. No change of behavior was exhibited and the harbor seal was not observed again after pile driving began.
    - 1245-One California sea lion was observed approximately 500 feet southeast of the barge. No pile driving was occurring at this time. No change of behavior was exhibited and the sea lion was not observed again after pile driving began.

Wednesday, August 1, 2012

Biological monitoring at the BSW began at 0706 and continued until 1515. One steel pile (A27.5) was completed which had been started Tuesday, July 31 and four more steel piles were driven (A26.5, A26, A25.5 and A25). No negative impacts on any animal species were observed.

Biological Monitors- Ian Cole and Shannon Lindquist

- **Birds:** Cormorants and gulls were observed in the area throughout the day, before, during and after pile driving. The birds were observed feeding on small fish. No bird strikes were observed.
- **Marine Mammals:** Five marine mammals were observed throughout the monitoring period. All were observed outside the exclusion zone. None were observed to exhibit any change in behavior as a result of project activities.
    - 1016-One California sea lion was observed near Pier 32 approximately 550 feet northeast of the barge. No change of behavior was exhibited and the sea lion was not observed again.
    - 1020- Three harbor porpoises were observed “porpoising” approximately 1,000 feet east of the barge. The animals were swimming north toward the Bay Bridge. No change of behavior was exhibited as a result of pile driving and the animals were not observed again.
    - 1412-One harbor seal was observed approximately 600 feet southeast of the barge several times for approximately 10 minutes before swimming east out of the area. No change of behavior was exhibited as a result of pile driving and the animal was not observed again.
    - 1426 and 1437-One harbor seal was observed approximately 600 feet northeast of the barge. Two observations of this animal were made and due to the proximity of time and location, it was assumed to be the same animal. No change of behavior was exhibited as a result of pile driving and the animal was not observed again.

Thursday, August 2, 2012

Biological monitoring at the BSW began at 0700 and continued until 1630. Five steel piles (A24.5, A23.5, A23, A22.5, A21) were driven. No negative impacts on any marine mammals were observed.

Biological Monitors- Ian Cole and Mandi McElroy

- **Birds:** Cormorants and gulls were observed in the area throughout the day, before, during and after pile driving. No feeding was observed; no bird strikes were observed.
- **Marine Mammals:** Four harbor seals and one California sea lion were observed throughout the monitoring period. All were observed outside of the exclusion zone. None were observed during active pile driving. None exhibited a change in behavior as a result of project activities.
    - 0945-One harbor seal was observed approximately 950 feet east of the pile driving location, 22 minutes before the soft start of Pile A24.5. The seal surfaced intermittently while moving south. No change of behavior was exhibited and the harbor seal was not observed again.
    - 1042-One harbor seal was observed approximately 1000 feet east of the pile driving location, 7 minutes after the completion of Pile A24.5 and 47 minutes before the soft-start of Pile A23.5. No change of behavior was exhibited and the harbor seal was not observed again.
    - No marine mammals were observed before, during, or after the observation time for Pile A23.5.
    - 1259-One harbor seal was observed approximately 800 feet east of the pile driving location, 15 minutes before the soft-start of Pile A23. No change of behavior was exhibited and the harbor seal was not observed again.
    - 1401-One harbor seal was observed approximately 950 feet southeast of the pile driving location, 27 minutes before the soft-start of Pile A22.5. No change of behavior was exhibited and the harbor seal was not observed again.
    - 1459, 1613-One California sea lion was observed approximately 1200 feet east of the pile driving location, four minutes after completion of Pile A22.5. The sea lion (presumed to be the same individual) briefly surfaced in the same general location at 1613, 10 minutes after completion of Pile A21. No change of behavior was exhibited between the two sightings, and the sea lion was not observed again.

Friday, August 3, 2012

Biological monitoring at the BSW began at 0700 and continued until 1640. Five steel piles (A18, A15, A22, A21.5, A20.5) were driven. No negative impacts on any marine mammals were observed.

Biological Monitors- Ian Cole and Mandi McElroy

- **Birds:** Cormorants and gulls were observed in the area throughout the day, before, during and after pile driving. Cormorant feeding on small live fish was observed; no bird strikes were observed.
- **Marine Mammals:** Two California sea lions, two harbor seals, and one pair of harbor porpoises were observed throughout the monitoring period. All were observed outside of the exclusion zone. None were observed during active pile driving. None exhibited a change in behavior as a result of project activities.

- 0726-One California sea lion was observed approximately 1200 feet southeast of the pile driving location, more than one hour before the soft start of Pile A18. The sea lion surfaced briefly and dove. No change of behavior was exhibited and the animal was not observed again.
- 0741, 0802-One harbor seal was observed approximately 1150 feet southeast of the pile driving location, more than one hour before the soft-start of Pile A18. The seal surfaced again in the same general location at 0802, 46 minutes before the soft-start of Pile A18. No change of behavior was exhibited and the harbor seal was not observed again.
- 1143-One California sea lion was observed surfacing/diving approximately 900 feet east of the pile driving location, 25 minutes after the completion of Pile A15 and over one hour before the soft-start of Pile A22. No change of behavior was exhibited and the sea lion was not observed again.
- No marine mammals were observed before, during, or after the observation period for Pile A22.
- 1405-A pair of harbor porpoises was observed fast-moving in a northerly direction approximately1300 feet east of the pile driving location, two minutes before the soft-start of Pile A21.5. No change of behavior was exhibited, and the pair was last observed continuing to travel north of the Bay Bridge before the first “tap” of Pile A21.5.
- 1511-One harbor seal was observed approximately 1000 feet southeast of the pile driving location, 19 minutes before the soft-start of Pile A 20.5. No change of behavior was exhibited and the harbor seal was not seen again.

on site @ 0640
departed @ 0345

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

Date 7/30/12 **Monitor (s)** Mandi **Visibility** FOG/cloudy 0645-0945 CLEAR - 0945-0345

Tide Level BSS 1-2 **Human Activity in the Area** sailboats, kayaks, pedestrians

Monitoring Locale: Pier 30 ☐ Pier 32 ☐ Pier 38 ☐ Boat ☐ 178 m from pile driving ☐

129 m from pile driving ☐ 1900 m from pile driving on vessels ☐ (on pile-driving barge platform)

Pile Type: 24-inch octagonal concrete ☐ 24-inch steel shell ☒ Ambient Conditions ☐

Piles/Day (1-8): 3 **Pile Driver:** Impact ☒ Vibratory/Impact ☐

pile #3, 4, and 5

Attenuation Device: None ☐ Bubble Curtain: On ☒ Off ☐

Minutes of Vibratory Driving: n/a ☒ 8:00 ☐ 15:00 ☐ **Impact Blows per Pile:** 800 ☐ 300 ☒ 600 ☐

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

Pile No.	Pile Driver (Impact, Vibratory)[1]	Pile Driving Start/End Time	Observation Start/End Time	Mammal Species[2]			Comments: Reference Number
				Species	No.	Time	
A30	impact	0915/1028	0920-0921	HS	1	0920	HS1
n/a	pre-pile #4	1154/1334	1119-1121	HS	2	1119	HS2
n/a	pre-pile #5	1430/1506	1421-1422	HS	3	1421	HS3

[1] Steel shell pile driving will include both vibratory (up to the last 10 feet) and impact (last 10 feet) pile drivers
[2] HS=Harbor Seal; SL = Sea Lion; HP=Harbor Porpoise; GW=Gray Whale; O = Other

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

Comments: Reference No.	Monitor's Distance from Pile Driving Activity	Initial Behavior of Marine Mammal	Changes in Marine Mammal Behavior (e.g., orientation, speed, diving, respiration rate, etc.)[3]
HS1	100 ft	slow travel	none

[3] **Note:** If a monitor sees a marine mammal within or approaching the Exclusion Zone prior to the start of impact pile driving, the monitor will notify the on-site resident engineer (or other authorized individual), who will then be required to delay pile driving until the marine mammal has moved outside of the Exclusion Zone, or if the animal has not been re-sighted within 15 minutes for pinnipeds or 30 minutes for cetaceans. If a marine mammal is sighted within or on a path toward the Exclusion Zone, pile driving will cease until that animal has cleared and is on a path away from the Exclusion Zone, or 15/30 minutes (pinnipeds/cetaceans) has lapsed since the last sighting.

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

PHOTOS

Comment: Reference No.	Photo Number	Time of Photo	Photo Taken Before (B), During (D) or After (A) Pile Driving	Description

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

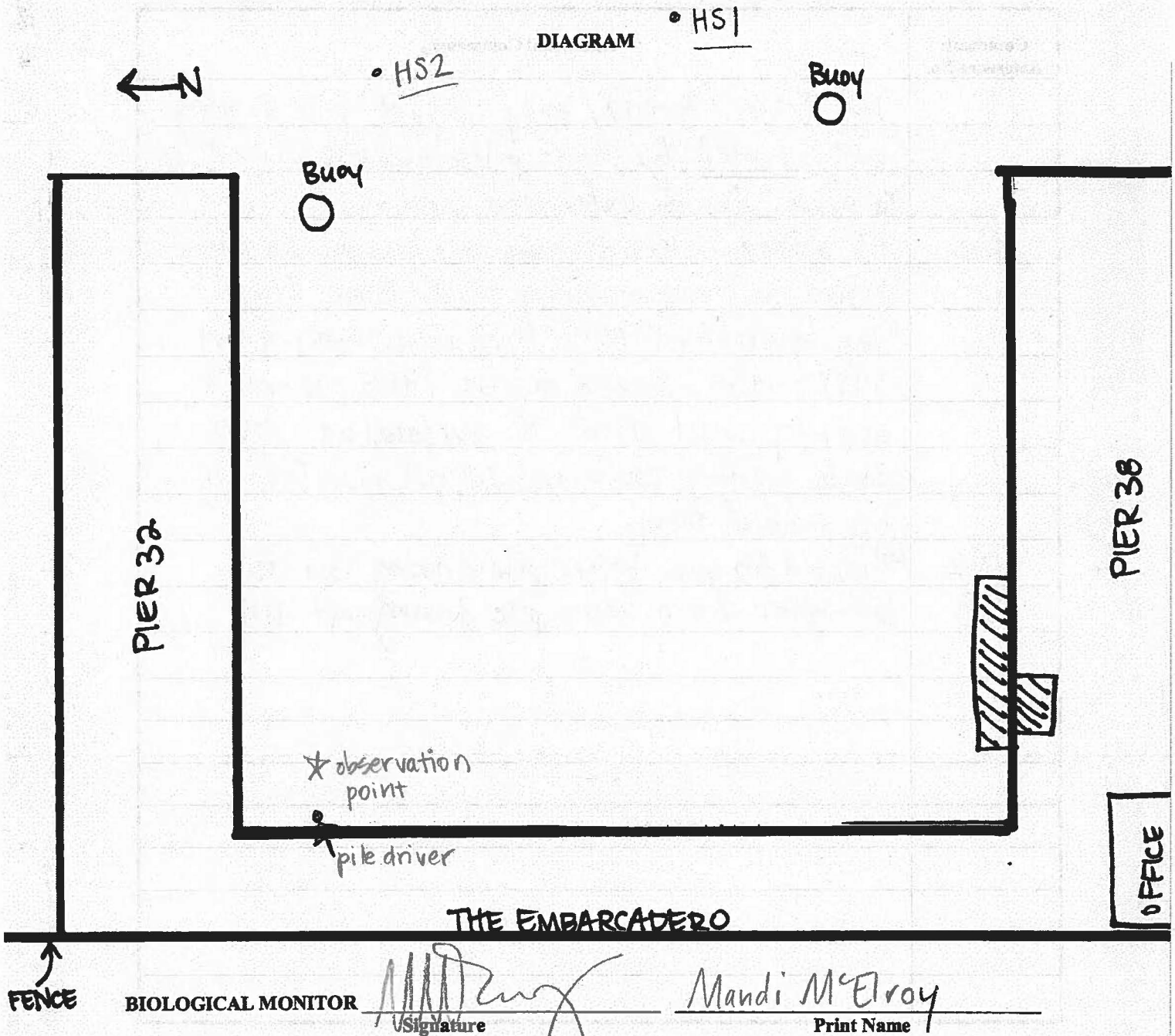
ADDITIONAL COMMENTS

Comment: Reference No.	Additional Comments
n/a	Per Dutra (Terry), only impact pile driving will be used for these piles located closest to shore, due to underwater debris.
HS1	HS sighted ~ 1000 ft from pile driver. No pile driving noise was occurring at the time (first "tap" occurred at 0915, then no activity from 0920-0935. Second tap at 0935, then no activity until 0947. HS surfaced at 0920 while moving south and did not resurface in my field of view.
HS2	last sighted 33 min. before pile driving soft-start
HS3	last sighted 8 min. before pile driving soft-start

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

DIAGRAM



BIOLOGICAL MONITOR _____ Mandi McElroy

Signature **Print Name**

on-site @ 0640
departed @ 0345

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

BIRDS[4]

Date 7/30/12 **Monitor** Mandi **Weather** cloudy 0645-0945, clear 0945-0345

Monitoring Locale: Pier 30 ☐ **Pier 32** ☐ **Pier 38** ☐ **178m from pile driving** ☐ **120m from pile driving** ☐

1900 m from pile driving on vessels ☐ on pile-driving barge platform

Pile Type: 24-inch octagonal concrete ☐ **24-inch steel shell** ☒ **Ambient Conditions** ☐ **Piles/Day (1-8):** 3

Pile Driver: Impact ☒ **Vibratory/Impact** ☐ **Attenuation Device: None** ☐ **Bubble Curtain: On** ☑ **Off** ☐

Minutes of Vibratory Driving : n/a ☒ **8:00** ☐ **15:00** ☐ **Impact Blows per Pile: 800** ☐ **300** ☒ **600** ☐

Pile No.	Pile Driver (Impact, Vibratory)[5]	Pile Driving Start/End Time	Observer Start/End Time	Bird Predation on Fish Observed (Y/N) and Time		General Bird Activity/Behavior	Comment: Reference Number
A30	impact	0915/1028	0832/1100	N	0923	gull, swim/preen	G1
A30	"	"	"	N	1007	gull, swim	G2
A30	"	"	"	N	1024	gull, swim	G3
A30	"	"	"	N	1025	gull, perched on barge	G4
A29	"	1154/1334	1124/1404	N	1206	gull, swim	G5
A29	"	"	"	N	1316	gull, swim/preen	G6
A29	"	"	"	N	1404	cormorant, swim	C1
A28.5	"	1430/1506	1404/1536	N	1501	gull, swim	G7
A28.5	"	"	"	N	1502	gull, swim	G8
A28.5	"	"	"	N	1505	gull, swim	G9
A28.5	"	"	"	N	1505	cormorant, swim	C2
				N			

[4] The bird monitor will have to work closely with the fish monitor because the monitor must attempt to determine the amount of bird predation on fishes, including the size and species of fish affected.

[5] Steel shell pile driving will include both vibratory (up to the last 10 feet) and impact (last 10 feet) pile drivers.

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

BIRDS

Comment: Reference No.	Predation[6]		Dead/Injured Fish Observed[7]		Dead/Injured Fish Collected[8]	
	Bird Strikes Per Minute	Duration	Species	Size	Species	Size

[6] Diving birds that may be present, but which cannot be confirmed to scavenge on injured fish while diving, will be noted on the data sheet, but are not included in the count of bird strikes.

[7] SH = steelhead; G=North American Green Sturgeon; O=Other

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

BIRDS

PHOTOS

Comment: Reference No.	Photo Number	Time of Photo	Photo Taken Before (B), During (D) or After (A) Pile Driving	Description

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

BIRDS

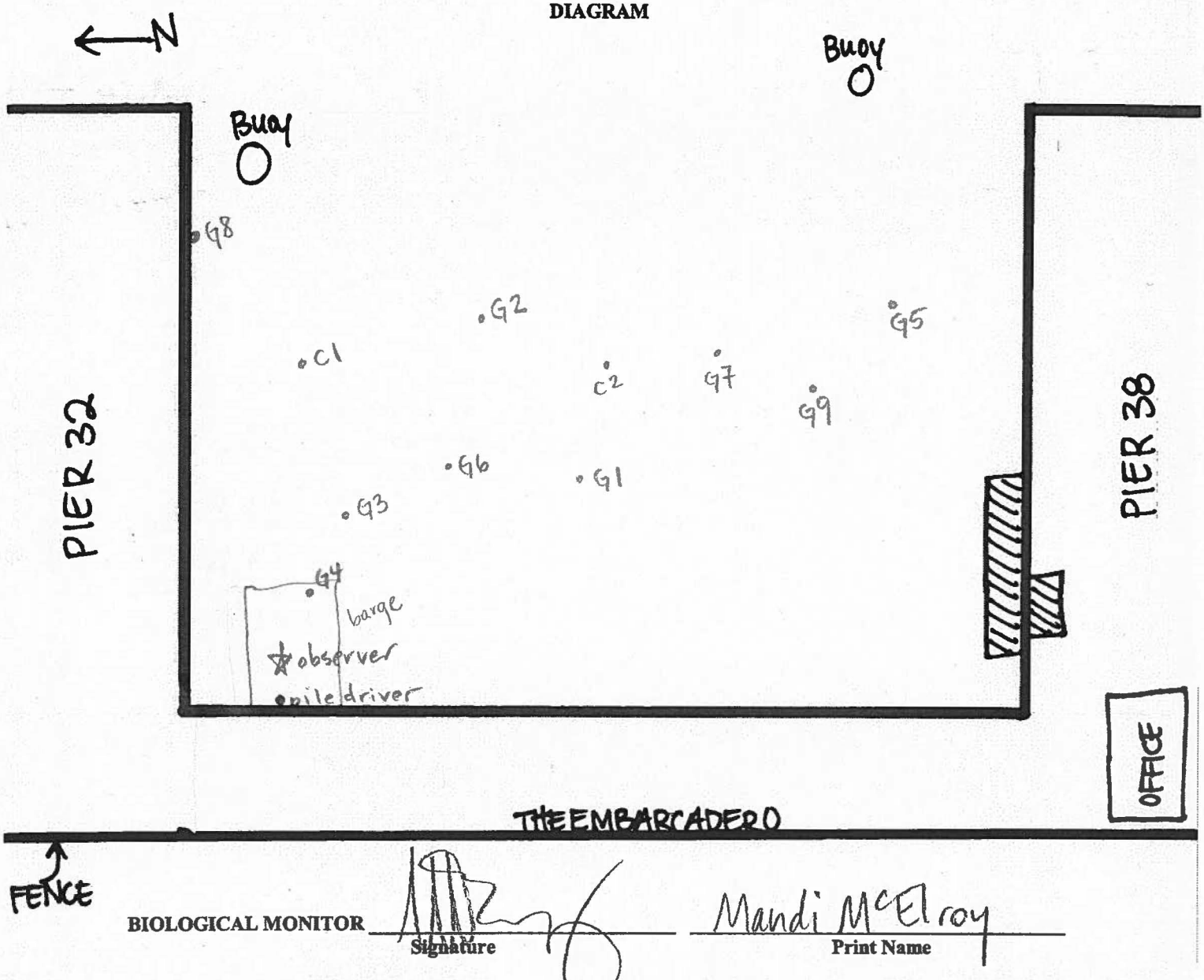
ADDITIONAL COMMENTS

Comment: Reference No.	Additional Comments

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

BIRDS

DIAGRAM



BIOLOGICAL MONITOR _____ Mandi McElroy

Signature **Print Name**

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

Date 7/31/12 **Monitor (s)** Shannon Lindquist / Ian Cole **Visibility** Clear, 15+NM vis, Beaufort 2

Tide Level see below **Human Activity in the Area** Walkers/joggers/Pier 32 construction

Monitoring Locale: **Pier 30** ☐ **Pier 32** ☐ **Pier 38** ☐ **Boat** ☒ **178 m from pile driving** ☐

129 m from pile driving ☐ **1900 m from pile driving on vessels** ☐

Pile Type: **24-inch octagonal concrete** ☐ **24-inch steel shell** ☒ **Ambient Conditions** ☐

Piles/Day (1-8): ☐ **Pile Driver**: **Impact** ☒ **Vibratory/Impact** ☐

Attenuation Device: **None** ☐ **Bubble Curtain: On** ☒ **Off** ☐

Minutes of Vibratory Driving : **n/a** ☐ **8:00** ☐ **15:00** ☐ **Impact Blows per Pile**: **800** ☐ **300** ☒ **600** ☐

Tides-	Low	High	Low	High
	0447	1156	1645	2246
	-0.9	+5.0	+2.4	+6.8

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

Pile No.	Pile Driver (Impact, Vibratory)[1]	Pile Driving Start/End Time	Observation Start/End Time	Mammal Species[2]			Comments: Reference Number
		0838		Species	No.	Time	
A28	Impact	0906	0720/0940	~~HS~~	1	0915	~~6~~00 ft E of barge (1)
A27.5	impact	1020/1100	0950/				
↓	↓	1125		SL	1	1245	800 ft SE of barge (2)
↓	↓	1250/1315	/1400	–	–	–	(3)

[1] Steel shell pile driving will include both vibratory (up to the last 10 feet) and impact (last 10 feet) pile drivers

[2] HS=Harbor Seal; SL = Sea Lion; HP=Harbor Porpoise; GW=Gray Whale; O = Other

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

Comments: Reference No.	Monitor's Distance from Pile Driving Activity	Initial Behavior of Marine Mammal	Changes in Marine Mammal Behavior (e.g., orientation, speed, diving, respiration rate, etc.)[3]
1	550ft.	surfaced & dove	no change in behavior
2	500ft.	surfaced briefly & dove	no change in behavior

[3] **Note:** If a monitor sees a marine mammal within or approaching the Exclusion Zone prior to the start of impact pile driving, the monitor will notify the on-site resident engineer (or other authorized individual), who will then be required to delay pile driving until the marine mammal has moved outside of the Exclusion Zone, or if the animal has not been re-sighted within 15 minutes for pinnipeds or 30 minutes for cetaceans. If a marine mammal is sighted within or on a path toward the Exclusion Zone, pile driving will cease until that animal has cleared and is on a path away from the Exclusion Zone, or 15/30 minutes (pinnipeds/cetaceans) has lapsed since the last sighting.

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

PHOTOS

Comment: Reference No.	Photo Number	Time of Photo	Photo Taken Before (B), During (D) or After (A) Pile Driving	Description
~~5~~	1	0732	B	Barge set up prior to pile driving
	2	1214	A	Barge between piles

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

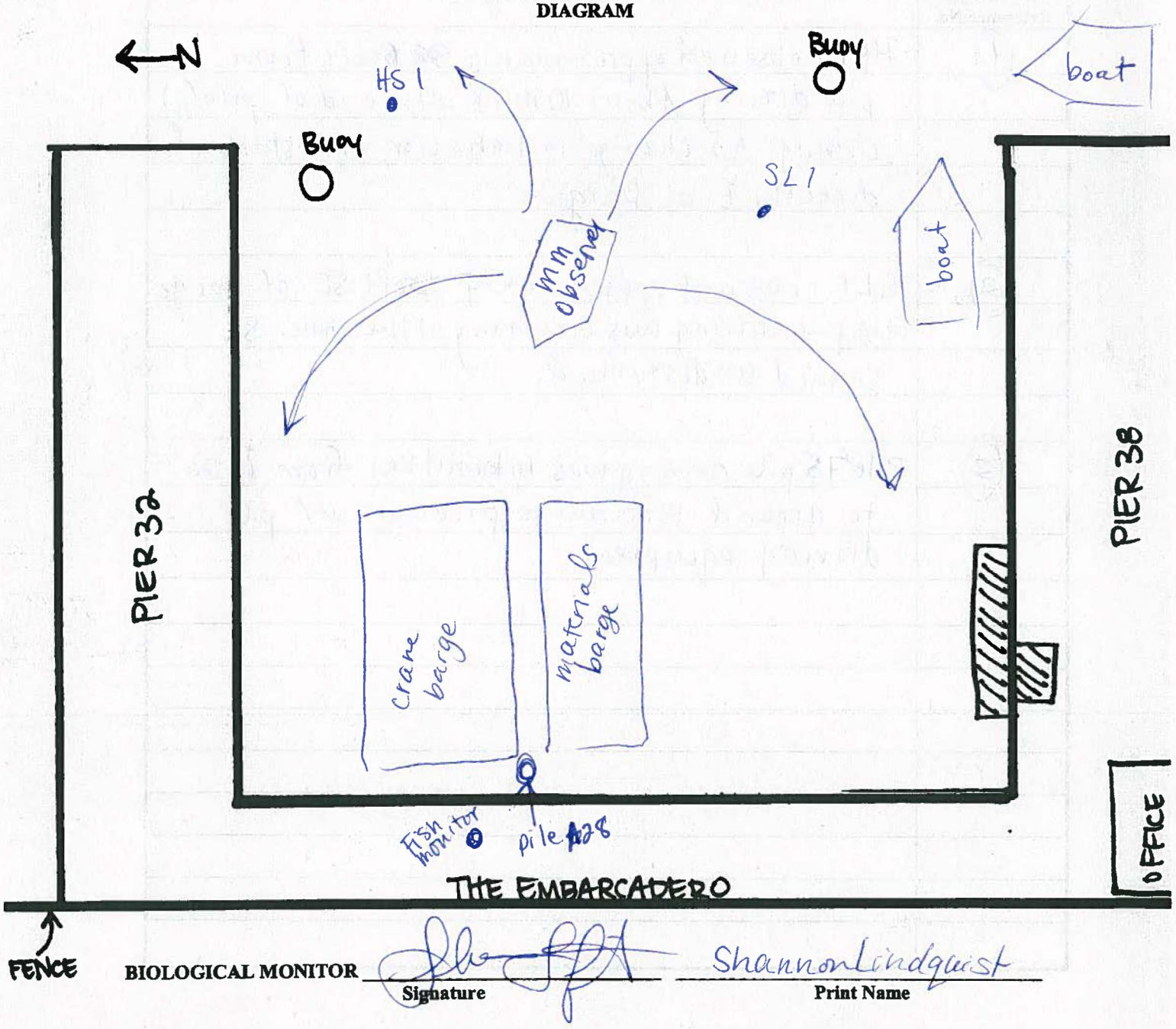
ADDITIONAL COMMENTS

Comment: Reference No.	Additional Comments
(1)	HSI - observed approximately ~~[illegible]~~ 600ft from pile driving. About 10 mins after end of pile(6) driving. No change in behavior, undisturbed. directly E of barge.
(2)	SLI - observed approximately 800ft SE of barge No pile driving was occurring at the time. SL seemed undisturbed.
(3)	Pile ~~27.5~~ pile driving was intermittent from 10:20 to around 1300 due to problems w/ pile driving equipment.

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

DIAGRAM



BIOLOGICAL MONITOR _____ Shannon Lindquist

Signature **Print Name**

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

BIRDS[4]

Date 7/31/12 **Monitor** Shannon Lindquist / Ian Cole **Weather** Clear, 15+ mm vis, Beufort 2

Monitoring Locale: Pier 30 ☐ **Pier 32** ☐ **Pier 38** ☐ **178m from pile driving** ☐ **120m from pile driving** ☐ Boat ☒ **1900 m from pile driving on vessels** ☐

Pile Type: 24-inch octagonal concrete ☐ **24-inch steel shell** ☒ **Ambient Conditions** ☐ **Piles/Day (1-8):** ☐

Pile Driver: Impact ☒ **Vibratory/Impact** ☐ **Attenuation Device: None** ☐ **Bubble Curtain: On** ☒ **Off** ☐

Minutes of Vibratory Driving : n/a ☐ 8:00 ☐ 15:00 ☐ **Impact Blows per Pile:** 800 ☐ 300 ☒ 600 ☐

Pile No.	Pile Driver (Impact, Vibratory)[5]	Pile Driving Start/End Time	Observer Start/End Time	Bird Predation on Fish Observed (Y/N) and Time		General Bird Activity/Behavior	Comment Reference Number
A28	impact	0838/0906	0720/0940	No	/	cormorants in area.	(1)
A27.5	impact	1020/1315	0950/1400	No	/	" "	(2)

[4] The bird monitor will have to work closely with the fish monitor because the monitor must attempt to determine the amount of bird predation on fishes, including the size and species of fish affected.

[5] Steel shell pile driving will include both vibratory (up to the last 10 feet) and impact (last 10 feet) pile drivers.

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

BIRDS

Comment: Reference No.	Predation[6]		Dead/Injured Fish Observed[7]		Dead/Injured Fish Collected[8]	
	Bird Strikes Per Minute	Duration	Species	Size	Species	Size

[6] Diving birds that may be present, but which cannot be confirmed to scavenge on injured fish while diving, will be noted on the data sheet, but are not included in the count of bird strikes.

[7] SH = steelhead; G=North American Green Sturgeon; O=Other

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

BIRDS

PHOTOS

Comment: Reference No.	Photo Number	Time of Photo	Photo Taken Before (B), During (D) or After (A) Pile Driving	Description
				Photos on mm data sheet

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

BIRDS

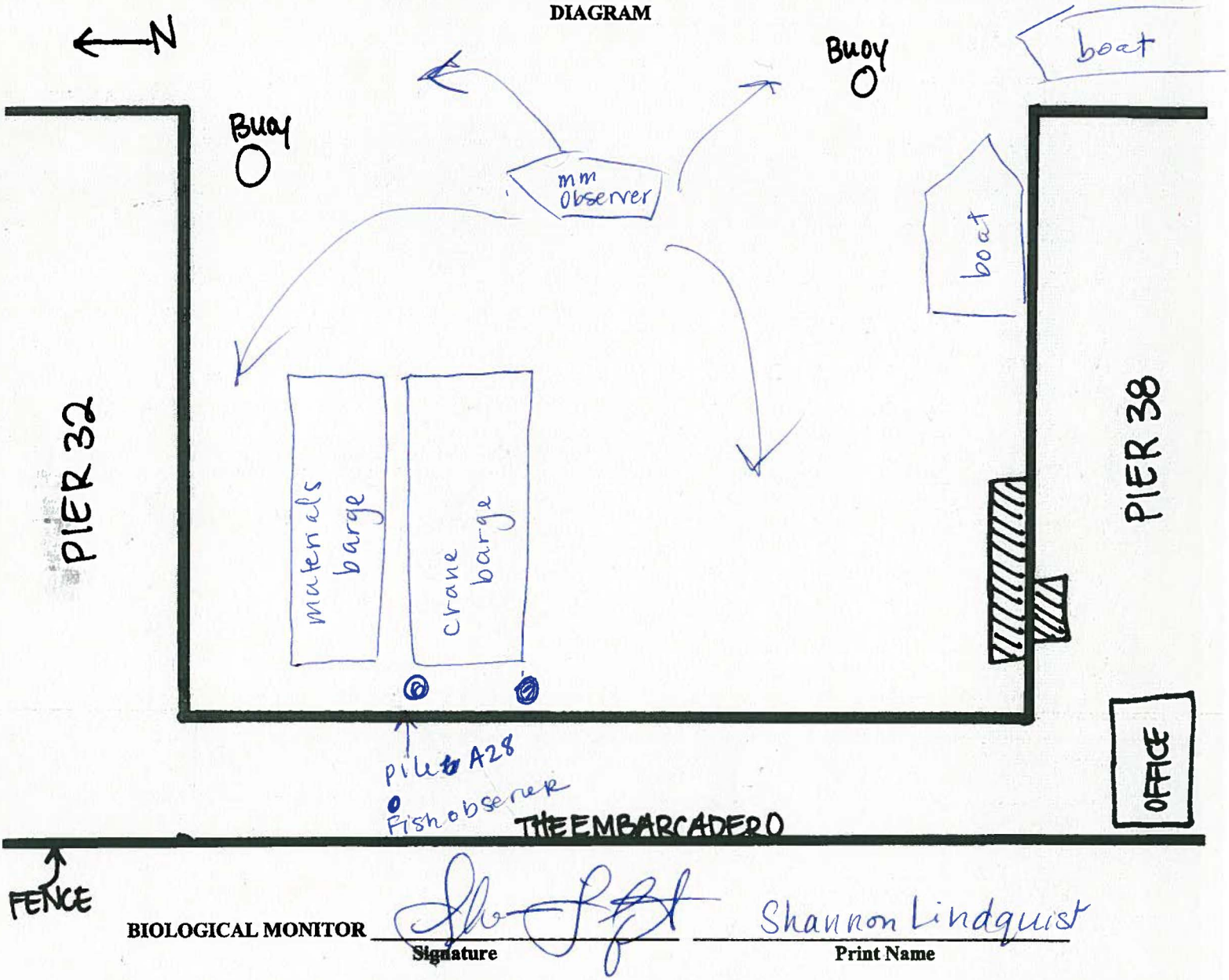
ADDITIONAL COMMENTS

Comment: Reference No.	Additional Comments
	0749 - cormorant w/in exclusion ~~zone~~ observed diving. Not preying on dead fish. Before pile driving began.
(1)	Cormorants continue to dive/feed near barge. undisturbed by pile driving activities
(2)	Pile ~~#7.5~~ pile driving was intermittent from 1020 - 1315 due to a problem w/ the equipment

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

BIRDS

DIAGRAM



BIOLOGICAL MONITOR _____ Shannon Lindquist

Signature **Print Name**

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

Date 8/1/12 **Monitor (s)** Shannon Lindquist / Ian Cole **Visibility** Clear, Beaufort 2

Tide Level See below **Human Activity in the Area** walking/jogging/work on Pier 32

Monitoring Locale: Pier 30 ☐ Pier 32 ☐ Pier 38 ☐ Boat ☒ 178 m from pile driving ☐

129 m from pile driving ☐ 1900 m from pile driving on vessels ☐

Pile Type: 24-inch octagonal concrete ☐ 24-inch steel shell ☒ Ambient Conditions ☐

Piles/Day (1-8): ☒ **Pile Driver**: Impact ☒ Vibratory/Impact ☐

Attenuation Device: None ☐ Bubble Curtain: On ☒ Off ☐

Minutes of Vibratory Driving : n/a ☐ 8:00 ☐ 15:00 ☐ **Impact Blows per Pile**: 800 ☐ 300 ☒ 600 ☐

Tides:	Low	High	Low	High
	0532	1236	1727	2340
	-0.9	5.3	2.2	6.7

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

Pile No.	Pile Driver (Impact, Vibratory)[1]	Pile Driving Start/End Time	Observation Start/End Time	Mammal Species[2]			Comments: Reference Number
				Species	No.	Time	
A27.5 (cont)	impact	0736/0756	0706/0826	—	—	—	
A26.5	impact	0857/0926	0826/[illegible]	—	—	—	
A 26	impact	1010/1037	↓ [illegible]1115	SL	1	10:16	(1)
↓ "	" ↓ "	↓	↓	HP	x3	1020	(2)
A25.5	impact	1200/1210	1130/	—	—	—	
↓	↓	1248/1312	↓	—	—	—	
A25	impact	1400/1437	/1507	HS	1	1412/1419	(3) Hung around for about 8 mins.
↓	↓	↓		HS	2	1426	(4)
↓	↓	↓		HS	3	1437	(5)

1210 - 1240 - Dutra Break for lunch. It Stayed on water

[1] Steel shell pile driving will include both vibratory (up to the last 10 feet) and impact (last 10 feet) pile drivers
[2] HS=Harbor Seal; SL = Sea Lion; HP=Harbor Porpoise; GW=Gray Whale; O = Other

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

Comments: Reference No.	Monitor's Distance from Pile Driving Activity	Initial Behavior of Marine Mammal	Changes in Marine Mammal Behavior (e.g., orientation, speed, diving, respiration rate, etc.)[3]
(1)	500 ft	poked head out of water/dove	no change
(2)	1000 ft	swimming toward bridge	no change
(3)	600 ft.	head out of water/dove	no change
(4)	600 ft	surfaced briefly/dove	no change
(5)	450 ft.	" "	no change

[3] **Note:** If a monitor sees a marine mammal within or approaching the Exclusion Zone prior to the start of impact pile driving, the monitor will notify the on-site resident engineer (or other authorized individual), who will then be required to delay pile driving until the marine mammal has moved outside of the Exclusion Zone, or if the animal has not been re-sighted within 15 minutes for pinnipeds or 30 minutes for cetaceans. If a marine mammal is sighted within or on a path toward the Exclusion Zone, pile driving will cease until that animal has cleared and is on a path away from the Exclusion Zone, or 15/30 minutes (pinnipeds/cetaceans) has lapsed since the last sighting.

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

PHOTOS

Comment: Reference No.	Photo Number	Time of Photo	Photo Taken Before (B), During (D) or After (A) Pile Driving	Description
	1	0847	B	View of pile driving from outside exclusion zone
(3)	2	1420	D	HS1 near Pier 32

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

ADDITIONAL COMMENTS

Comment: Reference No.	Additional Comments
(2)	3 Harbor porpoises spotted approximately 1000 ft E from barge. Swimming N toward Bay Bridge
(1)	1 Sea lion observed near Pier 32. poked head out of water, dove. Not sighted again. Approximately 550 ft ~~from~~ NE of barge.
(3) (HS1)	Harbor Seal poked head out of water, then dove ~~from barge~~. Did not appear disturbed. Approximately 600ft SE of barge. Spotted again in same area @ 1919.
(4)	(HS2) - Surfaced briefly. appeared undisturbed.
(5)	(HS3) - " "

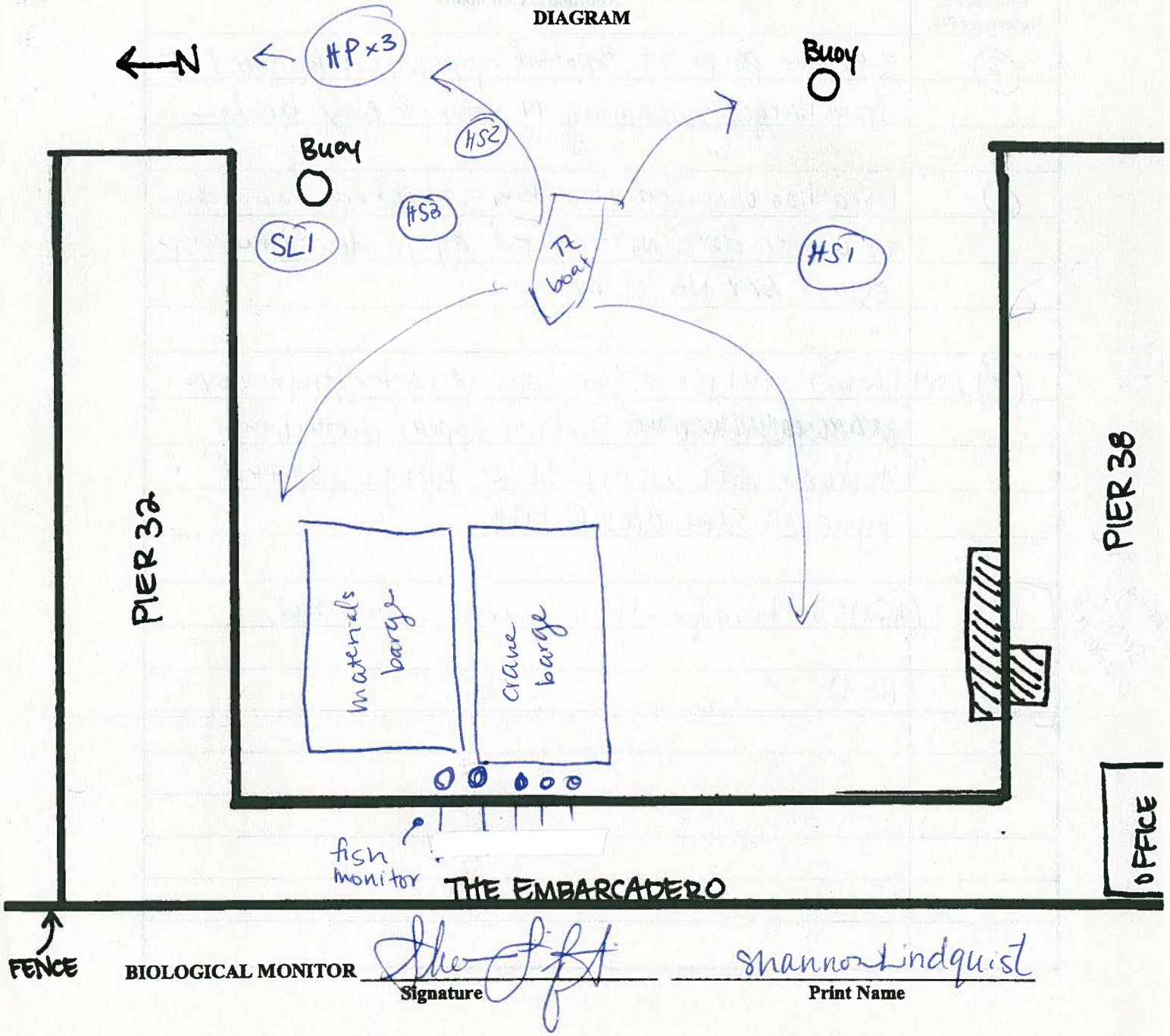
Likely the same animal

* HS2 & HS3 likely same animal due to proximity of location & time observations

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

DIAGRAM



BIOLOGICAL MONITOR _____ Signature _____ Shannon Lindquist Print Name

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

BIRDS[4]

Page 1 of 5

Date 8/1/12 Monitor Shannon Lindquist Ian Cole Weather clear, Beufort 2

Monitoring Locale: Pier 30 ☐ Pier 32 ☐ Pier 38 ☐ 178m from pile driving ☐ 120m from pile driving ☐

1900 m from pile driving on vessels ☐ ☒ boat

Pile Type: 24-inch octagonal concrete ☐ 24-inch steel shell ☒ Ambient Conditions ☐ Piles/Day (1-8): ☐

Pile Driver: Impact ☒ Vibratory/Impact ☐ Attenuation Device: None ☐ Bubble Curtain: On ☒ Off ☐

Minutes of Vibratory Driving : n/a ☐ 8:00 ☐ 15:00 ☐ Impact Blows per Pile: 800 ☐ 300 ☒ 600 ☐

Pile No.	Pile Driver (Impact, Vibratory)[5]	Pile Driving Start/End Time	Observer Start/End Time	Bird Predation on Fish Observed (Y/N) and Time		General Bird Activity/Behavior	Comment: Reference Number
(cont) A27.5	impact	0736/0756	0706/0826	/	/	cormorants/gulls feeding in area	
A26.5	impact	0857/0926	0826/	/	/	" "	
A26	impact	1010/1037	/1115	/	/	" "	
A25.5	impact	1209/1210	1130/	/	/		
↓	↓	1248/1317	↓	/	/		
A25	impact	1400/1437	/1507	/	/		

[4] The bird monitor will have to work closely with the fish monitor because the monitor must attempt to determine the amount of bird predation on fishes, including the size and species of fish affected.

[5] Steel shell pile driving will include both vibratory (up to the last 10 feet) and impact (last 10 feet) pile drivers.

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

BIRDS

Comment: Reference No.	Predation[6]		Dead/Injured Fish Observed[7]		Dead/Injured Fish Collected[8]	
	Bird Strikes Per Minute	Duration	Species	Size	Species	Size

[6] Diving birds that may be present, but which cannot be confirmed to scavenge on injured fish while diving, will be noted on the data sheet, but are not included in the count of bird strikes.

[7] SH = steelhead; G=North American Green Sturgeon; O=Other

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

BIRDS

PHOTOS

Comment: Reference No.	Photo Number	Time of Photo	Photo Taken Before (B), During (D) or After (A) Pile Driving	Description

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

BIRDS

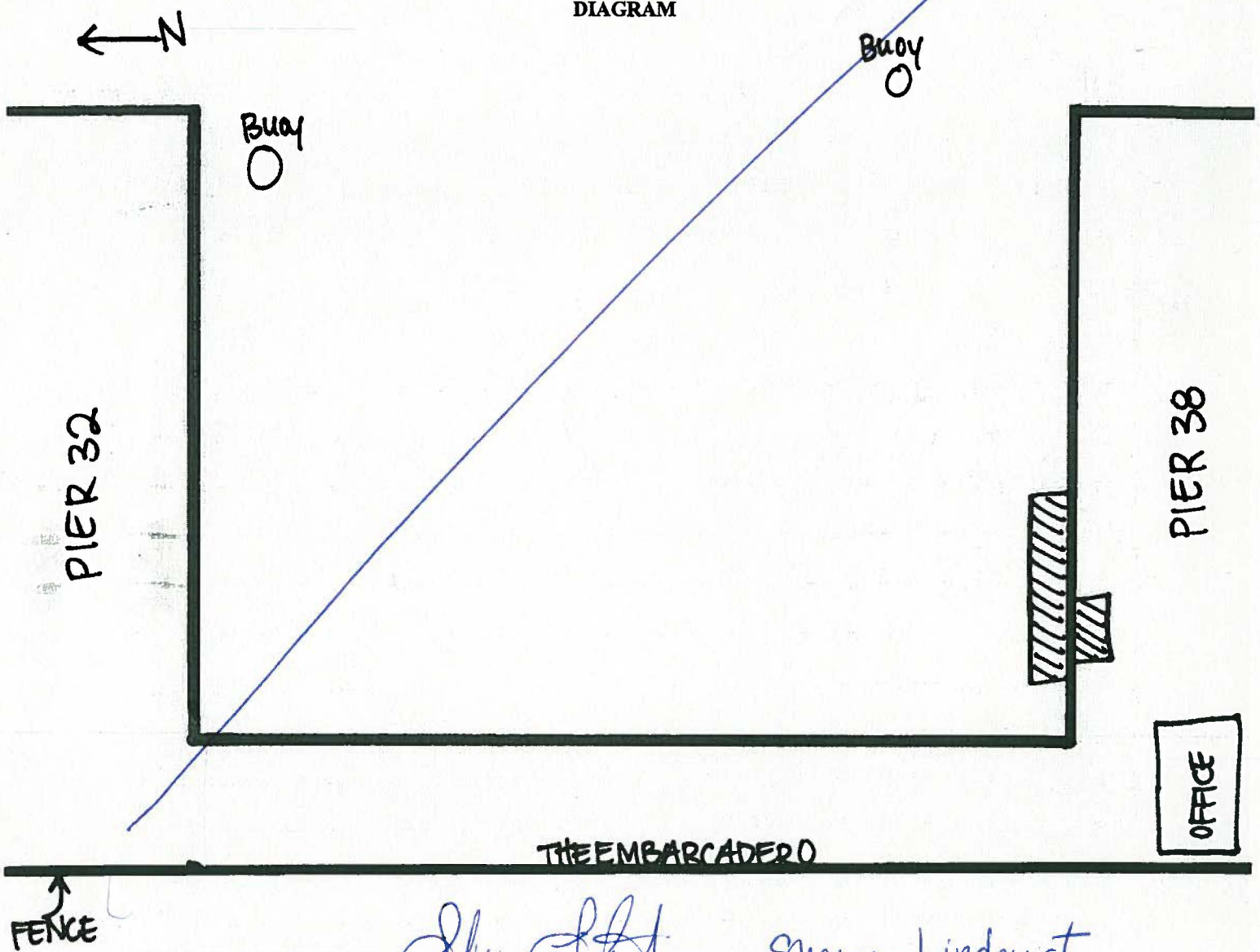
ADDITIONAL COMMENTS

Comment: Reference No.	Additional Comments

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

BIRDS

DIAGRAM



BIOLOGICAL MONITOR _____ (Signature) Shannon Lindquist (Print Name)

arrived 0640
departed 1633

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

Date 8/2/12 **Monitor (s)** Mandi **Visibility** foggy 0640 - 1000 clear 1000 — end

Tide Level BSS1 **Human Activity in the Area** sailing/boating, kayaks, pedestrians

Monitoring Locale: Pier 30 ☐ Pier 32 ☐ Pier 38 ☐ Boat ☒ 178 m from pile driving ☐

129 m from pile driving ☐ 1900 m from pile driving on vessels ☐

Pile Type: 24-inch octagonal concrete ☐ 24-inch steel shell ☒ Ambient Conditions ☐

Piles/Day (1-8): 5 **Pile Driver:** Impact ☒ Vibratory/Impact ☐ starting pile A24.5

Attenuation Device: None ☐ Bubble Curtain: On ☒ Off ☐

Minutes of Vibratory Driving: n/a ☒ 8:00 ☐ 15:00 ☐ **Impact Blows per Pile:** 800 ☐ 300 ☒ 600 ☐

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

Pile No.	Pile Driver (Impact, Vibratory)[5]	Pile Driving Start/End Time	Observation Start/End Time	Mammal Species[6]			Comments: Reference Number
				Species	No.	Time	
A24.5	Impact	1007/1035	0900/1105	HS	1	0945	HS1
A24.5	"	"	"	HS	2	1042	HS2
A23.5	"	1129/1155	1105/1225	—	—	—	n/a
A23	"	1314/1339	1225/1409	HS	3	1259	HS3
A22.5	"	1428/1455	1409/1525	HS	4	1401	HS4
A21	"	1551/1603	1525/1633	SL	1	1459	SL1
A21	"	"	"	SL	1	1613	SL1

[5] Steel shell pile driving will include both vibratory (up to the last 10 feet) and impact (last 10 feet) pile drivers
[6] HS=Harbor Seal; SL = Sea Lion; HP=Harbor Porpoise; GW=Gray Whale; O = Other

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

Comments: Reference No.	Monitor's Distance from Pile Driving Activity	Initial Behavior of Marine Mammal	Changes in Marine Mammal Behavior (e.g., orientation, speed, diving, respiration rate, etc.)[7]
HS1	700 ft	slow travel / intermittent surfacing	none
HS2	900 ft	slow travel, breaching 50 ft	none
HS3	600 ft	slow travel, porpoising	none
HS4	750 ft	slow travel	none
SL1	1000 ft	slow travel, diving	none

[7] **Note:** If a monitor sees a marine mammal within or approaching the Exclusion Zone prior to the start of impact pile driving, the monitor will notify the on-site resident engineer (or other authorized individual), who will then be required to delay pile driving until the marine mammal has moved outside of the Exclusion Zone, or if the animal has not been re-sighted within 15 minutes for pinnipeds or 30 minutes for cetaceans. If a marine mammal is sighted within or on a path toward the Exclusion Zone, pile driving will cease until that animal has cleared and is on a path away from the Exclusion Zone, or 15/30 minutes (pinnipeds/cetaceans) has lapsed since the last sighting.

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

PHOTOS

Comment: Reference No.	Photo Number	Time of Photo	Photo Taken Before (B), During (D) or After (A) Pile Driving	Description

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

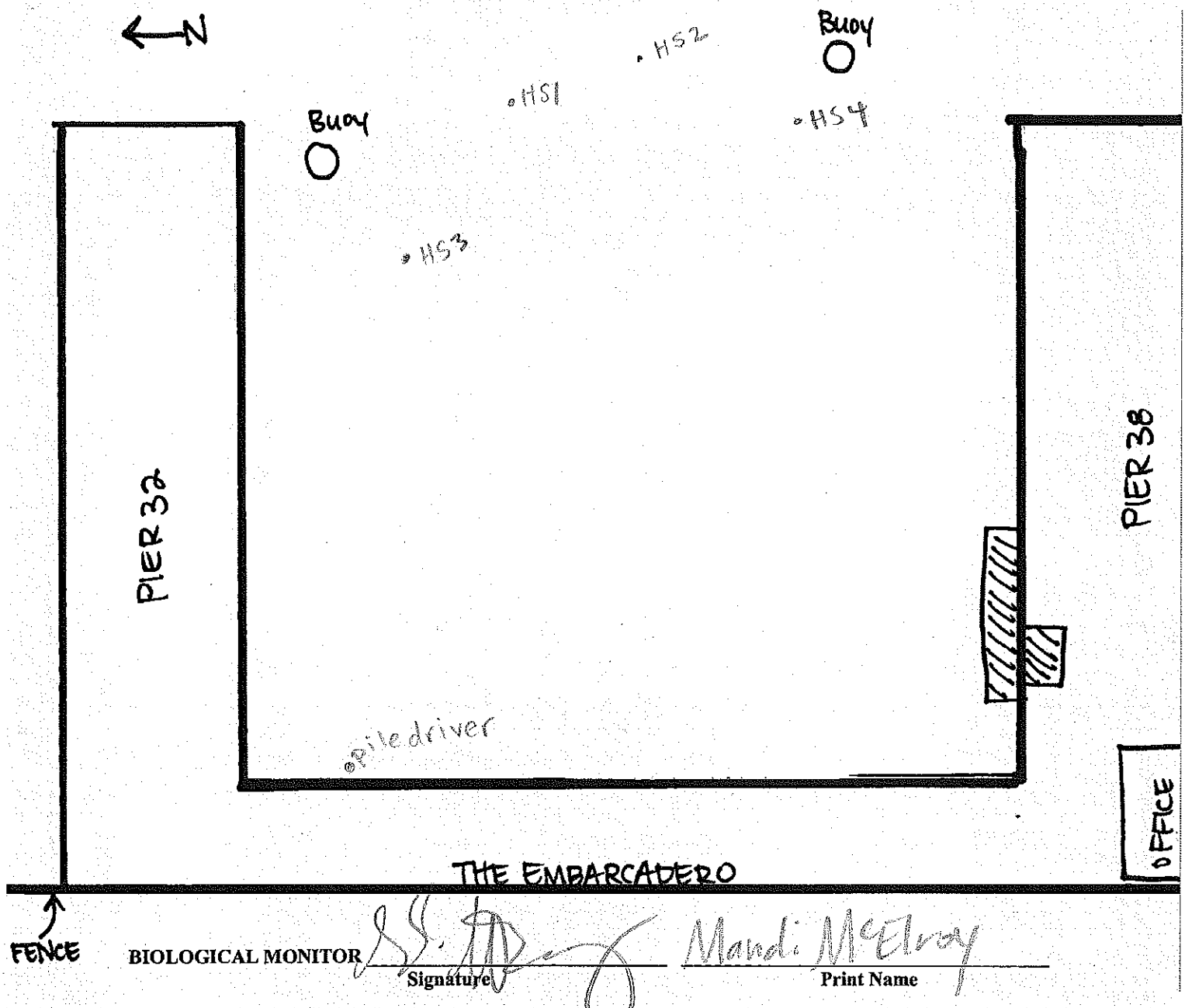
ADDITIONAL COMMENTS

Comment: Reference No.	Additional Comments
HS1	did not resurface after initial sighting
HS2	7 minutes after cessation of Pile 12.
HS3	did not resurface after inital sighting
SL1	likely the same individual, sighted twice in same location. Sightings > 1 hour apart.

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

DIAGRAM



BIOLOGICAL MONITOR _____ Mandi McElroy

Signature **Print Name**

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

BIRDS[8]

Date 8/2/12 **Monitor** Mandi **Weather** fog 0640-1000, then clear

Monitoring Locale: Pier 30 ☐ **Pier 32** ☐ **Pier 38** ☐ **178m from pile driving** ☐ **120m from pile driving** ☐

1900 m from pile driving on vessels ☐ boat

Pile Type: 24-inch octagonal concrete ☐ **24-inch steel shell** ☒ **Ambient Conditions** ☐ **Piles/Day (1-8):** 5

Pile Driver: Impact ☒ **Vibratory/Impact** ☐ **Attenuation Device: None** ☐ **Bubble Curtain: On** ☒ **Off** ☐

Minutes of Vibratory Driving : n/a ☒ **8:00** ☐ **15:00** ☐ **Impact Blows per Pile: 800** ☐ **300** ☒ **600** ☐

Pile No.	Pile Driver (Impact, Vibratory)[9]	Pile Driving Start/End Time	Observer Start/End Time	Bird Predation on Fish Observed (Y/N) and Time		General Bird Activity/Behavior	Comment: Reference Number
A23.5	impact	1129/1155	0700/1225	N	1137	gull / swim	G1
A23	"	1314/1339	1225/1409	N	1314	gull / swim	G2
A23	"	"	1225/1409	N	1314	cormorant swim	C1
A22.5	"	1428/1455	1409/1525	N	1432	gull / swim	G3
A22.5	"	"	"	N	1432	gull / swim	G4

[8] The bird monitor will have to work closely with the fish monitor because the monitor must attempt to determine the amount of bird predation on fishes, including the size and species of fish affected.

[9] Steel shell pile driving will include both vibratory (up to the last 10 feet) and impact (last 10 feet) pile drivers.

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

BIRDS

Comment: Reference No.	Predation[10]		Dead/Injured Fish Observed[11]		Dead/Injured Fish Collected[8]	
	Bird Strikes Per Minute	Duration	Species	Size	Species	Size

[10] Diving birds that may be present, but which cannot be confirmed to scavenge on injured fish while diving, will be noted on the data sheet, but are not included in the count of bird strikes.

[11] SH = steelhead; G=North American Green Sturgeon; O=Other

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

BIRDS

PHOTOS

Comment: Reference No.	Photo Number	Time of Photo	Photo Taken Before (B), During (D) or After (A) Pile Driving	Description

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

BIRDS

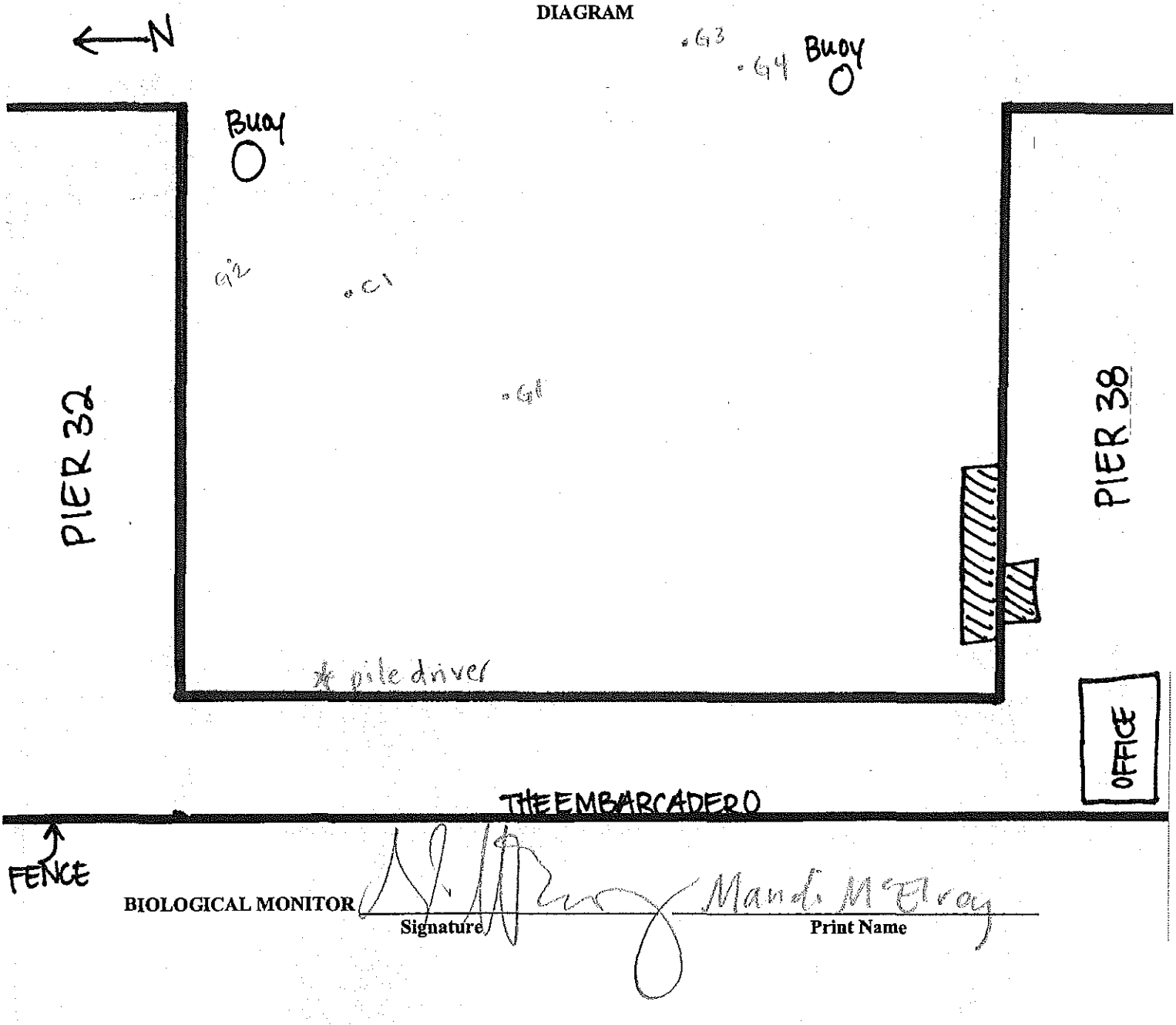
ADDITIONAL COMMENTS

Comment: Reference No.	Additional Comments
91	gull flew away <1 min after initial sighting

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

BIRDS

DIAGRAM



BIOLOGICAL MONITOR _____ Mandi McElroy

Signature **Print Name**

on site 0635
departed 1640

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

Date 8/3/12 **Monitor (s)** Mandi **Visibility** fog until ~1200, then clear

Tide Level BSS 1-2 until ~1300, then 3 **Human Activity in the Area** motor/sail boats, pedestrians

Monitoring Locale: Pier 30 ☐ Pier 32 ☐ Pier 38 ☐ Boat ☑ 178 m from pile driving ☐

129 m from pile driving ☐ 1900 m from pile driving on vessels ☐

Pile Type: 24-inch octagonal concrete ☐ 24-inch steel shell ☑ Ambient Conditions ☐

Piles/Day (1-8): 5 **Pile Driver:** Impact ☑ Vibratory/Impact ☐

Attenuation Device: None ☐ Bubble Curtain: On ☑ Off ☐

Minutes of Vibratory Driving: n/a ☒ 8:00 ☐ 15:00 ☐ **Impact Blows per Pile:** 800 ☐ 300 ☑ 600 ☐

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

Pile No. (Data)	Pile Driver (Impact, Vibratory)[5]	Pile Driving Start/End Time	Observation Start/End Time	Mammal Species[6]			Comments: Reference Number
				Species	No.	Time	
A18 (pre-start)	impact	0848/0904	0708/0934	SL	1	0726	SL1
A18 (pre-start)	"	"	"	HS	1	0741	HS1
A18 (pre-start)	"	"	"	HS	1	0802	HS1
A15	"	1100/1118	0934/1148	SL	2	1143	SL2
A22	"	1303/1333	1148/1403	—	—	—	no sightings
A21.5	"	1407/1434	1403/1504	HP	1	1405	HP1 (pair)
A20.5	"	1530/1609	1504/1638	HS	2	1511	HS2

[5] Steel shell pile driving will include both vibratory (up to the last 10 feet) and impact (last 10 feet) pile drivers

[6] HS=Harbor Seal; SL = Sea Lion; HP=Harbor Porpoise; GW=Gray Whale; O = Other

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

Comments: Reference No.	Monitor's Distance from Pile Driving Activity	Initial Behavior of Marine Mammal	Changes in Marine Mammal Behavior (e.g., orientation, speed, diving, respiration rate, etc.)[7]
SL1	900 ft	slow moving south	none
HS1	650 ft	slow moving east	none
SL2	1000 ft	briefly surfaced, facing S	none
HP1	1200 ft	fast moving north	none
HS2	850 ft	briefly surfaced, facing E	none

[7] **Note:** If a monitor sees a marine mammal within or approaching the Exclusion Zone prior to the start of impact pile driving, the monitor will notify the on-site resident engineer (or other authorized individual), who will then be required to delay pile driving until the marine mammal has moved outside of the Exclusion Zone, or if the animal has not been re-sighted within 15 minutes for pinnipeds or 30 minutes for cetaceans. If a marine mammal is sighted within or on a path toward the Exclusion Zone, pile driving will cease until that animal has cleared and is on a path away from the Exclusion Zone, or 15/30 minutes (pinnipeds/cetaceans) has lapsed since the last sighting.

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

PHOTOS

Comment: Reference No.	Photo Number	Time of Photo	Photo Taken Before (B), During (D) or After (A) Pile Driving	Description

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

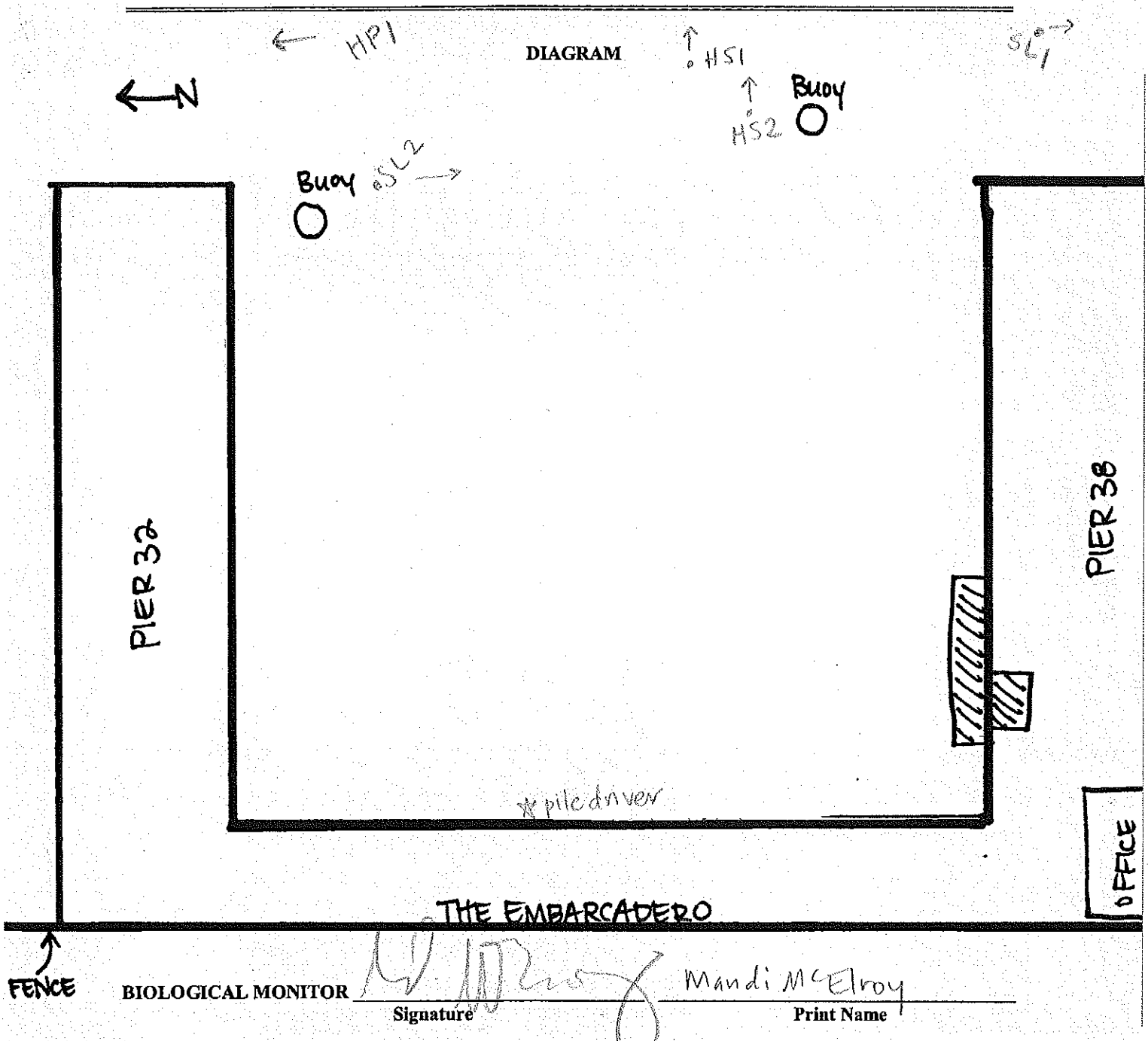
ADDITIONAL COMMENTS

Comment: Reference No.	Additional Comments
H81	Moving fast, heading north. Surfacing every ~15 seconds, continuing north...
	(a) 1407 seen under Bay Bridge; still moving north (just before fast tap)

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

DIAGRAM



BIOLOGICAL MONITOR _____ Mandi McElroy

Signature **Print Name**

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

BIRDS[8]

Date 8/3/12 Monitor AMandi Weather fog 0635-1200, then clear

Monitoring Locale: Pier 30 ☐ Pier 32 ☐ Pier 38 ☐ 178m from pile driving ☐ 120m from pile driving ☐

1900 m from pile driving on vessels ☐ boat

Pile Type: 24-inch octagonal concrete ☐ 24-inch steel shell ☑ Ambient Conditions ☐ Piles/Day (1-8): 5

Pile Driver: Impact ☑ Vibratory/Impact ☐ Attenuation Device: None ☐ Bubble Curtain: On ☑ Off ☐

Minutes of Vibratory Driving: n/a ☑ 8:00 ☐ 15:00 ☐ Impact Blows per Pile: 800 ☐ 300 ☑ 600 ☐

Pile No.	Pile Driver (Impact, Vibratory)[9]	Pile Driving Start/End Time	Observer Start/End Time	Bird Predation on Fish Observed (Y/N) and Time		General Bird Activity/Behavior	Comment: Reference Number
A18	impact	0848/0904	0708/0934	N	0841	swim	G1
A15	"	1100/1118	0934/1148	N	1117	perched on dock	G2
A22	"	1303/1333	1148/1403	N	1304	swim	C1
A22	"	"	1148/1403	Y	1331	feed (live fish)	C2
A21.5	"	1407/1434	1403/1504	N	1416	swim	G3
A20.5	"	1530/1609	1504/1638	N	1557	swim	C3

[8] The bird monitor will have to work closely with the fish monitor because the monitor must attempt to determine the amount of bird predation on fishes, including the size and species of fish affected.

[9] Steel shell pile driving will include both vibratory (up to the last 10 feet) and impact (last 10 feet) pile drivers.

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

BIRDS

Comment: Reference No.	Predation[10]		Dead/Injured Fish Observed[11]		Dead/Injured Fish Collected[8]	
	Bird Strikes Per Minute	Duration	Species	Size	Species	Size

[10] Diving birds that may be present, but which cannot be confirmed to scavenge on injured fish while diving, will be noted on the data sheet, but are not included in the count of bird strikes.

[11] SH = steelhead; G=North American Green Sturgeon; O=Other

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

BIRDS

PHOTOS

Comment: Reference No.	Photo Number	Time of Photo	Photo Taken Before (B), During (D) or After (A) Pile Driving	Description

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

BIRDS

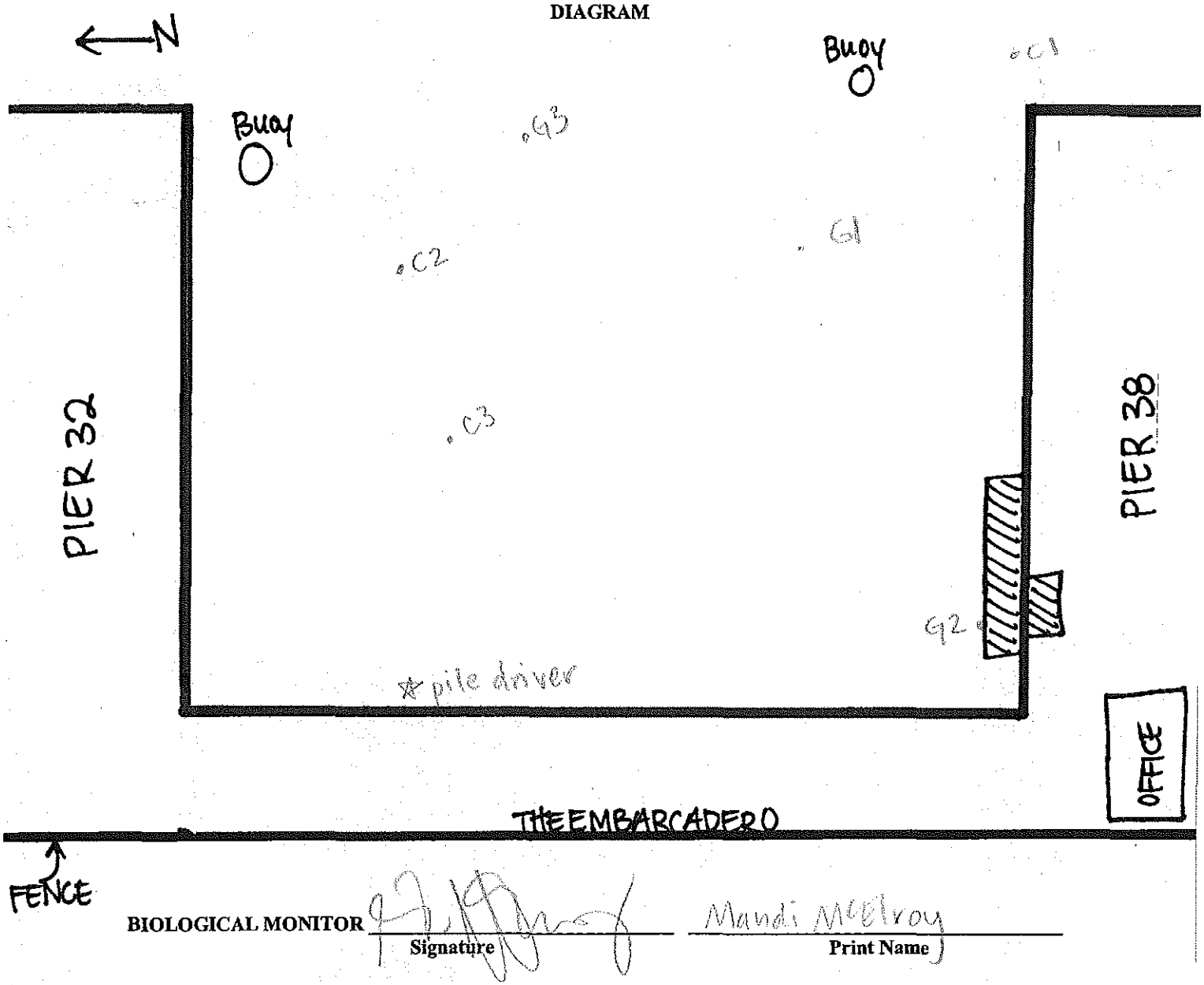
ADDITIONAL COMMENTS

Comment: Reference No.	Additional Comments

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

BIRDS

DIAGRAM



BIOLOGICAL MONITOR _____ Mandi McElroy

Signature | Print Name

Brannan Street Wharf – Biological Monitoring
Weekly Summary – August 6, 2012 through August 10, 2012

Monday, August 6, 2012

Biological monitoring at the BSW began at 0700 and continued until 1520. Five steel piles (A20, A19.5, A19, A18.5, J30) were driven. No negative impacts on any marine mammals were observed.

Biological Monitors - Mandi McElroy and Tom Copper

- **Birds:** Cormorants and gulls were observed in the area throughout the day, before, during and after pile driving. No feeding was observed; no bird strikes were observed.
- **Marine Mammals:** Two harbor seals and one California sea lion were observed throughout the monitoring period. All were observed outside of the exclusion zone. None exhibited a change in behavior as a result of project activities.
    - 0751, 0824-One harbor seal was observed approximately 1100 feet east of the pile driving location, two minutes before the soft start of Pile A20 and again one minute after the completion of Pile A20. In both instances, the seal surfaced briefly in the same general area and is assumed to be the same individual. No change of behavior was exhibited.
    - 0820-One sea lion was observed slow-moving and diving approximately 1200 feet east of the pile driving location, during the last series of blows of Pile A20 (three minutes before completion). No change of behavior was exhibited and the sea lion was not observed again.
    - 1443-One harbor seal was observed approximately 1100 feet east of the pile driving location by an observer stationed on Pier 32 for another project, during the driving of Pile J30. Piles were also being driven (vibrational) on the south side of Pier 32 at this time, approximately 500 feet from the animal. No change of behavior was exhibited.

Tuesday, August 7, 2012

Biological monitoring at the BSW began at 0700 and continued until 1550. Eight steel piles were driven – three were indicator piles that had been previously placed (A15, A18, A21) and the other five were newly placed (B27, C21, B22, B23, B24). No negative impacts on any marine mammals were observed.

Biological Monitors - Mandi McElroy and Tom Copper

- **Birds:** Cormorants and gulls were observed in the area throughout the day, before, during and after pile driving. No feeding or bird strikes were observed.
- **Marine Mammals:** Two harbor seals, one California sea lion, and several pairs of harbor porpoise (five sightings recorded, some may have been repeat sightings of same pair) were observed. None were observed to exhibit any change in behavior as a result of project activities.

- 0720 through 0844-One harbor seal was observed approximately 900 to 1100 feet east of pile-driving activities, surfacing multiple times before, during, and after the driving of Pile B27. No change of behavior was exhibited during the entire observation.
- 0849-One harbor porpoise was observed approximately 1500 feet east of pile-driving activities, slow-moving to the southeast, one minute before the start of Pile A15. No change of behavior was exhibited.
- 1034-One harbor porpoise was observed approximately 1100 feet east of pile-driving activities, slow-moving to the southeast, three minutes before the start of Pile A21. No change of behavior was exhibited.
- 1402 through 1447-Two pairs of harbor porpoise were observed multiple times in the same general area during this time frame, 1300 feet east of the pile-driving location, before and during the driving of Piles B23 and B24. The porpoises were slow-moving and diving in a circular pattern in the Bay; no changes in behavior were observed.
- 1515, 1540-One harbor seal was observed slow-moving and surfacing approximately 900 feet southeast of the pile-driving location. The seal continued to surface intermittently around the east end of Pier 38 for the remainder of the observation period, up to 30 minutes after cessation of pile-driving. No changes in behavior were observed.

Wednesday, August 8, 2012

Biological monitoring at the BSW began at 0652 and continued until 1520. Seven steel piles were driven – two were indicator piles that had been previously placed (A15 and A18) and the other five were newly placed (B26, C21, B25, C20, A15.5, A16). No negative impacts on any marine mammals were observed.

Biological Monitors – Shannon Lindquist and Tom Copper

- **Birds:** Cormorants, pelicans and gulls were observed in the area throughout the day, before, during and after pile driving. No feeding or bird strikes were observed. One dead gull was observed floating in the water however, it is not assumed to be a result of pile driving activity. Photo taken.
- **Marine Mammals:** Three harbor seals were observed throughout the day however, they are all assumed to be the same animal. None were observed to exhibit any change in behavior as a result of project activities.
  - 0719 through 0740- One harbor seal was observed repeatedly in the area exhibiting slow surface travel approximately 800 feet southeast of the pile-driving location. No changes in behavior were observed.
  - 1157- One harbor seal was observed surfacing briefly approximately 700 feet southeast of pile-driving activity, immediately following pile-driving. No changes in behavior were observed.
  - 1402 through 1410- One harbor seal was observed surfacing several times between 550 and 700 feet east and northeast of pile-driving. The animal exhibited slow surface travel and no changes in behavior were observed.

Thursday, August 9, 2012

Biological monitoring at the BSW began at 0700 and continued until 1449. Seven steel piles were driven (A17.5, C19, C18, C20, A17, A16.5, C17 and C16). No negative impacts on any marine mammals were observed.

Biological Monitors – Shannon Lindquist, Ann Zoidis and Tom Copper

- **Birds:** Cormorants, pelicans and gulls were observed in the area throughout the day, before, during and after pile driving. No feeding or bird strikes were observed.
- **Marine Mammals:** Four harbor seals and two California sea lions were observed throughout the day. Harbor seal observations assumed to be the same animal. None were observed to exhibit any change in behavior as a result of project activities.
    - 0913- One harbor seal was observed surfacing several times approximately 900 feet east of pile-driving. The animal exhibited slow surface travel followed by diving, during and immediately after pile-driving. No change in behavior was observed.
    - 0941- Same harbor seal previously observed. Animal was spotted floating on it's back briefly before flipping over and diving, approximately 900 feet south of the pile-driving.
    - 1056- One California sea lion was observed approximately 550 feet east of the pile-driving. The animal surfaced twice and continued to swim south and out of the area. No change in behavior was observed
    - 1310- One California sea lion was observed approximately 400 feet northeast of the pile-driving. The animal surfaced twice and sunk and was not sighted again until 1315. The animal was moving slowly and appeared undisturbed.
    - 1322- One harbor seal was observed approximately 600 feet south of the barge. The animal appeared mellow with its head up looking at the boat. No disturbance was apparent.
    - 1402- One harbor seal was observed with head, tail and flippers out. The animal hovered at the surface and then sunk down approximately 400 feet south of the pile-driving. The seal appeared undisturbed.

Friday, August 10, 2012

Biological monitoring at the BSW began at 0700 and continued until 1512. Seven steel piles were driven (A14.5, A14, A13.5, A13, C13, C14 and C15). No negative impacts on any marine mammals were observed.

Biological Monitors – Shannon Lindquist, Ann Zoidis and Tom Copper

- **Birds:** Cormorants, pelicans and gulls were observed in the area throughout the day, before, during and after pile driving. No feeding or bird strikes were observed.

- **Marine Mammals:** Four harbor seals and one California sea lion was observed throughout the day. None were observed to exhibit any change in behavior as a result of project activities.
    - 0916- One harbor seal was spotted approximately 850 feet east of pile-driving. The animal surfaced briefly and exhibited slow travel. Did not appear disturbed by pile driving.
    - 1045- One harbor seal was spotted approximately 350 feet east of pile-driving. No pile-driving was occurring at the time of the observation. The animal surfaced briefly with only the head visible and exhibited slow travel.
    - 1129- One California sea lion was spotted approximately 600 feet east of the pile-driving immediately following pile-driving. The animal was only spotted at the surface briefly and was not sighted again in the area.
    - 1257- One harbor seal was spotted approximately 400 feet southeast of the pile-driving while it was occurring.
    - 1434- One harbor seal was again spotted approximately 350 feet southeast of the pile-driving. Assumed to be the same animal as previously spotted in the area. This animal seems to hang out in the area of the barge during or just after pile-driving, but does not appear to be disturbed by the activity.

on site 0630
departed 1530

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

Date 8/6/12 **Monitor (s)** Mandi, Tom **Visibility** clear all day

Tide Level BSS 1-2 **Human Activity in the Area** kayaks, sailboats, America's Cup barge @ Pier 32

Monitoring Locale: Pier 30 ☐ Pier 32 ☐ Pier 38 ☐ Boat ☒ 178 m from pile driving ☐

129 m from pile driving ☐ 1900 m from pile driving on vessels ☐

Pile Type: 24-inch octagonal concrete ☐ 24-inch steel shell ☒ Ambient Conditions ☐

Piles/Day (1-8): 5 **Pile Driver:** Impact ☒ Vibratory/Impact ☐

Attenuation Device: None ☐ Bubble Curtain: On ☒ Off ☐

Minutes of Vibratory Driving: n/a ☒ 8:00 ☐ 15:00 ☐ **Impact Blows per Pile:** 800 ☐ 300 ☒ 600 ☐

A20

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

Pile No.	Pile Driver (Impact, Vibratory)[5]	Pile Driving Start/End Time	Observation Start/End Time	Mammal Species[6]			Comments: Reference Number
				Species	No.	Time	
A20	impact	0753/0823	0700/0853	HS	1	0751	HS1
A20	"	"	0700/0853	SL	1	0820	SL1
A20	"	"	"	HS	1	0824	HS1
A19.5	"	0925/0951	0853/1021	—	—	—	n/a no species observed
A19	"	1034/1114	1021/1144	—	—	—	n/a no species observed
A18.5	"	1234/1304	1144/1334	—	—	—	n/a no spp. observed
J30	"	1430/1449	1334/1519	HS	2	1443	HS2

[5] Steel shell pile driving will include both vibratory (up to the last 10 feet) and impact (last 10 feet) pile drivers
[6] HS=Harbor Seal; SL = Sea Lion; HP=Harbor Porpoise; GW=Gray Whale; O = Other

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

Comments: Reference No.	Monitor's Distance from Pile Driving Activity	Initial Behavior of Marine Mammal	Changes in Marine Mammal Behavior (e.g., orientation, speed, diving, respiration rate, etc.)[7]
HS1	1200 ft	briefly surfaced twice.	none
SL1	1200 ft	swimming north, surfaced 3x	none
HS2	900ft	briefly surfaced	none

[7] **Note:** If a monitor sees a marine mammal within or approaching the Exclusion Zone prior to the start of impact pile driving, the monitor will notify the on-site resident engineer (or other authorized individual), who will then be required to delay pile driving until the marine mammal has moved outside of the Exclusion Zone, or if the animal has not been re-sighted within 15 minutes for pinnipeds or 30 minutes for cetaceans. If a marine mammal is sighted within or on a path toward the Exclusion Zone, pile driving will cease until that animal has cleared and is on a path away from the Exclusion Zone, or 15/30 minutes (pinnipeds/cetaceans) has lapsed since the last sighting.

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

PHOTOS

Comment: Reference No.	Photo Number	Time of Photo	Photo Taken Before (B), During (D) or After (A) Pile Driving	Description

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

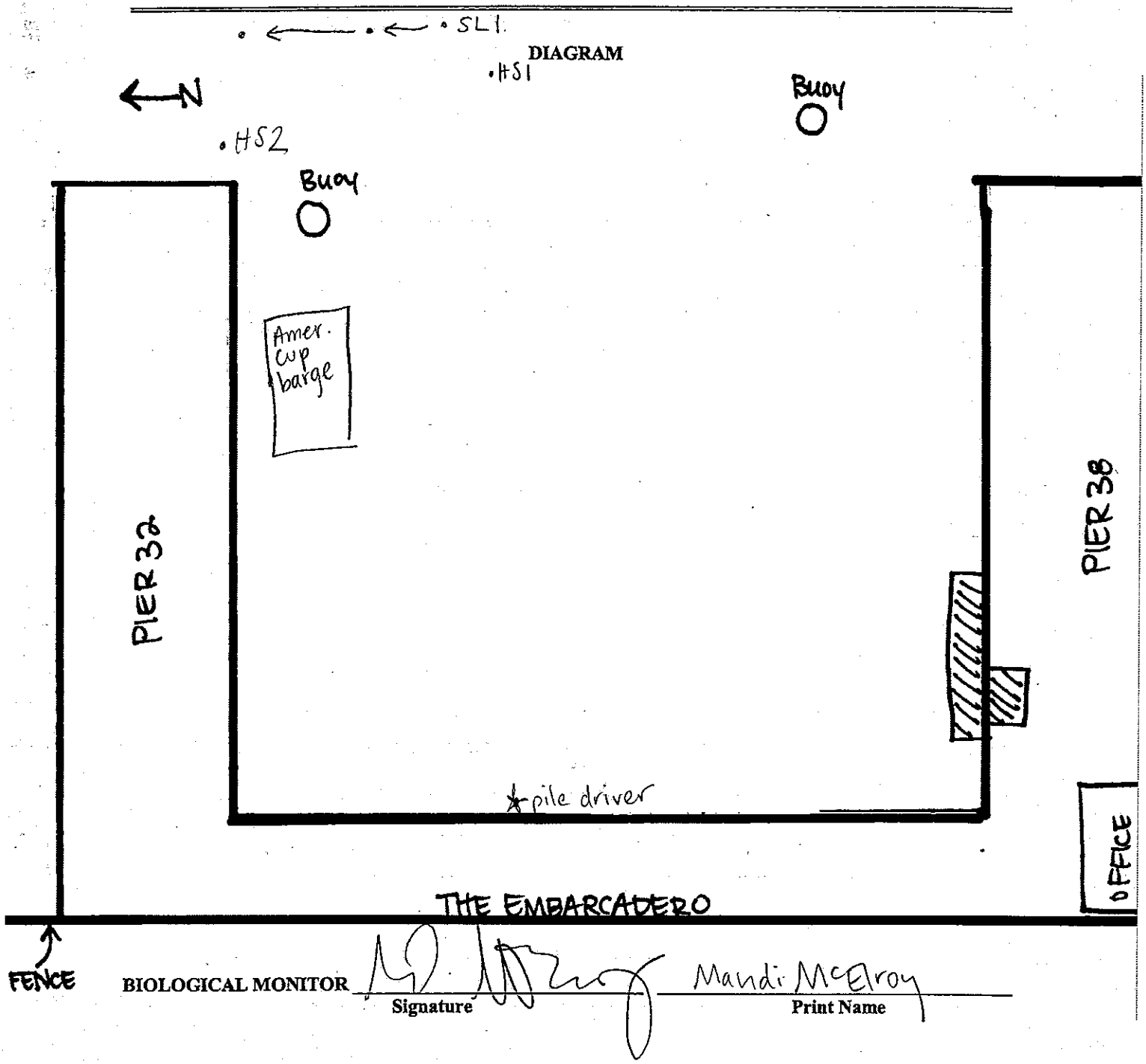
ADDITIONAL COMMENTS

Comment: Reference No.	Additional Comments
HS1	surfaced twice in same general location, looking west in
	direction of pile driver. no signs of distress/disturbance.
—	vibrational pile driving activity taking place
	@ Pier 32 throughout the day.
HS2	was observed by Shannon Lindquist, while
	monitoring pile driving on Pier 32.

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

DIAGRAM



BIOLOGICAL MONITOR _____ Mandi McElroy

Signature **Print Name**

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

BIRDS[8]

Date 8/6/12 Monitor Mandi Weather ~62°F, clear

Monitoring Locale: Pier 30 ☐ Pier 32 ☐ Pier 38 ☐ 178m from pile driving ☐ 120m from pile driving ☐

1900 m from pile driving on vessels ☐ boat

Pile Type: 24-inch octagonal concrete ☐ 24-inch steel shell ☒ Ambient Conditions ☐ Piles/Day (1-8): 5

Pile Driver: Impact ☒ Vibratory/Impact ☐ Attenuation Device: None ☐ Bubble Curtain: On ☒ Off ☐

Minutes of Vibratory Driving: n/a ☒ 8:00 ☐ 15:00 ☐ Impact Blows per Pile: 800 ☐ 300 ☒ 600 ☐

Pile No.	Pile Driver (Impact, Vibratory)[9]	Pile Driving Start/End Time	Observer Start/End Time	Bird Predation on Fish Observed (Y/N) and Time		General Bird Activity/Behavior	Comment: Reference Number
A20	impact	0753/0823	0700/0853	N	0750	gull swimming	G1
A19.5	"	0925/0951	0853/1021	N	0931	gull perched	G2
A19.5	"	"	"	N	0936	juvenile gull. swimming	G3
A19	"	1034/1114	1004/1144	N	1058	gull swimming	G4
A18.5	"	1234/1304	1144/1334	N	1234	gull swimming	G5
A18.5	"	"	"	N	1242	gulls swimming	G6 (group of 8)
J30	"	1430/1449	1334/1519	N	1440	gull swimming	G7
J30	"	1430/1449	"	N	1447	cormorant, swim	C1

[8] The bird monitor will have to work closely with the fish monitor because the monitor must attempt to determine the amount of bird predation on fishes, including the size and species of fish affected.

[9] Steel shell pile driving will include both vibratory (up to the last 10 feet) and impact (last 10 feet) pile drivers.

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

BIRDS

Comment: Reference No.	Predation[10]		Dead/Injured Fish Observed[11]		Dead/Injured Fish Collected[8]	
	Bird Strikes Per Minute	Duration	Species	Size	Species	Size

[10] Diving birds that may be present, but which cannot be confirmed to scavenge on injured fish while diving, will be noted on the data sheet, but are not included in the count of bird strikes.

[11] SH = steelhead; G=North American Green Sturgeon; O=Other

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

BIRDS

PHOTOS

Comment: Reference No.	Photo Number	Time of Photo	Photo Taken Before (B), During (D) or After (A) Pile Driving	Description

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

BIRDS

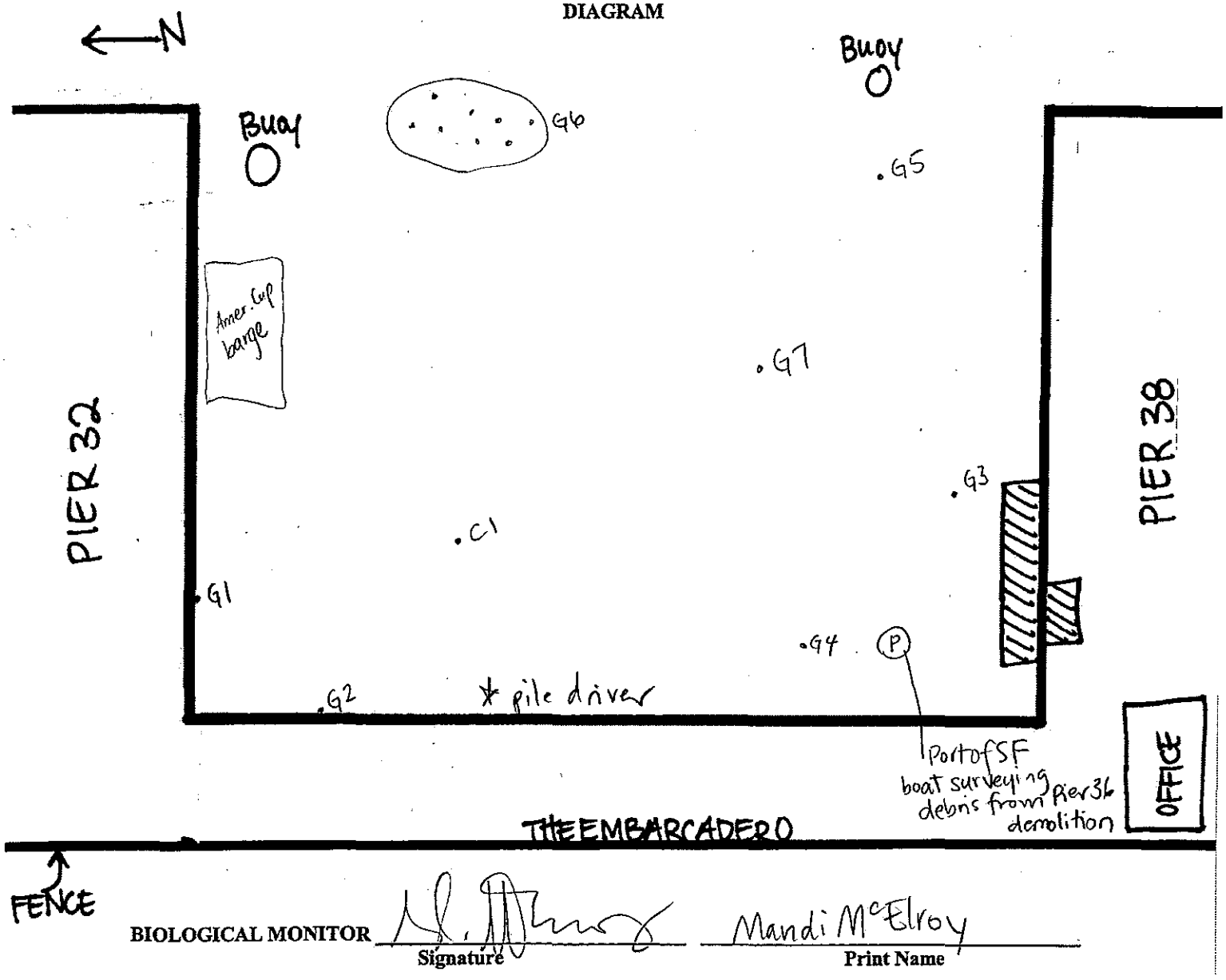
ADDITIONAL COMMENTS

Comment: Reference No.	Additional Comments
46	group of 8 gulls - 4 juveniles, 4 adults

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

BIRDS

DIAGRAM



BIOLOGICAL MONITOR _____ Mandi McElroy

Signature Print Name

on site 0638
departed 1550

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

Page 1 of 6

Date 8/7/12 **Monitor (s)** Mandi **Visibility** clear all day

Tide Level BSS 1-2 **Human Activity in the Area** sailboats, motorboats, construction on Pier 32

Monitoring Locale: Pier 30 ☐ Pier 32 ☐ Pier 38 ☐ Boat ☒ 178 m from pile driving ☐

129 m from pile driving ☐ 1900 m from pile driving on vessels ☐

Pile Type: 24-inch octagonal concrete ☐ 24-inch steel shell ☒ Ambient Conditions ☐

Piles/Day (1-8): 8 **Pile Driver:** Impact ☒ Vibratory/Impact ☐ three indicator piles, previously ½ driven five new piles.

Attenuation Device: None ☐ Bubble Curtain: On ☒ Off ☐

Minutes of Vibratory Driving: n/a ☒ 8:00 ☐ 15:00 ☐ **Impact Blows per Pile:** 800 ☐ 300 ☒ 600 ☐

11am mtg
give radio to Tom

1

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

	Pile No.	Pile Driver (Impact, Vibratory)[5]	Pile Driving Start/End Time	Observation Start/End Time	Mammal Species[6]			Comments: Reference Number
					Species	No.	Time	
new	B27	impact	0740/0803	0700/0833	HS	1	0720	HS1
	B27	"	"	"	HS	1	0739	" 1
	B27	"	"	"	HS	1	0746	"
	B27	"	"	"	HS	1	0754	"
indicator pile >	A15	"	0850/0904	0833/0934	HP	1	0849	HP1
previously placed indicator pile >	A18	"	0942/0958	0934/1028	—	—	—	no sightings
previously placed indicator pile >	A21	"	1037/1053	1028/1055 (came in for meeting)	HP	2	1034	HP2
new	C21	"	1126/1150	1055/1220	—	—	—	no sightings
	B22	"	1304/1326	1220/1356	—	—	—	no sightings
	B23	"	1404/1416	1356/1446	HP	3	1402	HP3 (pair)
	B23	"	"	"	SL	1	1412	SL1
	B24	"	1454/1517	1446/1547	HP	4	1446	HP4 (pair)
	B24	"	"	"	HP	5	1447	HP5 (pair)
	B24	"	"	"	HS	2	1515	HS2
	B24	"	"	"	HS	2	1540	HS2

[5] Steel shell pile driving will include both vibratory (up to the last 10 feet) and impact (last 10 feet) pile drivers

[6] HS=Harbor Seal; SL = Sea Lion; HP=Harbor Porpoise; GW=Gray Whale; O = Other

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

Comments: Reference No.	Monitor's Distance from Pile Driving Activity	Initial Behavior of Marine Mammal	Changes in Marine Mammal Behavior (e.g., orientation, speed, diving, respiration rate, etc.)[7]
HS1	1100 ft	slow moving, diving	none
HP1	1000 ft	"	"
HP2	1100 ft	"	"
HP3, HP4, HP5	1300 ft	"	"
SL1	950 ft	"	"
HS2	800 ft	"	"

[7] **Note:** If a monitor sees a marine mammal within or approaching the Exclusion Zone prior to the start of impact pile driving, the monitor will notify the on-site resident engineer (or other authorized individual), who will then be required to delay pile driving until the marine mammal has moved outside of the Exclusion Zone, or if the animal has not been re-sighted within 15 minutes for pinnipeds or 30 minutes for cetaceans. If a marine mammal is sighted within or on a path toward the Exclusion Zone, pile driving will cease until that animal has cleared and is on a path away from the Exclusion Zone, or 15/30 minutes (pinnipeds/cetaceans) has lapsed since the last sighting.

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

PHOTOS

Comment: Reference No.	Photo Number	Time of Photo	Photo Taken Before (B), During (D) or After (A) Pile Driving	Description

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

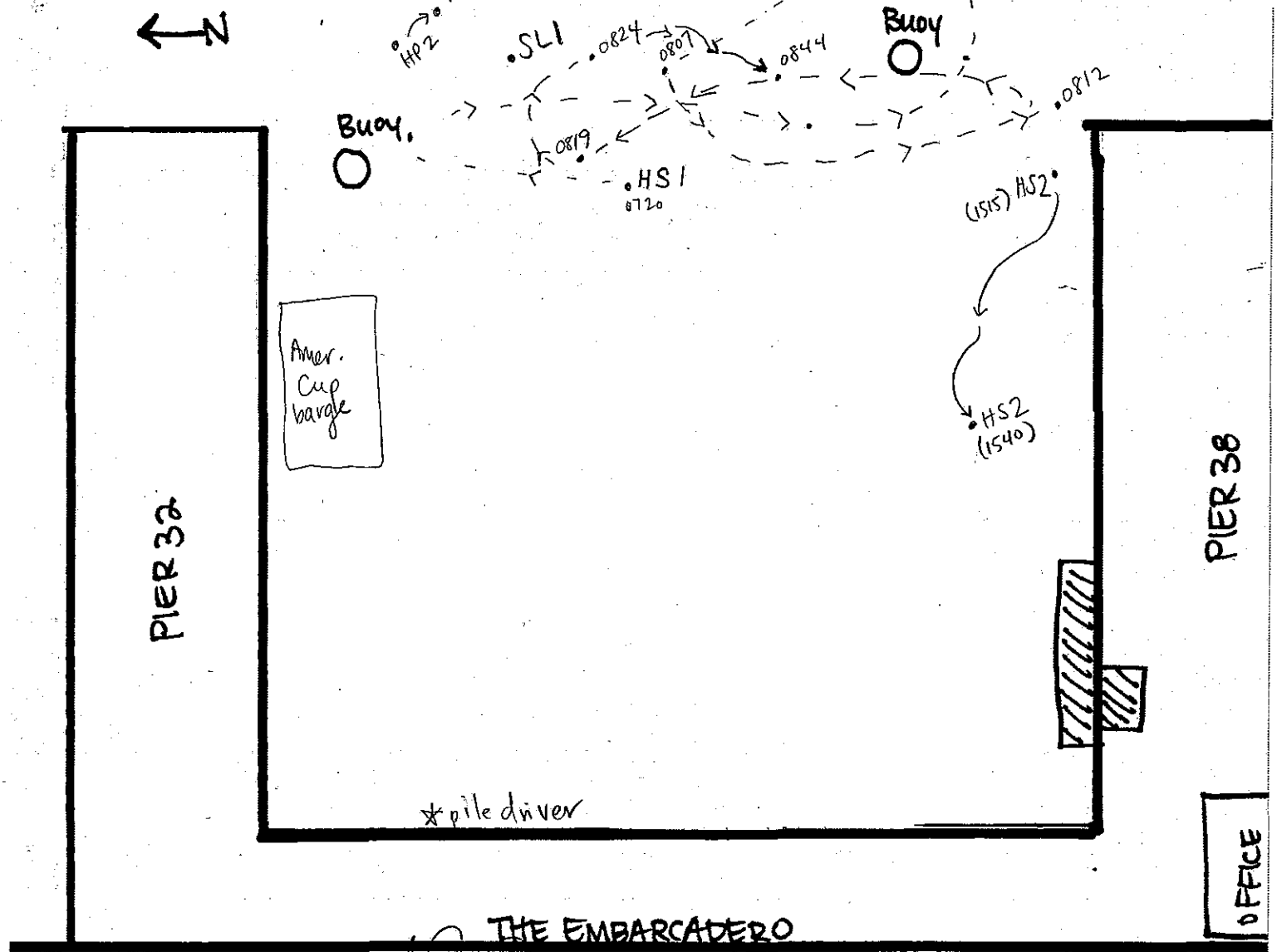
ADDITIONAL COMMENTS

Comment: Reference No.	Additional Comments
—	construction - including vibrational pile-driving - occurring simultaneously on Pier 32. south side of
HP3, HP4, HP5	- two pairs observed multiple times circling same general area
—	attended weekly meeting @ Dutra trailer from 1055-1220. One monitor (Tom) was observing during that time, and did not observe any animals within exclusion zone.

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

HP1 HP4 HP3 HP5 **MARINE MAMMALS**

DIAGRAM



BIOLOGICAL MONITOR _____ Mandi McElroy

Signature **Print Name**

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

BIRDS[8]

Date 8/7/12 Monitor Mandi Weather clear all day, BSS 1-2

Monitoring Locale: Pier 30 ☐ Pier 32 ☐ Pier 38 ☐ 178m from pile driving ☐ 120m from pile driving ☐

1900 m from pile driving on vessels ☐ boat

Pile Type: 24-inch octagonal concrete ☐ 24-inch steel shell ☒ Ambient Conditions ☐ Piles/Day (1-8): 8

Pile Driver: Impact ☒ Vibratory/Impact ☐ Attenuation Device: None ☐ Bubble Curtain: On ☒ Off ☐

Minutes of Vibratory Driving: n/a ☒ 8:00 ☐ 15:00 ☐ Impact Blows per Pile: 800 ☐ 300 ☒ 600 ☐

Pile No.	Pile Driver (Impact, Vibratory)[9]	Pile Driving Start/End Time	Observer Start/End Time	Bird Predation on Fish Observed (Y/N) and Time		General Bird Activity/Behavior	Comment: Reference Number
B27	Impact	0740/0803	0700/0833	N	0753	cormorant, swim	C1
A18	"	0942/0958	0934/1028	N	0945	(2) gulls, swimming	G1
A18	"	"	"	N	0954	gull, swimming	G2
A21	"	1037/1053	1028/1055	N	1037	gull, swimming	G3
A21	"	"	"	N	1051	cormorant, swim	C2
B23	"	1404/1416	1356/1446	N	1407	gull, swim	G4
B24	"	1454/1517	1446/1547	N	1502	"	G5
B24	"	"	"	N	1504	"	G6

[8] The bird monitor will have to work closely with the fish monitor because the monitor must attempt to determine the amount of bird predation on fishes, including the size and species of fish affected.

[9] Steel shell pile driving will include both vibratory (up to the last 10 feet) and impact (last 10 feet) pile drivers.

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

BIRDS

Comment: Reference No.	Predation[10]		Dead/Injured Fish Observed[11]		Dead/Injured Fish Collected[8]	
	Bird Strikes Per Minute	Duration	Species	Size	Species	Size

[10] Diving birds that may be present, but which cannot be confirmed to scavenge on injured fish while diving, will be noted on the data sheet, but are not included in the count of bird strikes.

[11] SH = steelhead; G=North American Green Sturgeon; O=Other

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

BIRDS

PHOTOS

Comment: Reference No.	Photo Number	Time of Photo	Photo Taken Before (B), During (D) or After (A) Pile Driving	Description

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

BIRDS

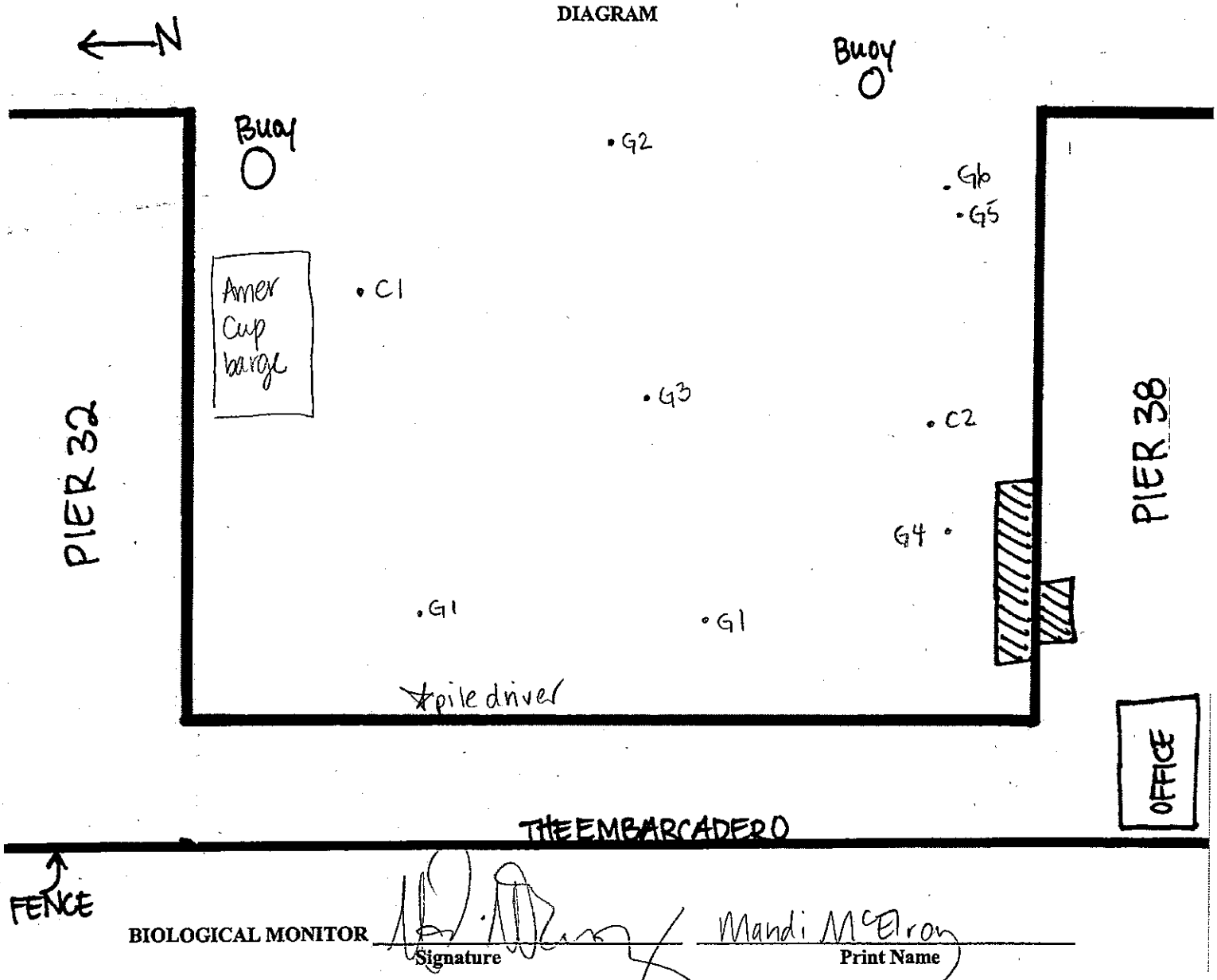
ADDITIONAL COMMENTS

Comment: Reference No.	Additional Comments

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

BIRDS

DIAGRAM



BIOLOGICAL MONITOR _____ Mandi McElroy
Signature Print Name

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

Date 8/8/12 **Monitor (s)** Shannon Lindquist **Visibility** clear, Beufort 2

Tide Level see below **Human Activity in the Area** work on Pier 32, pedestrians on the Embarcadero

Monitoring Locale: Pier 30 ☐ Pier 32 ☐ Pier 38 ☐ Boat ☒ 178 m from pile driving ☐

129 m from pile driving ☐ 1900 m from pile driving on vessels ☐

Pile Type: 24-inch octagonal concrete ☐ 24-inch steel shell ☒ Ambient Conditions ☐

Piles/Day (1-8): ☐ **Pile Driver:** Impact ☒ Vibratory/Impact ☐

Attenuation Device: None ☐ Bubble Curtain: On ☒ Off ☐

Minutes of Vibratory Driving: n/a ☐ 8:00 ☐ 15:00 ☐ **Impact Blows per Pile:** 800 ☐ 300 ☒ 600 ☐

Tide level:

H	L	H	L
0454	1013	1650	2343
4.03	2.07	5.54	1.37

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

Pile No.	Pile Driver (Impact, Vibratory)[5]	Pile Driving Start/End Time	Observation Start/End Time	Mammal Species[6]			Comments: Reference Number
				Species	No.	Time	
B26	impact	0753/0812	0652/	HS	1	0719	(1)
				HS	1	0740	Same animal
B25	impact	0848/0913		/	/	/	
C20	impact	1009/1028		/	/	/	
A18	impact	1127/1130		/	/	/	(2)
A15	impact	1154/1155		HS	2	1157	(3)
A15.5	impact	1310/1343		HS	3	1402	(4)
A16	impact	1414/1444	/1520	HS	3	1410	(5)

[5] Steel shell pile driving will include both vibratory (up to the last 10 feet) and impact (last 10 feet) pile drivers

[6] HS=Harbor Seal; SL = Sea Lion; HP=Harbor Porpoise; GW=Gray Whale; O = Other

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

Comments: Reference No.	Monitor's Distance from Pile Driving Activity	Initial Behavior of Marine Mammal	Changes in Marine Mammal Behavior (e.g., orientation, speed, diving, respiration rate, etc.)[7]
(1)	800ft.	HS hovering @ surface	no change
(3)	200ft.	" "	no change
(4)	400ft.	HS surfaced, floated on surface,	no change
(5)	600ft.	HS checking out recently placed buoy	no change

[7] **Note:** If a monitor sees a marine mammal within or approaching the Exclusion Zone prior to the start of impact pile driving, the monitor will notify the on-site resident engineer (or other authorized individual), who will then be required to delay pile driving until the marine mammal has moved outside of the Exclusion Zone, or if the animal has not been re-sighted within 15 minutes for pinnipeds or 30 minutes for cetaceans. If a marine mammal is sighted within or on a path toward the Exclusion Zone, pile driving will cease until that animal has cleared and is on a path away from the Exclusion Zone, or 15/30 minutes (pinnipeds/cetaceans) has lapsed since the last sighting.

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

PHOTOS

Comment: Reference No.	Photo Number	Time of Photo	Photo Taken Before (B), During (D) or After (A) Pile Driving	Description

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

ADDITIONAL COMMENTS

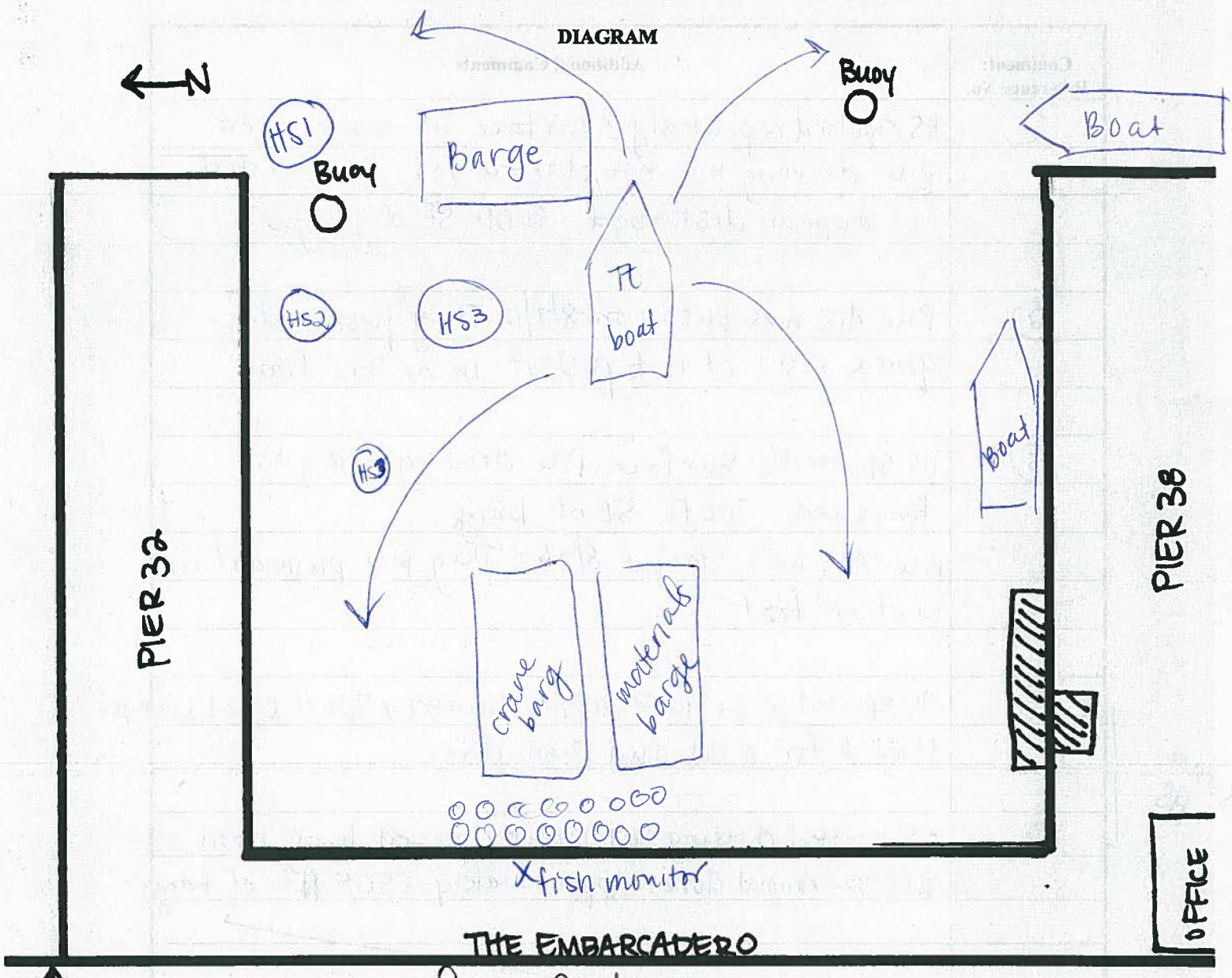
Comment: Reference No.	Additional Comments
(1)	HS spotted repeatedly @ surface in same area. Pile driving has not started yet. Animal did not appear disturbed. 800ft SE of barge
(2)	Pile A18 was put in on 8/7/12. They just did a quick reset of it to push it in another foot.
(3)	HS spotted @ surface. Pile driving had just finished. 700ft. SE of barge. Pile A15 was started 8/7/12. They just pushed it in another foot
(4)	HS spotted @ surface approximately 700 ft. E of barge. floated for a bit and then dove.
(5)	HS spotted checking out recently placed buoy near Pier 32. Animal dove. Approximately 550ft SE of barge.

same HS

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

DIAGRAM



BIOLOGICAL MONITOR _____ _____

Signature **Print Name**

Shannon Lindquist

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

BIRDS[8]

Date 8/8/12 Monitor ShannonLindquist Weather Clear, Beaufort 2

Monitoring Locale: Pier 30 ☐ Pier 32 ☐ Pier 38 ☐ 178m from pile driving ☐ 120m from pile driving ☐
Boat ☒
1900 m from pile driving on vessels ☐

Pile Type: 24-inch octagonal concrete ☐ 24-inch steel shell ☒ Ambient Conditions ☐ Piles/Day (1-8): ☐

Pile Driver: Impact ☒ Vibratory/Impact ☐ Attenuation Device: None ☐ Bubble Curtain: On ☐ Off ☐

Minutes of Vibratory Driving: n/a ☒ 8:00 ☐ 15:00 ☐ Impact Blows per Pile: 800 ☐ 300 ☒ 600 ☐

Pile No.	Pile Driver (Impact, Vibratory)[9]	Pile Driving Start/End Time	Observer Start/End Time	Bird Predation on Fish Observed (Y/N) and Time		General Bird Activity/Behavior	Comment: Reference Number
B26	impact	0753/0812	0652/	/	/	cormorants &	
B25	impact.	0848/0913	|	/	/	gulls observed	
C20	impact	1009/1028	|	/	/	in the area feeding	
A18	impact	1127/1130	|	/	/		(1)
A15	impact	1154/1155	|	/	/		
A15.5	impact	1310/1343	↓	/	/		
A16	impact	1414/1444	1520	/	/	dead gull seen floating	(2)

[8] The bird monitor will have to work closely with the fish monitor because the monitor must attempt to determine the amount of bird predation on fishes, including the size and species of fish affected.
[9] Steel shell pile driving will include both vibratory (up to the last 10 feet) and impact (last 10 feet) pile drivers.

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

BIRDS

Comment: Reference No.	Predation[10]		Dead/Injured Fish Observed[11]		Dead/Injured Fish Collected[8]	
	Bird Strikes Per Minute	Duration	Species	Size	Species	Size

[10] Diving birds that may be present, but which cannot be confirmed to scavenge on injured fish while diving, will be noted on the data sheet, but are not included in the count of bird strikes.

[11] SH = steelhead; G=North American Green Sturgeon; O=Other

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

BIRDS

PHOTOS

Comment: Reference No.	Photo Number	Time of Photo	Photo Taken Before (B), During (D) or After (A) Pile Driving	Description
(2)	1	1440	D	photo of dead gull

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

BIRDS

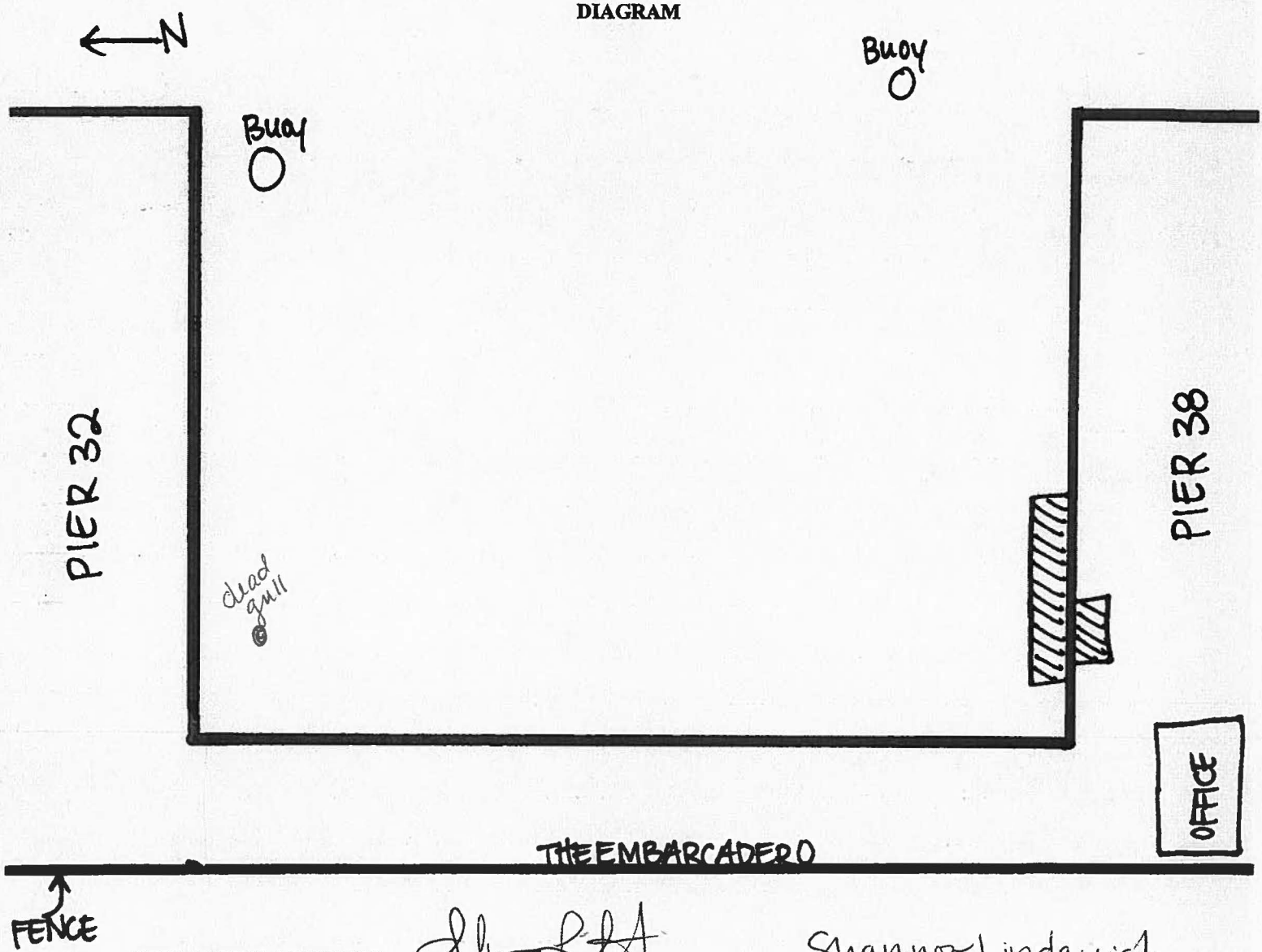
ADDITIONAL COMMENTS

Comment: Reference No.	Additional Comments
(2)	dead fledgling gull spotted floating near Pier 32 approximately 400ft N of barge. Looked freshly deceased. unlikely a result of the pile driving

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

BIRDS

DIAGRAM



BIOLOGICAL MONITOR _____ Shannon Lindquist

Signature **Print Name**

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

Ann Zoidis 1300-1500

Page 1 of 6

Date 8/9/12 **Monitor (s)** Shannon Lindquist - 6:45 → 1300 **Visibility** clear, Beufort 2

Tide Level See below **Human Activity in the Area** work on Pier 32 pedestrians on The Embarcadero

Monitoring Locale: Pier 30 ☐ Pier 32 ☐ Pier 38 ☐ Boat ☒ 178 m from pile driving ☐

129 m from pile driving ☐ 1900 m from pile driving on vessels ☐

Pile Type: 24-inch octagonal concrete ☐ 24-inch steel shell ☒ Ambient Conditions ☐

Piles/Day (1-8): ☐ **Pile Driver:** Impact ☒ Vibratory/Impact ☐

Attenuation Device: None ☐ Bubble Curtain: On ☒ Off ☐

Minutes of Vibratory Driving: n/a ☐ 8:00 ☐ 15:00 ☐ **Impact Blows per Pile:** 800 ☐ 300 ☒ 600 ☐

Tides:

High	Low	High	Low
05:17	10:06	1636	2350
+3.7	+2.5	+5.5	+1.2

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

Pile No.	Pile Driver (Impact, Vibratory)[1]	Pile Driving Start/End Time	Observation Start/End Time	Mammal Species[2]			Comments: Reference Number
				Species	No.	Time	
A17.5	impact	0746/0816	0700/	/	/	/	
C19	impact	0855/0914	|	HS	1	0913	(1) 0921
C18	impact	0942/0959	|	HS	1	0941	(2)
A17	impact	1045/1113	|	SL	1	1056	(3)
A16.5	impact	1143/1205	|	/	/	/	
C17	impact	1309/1328	|	SL	1	1310	(4)
C16	impact	1353/1419	|	HS	1	1322	(5)
			↓	HS	1	1402	(6)
			/1449				

[1] Steel shell pile driving will include both vibratory (up to the last 10 feet) and impact (last 10 feet) pile drivers
[2] HS=Harbor Seal; SL = Sea Lion; HP=Harbor Porpoise; GW=Gray Whale; O = Other

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

Comments: Reference No.	Monitor's Distance from Pile Driving Activity	Initial Behavior of Marine Mammal	Changes in Marine Mammal Behavior (e.g., orientation, speed, diving, respiration rate, etc.)[3]
(1)	1000ft.	HS observed hovering near the surface for about 30 seconds	no change.
(2)	900ft.	Same HS observed.	no change.
(3)	600ft.	CSL observed swimming South away from pile driving	no change
(4)	400ft	CSL observed milling hovering at surface @ 30 seconds	no change
(5)	600ft	HS observed hovering at surface ~ 30 seconds	no change
(6)	400ft	HS observed at surface ~ 20 sec moves in closer to ~350' of barge	no change

[3] **Note:** If a monitor sees a marine mammal within or approaching the Exclusion Zone prior to the start of impact pile driving, the monitor will notify the on-site resident engineer (or other authorized individual), who will then be required to delay pile driving until the marine mammal has moved outside of the Exclusion Zone, or if the animal has not been re-sighted within 15 minutes for pinnipeds or 30 minutes for cetaceans. If a marine mammal is sighted within or on a path toward the Exclusion Zone, pile driving will cease until that animal has cleared and is on a path away from the Exclusion Zone, or 15/30 minutes (pinnipeds/cetaceans) has lapsed since the last sighting.

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

Page 4 of 6

PHOTOS

Comment: Reference No.	Photo Number	Time of Photo	Photo Taken Before (B), During (D) or After (A) Pile Driving	Description
②	1	0945	D	HS1 @ surface

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

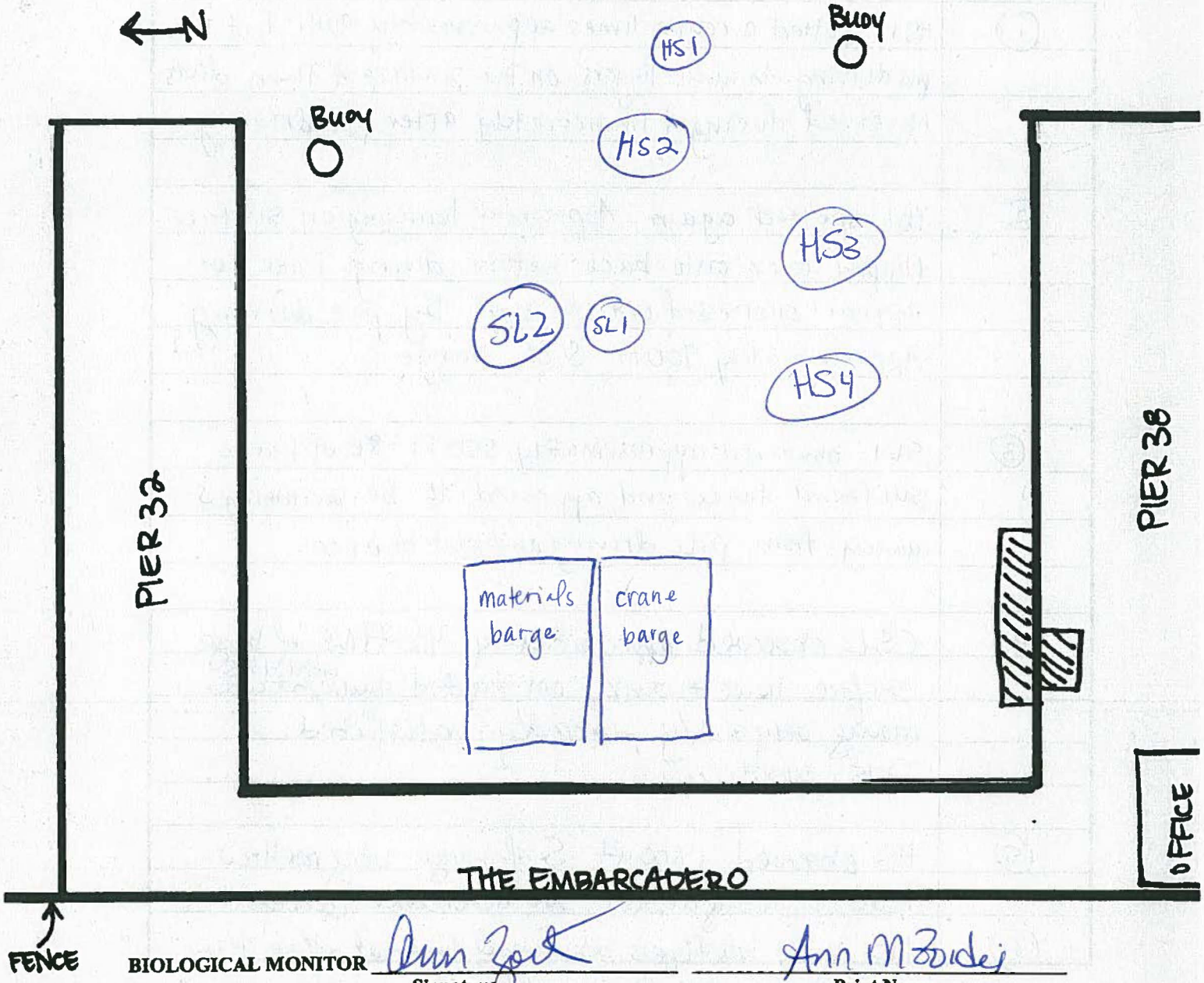
ADDITIONAL COMMENTS

Comment: Reference No.	Additional Comments
(1)	HS1 spotted a couple times approximately 900ft E of the pile driving. Animals lingers on the surface & Then dives. observed during & immediately after pile driving.
(2)	HS1 spotted again. Appeared lounging on surface. flipped over onto back before diving. Does not appear distressed or disturbed by pile driving. Approximately 900 ft. S of barge.
(3)	SL1 observed approximately 550 ft. E of barge. surfaced twice and appeared to be swimming S away from pile driving and out of area.
(4)	CSL observed approximately 400 ft NE of barge surface twice + sink, not sighted again until 13:15 but was moving very slowly, apparently undisturbed. 13:15 - head up.
(5)	HS observed ~600 ft S of barge. Very mellow head up, looking at boat. No disturbance apparent
(6)	HS head + tail flippers at, animal hover at surface then sink down. ~400 ft S. of Barge.

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

DIAGRAM



BIOLOGICAL MONITOR Ann Zoidis / Ann M Zoidis

Signature **Print Name**

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

BIRDS[4]

Ann Birds 1300-1500 6:45-1300 Page 1 of 5

Date 8/9/12 **Monitor** ShannonLindquist **Weather** clear, Beaufort 2

Monitoring Locale: Pier 30 ☐ **Pier 32** ☐ **Pier 38** ☐ **178m from pile driving** ☐ **120m from pile driving** ☐
Boat ☒
1900 m from pile driving on vessels ☐

Pile Type: 24-inch octagonal concrete ☐ **24-inch steel shell** ☒ **Ambient Conditions** ☐ **Piles/Day (1-8):** ☐

Pile Driver: Impact ☒ **Vibratory/Impact** ☐ **Attenuation Device: None** ☐ **Bubble Curtain: On** ☒ **Off** ☐

Minutes of Vibratory Driving : n/a ☐ **8:00** ☐ **15:00** ☐ **Impact Blows per Pile: 800** ☐ **300** ☒ **600** ☐

Pile No.	Pile Driver (Impact, Vibratory)[5]	Pile Driving Start/End Time	Observer Start/End Time	Bird Predation on Fish Observed (Y/N) and Time		General Bird Activity/Behavior	Comment Reference Number
A17.5	impact	0746/0816	0700	/	/	cormorants, gulls	
C19	impact	0855/0914		/	/	and a few pelicans	
C18	impact	0942/0959		/	/	are present in the	
A17	impact	1045/1113		/	/	area.	
A16.5	impact	1143/1208		/	/		
C17	impact	1309/1328	/1449	Y	1339	3 gulls on water surface feeding	(1)

[4] The bird monitor will have to work closely with the fish monitor because the monitor must attempt to determine the amount of bird predation on fishes, including the size and species of fish affected.

[5] Steel shell pile driving will include both vibratory (up to the last 10 feet) and impact (last 10 feet) pile drivers.

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

BIRDS

Comment: Reference No.	Predation[6]		Dead/Injured Fish Observed[7]		Dead/Injured Fish Collected[8]	
	Bird Strikes Per Minute	Duration	Species	Size	Species	Size
①	No dead fish observed but birds diving breaks into water					

[6] Diving birds that may be present, but which cannot be confirmed to scavenge on injured fish while diving, will be noted on the data sheet, but are not included in the count of bird strikes.

[7] SH = steelhead; G=North American Green Sturgeon; O=Other

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

BIRDS

PHOTOS

Comment: Reference No.	Photo Number	Time of Photo	Photo Taken Before (B), During (D) or After (A) Pile Driving	Description

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

BIRDS

Page 4 of 5

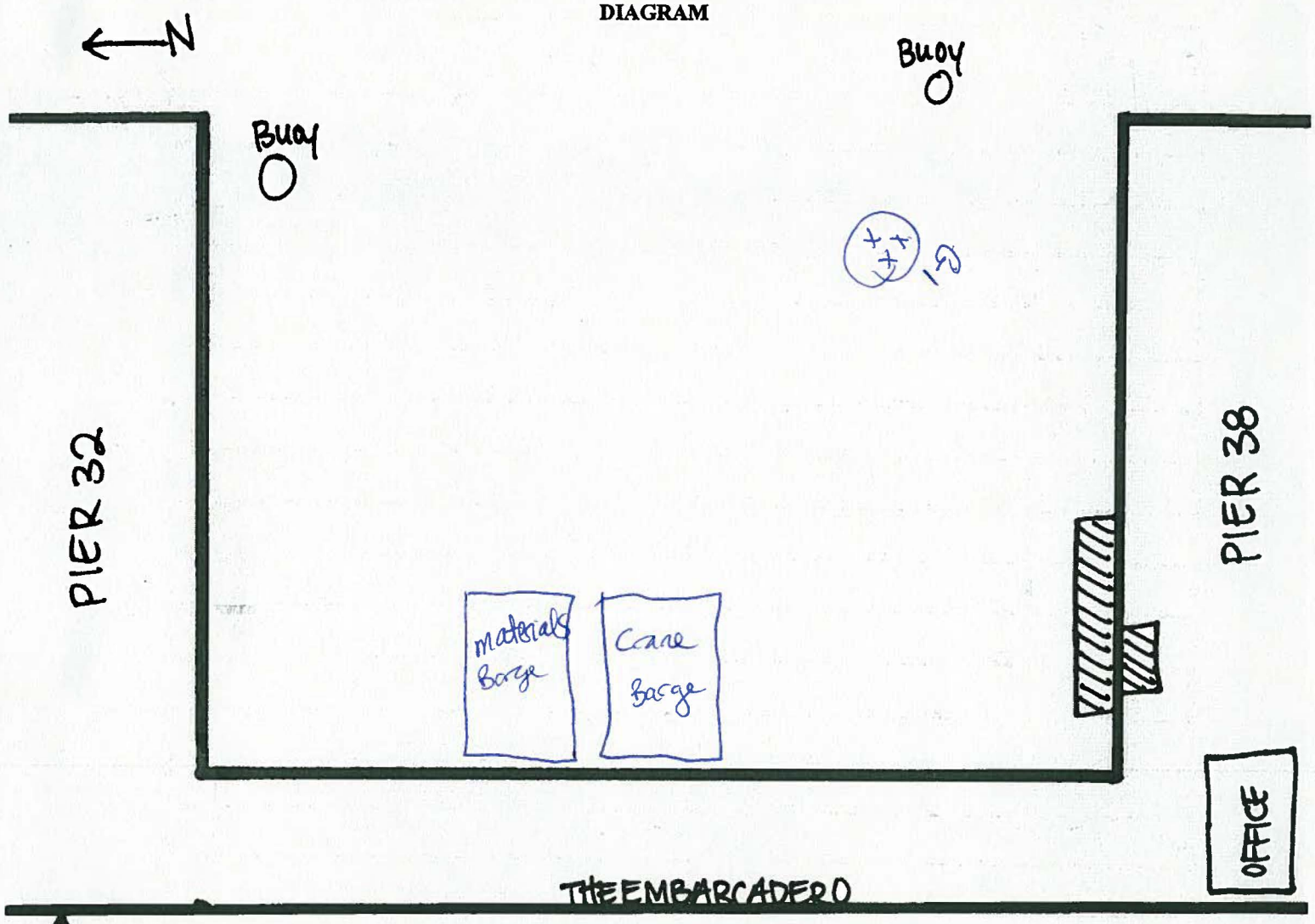
ADDITIONAL COMMENTS

Comment: Reference No.	Additional Comments
①	3 Gulls sighted ~ 900 ft S of Barge. They landed on water surface, dipped beaks in foraging behavior for ~ 20 seconds, then flew off. No Fish or prey visible.

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

BIRDS

DIAGRAM



BIOLOGICAL MONITOR Ann M Zoidis / Ann M Zoidis.

Signature **Print Name**

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

Shannon Lindquist: 1130 – 1530

Date 8/10/12 **Monitor (s)** ~~Amzoides~~ 0700 – 11:10 **Visibility** Clear, Beaufort 2

Tide Level See Below: **Human Activity in the Area** Pedestrians on the Embarcadero - 2nd care Sage gills up to Am. Cup. Pier @ 0932.

Monitoring Locale: Pier 30 ☐ Pier 32 ☐ Pier 38 ~~☒~~ Boat ☐ 178 m from pile driving ☐ ~~Boat~~ ☒

129 m from pile driving ☐ 1900 m from pile driving on vessels ☐

Pile Type: 24-inch octagonal concrete ☐ 24-inch steel shell ☒ Ambient Conditions ☐

~~**Piles/Day (1-8):**~~ ☐ **Pile Driver:** Impact ☒ Vibratory/Impact ☐

Attenuation Device: None ☐ Bubble Curtain: On ☒ Off ☐

Minutes of Vibratory Driving: n/a ☐ 8:00 ☐ 15:00 ☐ **Impact Blows per Pile:** 800 ☐ 300 ☒ 600 ☐

Tides:

	L	H	L	H
~~Pilot~~	0050	0753	1211	~~8~~ 1828
	1.2	3.73	2.88	5.52

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

Pile No.	Pile Driver (Impact, Vibratory)[5]	Pile Driving Start/End Time	Observation Start/End Time	Mammal Species[6]			Comments: Reference Number
				Species	No.	Time	
A14.5	Impact	0737/0800	0700	/	/	/	
A14	Impact	0827/0852	↓	HS	1	0916	(1)
A13.5	Impact	0918/0943		/	/	/	
A13	Impact	10:08/1033		/	/	/	
CB	Impact	11:00/1120		HS	2	1045	(2)
C14	impact	1233/1301		SL	1	1129	(3)
C15	impact	1332/1441		HS	3	1257	(4) 1303
			1512	HS	4	1434	(5)

[5] Steel shell pile driving will include both vibratory (up to the last 10 feet) and impact (last 10 feet) pile drivers
[6] HS=Harbor Seal; SL = Sea Lion; HP=Harbor Porpoise; GW=Gray Whale; O = Other

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

Comments: Reference No.	Monitor's Distance from Pile Driving Activity	Initial Behavior of Marine Mammal	Changes in Marine Mammal Behavior (e.g., orientation, speed, diving, respiration rate, etc.)[7]
(1)	850'	Relaxed surfaced, slow travel at surface headout for ~ 15 sec.	none - no change
(2)	350'	Relaxed surface, slow travel, headup ~ 15 sec.	None - no change
(3)	600 ft	relaxed, slow surface travel clove	no change
(4)	400 ft.	HS3, slow surface travel Hanging out in area	no Change
(5)	350 ft.	HS4 - surfaced briefly during pile driving	no change

[7] **Note:** If a monitor sees a marine mammal within or approaching the Exclusion Zone prior to the start of impact pile driving, the monitor will notify the on-site resident engineer (or other authorized individual), who will then be required to delay pile driving until the marine mammal has moved outside of the Exclusion Zone, or if the animal has not been re-sighted within 15 minutes for pinnipeds or 30 minutes for cetaceans. If a marine mammal is sighted within or on a path toward the Exclusion Zone, pile driving will cease until that animal has cleared and is on a path away from the Exclusion Zone, or 15/30 minutes (pinnipeds/cetaceans) has lapsed since the last sighting.

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

PHOTOS

Comment: Reference No.	Photo Number	Time of Photo	Photo Taken Before (B), During (D) or After (A) Pile Driving	Description

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

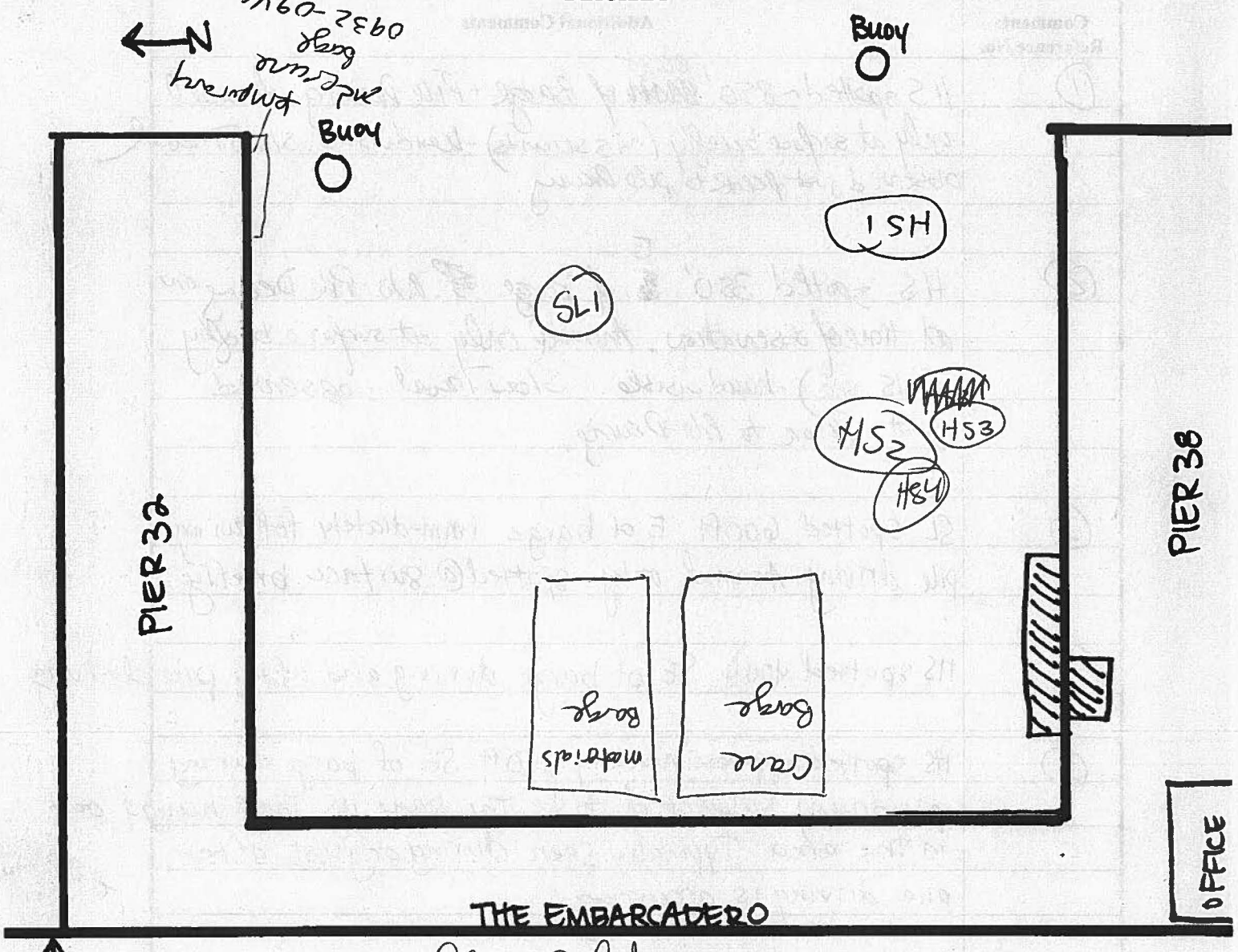
ADDITIONAL COMMENTS

Comment: Reference No.	Additional Comments
(1)	HS spotted ~350' east of Barge + Pile Driving. Animal only at surface briefly (~15 seconds) - head visible. Slow Travel observed just prior to pile Driving.
(2)	HS spotted 350' E. of Barge & Pile Driving. No Pile Driving on at time of observation. Animal only at surface briefly (~15 sec.) - head visible. Slow Travel - observed just Prior to Pile Driving.
(3)	SL spotted 600ft E of barge immediately following pile driving. Animal only spotted @ surface briefly.
(4)	HS spotted 400ft. SE of barge, during and after pile driving
(5)	HS spotted approximately 350ft SE of barge during pile driving. Suspected to be the same HS that hangs out in the area. Typically seen during or just after pile driving is occurring.

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

DIAGRAM



BIOLOGICAL MONITOR Shannon Lindquist

Signature

Shannon Lindquist

Print Name

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

BIRDS[8]

Anna Boidis 0700 - 1100

Date 8/10/12 **Monitor** Shannon Lindquist 1100 - 1530 **Weather** Clear, Beaufort 2

Monitoring Locale: Pier 30 ☐ **Pier 32** ☐ **Pier 38** ☐ **178m from pile driving** ☐ **120m from pile driving** ☐
1900 m from pile driving on vessels ☐ Boat ☒

Pile Type: 24-inch octagonal concrete ☐ **24-inch steel shell** ☒ **Ambient Conditions** ☐ **Piles/Day (1-8):** ☐

Pile Driver: Impact ☒ **Vibratory/Impact** ☐ **Attenuation Device: None** ☐ **Bubble Curtain: On** ☒ **Off** ☐

Minutes of Vibratory Driving: n/a ☐ **8:00** ☐ **15:00** ☐ **Impact Blows per Pile: 800** ☐ **300** ☒ **600** ☐

Pile No.	Pile Driver (Impact, Vibratory)[9]	Pile Driving Start/End Time	Observer Start/End Time	Bird Predation on Fish Observed (Y/N) and Time		General Bird Activity/Behavior	Comment: Reference Number
A14.5	impact	0737/0800	0700/	✓	✓		
A14	impact	0827/0852		✓	✓		
A13.5	impact	0918/0943		✓	✓		
A13	impact	1008/1033		✓	✓		
C13	impact	1100/1120		✓	✓		
C14	impact	1233/1301	/1512	✓	✓		
C15	impact	1332/1441			✓		

[8] The bird monitor will have to work closely with the fish monitor because the monitor must attempt to determine the amount of bird predation on fishes, including the size and species of fish affected.

[9] Steel shell pile driving will include both vibratory (up to the last 10 feet) and impact (last 10 feet) pile drivers.

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

BIRDS

Comment: Reference No.	Predation[10]		Dead/Injured Fish Observed[11]		Dead/Injured Fish Collected[8]	
	Bird Strikes Per Minute	Duration	Species	Size	Species	Size

[10] Diving birds that may be present, but which cannot be confirmed to scavenge on injured fish while diving, will be noted on the data sheet, but are not included in the count of bird strikes.

[11] SH = steelhead; G=North American Green Sturgeon; O=Other

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

BIRDS

PHOTOS

Comment: Reference No.	Photo Number	Time of Photo	Photo Taken Before (B), During (D) or After (A) Pile Driving	Description

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

BIRDS

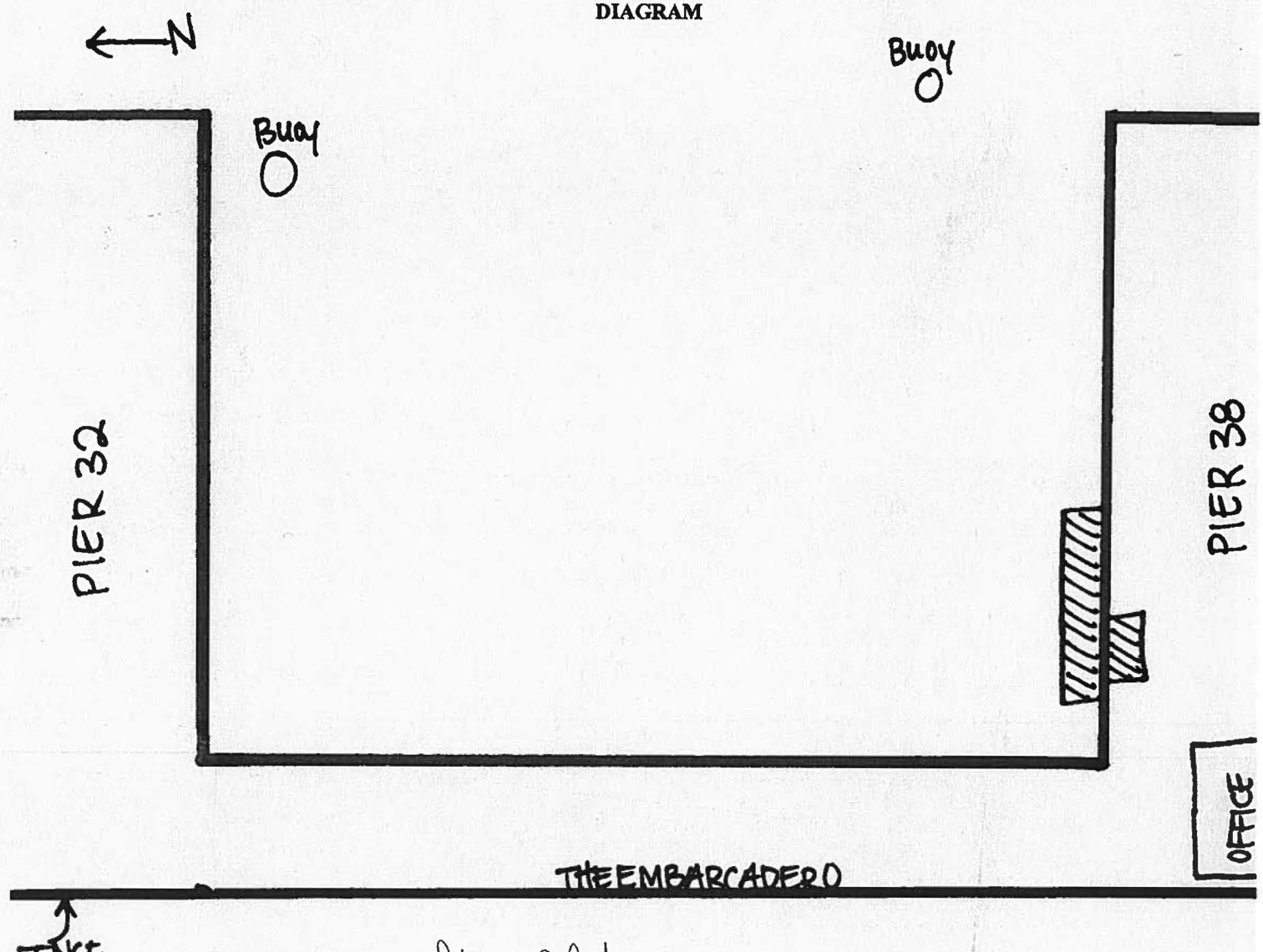
ADDITIONAL COMMENTS

Comment: Reference No.	Additional Comments

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

BIRDS

DIAGRAM



BIOLOGICAL MONITOR _____ (Signature) Shannon Lindquist (Print Name)

Brannan Street Wharf – Biological Monitoring
Weekly Summary – August 13, 2012 through August 17, 2012

Concrete pile-driving started this week. Note the method used to drive the concrete piles: a hose is used to push water through the pile to create an opening in the substrate before the hammer is used. For consistency with the monitoring methodology for steel piles, the concrete pile-driving start times for birds and mammals were recorded upon the first hammer blow, rather than upon initiation of the water hose. However, water hose start-times have also been noted on the data sheets.

One monitor was stationed at the east end of Pier 32, and the other monitor was stationed facing east on the Embarcadero seawall directly next to the pile-driving barge. The amount of America's Cup activity at Pier 32 (people, boats) increased substantially throughout this week, compared to previous weeks.

Monday, August 13, 2012

Biological monitoring at the BSW began at 0712 and continued until 1455. This was the first day of concrete pile driving. One concrete pile (J29) was driven and a second pile (K30) was set-up to be driven tomorrow. No negative impacts on marine mammals were observed.

Biological Monitors - Mandi McElroy and Tom Copper

- **Birds:** Cormorants and gulls were observed in the area throughout the day, before, during and after pile driving. No feeding was observed within the monitoring zone; no bird strikes were observed.
- **Marine Mammals:** Two harbor seals were observed throughout the monitoring period; however, all of the sightings occurred more than 30 minutes before the driving of Pile J29. All were observed outside of the exclusion zone. None exhibited a change in behavior as a result of project activities.
    - 0838-One harbor seal was observed surfacing and slowly moving approximately 950 feet east of the pile driving location, almost four hours before the first hammer blow of Pile J29. No change of behavior was exhibited.
    - 1128, 1141-One harbor seal was observed slow-moving and diving approximately 1000 feet southeast of the pile driving location, about an hour before the start of Pile J29. No change of behavior was exhibited.

Tuesday, August 14, 2012

Biological monitoring at the BSW began at 0715 and continued until 1620. Four concrete piles were driven – one was an indicator pile (K30) and the other three were fully driven (J28, J27, H25). Tom Copper was told by the construction crew that the indicator pile (K30) had been driven too far and would be corrected at a later date. Mandi attended a weekly meeting (also attended by Dutra and Port of SF) at the on-site trailer from 1045-1115; only one monitor (Tom) was viewing the observation area at that time. No negative impacts on any marine mammals were observed.

Biological Monitors - Mandi McElroy and Tom Copper

- **Birds:** Cormorants and gulls were observed in the area throughout the day, before, during and after pile driving. No feeding or bird strikes were observed.
- **Marine Mammals:** Two California sea lions were observed (might have been the same individual). None were observed to exhibit any change in behavior as a result of project activities.
    - 0908-One sea lion was observed approximately 1100 feet southeast of pile-driving activities, surfacing multiple times during the driving of Pile K30. No change of behavior was exhibited during the entire observation.
    - No marine mammals were observed during the driving of Pile J28.
    - 1234-One sea lion was observed approximately 950 feet east of pile-driving activities, an hour after completion of Pile J28 and 45 minutes before the start of Pile J27. It might have been the same individual seen at 0908, given the general location.
    - No marine mammals were observed during the driving of Pile H25.

Wednesday, August 15, 2012

Biological monitoring at the BSW began at 0705 and continued until 1445. Four concrete piles were driven (H24, H23, H22, G20). A barge (carrying a crane) was docked at the southeast corner of Pier 32 from 1300-1400. View was partially obscured at the established monitoring location, so the monitor continually moved to either side of the barge (east-west) to get a full view of the surrounding area. Boat activity at the America's Cup dock at Pier 32 increased substantially today (numerous motorboats and sailboats coming and going throughout the day, and boats were intermittently anchored in between Pier 32 and Pier 38). The America's Cup activity also attracted spectators into the area on recreational motorboats and kayaks. No negative impacts on any marine mammals were observed.

Biological Monitors – Mandi McElroy and Tom Copper

- **Birds:** Cormorants and gulls were observed in the area throughout the day, before, during and after pile driving. One cormorant was seen making multiple foraging dives, and surfaced with and ingested a small live fish following one of the dives.
- **Marine Mammals:** One pair of harbor porpoises and one harbor seal were observed. None were observed to exhibit any change in behavior as a result of project activities.
    - No marine mammals were observed during the driving of Pile H24.
    - 0947- A pair of harbor porpoises was observed in the bay, approximately 1500 (moving to 2000) feet east of the pile-driving location almost 30 minutes before the start of Pile H23. They were slowly moving southeast, no changes in behavior were observed.
    - 1140- One harbor seal was observed surfacing approximately 650 feet east of pile-driving, one minute after the start of Pile H22. The animal slowly surfaced then submerged within one minute. No visible reaction to the hammer blows was observed, and no changes in behavior were observed. The seal did not surface again within the observation area during pile-driving.

- No marine mammals were observed during the driving of Pile G20.

Thursday, August 16, 2012

Biological monitoring at the BSW began at 0645 and continued until 1553. Five concrete piles were driven (G19, G17, F15, F14, G16). Boat activity at the America's Cup dock at Pier 32 continued (numerous motorboats and sailboats coming and going throughout the day, and boats were intermittently anchored in between Pier 32 and Pier 38). The America's Cup activity also attracted spectators into the area on recreational motorboats and kayaks. No negative impacts on any marine mammals were observed.

Biological Monitors – Shannon Lindquist and Tom Copper

- **Birds:** Cormorants, pelicans, gulls and terns were observed in the area throughout the day, before, during and after pile driving. No birds were observed making any strikes at dead fish as result of pile-driving activities.
- **Marine Mammals:** Three harbor seals and one California sea lion were observed throughout the monitoring period. None were observed to exhibit any change in behavior as a result of project activities.
  - 0651- One harbor seal was observed with its head above water and then dove quickly and was not sighted again. The animal was approximately 900 feet east of pile-driving. At the time of the observation, no pile-driving had occurred yet this day. No changes in behavior were observed.
  - 0909- One harbor seal was observed exhibited slow surface travel approximately 900 feet east of pile-driving. This animal was seen 14 minutes after Pile G19 was completed and did not appear disturbed following pile-driving.
  - 1307- One harbor seal was observed after Pile F15 was completed. The animal was seen approximately 700 feet southeast of pile-driving with its head above water and then dove quickly and was not sighted again.
  - 1508- One California sea lion was observed swimming south approximately 1,000 feet southeast of pile-driving while Pile G16 was being driven. The animal was seen moving away from the pile-driving but did not appear to be disturbed and was not traveling quickly.

Friday, August 17, 2012

Biological monitoring at the BSW began at 0655 and continued until 1430. Five concrete piles were driven (J26, J25, J24, J23, K29). Boat activity at the America's Cup dock at Pier 32 continued (numerous motorboats and sailboats coming and going throughout the day, and boats were intermittently anchored in between Pier 32 and Pier 38). The America's Cup activity also attracted spectators into the area on recreational motorboats and kayaks. No negative impacts on any marine mammals were observed.

Biological Monitors – Shannon Lindquist and Tom Copper

- **Birds:** Cormorants, pelicans, gulls and terns were observed in the area throughout the day, before, during and after pile driving. No birds were observed making any strikes at dead fish as result of pile-driving activities.
- **Marine Mammals:** Two harbor seals and one California sea lion were observed throughout the monitoring period. None were observed to exhibit any change in behavior as a result of project activities.
    - 0926- One harbor seal was observed approximately 1,300 feet northeast of pile-driving. The animal exhibited slow surface travel north towards the Bay Bridge. No pile-driving was occurring at the time of the observation and the animal did not exhibit any change in behavior.
    - 1025- One harbor seal was observed approximately 1,000 feet east of pile-driving. The animal was seen with its head above water briefly and then dove and was not sighted again. Pile-driving was not occurring at the time of this observation and the animal did not appear disturbed.
    - 1047- One California sea lion was observed approximately 900 feet east of pile-driving. The animal exhibited feeding behavior, surfacing often. Pile-driving was not occurring at the time of this observation and the animal did not appear disturbed.

on site @ 0635
departed @ 1500
(8.5)

DAY 1 of concrete pile driving

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

Date 8/13/12 **Monitor (s)** Mandi / Tom **Visibility** clear all day

Tide Level BSS 1-2 **Human Activity in the Area** kayaks, recreational boats, many people on Pier 32

Monitoring Locale: Pier 30 ☐ Pier 32 ☒ Pier 38 ☐ Boat ☐ 178 m (584 ft) from pile driving ☐

Pier 38: 0712-0800
Pier 32: 0815-1500

129 m (423 ft) from pile driving ☐ 1900 m (6234 ft) from pile driving on vessels ☐

Pile Type: 24-inch octagonal concrete ☒ 24-inch steel shell ☐ Ambient Conditions ☐

high tide 5.73 @ 0318
low tide 0.41 @ 1030
high 4.37 @ 1800

Piles/Day (1-8): 1 (started 2nd pile) **Pile Driver:** Impact ☒ Vibratory/Impact ☐

Attenuation Device: None ☐ Bubble Curtain: On ☐ Off ☒

Minutes of Vibratory Driving: n/a ☒ 8:00 ☐ 15:00 ☐ **Impact Blows per Pile:** 800 ☐ 300 ☒ 600 ☐

0645-0730 steel pile materials barge was removed and replaced w/ concrete pile materials barge.

0815 barge/crane still being positioned.
0915 no activity
1030 barge being re-positioned
1115 positioning first concrete pile
1147 started hose
1154 hose repair
? started hose again
1231 first "tap"
1241 second "tap"
1247 stopped - hose malfunction
1300 started hose again
1305 first 'tap'
1307 second 'tap'
1315 hit 3x
1316 started driving (~10x, then stopped)
1322 started again (consistent) until 1336

1425 next (K30) pile being loaded/placed
- only driven partially -

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

Pile No.	Pile Driver (Impact, Vibratory)[5]	Pile Driving Start/End Time	Observation Start/End Time	Mammal Species[6]			Comments: Reference Number
				Species	No.	Time	
pre-start > n/a	—	—	0712 / 1200	HS	1	0838	HS1
n/a	—	—	0712 / 1206	HS	2	1128	HS2
J29	impact (concrete)	1231 / 1336	1200 / 1406	"	"	1141	"

[5] Steel shell pile driving will include both vibratory (up to the last 10 feet) and impact (last 10 feet) pile drivers
[6] HS=Harbor Seal; SL = Sea Lion; HP=Harbor Porpoise; GW=Gray Whale; O = Other

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

Comments: Reference No.	Monitor's Distance from Pile Driving Activity	Initial Behavior of Marine Mammal	Changes in Marine Mammal Behavior (e.g., orientation, speed, diving, respiration rate, etc.)[7]
HS1	950 ft	briefly surfaced, diving	none
HS2	950 ft	" " "	none

[7] **Note:** If a monitor sees a marine mammal within or approaching the Exclusion Zone prior to the start of impact pile driving, the monitor will notify the on-site resident engineer (or other authorized individual), who will then be required to delay pile driving until the marine mammal has moved outside of the Exclusion Zone, or if the animal has not been re-sighted within 15 minutes for pinnipeds or 30 minutes for cetaceans. If a marine mammal is sighted within or on a path toward the Exclusion Zone, pile driving will cease until that animal has cleared and is on a path away from the Exclusion Zone, or 15/30 minutes (pinnipeds/cetaceans) has lapsed since the last sighting.

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

PHOTOS

Comment: Reference No.	Photo Number	Time of Photo	Photo Taken Before (B), During (D) or After (A) Pile Driving	Description

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

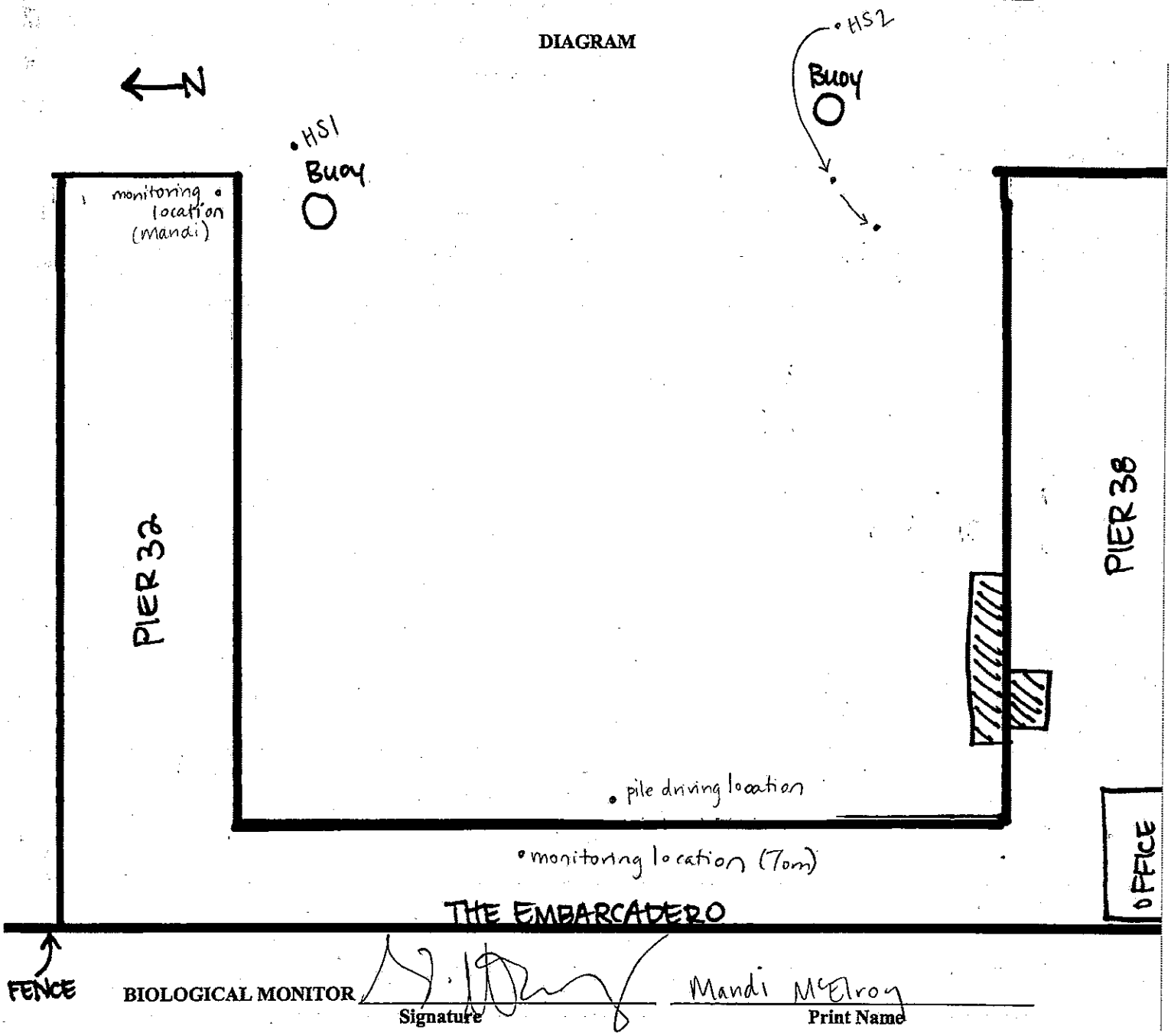
ADDITIONAL COMMENTS

Comment: Reference No.	Additional Comments
—	

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

DIAGRAM



BIOLOGICAL MONITOR _____ Mandi McElroy

Signature **Print Name**

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

BIRDS[8]

Date 8/13/12 **Monitor** Mandi, Tom **Weather** clear all day

Monitoring Locale: Pier 30 ☐ **Pier 32** ☒ **Pier 38** ☐ **178m from pile driving** ☐ **120m from pile driving** ☐

1900 m from pile driving on vessels ☐

Pile Type: 24-inch octagonal concrete ☒ **24-inch steel shell** ☐ **Ambient Conditions** ☐ **Piles/Day (1-8):** 1

Pile Driver: Impact ☒ **Vibratory/Impact** ☐ **Attenuation Device: None** ☐ **Bubble Curtain: On** ☐ **Off** ☒

Minutes of Vibratory Driving : n/a ☑ **8:00** ☐ **15:00** ☐ **Impact Blows per Pile: 800** ☐ **300** ☒ **600** ☐

Pile No.	Pile Driver (Impact, Vibratory)[9]	Pile Driving Start/End Time	Observer Start/End Time	Bird Predation on Fish Observed (Y/N) and Time		General Bird Activity/Behavior	Comment: Reference Number
J29	impact	1231/1336	0712/1406	N	1323	swim/dive	C1
J29	"	1231/1336	0712/1406	N	1331	swim/2 juvy gulls	G1

[8] The bird monitor will have to work closely with the fish monitor because the monitor must attempt to determine the amount of bird predation on fishes, including the size and species of fish affected.

[9] Steel shell pile driving will include both vibratory (up to the last 10 feet) and impact (last 10 feet) pile drivers.

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

BIRDS

Comment: Reference No.	Predation[10]		Dead/Injured Fish Observed[11]		Dead/Injured Fish Collected[8,7]	
	Bird Strikes Per Minute	Duration	Species	Size	Species	Size

[10] Diving birds that may be present, but which cannot be confirmed to scavenge on injured fish while diving, will be noted on the data sheet, but are not included in the count of bird strikes.

[11] SH = steelhead; G=North American Green Sturgeon; O=Other

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

BIRDS

PHOTOS

Comment: Reference No.	Photo Number	Time of Photo	Photo Taken Before (B), During (D) or After (A) Pile Driving	Description

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

BIRDS

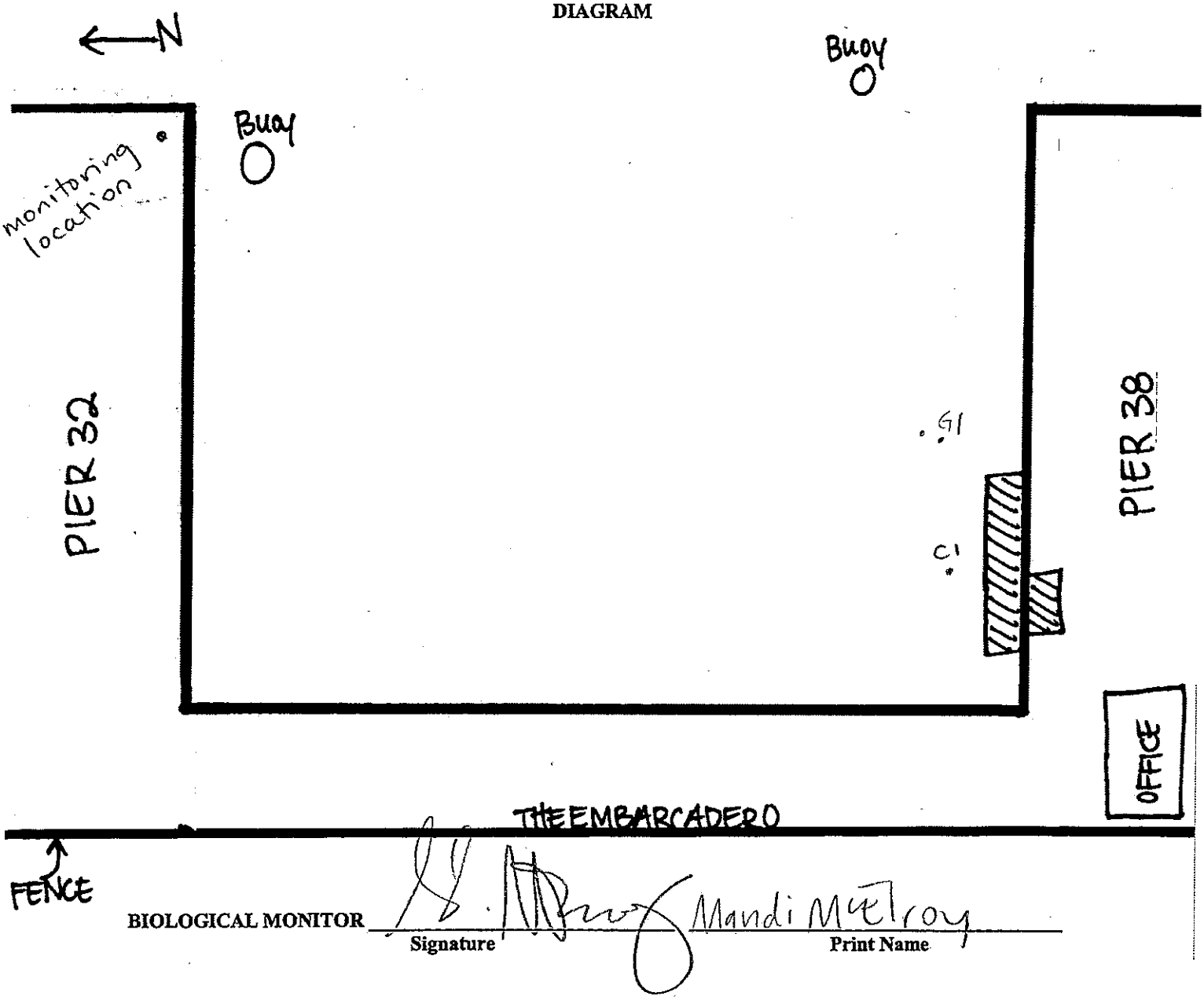
ADDITIONAL COMMENTS

Comment: Reference No.	Additional Comments

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

BIRDS

DIAGRAM



BIOLOGICAL MONITOR _____ Mandi McElroy

Signature **Print Name**

concrete Day 2

on site 0645
depart 1620
(9.5h)

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

Date 8/14/12 **Monitor (s)** Mandi, Tom **Visibility** clear all day

Tide Level BSS 1-2 **Human Activity in the Area** boats coming/going from Pier 32 (Amer. Cupdock) helicopter activity

Monitoring Locale: Pier 30 ☐ Pier 32 ☒ Pier 38 ☐ Boat ☐ 178 m from pile driving ☐

129 m from pile driving ☐ 1900 m from pile driving on vessels ☐

Pile Type: 24-inch octagonal concrete ☑ 24-inch steel shell ☐ Ambient Conditions ☐

Piles/Day (1-8): 4 **Pile Driver:** Impact ☒ Vibratory/Impact ☐

K30, J28, J27, H25

Attenuation Device: None ☐ Bubble Curtain: On ☐ Off ☒

Minutes of Vibratory Driving: n/a ☑ 8:00 ☐ 15:00 ☐ **Impact Blows per Pile:** 800 ☐ 300 ☒ 600 ☐

hightide 5.89 @ 0400
lowtide 0.18 @ 1106

0800 - barge still being positioned
0827 - water pump started
0840 - first 'tap' (K30 - indicator pile)
0842-0902 - applying sensors
0902 - started consistent driving
0915 - ended. coast guard helicopter circling ahead. Push-boat has entered observation area ~ 500 ft east of barge, just south of Pier 32.
0925 - pile was driven too far. crew working to fix (sensor submerged).
1000 - no activity
1015 - hooking up next pile J28
1037 - water pump started
1106 - J28 completed
1045-1106 had one observer only (meeting) hammer started ~ 1049
1230 - setting up for J27
1310 - water pump started
1317 - first 'tap'
1337 - J27 completed
1350 - setting up for H25
1430 - lifting pile
1500 - still positioning pile
1505 - water pump started
1520 - first tap
1547 - H25 completed
1617 - end monitoring time

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

Pile No.	Pile Driver (Impact, Vibratory)[5]	Pile Driving Start/End Time	Observation Start/End Time	Mammal Species[6]			Comments: Reference Number
				Species	No.	Time	
indicator> K30	impact	0840/0915	0715/0945	SL	1	0908	SL1
J28	"	1049/1106	0945/1136	—	—	—	—
J27	"	1317/1337	1136/1407	SL	2	1234	SL2
H25	"	1520/1547	1407/1617	—	—	—	—

[5] Steel shell pile driving will include both vibratory (up to the last 10 feet) and impact (last 10 feet) pile drivers

[6] HS=Harbor Seal; SL = Sea Lion; HP=Harbor Porpoise; GW=Gray Whale; O = Other

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

Comments: Reference No.	Monitor's Distance from Pile Driving Activity	Initial Behavior of Marine Mammal	Changes in Marine Mammal Behavior (e.g., orientation, speed, diving, respiration rate, etc.)[7]
SL1	~950 ft	slow-moving, swim/dive	none
SL2	"	" "	none

[7] **Note:** If a monitor sees a marine mammal within or approaching the Exclusion Zone prior to the start of impact pile driving, the monitor will notify the on-site resident engineer (or other authorized individual), who will then be required to delay pile driving until the marine mammal has moved outside of the Exclusion Zone, or if the animal has not been re-sighted within 15 minutes for pinnipeds or 30 minutes for cetaceans. If a marine mammal is sighted within or on a path toward the Exclusion Zone, pile driving will cease until that animal has cleared and is on a path away from the Exclusion Zone, or 15/30 minutes (pinnipeds/cetaceans) has lapsed since the last sighting.

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

PHOTOS

Comment: Reference No.	Photo Number	Time of Photo	Photo Taken Before (B), During (D) or After (A) Pile Driving	Description

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

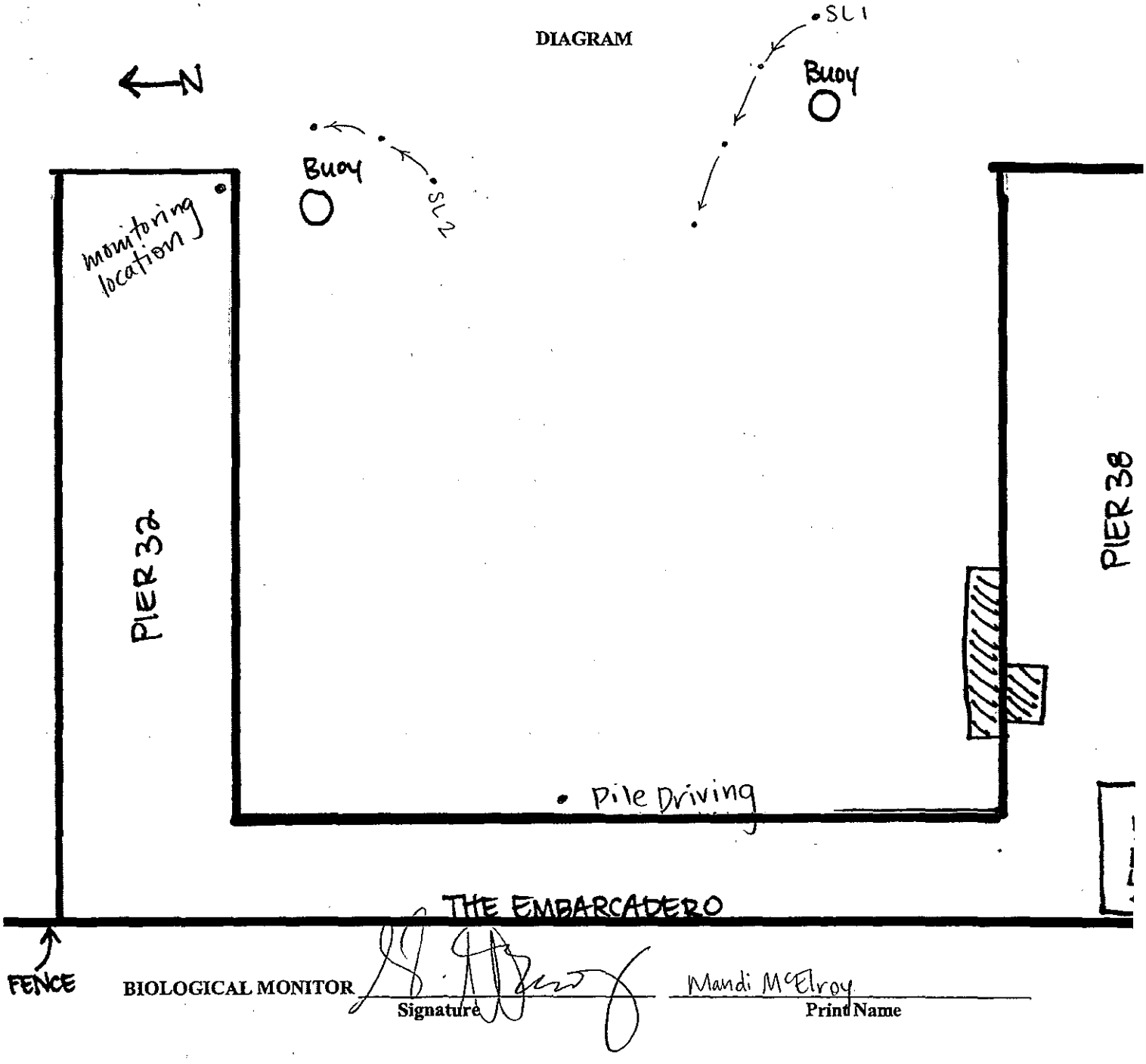
ADDITIONAL COMMENTS

Comment: Reference No.	Additional Comments
SL1/2	might have been the same individual
	(observations ≥ 3 hrs apart, in same general location)

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

DIAGRAM



BIOLOGICAL MONITOR _____ Mandi McElroy

Signature **Print Name**

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

BIRDS[8]

Date 8/14/12 Monitor Mandi, Tom Weather clear all day

Monitoring Locale: Pier 30 ☐ Pier 32 ☒ Pier 38 ☐ 178m from pile driving ☐ 120m from pile driving ☐

1900 m from pile driving on vessels ☐

Pile Type: 24-inch octagonal concrete ☒ 24-inch steel shell ☐ Ambient Conditions ☐ Piles/Day (1-8): 4

Pile Driver: Impact ☒ Vibratory/Impact ☐ Attenuation Device: None ☐ Bubble Curtain: On ☐ Off ☒

Minutes of Vibratory Driving: n/a ☒ 8:00 ☐ 15:00 ☐ Impact Blows per Pile: 800 ☐ 300 ☒ 600 ☐

Pile No.	Pile Driver (Impact, Vibratory)[9]	Pile Driving Start/End Time	Observer Start/End Time	Bird Predation on Fish Observed (Y/N) and Time		General Bird Activity/Behavior	Comment: Reference Number
K30	impact	0840/0915	0715/0945	N	0840	swim	G1
J28	impact	1049/1106	0945/1136	N	1104	swim/preen	G2
J28	impact	"	"	N	1104	swim	G3
J27	impact	1317/1337	1136/1407	N	1314	swim/dive	C1
J27	"	"	"	N	1318	swim	G4
H25	"	1520/1547	1407/1617	N	1522	swim	C2

[8] The bird monitor will have to work closely with the fish monitor because the monitor must attempt to determine the amount of bird predation on fishes, including the size and species of fish affected.

[9] Steel shell pile driving will include both vibratory (up to the last 10 feet) and impact (last 10 feet) pile drivers.

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

BIRDS

Comment: Reference No.	Predation[10]		Dead/Injured Fish Observed[11]		Dead/Injured Fish Collected[8]	
	Bird Strikes Per Minute	Duration	Species	Size	Species	Size

[10] Diving birds that may be present, but which cannot be confirmed to scavenge on injured fish while diving, will be noted on the data sheet, but are not included in the count of bird strikes.

[11] SH = steelhead; G=North American Green Sturgeon; O=Other

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

BIRDS

PHOTOS

Comment: Reference No.	Photo Number	Time of Photo	Photo Taken Before (B), During (D) or After (A) Pile Driving	Description

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

BIRDS

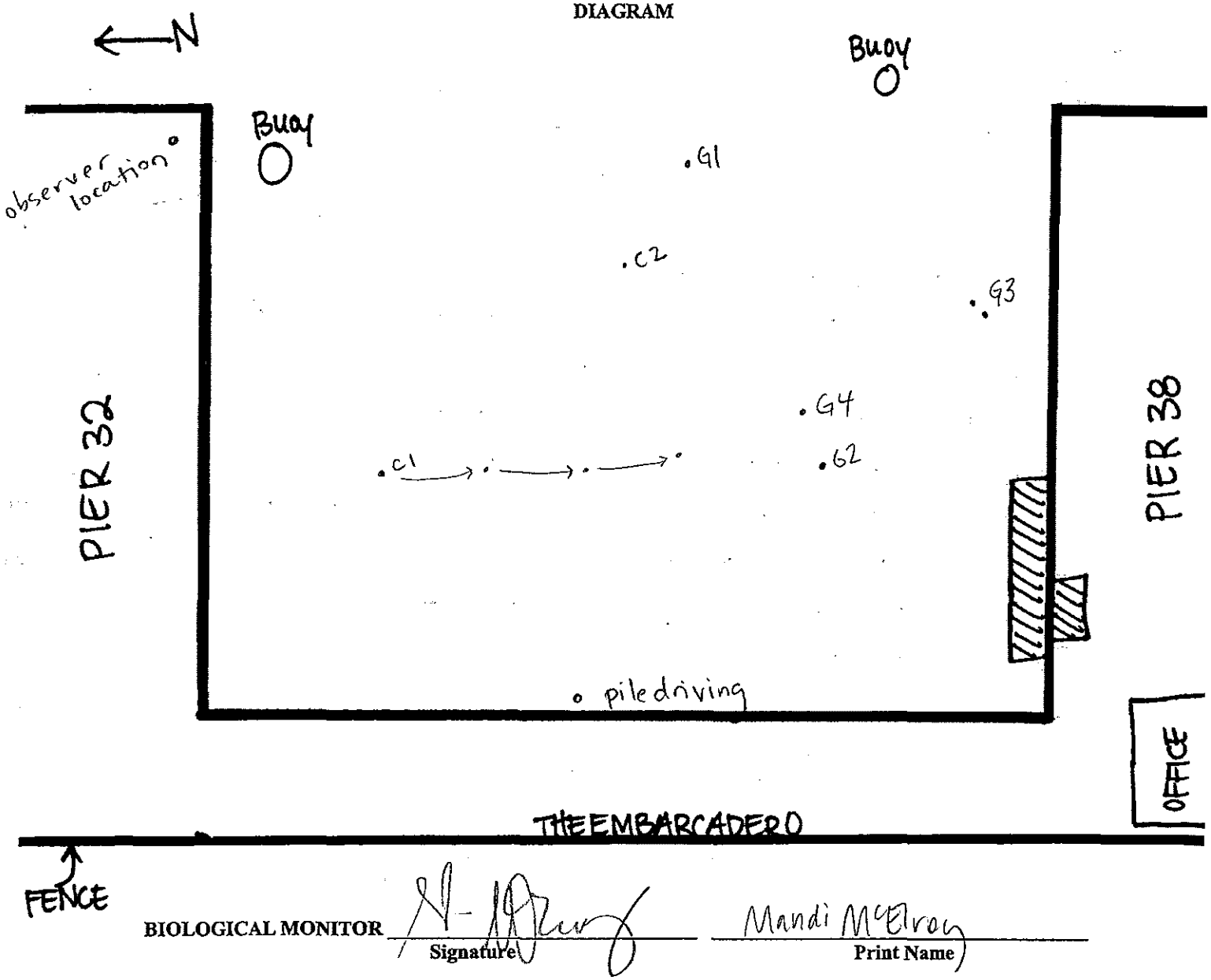
ADDITIONAL COMMENTS

Comment: Reference No.	Additional Comments
G1	flew away @ first hammer blow
C1	diving, but no feeding observed

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

BIRDS

DIAGRAM



BIOLOGICAL MONITOR _____ (Signature) Mandi McElroy (Print Name)

concrete day 3

arrive 0645
depart 1445
(8.0)

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

Date 8/15/12 **Monitor (s)** Mandi, Tom **Visibility** AM fog, cleared ~ 11 a.m.

Tide Level BSS 1-2 **Human Activity in the Area** Amer. Cup boats, kayakers, CG + police boats
* lots of boat traffic in/out of Pier 32; 2 boats anchored ~ 300 ft east of BSW barge

Monitoring Locale: Pier 30 ☐ Pier 32 ☒ Pier 38 ☐ Boat ☐ 178 m from pile driving ☐

129 m from pile driving ☐ 1900 m from pile driving on vessels ☐

Pile Type: 24-inch octagonal concrete ☒ 24-inch steel shell ☐ Ambient Conditions ☐

Piles/Day (1-8): 4 **Pile Driver:** Impact ☒ Vibratory/Impact ☐
H24, H23, H22, G20

Attenuation Device: None ☐ Bubble Curtain: On ☐ Off ☒

Minutes of Vibratory Driving: n/a ☒ 8:00 ☐ 15:00 ☐ **Impact Blows per Pile:** 800 ☐ 300 ☒ 600 ☐

high tide 6.06 @ 0454
low tide 0.00 @ 1142

H24
- 0839 water pump started (H24)
- 0845 first 'tap'
- 0910 end

H23
- 1004 water pump started (H23)
- 1013 first 'tap'
- 1040 end

H22
- 1132 water pump started (H22)
- 1139 first tap
- 1202 end

1300 - crane barge (coming from Marina Green) docked @ SE corner of Pier 32, partially obscuring view.
- continually moved east/west to see around it.

G20
- 1333 - water pump started (G20)
- 1346 - first tap
- 1402 - end

1415 - crew decided to cease pile driving to work on equipment maintenance

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

Pile No.	Pile Driver (Impact, Vibratory)[5]	Pile Driving Start/End Time	Observation Start/End Time	Mammal Species[6]			Comments: Reference Number
				Species	No.	Time	
H24	impact	0845 / 0910	0705 / 0940	—	—	—	n/a
H23	"	1013 / 1040	0940 / 1110	HP	1	0947	HP1
H22	"	1139 / 1202	1110 / 1232	HS	1	1140	HS1
G20	"	1346 / 1402	1232 / 1435	—	—	—	n/a

[5] Steel shell pile driving will include both vibratory (up to the last 10 feet) and impact (last 10 feet) pile drivers
[6] HS=Harbor Seal; SL = Sea Lion; HP=Harbor Porpoise; GW=Gray Whale; O = Other

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

PHOTOS

Comment: Reference No.	Photo Number	Time of Photo	Photo Taken Before (B), During (D) or After (A) Pile Driving	Description

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

Comments: Reference No.	Monitor's Distance from Pile Driving Activity	Initial Behavior of Marine Mammal	Changes in Marine Mammal Behavior (e.g., orientation, speed, diving, respiration rate, etc.)[7]
HP1	950 ft	slow-moving, diving	none
HS1	950 ft	slow-moving, intermittent surfacing	none

[7] **Note:** If a monitor sees a marine mammal within or approaching the Exclusion Zone prior to the start of impact pile driving, the monitor will notify the on-site resident engineer (or other authorized individual), who will then be required to delay pile driving until the marine mammal has moved outside of the Exclusion Zone, or if the animal has not been re-sighted within 15 minutes for pinnipeds or 30 minutes for cetaceans. If a marine mammal is sighted within or on a path toward the Exclusion Zone, pile driving will cease until that animal has cleared and is on a path away from the Exclusion Zone, or 15/30 minutes (pinnipeds/cetaceans) has lapsed since the last sighting.

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

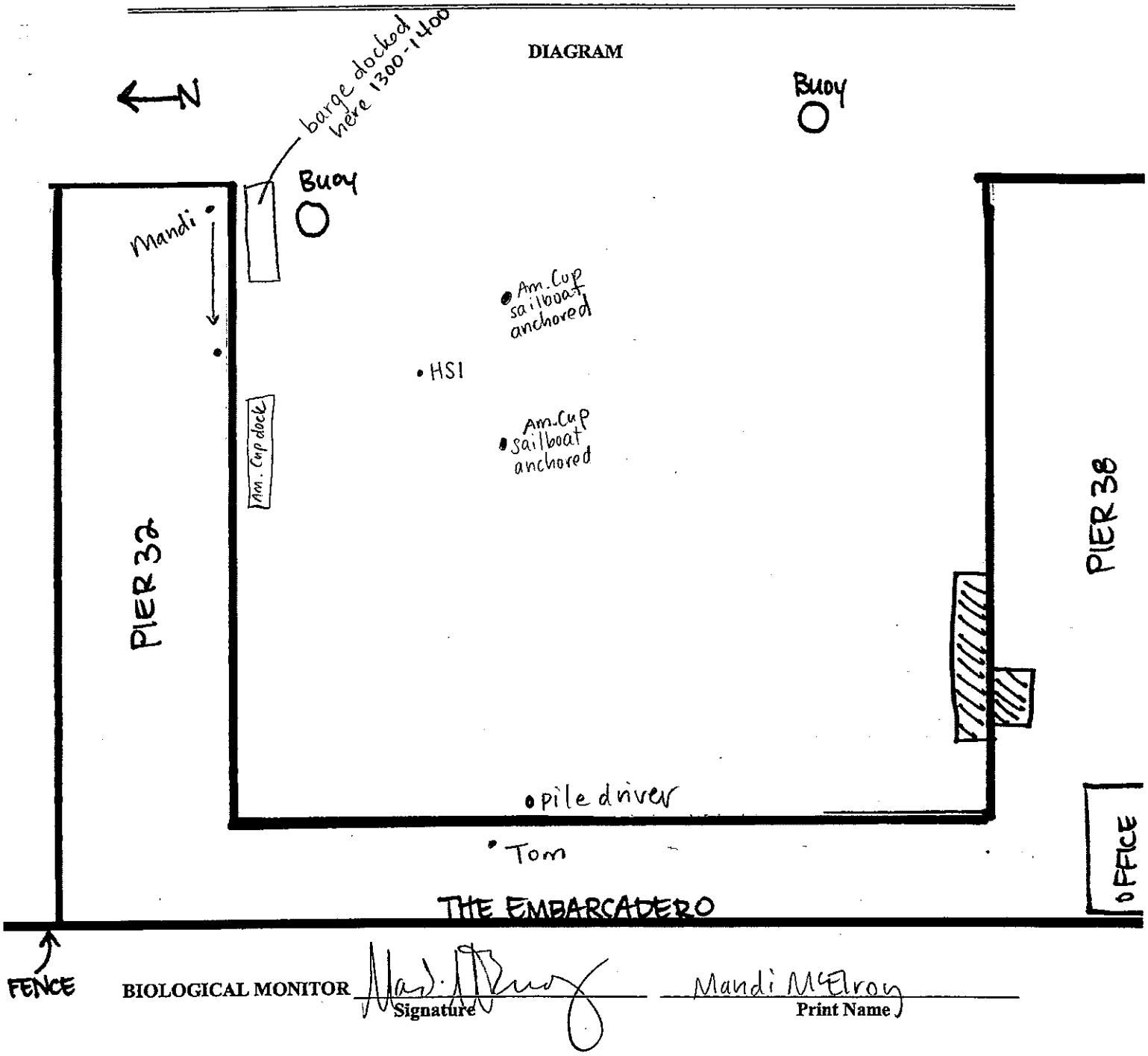
ADDITIONAL COMMENTS

Comment: Reference No.	Additional Comments
HP1	pair of harbor porpoise slow-moving southeast ~ 2000 ft east
	of pile-driving (observed during break between H24 and H23)
HS1	leisurely surfaced ~ 650 ft east of pile-driving during Pile H22.
	dove after ~ 10 seconds, no observed reaction to hammer blows,
	no behavior Δ. Did not surface again in observation area
	during time window for H22.

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

DIAGRAM



BIOLOGICAL MONITOR Mandi McElroy _____ Mandi McElroy

Signature Print Name

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

BIRDS[8]

Date 8/15/12 **Monitor** Mandi, Tom **Weather** overcast / fog

Monitoring Locale: Pier 30 ☐ **Pier 32** ☒ **Pier 38** ☐ **178m from pile driving** ☐ **120m from pile driving** ☐

1900 m from pile driving on vessels ☐

Pile Type: 24-inch octagonal concrete ☒ **24-inch steel shell** ☐ **Ambient Conditions** ☐ **Piles/Day (1-8):** 4 (H24, H23)

Pile Driver: Impact ☒ **Vibratory/Impact** ☐ **Attenuation Device: None** ☐ **Bubble Curtain: On** ☐ **Off** ☒

Minutes of Vibratory Driving: n/a ☒ **8:00** ☐ **15:00** ☐ **Impact Blows per Pile: 800** ☐ **300** ☒ **600** ☐

Pile No.	Pile Driver (Impact, Vibratory)[9]	Pile Driving Start/End Time	Observer Start/End Time	Bird Predation on Fish Observed (Y/N) and Time		General Bird Activity/Behavior	Comment: Reference Number
H24	impact	0845 / 0910	0705 / 0940	N	0844	flew away @ first 'tap'. cormorant	C1
H24	"	"	"	Y	0852	diving / feeding	C1
H23	"	1013 / 1040	0940 / 1110	N	1028	swim	G1
G20	"	1346 / 1402	1232 / 1435	N	1352	swim	G2
G20	"	1346 / 1402	1232 / 1435	N	1400	swim	G3

[8] The bird monitor will have to work closely with the fish monitor because the monitor must attempt to determine the amount of bird predation on fishes, including the size and species of fish affected.

[9] Steel shell pile driving will include both vibratory (up to the last 10 feet) and impact (last 10 feet) pile drivers.

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

BIRDS

Comment: Reference No.	Predation[10]		Dead/Injured Fish Observed[11]		Dead/Injured Fish Collected[8]	
	Bird Strikes Per Minute	Duration	Species	Size	Species	Size

[10] Diving birds that may be present, but which cannot be confirmed to scavenge on injured fish while diving, will be noted on the data sheet, but are not included in the count of bird strikes.

[11] SH = steelhead; G=North American Green Sturgeon; O=Other

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

BIRDS

PHOTOS

Comment: Reference No.	Photo Number	Time of Photo	Photo Taken Before (B), During (D) or After (A) Pile Driving	Description

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

BIRDS

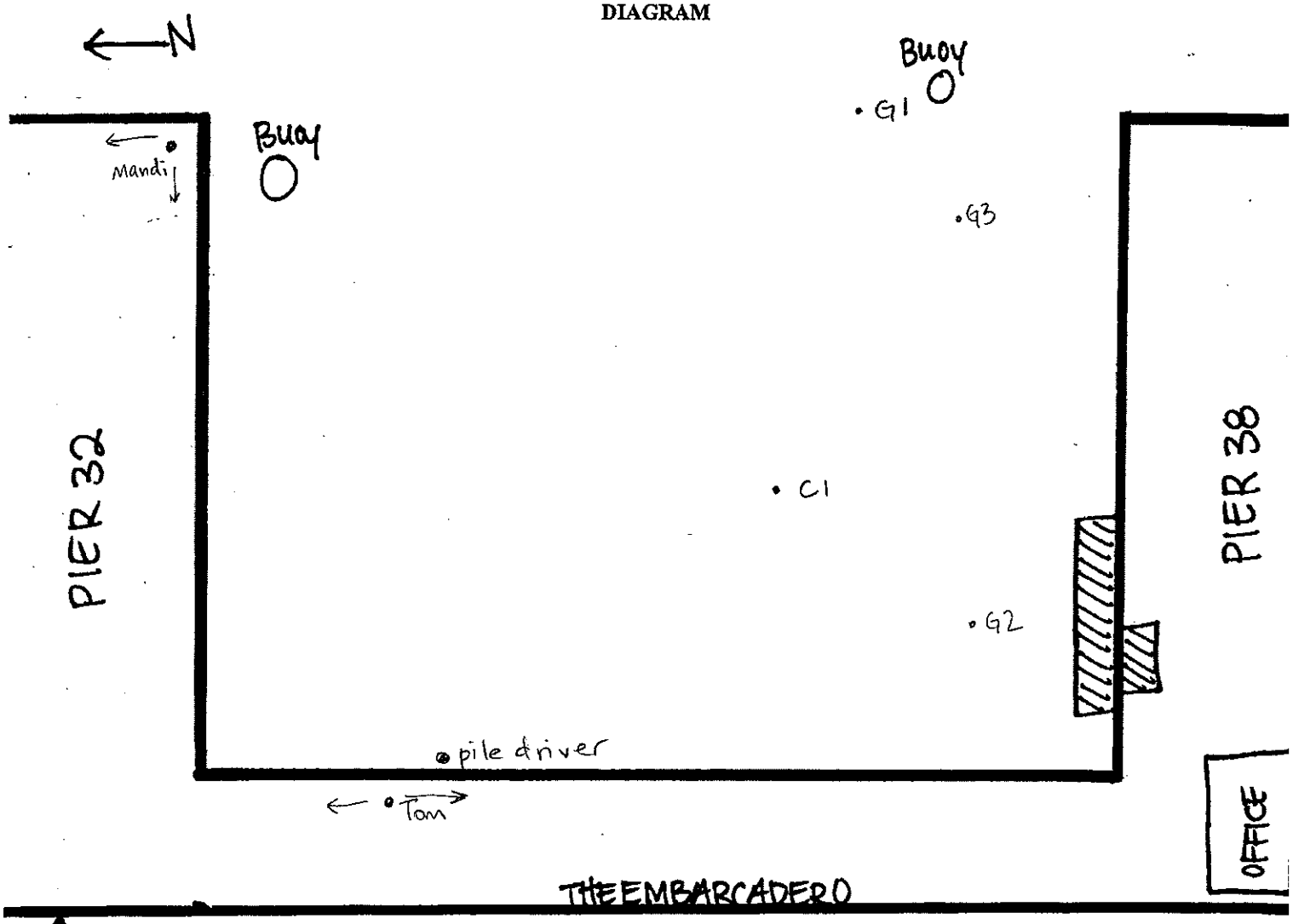
ADDITIONAL COMMENTS

Comment: Reference No.	Additional Comments
C1	flew away @ first hammer blow (0844), returned during a break (0852)
	and remained for duration of Pile #24. Made multiple foraging
	dives, mostly came up empty. Observed feeding once on a small live fish.

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

BIRDS

DIAGRAM



BIOLOGICAL MONITOR _____ Mandi McElroy
Signature Print Name

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

Date 8/16/12 Monitor (s) Shannon Lindquist Visibility foggy morning Beaufort - Clear afternoon

Tide Level see below Human Activity in the Area pedestrians on the Embarcadero AmCup work on Pier 32.

Monitoring Locale: Pier 30 ☐ Pier 32 ☒ Pier 38 ☐ Boat ☐ 178 m from pile driving ☐

129 m from pile driving ☐ 1900 m from pile driving on vessels ☐

Pile Type: 24-inch octagonal concrete ☒ 24-inch steel shell ☐ Ambient Conditions ☐

Piles/Day (1-8): ☐ **Pile Driver**: Impact ☒ Vibratory/Impact ☐

Attenuation Device: None ☒ Bubble Curtain: On ☐ Off ☐

Minutes of Vibratory Driving: n/a ☒ 8:00 ☐ 15:00 ☐ **Impact Blows per Pile**: 800 ☐ 300 ☐ 600 ☐

Tide data

Low	High	Low	High
0521	1219	1717	2324
-0.11	+5.03	+2.26	+6.2

* Start time indicates first hit w/ hammer

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

Pile No.	Pile Driver (Impact, Vibratory)[5]	Pile Driving Start/End Time *	Observation Start/End Time	Mammal Species[6]			Comments: Reference Number
				Species	No.	Time	
G19	impact	0803/0855	0645/	HS	1	0651	(1)
				HS	2	0909	(2)
G17	impact	0941/0958		/	/	/	
↓	↓	1031/1041		/	/	/	
F15	impact	1220/1248		HS	3	1307	(3)
F14	impact	1338/1408		/	/	/	
G16	impact	1457/1523	/1553	SL	1	1508	(4)

Y crack of no pile driving
im 0958 & 1031 to fix
something.

[5] Steel shell pile driving will include both vibratory (up to the last 10 feet) and impact (last 10 feet) pile drivers
[6] HS=Harbor Seal; SL = Sea Lion; HP=Harbor Porpoise; GW=Gray Whale; O = Other

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

Comments: Reference No.	Monitor's Distance from Pile Driving Activity	Initial Behavior of Marine Mammal	Changes in Marine Mammal Behavior (e.g., orientation, speed, diving, respiration rate, etc.)[7]
(1)	900 ft.	surfaced briefly head up	no change
(2)	900 ft.	Slow surface travel S	no change
(3)	800 ft.	spotted w/head up, dove	no change
(4)	900 ft.	swimming S, slow surface travel	no change

[7] **Note:** If a monitor sees a marine mammal within or approaching the Exclusion Zone prior to the start of impact pile driving, the monitor will notify the on-site resident engineer (or other authorized individual), who will then be required to delay pile driving until the marine mammal has moved outside of the Exclusion Zone, or if the animal has not been re-sighted within 15 minutes for pinnipeds or 30 minutes for cetaceans. If a marine mammal is sighted within or on a path toward the Exclusion Zone, pile driving will cease until that animal has cleared and is on a path away from the Exclusion Zone, or 15/30 minutes (pinnipeds/cetaceans) has lapsed since the last sighting.

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

PHOTOS

Comment: Reference No.	Photo Number	Time of Photo	Photo Taken Before (B), During (D) or After (A) Pile Driving	Description

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

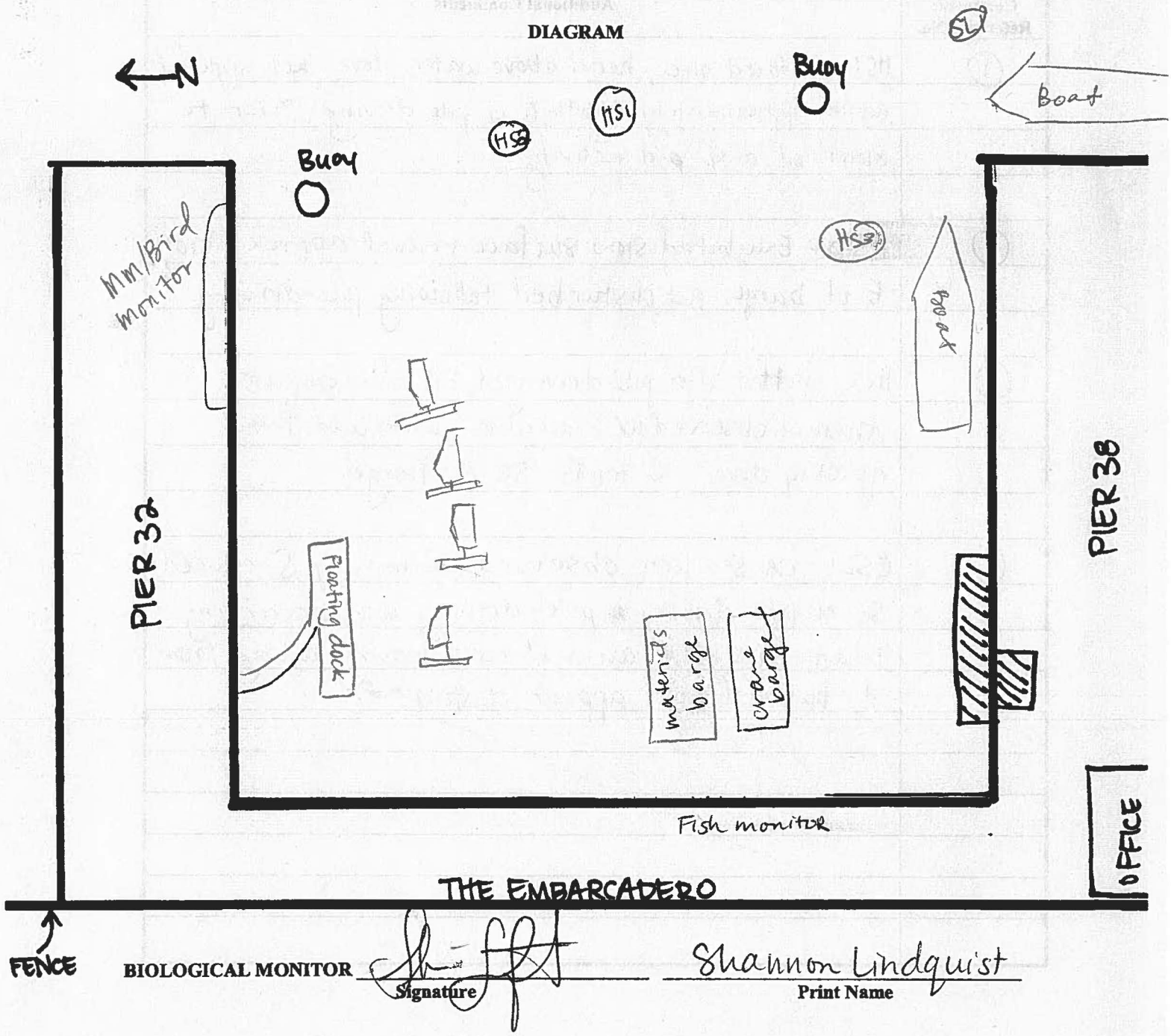
ADDITIONAL COMMENTS

Comment: Reference No.	Additional Comments
(1)	HS1 - surfaced once, head above water, dove, not sighted again. Approximately 900 ft. E of pile-driving. Prior to start of any p-d activity.
(2)	HS2 - Exhibited slow surface travel approx. 900ft E of barge, not disturbed following pile-driving.
(3)	HS3 - spotted after pile-driving of P15 was completed. Animal observed w/ head above water and then quickly dove. ~700 ft. SE of barge.
(4)	ESL1 - CA Sea lion observed swimming S ~1000ft SE of pile-driving & pile-driving was occurring when sighted & animal was moving away from it, but did not appear disturbed.

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

DIAGRAM



BIOLOGICAL MONITOR _____ Shannon Lindquist

Signature **Print Name**

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

BIRDS[8]

Date 8/16/12 Monitor Shannon Lindquist Weather foggy in morning, Beaufort 3
(clear in afternoon

Monitoring Locale: Pier 30 ☐ Pier 32 ☒ Pier 38 ☐ 178m from pile driving ☐ 120m from pile driving ☐

1900 m from pile driving on vessels ☐

Pile Type: 24-inch octagonal concrete ☒ 24-inch steel shell ☐ Ambient Conditions ☐ Piles/Day (1-8): 6

Pile Driver: Impact ☒ Vibratory/Impact ☐ Attenuation Device: None ☒ Bubble Curtain: On ☐ Off ☐

Minutes of Vibratory Driving: n/a ☒ 8:00 ☐ 15:00 ☐ Impact Blows per Pile: 800 ☐ 300 ☐ 600 ☐

long break b/tm 0958 & 1031. Occurred during nat time
to fix something. No pile-driving

Pile No.	Pile Driver (Impact, Vibratory)[9]	Pile Driving* Start/End Time	Observer Start/End Time	Bird Predation on Fish Observed (Y/N) and Time		General Bird Activity/Behavior	Comment: Reference Number
G19	impact	0803/0855	0645/	/	/	guls, cormorants,	(1)
G17	impact	0941/0958		/	/	pelicans common	
		1031/1041		/	/	in the area.	
F15	impact	1220/1248		/	/	Feeding.	
F14	impact	1338/1408	↓	/	/		
G16	impact	1457/1523	/1553	/	/		

[8] The bird monitor will have to work closely with the fish monitor because the monitor must attempt to determine the amount of bird predation on fishes, including the size and species of fish affected.

[9] Steel shell pile driving will include both vibratory (up to the last 10 feet) and impact (last 10 feet) pile drivers.

* Start time indicates first hit with hammer

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

BIRDS

Comment: Reference No.	Predation[10]		Dead/Injured Fish Observed[11]		Dead/Injured Fish Collected[8]	
	Bird Strikes Per Minute	Duration	Species	Size	Species	Size

[10] Diving birds that may be present, but which cannot be confirmed to scavenge on injured fish while diving, will be noted on the data sheet, but are not included in the count of bird strikes.

[11] SH = steelhead; G=North American Green Sturgeon; O=Other

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

BIRDS

PHOTOS

Comment: Reference No.	Photo Number	Time of Photo	Photo Taken Before (B), During (D) or After (A) Pile Driving	Description

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

BIRDS

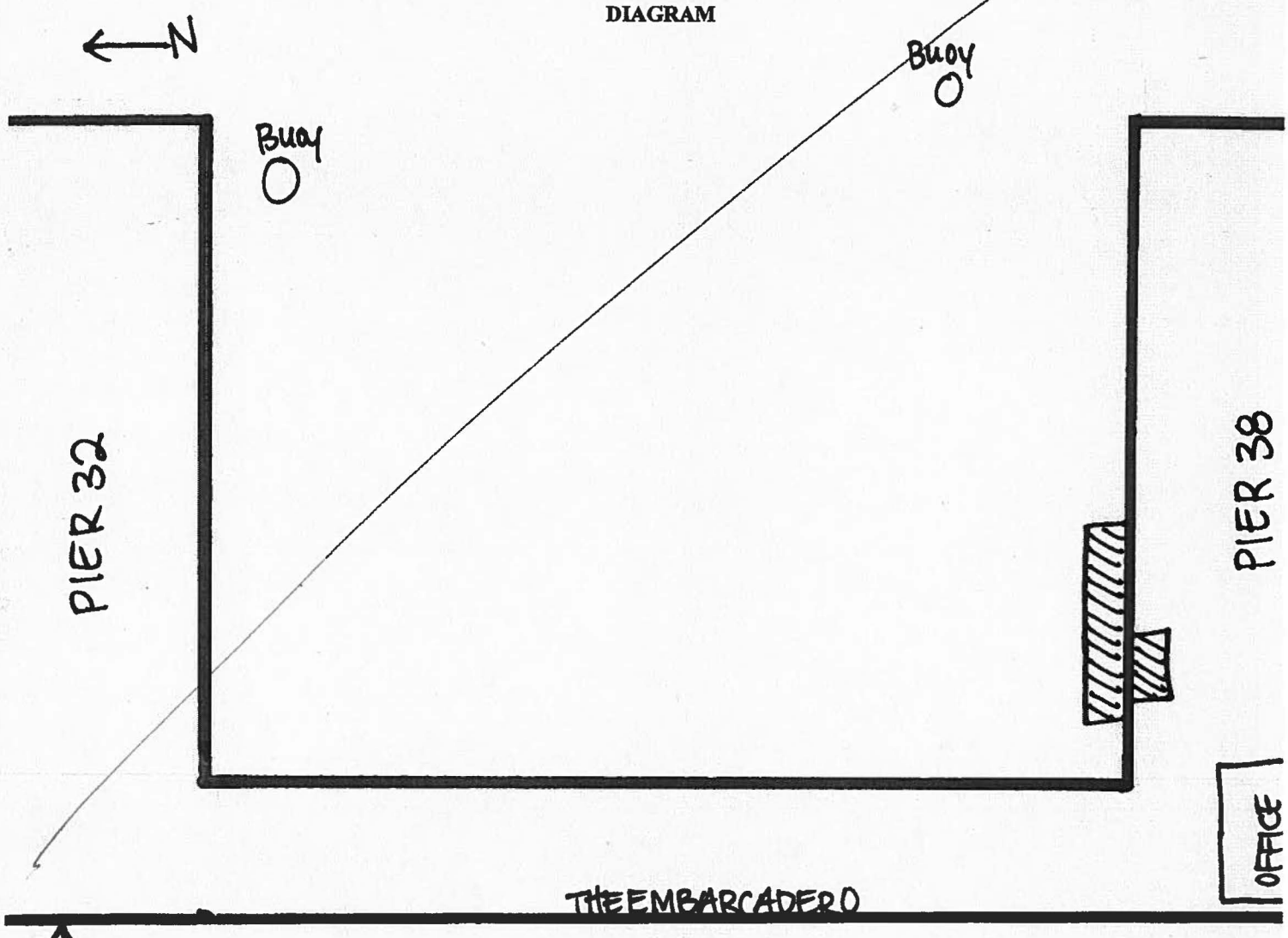
ADDITIONAL COMMENTS

Comment: Reference No.	Additional Comments
(1)	Common birds in the area include, cormorants, gulls, and pelicans. Birds dove and fed often, however no bird strikes were observed as a result of fish kills during pile driving.

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

BIRDS

DIAGRAM



BIOLOGICAL MONITOR _____ (Signature) Shannon Lindquist (Print Name)

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

Date 8/17/12 **Monitor (s)** Shannon Lindquist **Visibility** foggy morning clear afternoon, Beaufort

Tide Level Sea below **Human Activity in the Area** pedestrians on the Embarcadero
America's Cup work on Pier 32

Monitoring Locale: Pier 30 ☐ Pier 32 ☒ Pier 38 ☐ Boat ☐ 178 m from pile driving ☐

129 m from pile driving ☐ 1900 m from pile driving on vessels ☐

Pile Type: 24-inch octagonal concrete ☒ 24-inch steel shell ☐ Ambient Conditions ☐

Piles/Day (1-8): ☐ **Pile Driver:** Impact ☒ Vibratory/Impact ☐

Attenuation Device: None ☒ Bubble Curtain: On ☐ Off ☐

Minutes of Vibratory Driving: n/a ☒ 8:00 ☐ 15:00 ☐ **Impact Blows per Pile:** 800 ☐ 300 ☐ 600 ☐

Tide data

Low	High	Low
0553	1248	1757
-0.11	+5.26	+1.94

0

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

Pile No.	Pile Driver (Impact, Vibratory)[5]	* Pile Driving Start/End Time	Observation Start/End Time	Mammal Species[6]			Comments: Reference Number
				Species	No.	Time	
J26	impact	0835/0857	0655/	/	/	/	
J25	impact	0953/1004		HS	1	0926	(1)
J24	impact	1102/1108		HS	2	1025	(2)
				SL	1	1047	(3)
J23	impact	1244/1257		/	/	/	
K29	impact	1350/1359	/1430				

*Start time is the first hammer blow.

[5] Steel shell pile driving will include both vibratory (up to the last 10 feet) and impact (last 10 feet) pile drivers
[6] HS=Harbor Seal; SL = Sea Lion; HP=Harbor Porpoise; GW=Gray Whale; O = Other

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

Comments: Reference No.	Monitor's Distance from Pile Driving Activity	Initial Behavior of Marine Mammal	Changes in Marine Mammal Behavior (e.g., orientation, speed, diving, respiration rate, etc.)[7]
(1)	900ft.	Slow surface travel, N	no change
(2)	900ft.	Seen w/head above water briefly	no change
(3)	900ft.	feeding. surfacing often	no change

[7] **Note:** If a monitor sees a marine mammal within or approaching the Exclusion Zone prior to the start of impact pile driving, the monitor will notify the on-site resident engineer (or other authorized individual), who will then be required to delay pile driving until the marine mammal has moved outside of the Exclusion Zone, or if the animal has not been re-sighted within 15 minutes for pinnipeds or 30 minutes for cetaceans. If a marine mammal is sighted within or on a path toward the Exclusion Zone, pile driving will cease until that animal has cleared and is on a path away from the Exclusion Zone, or 15/30 minutes (pinnipeds/cetaceans) has lapsed since the last sighting.

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

PHOTOS

Comment: Reference No.	Photo Number	Time of Photo	Photo Taken Before (B), During (D) or After (A) Pile Driving	Description

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

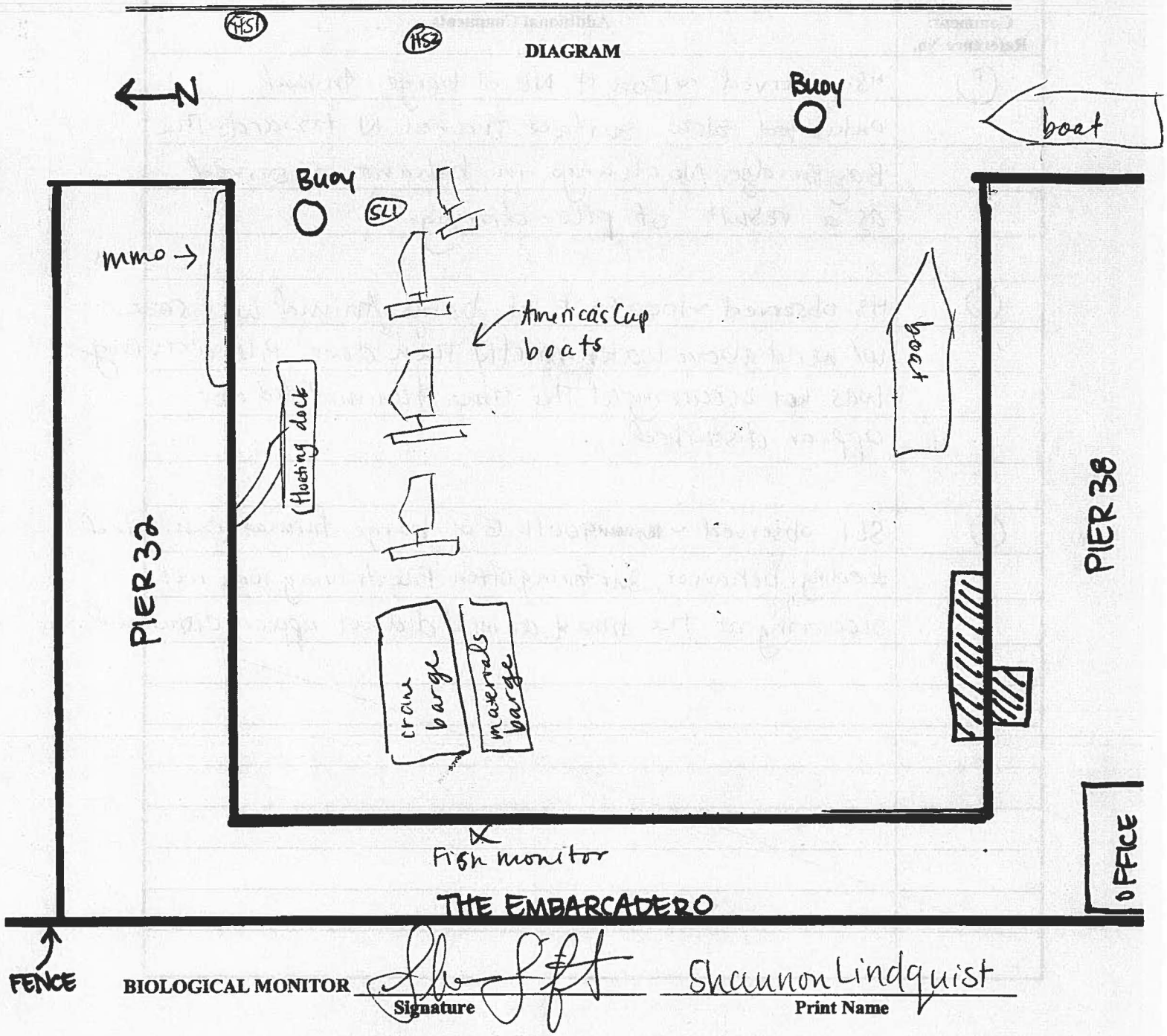
ADDITIONAL COMMENTS

Comment: Reference No.	Additional Comments
(1)	HSI observed ~1300 ft NE of barge. Animal exhibited slow surface travel N towards The Bay Bridge. No change in behavior observed as a result of pile-driving.
(2)	HS observed ~1000 ft. E of barge. Animal was seen w/ head above water briefly then dove. Pile-driving was not occurring at the time & animal did not appear disturbed.
(3)	SLI - observed ~900 ft. E of barge. Animal exhibited feeding behavior, surfacing often. Pile driving was not occurring at the time & animal did not appear disturbed.

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

DIAGRAM



BIOLOGICAL MONITOR Signature: [signature] Print Name: Shannon Lindquist

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

BIRDS[8]

Date 8/17/12 Monitor Shannon Lindquist Weather foggy morning clear afternoon, Beaufort 3

Monitoring Locale: Pier 30 ☐ Pier 32 ☒ Pier 38 ☐ 178m from pile driving ☐ 120m from pile driving ☐

1900 m from pile driving on vessels ☐

Pile Type: 24-inch octagonal concrete ☒ 24-inch steel shell ☐ Ambient Conditions ☐ Piles/Day (1-8): ☐

Pile Driver: Impact ☒ Vibratory/Impact ☐ Attenuation Device: None ☒ Bubble Curtain: On ☐ Off ☐

Minutes of Vibratory Driving: n/a ☒ 8:00 ☐ 15:00 ☐ Impact Blows per Pile: 800 ☐ 300 ☐ 600 ☐

Pile No.	Pile Driver (Impact, Vibratory)[9]	Pile Driving * Start/End Time	Observer Start/End Time	Bird Predation on Fish Observed (Y/N) and Time		General Bird Activity/Behavior	Comment: Reference Number
J26	impact	0835/0851	0655/	✓	✓	gulls, cormorants,	(1)
J25	impact	0953/1004		✓	✓	pelicans & terns	
J24	impact	1102/1108		✓	✓	feeding in area	
J23	impact	1244/1257		✓	✓		
K29	impact	1350/1359	1430	✓	✓		

* Start time is the first hammer blow.

[8] The bird monitor will have to work closely with the fish monitor because the monitor must attempt to determine the amount of bird predation on fishes, including the size and species of fish affected.

[9] Steel shell pile driving will include both vibratory (up to the last 10 feet) and impact (last 10 feet) pile drivers.

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

BIRDS

Comment: Reference No.	Predation[10]		Dead/Injured Fish Observed[11]		Dead/Injured Fish Collected[8]	
	Bird Strikes Per Minute	Duration	Species	Size	Species	Size

[10] Diving birds that may be present, but which cannot be confirmed to scavenge on injured fish while diving, will be noted on the data sheet, but are not included in the count of bird strikes.

[11] SH = steelhead; G=North American Green Sturgeon; O=Other

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

BIRDS

PHOTOS

Comment: Reference No.	Photo Number	Time of Photo	Photo Taken Before (B), During (D) or After (A) Pile Driving	Description

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

BIRDS

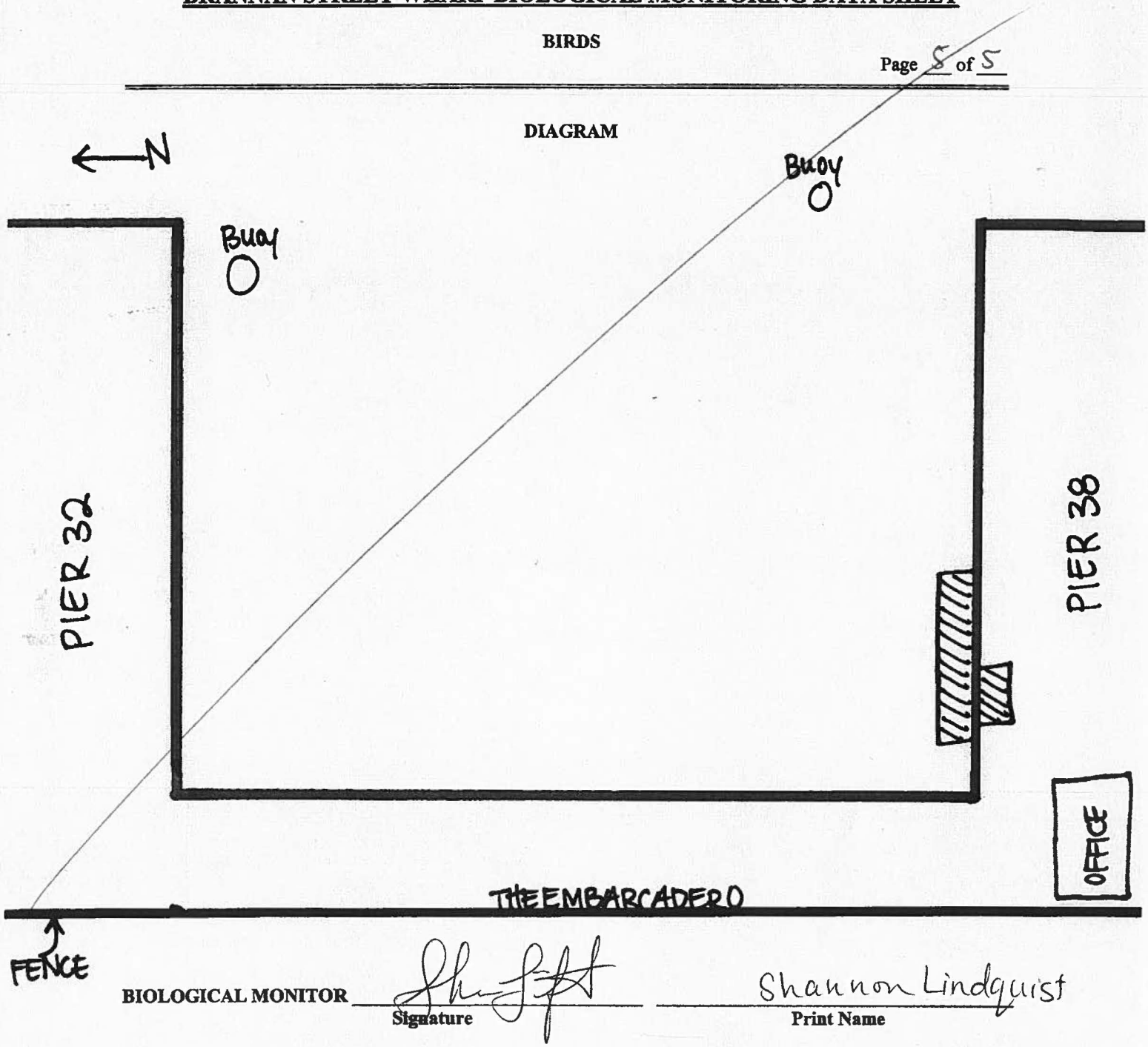
ADDITIONAL COMMENTS

Comment: Reference No.	Additional Comments
(1.)	Pelicans, terns, gulls, & cormorants observed feeding in the area throughout the monitoring period. Feeding behavior did not include any bird strikes as a result of pile driving.

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

BIRDS

DIAGRAM



BIOLOGICAL MONITOR _____ _____

Signature **Print Name**

Shannon Lindquist

Brannan Street Wharf – Biological Monitoring
Weekly Summary – August 20, 2012 through August 24, 2012

Concrete pile-driving continued this week.

One monitor was stationed at the east end of Pier 32, and the other monitor was stationed facing east on the Embarcadero seawall directly next to the pile-driving barge. America's Cup activity at Pier 32 (people, boats) continued throughout the week.

Monday, August 20, 2012

Biological monitoring at the BSW began at 0700 and continued until 1550. Four concrete piles (G15, G18, K24, K28) were driven. G15, G18, and K24 were indicator piles. No negative impacts on marine mammals were observed.

Biological Monitors - Mandi McElroy and Tom Copper

- **Birds:** Cormorants and gulls were observed in the area throughout the day, before, during and after pile driving. No feeding was observed within the monitoring zone; no bird strikes were observed.
- **Marine Mammals:** Three harbor seals and two California sea lions were observed during the monitoring period. None exhibited a change in behavior as a result of project activities.
    - 0840, 1033-One harbor seal was observed intermittently surfacing and slowly diving approximately 650 feet southeast of the pile driving location, before the pile-driving of Pile G15 and continuously until approximately 30 minutes before the start of Pile G18. Both of these were indicator piles, and had long periods of no activity between hammer blows due to sensor placement. No variation in behavior was exhibited during this entire time window, and the animal did not move from this general location. The animal was last observed at 1033 by the biologist at the seawall; this sighting was not corroborated by the second observer at Pier 32. It was not seen again within the observation area.
    - 0936-One California sea lion was observed slow-moving and diving approximately 3 times in one minute, about 1000 feet east of the pile driving location, during the driving of Pile G15. No change in behavior was exhibited; the animal did not resurface in the observation zone.
    - 0939-One harbor seal was observed briefly surfacing and moving to the north, approximately 1100 feet east of the pile driving location during the driving of Pile G15. No change in behavior was observed.
    - 1346-One California sea lion was observed diving and slow-moving to the north, approximately 1000 feet east of the pile-driving, during the driving of Pile K24. No change in behavior was observed.

- 1523-One harbor seal was observed slowly diving and moving north, approximately 1100 feet from the pile-driving location, after the completion of Pile K28. No change in behavior was observed.

Tuesday, August 21, 2012

Biological monitoring at the BSW began at 0720 and continued until 1635. Six concrete piles were driven (K27, K26, K25, H21, H20, H19). Mandi attended a weekly meeting (also attended by Dutra and Port of SF) at the on-site trailer from 1055-1205 (note, no hammering occurred from 1058-1324); only one monitor (Tom) was viewing the observation area at that time. There was abundant boat activity at Pier 32 throughout the day for the America's Cup practice races. Up to eight racing sailboats were anchored in the observation area at any given time. All sailboats departed the site around 1230 and returned around 0330. Several on-lookers (on motorboats, kayaks) entered and exited the area throughout the day. No negative impacts on any marine mammals were observed.

Biological Monitors - Mandi McElroy and Tom Copper

- **Birds:** Cormorants and gulls were observed in the area throughout the day, before, during and after pile driving. No feeding or bird strikes were observed.
- **Marine Mammals:** One harbor seal was observed.
  - 0834-One harbor seal was observed slowly diving and surfacing approximately 1000 feet east of pile-driving activities, one minute before the completion of Pile K27. No change in behavior was observed.
  - No marine mammals were observed during the driving of Piles K26, K25, H21, H20, or H19.

Wednesday, August 22, 2012

Biological monitoring at the BSW began at 0655 and continued until 1700. Seven concrete piles were driven (H15, H16, H17, H18, J22, J21, J20). There was abundant boat activity at Pier 32 throughout the day for the America's Cup races by racing boats and team boats. All boats departed the site around 1230 and returned around 1630. Several on-lookers (on motorboats, kayaks) entered and exited the area throughout the day. No negative impacts on any marine mammals were observed.

Biological Monitors – Shannon Lindquist and Tom Copper

- **Birds:** Cormorants, gulls and a few pelicans were observed in the area throughout the day, before, during and after pile driving. No feeding or bird strikes were observed.
- **Marine Mammals:** Two harbor seals and two harbor porpoises were observed.
  - 0657-0807-One harbor seal was observed repeatedly over a little over an hour. The animal remained between 400-800 feet east and northeast of pile-driving activities. The animal was seen resting at the surface, or "bottling", for several minutes at a time. The animal remained present in the area while pile-driving of Pile H15 began. Shortly after the start of pile-driving activities, the animal fled the area and was not sighted again.

- 1135-One harbor seal was observed approximately 350 feet southeast of pile-driving activities. This animal was seen while pile-driving was occurring on Pile H18. The animal was seen swimming east, away from the noise. However, it did not exhibit any sudden change in behavior.
- 1448-Two harbor porpoises were observed traveling north towards the Bay Bridge approximately 1,200 feet east of pile-driving. The animals were seen during the driving of Pile J21, but did not appear to be disturbed.
- No marine mammals were observed during the driving of Piles H16, H17, J22, or J20.

Thursday, August 23, 2012

Biological monitoring at the BSW began at 0655 and continued until 1708. Five concrete piles were driven (J17, J18, J19, K18, K19) and two concrete piles that were driven previously were reset (G15 and K24). There was abundant boat activity at Pier 32 throughout the day for the America's Cup races by racing boats and team boats. All boats departed the site around 1230 and returned around 1630. Several on-lookers (on motorboats, kayaks) entered and exited the area throughout the day. No negative impacts on any marine mammals were observed.

Biological Monitors – Shannon Lindquist and Tom Copper

- **Birds:** Cormorants, gulls and a few pelicans and terns were observed in the area throughout the day, before, during and after pile driving. No feeding or bird strikes were observed.
- **Marine Mammals:** Two harbor seals and four California sea lions were observed.
  - 0655-0837-One harbor seal was spotted approximately 400 feet northeast of pile-driving activities. No pile-driving had occurred yet. The animal exhibited slow surface travel, surfacing frequently. The same animal was seen repeatedly while Pile J17 was being driven between 400 and 900 feet of the piles. The animal did not appear disturbed.
  - 0727-One California sea lion was spotted moving south approximately 900-1,000 feet east of the pile-driving. No pile-driving had occurred yet and the animal surfaced frequently and appeared to be feeding.
  - 1023-One California sea lion was observed approximately 800 feet northeast of pile-driving. The animal surfaced twice and was not seen again. No pile-driving was occurring at the time of the observation and no disturbance was noted.
  - 1215-One California sea lion was observed approximately 850 feet northeast of the pile-driving. The animal was only seen surfacing briefly and was not spotted again. No pile-driving was occurring at this time and the animal did not appear disturbed.
  - 1305-One California sea lion was observed approximately 900 feet northeast of the pile-driving. The animal surfaced once, briefly, immediately following the completion of Pile K24.
  - 1550-One harbor seal was seen approximately 700 feet northeast of the pile-driving. The animal was seen resting at the surface. No pile-driving was occurring at the time of the observation and the animal showed no signs of disturbance.

Friday, August 24, 2012

Biological monitoring at the BSW began at 0700 and continued until 1515. Six concrete piles were driven (K20, K21, K22, K23, J16, J17). There was abundant boat activity at Pier 32 throughout the day for the America's Cup races by racing boats and team boats. All boats departed the site around 1230 and had not yet returned by the end of the observation period. Several on-lookers (on motorboats, kayaks) entered and exited the area throughout the day. No negative impacts on any marine mammals were observed.

Biological Monitors – Shannon Lindquist and Tom Copper

- **Birds:** Cormorants and gulls were observed in the area throughout the day, before, during and after pile driving. No feeding or bird strikes were observed.
- **Marine Mammals:** Three harbor seals and two California sea lions were observed.
    - 0712-One California sea lion was observed swimming south approximately 900 feet east of pile-driving. The animal exhibited feeding behavior. No pile-driving had occurred yet at the time of this observation.
    - 0723-0837-One harbor seal was observed resting vertically at the surface approximately 600 feet east of pile-driving. The animal was first seen prior to any pile-driving activity. The animal was seen approximately 300 feet southeast of the barge at 0728. The same animal was then remained 800-900 feet east of pile-driving through the driving of Pile K20. The animal showed no signs of disturbance.
    - 0835-One harbor seal was seen with HS1. Both animals were exhibiting slow surface travel approximately 700 feet east of pile-driving. Pile K21 was being driven at the time of the observation. Neither seal appeared disturbed.
    - 0951-One sea lion was spotted approximately 1,000 feet northeast of the pile-driving. The animal surfaced once during the driving of Pile K22 and was not sighted again.
    - 1335-One harbor seal was spotted approximately 400 feet east of the pile-driving. The animal was exhibited slow surface travel following the completion of Pile J16. No disturbance was noted.

arrive 0640
dep 1600

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

Date 8/20/12 **Monitor (s)** Mandi + Tom **Visibility** fog, cleared ~ noon

Tide Level BSS 2 **Human Activity in the Area** Amer. Cup @ Pier 32, spectators (motorboats, sailboats, kayal

Monitoring Locale: Pier 30 ☐ Pier 32 ☒ Pier 38 ☐ Boat ☐ 178 m from pile driving ☐

129 m from pile driving ☐ 1900 m from pile driving on vessels ☐

Pile Type: 24-inch octagonal concrete ☒ 24-inch steel shell ☐ Ambient Conditions ☐

Piles/Day (1-8): 4 **Pile Driver:** Impact ☒ Vibratory/Impact ☐

G15, G18, K24, K28

Attenuation Device: None ☐ Bubble Curtain: On ☐ Off ☒

Minutes of Vibratory Driving: n/a ☒ 8:00 ☐ 15:00 ☐ **Impact Blows per Pile:** 800 ☐ 300 ☒ 600 ☐

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

	Pile No.	Pile Driver (Impact, Vibratory)[5]	Pile Driving Start/End Time	Observation Start/End Time	Mammal Species[6]			Comments: Reference Number
					Species	No.	Time	
indicator pile>	G15	impact	water hose @ 0857 hammer 0916/0947	0700/1017	HS	1	0840	HS1(a)
	G15	"	"	"	SL	1	0936	SL1
	G15	"	"	"	HS	2	0939	HS2
indicator>	G18	"	water hose @ 1103 hammer 1113/1154	1017/1224	HS	1	1033	HS1(b)
indicator>	K24	"	water hose @ 1310 hammer 1323/1350	1224/1420	SL	2	1346	SL2
	K28	"	water @ 1456 hammer 1501/1519	1420/1549	HS	3	1523	HS3

[5] Steel shell pile driving will include both vibratory (up to the last 10 feet) and impact (last 10 feet) pile drivers

[6] HS=Harbor Seal; SL = Sea Lion; HP=Harbor Porpoise; GW=Gray Whale; O = Other

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

PHOTOS

Comment: Reference No.	Photo Number	Time of Photo	Photo Taken Before (B), During (D) or After (A) Pile Driving	Description

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

Comments: Reference No.	Monitor's Distance from Pile Driving Activity	Initial Behavior of Marine Mammal	Changes in Marine Mammal Behavior (e.g., orientation, speed, diving, respiration rate, etc.)[7]
HS1	900 ft	intermittent surface/slow-moving	none
SL1	900 ft	slow moving + diving	none
HS2	900 ft	surfacing/diving, slow	none

[7] **Note:** If a monitor sees a marine mammal within or approaching the Exclusion Zone prior to the start of impact pile driving, the monitor will notify the on-site resident engineer (or other authorized individual), who will then be required to delay pile driving until the marine mammal has moved outside of the Exclusion Zone, or if the animal has not been re-sighted within 15 minutes for pinnipeds or 30 minutes for cetaceans. If a marine mammal is sighted within or on a path toward the Exclusion Zone, pile driving will cease until that animal has cleared and is on a path away from the Exclusion Zone, or 15/30 minutes (pinnipeds/cetaceans) has lapsed since the last sighting.

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

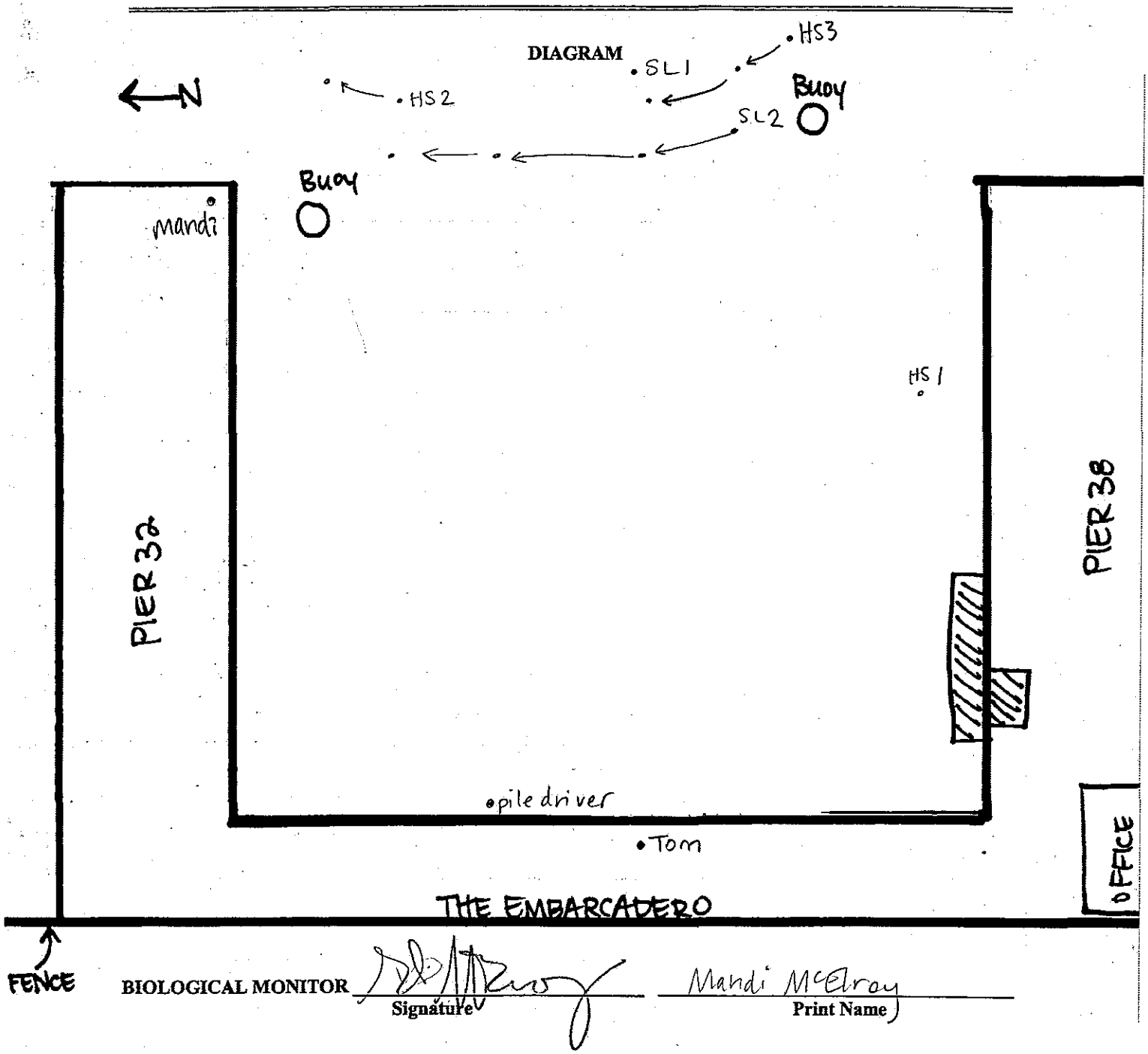
ADDITIONAL COMMENTS

Comment: Reference No.	Additional Comments
HS1 (a)	hammer/pile-driving stopped from 0919-0940 for
	sensor placement (indicator pile). HS surfaced
	repeatedly ~ 650 ft from pile-driving location. Slow
	movement, no variation in behavior during pile-driving
SL1	surfaced/dove 3x in one minute, did not
	resurface within observation zone.
HS2	surfaced briefly
HS1 (b)	break in hammering from 1128-1143. Tom thought
	he saw HS re-surface in same general location, Mandi
	did not observe the animal again after 0931.
SL2	steady swim/dive north, ~ 950 ft east of pile-driving

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

DIAGRAM



BIOLOGICAL MONITOR _____ Mandi McElroy
Signature Print Name

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

BIRDS[8]

Date 8/20/12 **Monitor** Mandi, Tom **Weather** fog until ~1115, then clear

Monitoring Locale: Pier 30 ☐ **Pier 32** ☒ **Pier 38** ☐ **178m from pile driving** ☐ **120m from pile driving** ☐

1900 m from pile driving on vessels ☐

Pile Type: 24-inch octagonal concrete ☒ **24-inch steel shell** ☐ **Ambient Conditions** ☐ **Piles/Day (1-8):** 4

Pile Driver: Impact ☒ **Vibratory/Impact** ☐ **Attenuation Device: None** ☐ **Bubble Curtain: On** ☐ **Off** ☒

Minutes of Vibratory Driving : n/a ☒ **8:00** ☐ **15:00** ☐ **Impact Blows per Pile: 800** ☐ **300** ☒ **600** ☐

Pile No.	Pile Driver (Impact, Vibratory)[9]	Pile Driving (hammer) Start/End Time	Observer Start/End Time	Bird Predation on Fish Observed (Y/N) and Time		General Bird Activity/Behavior	Comment: Reference Number
G15	impact	0916/0947	0700/1017	N	0932	swim	91
K24	"	1323/1350	1224/1420	N	1337	swim	92
K28	"	1501/1519	1420/1549	N	1501	swim	93
K28	"	1501/1519	1420/1549	N	1514	swim/dive	C1

[8] The bird monitor will have to work closely with the fish monitor because the monitor must attempt to determine the amount of bird predation on fishes, including the size and species of fish affected.

[9] Steel shell pile driving will include both vibratory (up to the last 10 feet) and impact (last 10 feet) pile drivers.

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

BIRDS

Comment: Reference No.	Predation[10]		Dead/Injured Fish Observed[11]		Dead/Injured Fish Collected[8]	
	Bird Strikes Per Minute	Duration	Species	Size	Species	Size

[10] Diving birds that may be present, but which cannot be confirmed to scavenge on injured fish while diving, will be noted on the data sheet, but are not included in the count of bird strikes.

[11] SH = steelhead; G=North American Green Sturgeon; O=Other

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

BIRDS

PHOTOS

Comment: Reference No.	Photo Number	Time of Photo	Photo Taken Before (B), During (D) or After (A) Pile Driving	Description

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

BIRDS

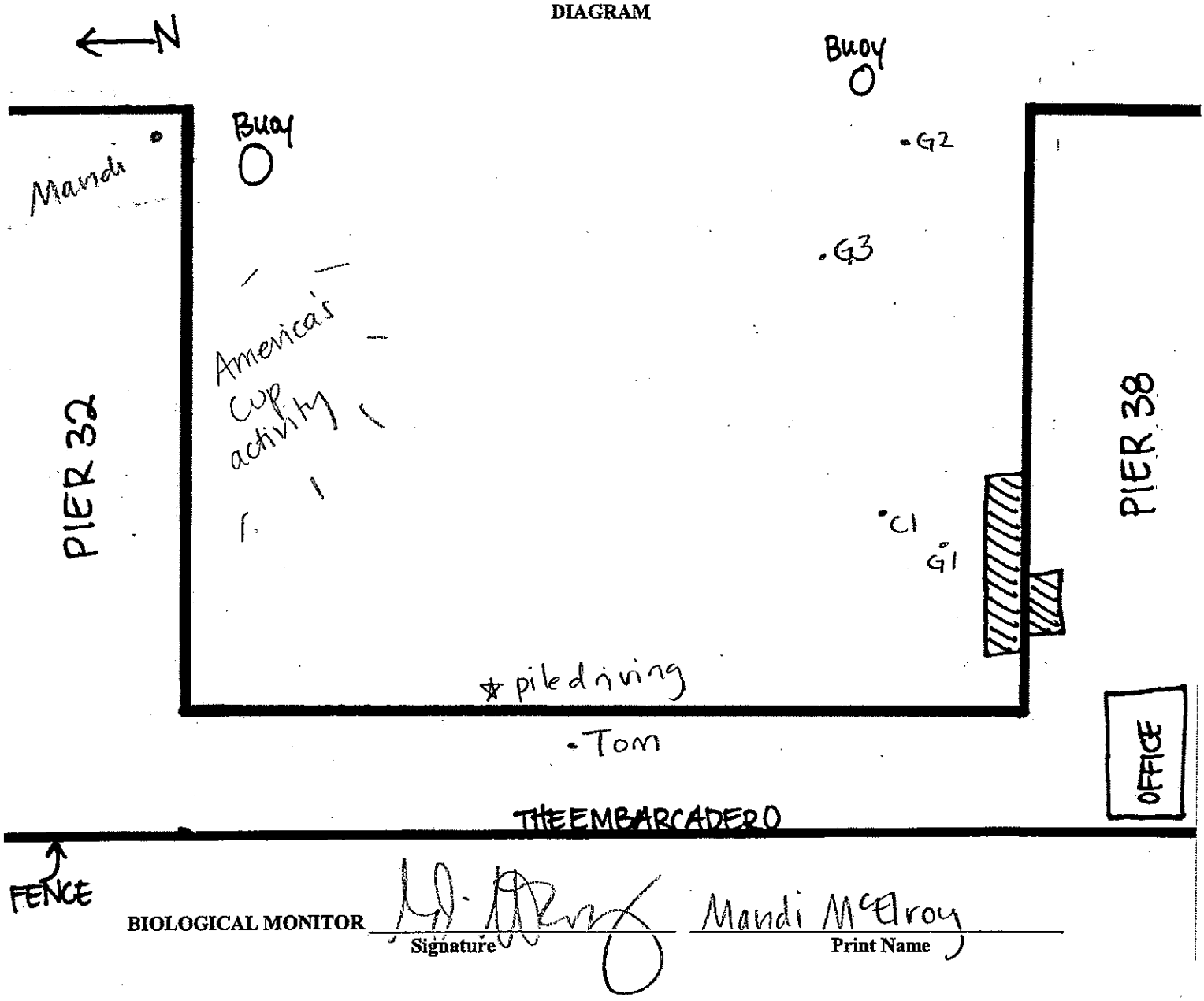
ADDITIONAL COMMENTS

Comment: Reference No.	Additional Comments

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

BIRDS

DIAGRAM



BIOLOGICAL MONITOR _____ Mandi McElroy
Signature Print Name

arrive 0645
depart 1640

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

Date 8/21/12 **Monitor (s)** Mandi, Tom **Visibility** A.M. fog, cleared ~ noon

Tide Level BSS 1-2 **Human Activity in the Area** Amer. Cup boats in+out of Pier 32 all day, motorboats, kayaks

Monitoring Locale: Pier 30 ☐ Pier 32 ☒ Pier 38 ☐ Boat ☐ 178 m from pile driving ☐

129 m from pile driving ☐ 1900 m from pile driving on vessels ☐

Pile Type: 24-inch octagonal concrete ☒ 24-inch steel shell ☐ Ambient Conditions ☐

Piles/Day (1-8): 16 **Pile Driver:** Impact ☒ Vibratory/Impact ☐

K27, K26, K25, H21, H20, H19

Attenuation Device: None ☐ Bubble Curtain: On ☐ Off ☒

Minutes of Vibratory Driving: n/a ☒ 8:00 ☐ 15:00 ☐ **Impact Blows per Pile:** 800 ☐ 300 ☒ 600 ☐

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

Pile No.	Pile Driver (Impact, Vibratory)[5]	Pile Driving Start/End Time	Observation Start/End Time	Mammal Species[6]			Comments: Reference Number
				Species	No.	Time	
K27	impact	water: 0758 hammer: 0818/0835	0720/0900	HS	1	0834	HS1
K26	"	water: 0920 hammer: 0931/0944	0900/1014	—	—	—	n/a
K25	"	water: 1031 hammer: 1039/1058	1014/1128 *	—	—	—	n/a
H21	"	water: 1306 hammer: 1324/1345	1128/1415	—	—	—	n/a
H20	"	water: 1429 hammer: 1440/1457	1415/1527	—	—	—	n/a
H19	"	water: 1531 hammer: 1541/1602	1527/1632	—	—	—	n/a

* only one observer present during weekly on-site meeting (Mandi attended 1055-1205)

[5] Steel shell pile driving will include both vibratory (up to the last 10 feet) and impact (last 10 feet) pile drivers

[6] HS=Harbor Seal; SL = Sea Lion; HP=Harbor Porpoise; GW=Gray Whale; O = Other

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

Comments: Reference No.	Monitor's Distance from Pile Driving Activity	Initial Behavior of Marine Mammal	Changes in Marine Mammal Behavior (e.g., orientation, speed, diving, respiration rate, etc.)[7]
HS1	900ft	slow moving, diving	none

[7] **Note:** If a monitor sees a marine mammal within or approaching the Exclusion Zone prior to the start of impact pile driving, the monitor will notify the on-site resident engineer (or other authorized individual), who will then be required to delay pile driving until the marine mammal has moved outside of the Exclusion Zone, or if the animal has not been re-sighted within 15 minutes for pinnipeds or 30 minutes for cetaceans. If a marine mammal is sighted within or on a path toward the Exclusion Zone, pile driving will cease until that animal has cleared and is on a path away from the Exclusion Zone, or 15/30 minutes (pinnipeds/cetaceans) has lapsed since the last sighting.

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

PHOTOS

Comment: Reference No.	Photo Number	Time of Photo	Photo Taken Before (B), During (D) or After (A) Pile Driving	Description

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

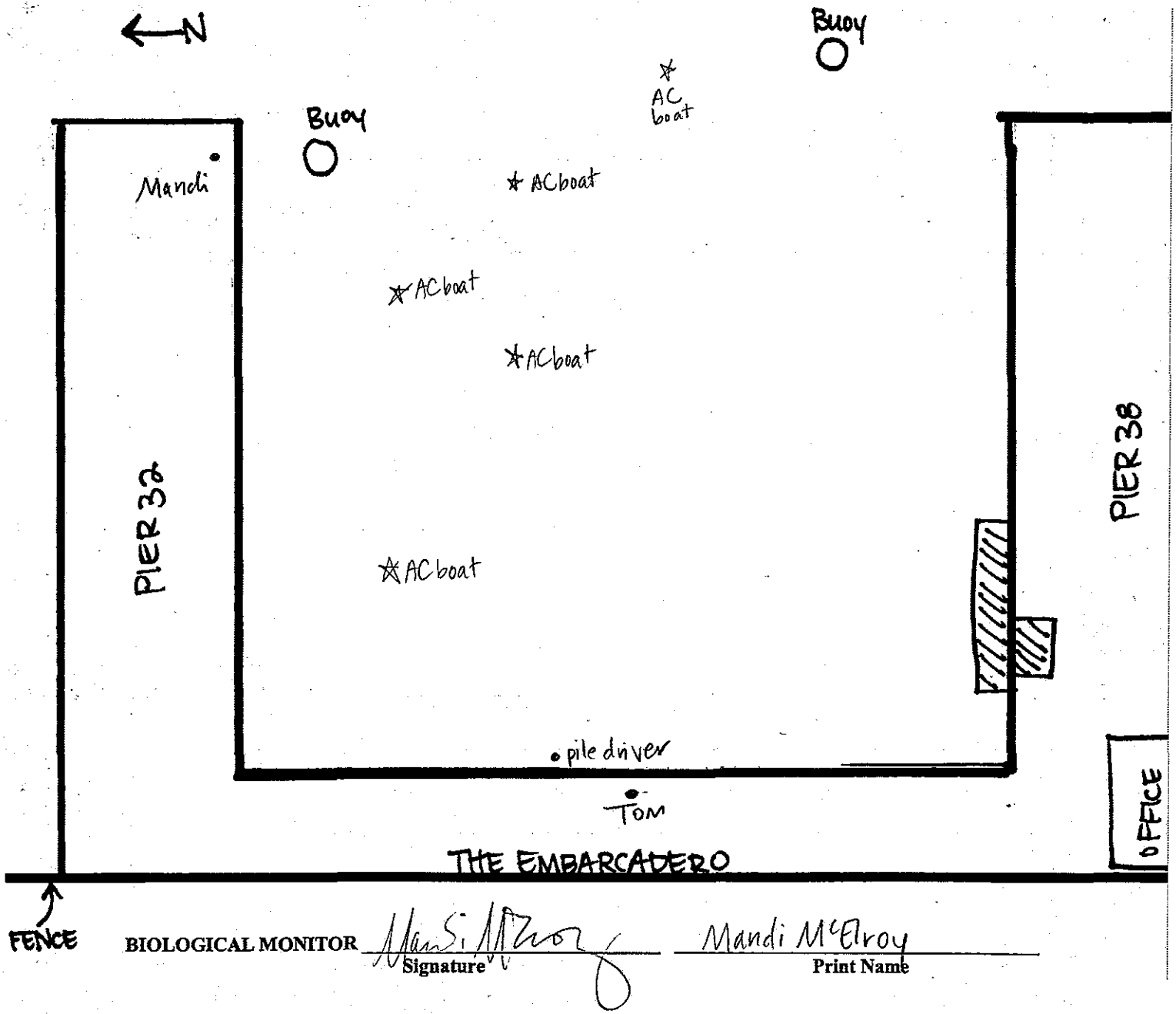
ADDITIONAL COMMENTS

Comment: Reference No.	Additional Comments

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS HS1 Page 6 of 6

DIAGRAM



BIOLOGICAL MONITOR Mandi McElroy
Signature Print Name

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

BIRDS[8]

Date 8/21/12 **Monitor** Mandi / Tom **Weather** A.M. fog, cleared ~noon

Monitoring Locale: Pier 30 ☐ **Pier 32** ☐ **Pier 38** ☒ **178m from pile driving** ☐ **120m from pile driving** ☐

1900 m from pile driving on vessels ☐

Pile Type: 24-inch octagonal concrete ☒ **24-inch steel shell** ☐ **Ambient Conditions** ☐ **Piles/Day (1-8):** 6

Pile Driver: Impact ☒ **Vibratory/Impact** ☐ **Attenuation Device: None** ☐ **Bubble Curtain: On** ☐ **Off** ☒

Minutes of Vibratory Driving : n/a ☒ **8:00** ☐ **15:00** ☐ **Impact Blows per Pile: 800** ☐ **300** ☒ **600** ☐

Pile No.	Pile Driver (Impact, Vibratory)[9]	(hammer) Pile Driving Start/End Time	Observer Start/End Time	Bird Predation on Fish Observed (Y/N) and Time		General Bird Activity/Behavior	Comment: Reference Number
K27	impact	0818/0835	0720/0900	N	0822	gull, swim	G1
K25	"	1039/1058	1014/1128	N	1051	gull, swim	G2
H20	"	1440/1457	1415/1527	N	1445	cormorant dive/swim	C1
H19	"	1541/1602	1527/1632	N	1539	gulls (group) swimming	G3

[8] The bird monitor will have to work closely with the fish monitor because the monitor must attempt to determine the amount of bird predation on fishes, including the size and species of fish affected.

[9] Steel shell pile driving will include both vibratory (up to the last 10 feet) and impact (last 10 feet) pile drivers.

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

BIRDS

Comment: Reference No.	Predation[10]		Dead/Injured Fish Observed[11]		Dead/Injured Fish Collected[8]	
	Bird Strikes Per Minute	Duration	Species	Size	Species	Size

[10] Diving birds that may be present, but which cannot be confirmed to scavenge on injured fish while diving, will be noted on the data sheet, but are not included in the count of bird strikes.

[11] SH = steelhead; G=North American Green Sturgeon; O=Other

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

BIRDS

PHOTOS

Comment: Reference No.	Photo Number	Time of Photo	Photo Taken Before (B), During (D) or After (A) Pile Driving	Description

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

BIRDS

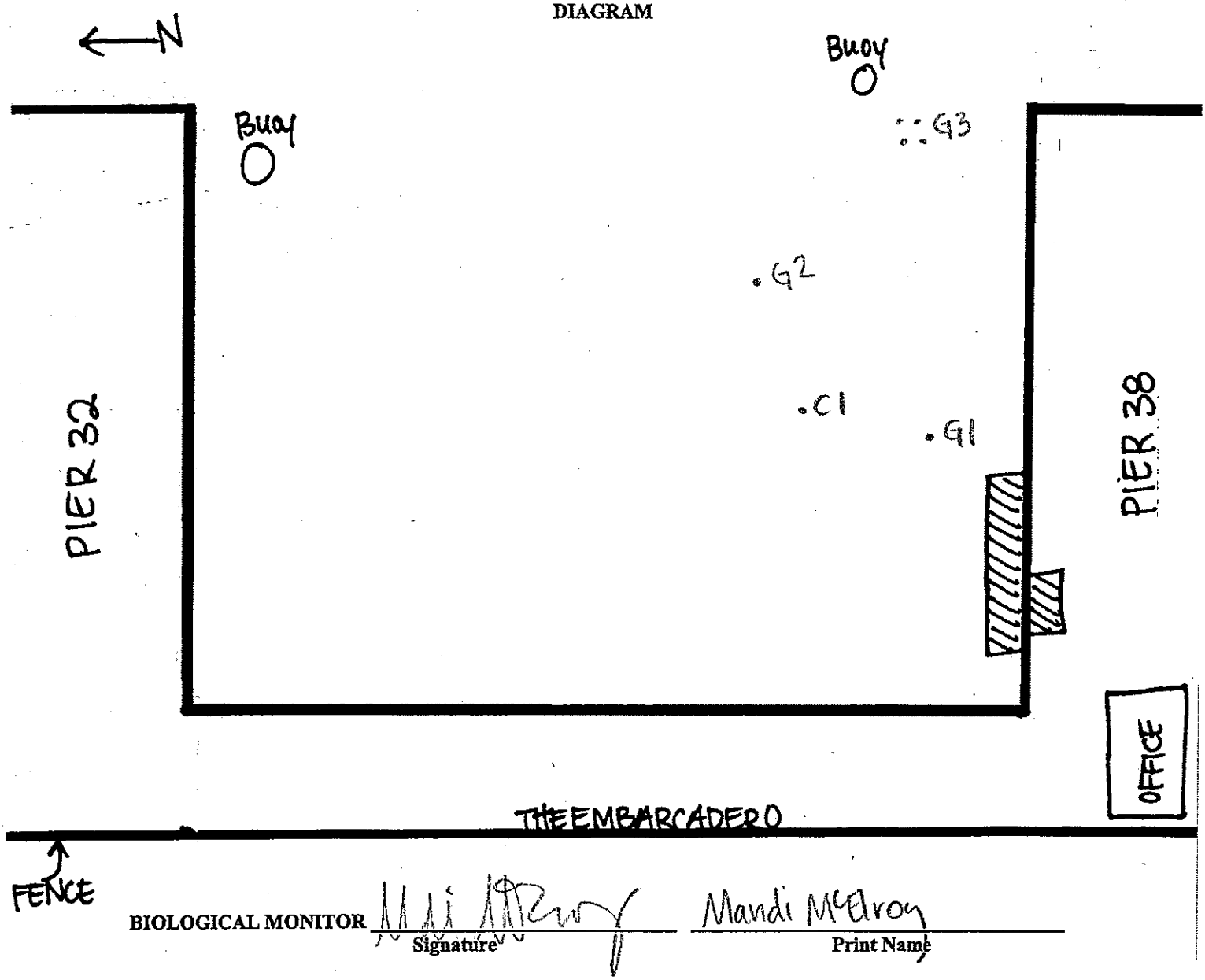
ADDITIONAL COMMENTS

Comment: Reference No.	Additional Comments
—	lots of Amer. Cup boats coming + going all day.

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

BIRDS

DIAGRAM



BIOLOGICAL MONITOR _____ Mandi McElroy
Signature Print Name

2

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

Date 8/22/12 **Monitor (s)** Shannon & Tom **Visibility** am-foggy pm-clear Beaufort 3

Tide Level see below **Human Activity in the Area** pedestrians along embarcadero America's Cup work on pier 32

Monitoring Locale: Pier 30 ☐ Pier 32 ☒ Pier 38 ☐ Boat ☐ 178 m from pile driving ☐

129 m from pile driving ☐ 1900 m from pile driving on vessels ☐

Pile Type: 24-inch octagonal concrete ☒ 24-inch steel shell ☐ Ambient Conditions ☐

Piles/Day (1-8): 7 **Pile Driver:** Impact ☒ Vibratory/Impact ☐

Attenuation Device: None ☒ Bubble Curtain: On ☐ Off ☐

Minutes of Vibratory Driving : n/a ☒ 8:00 ☐ 15:00 ☐ **Impact Blows per Pile:** 800 ☐ 300 ☒ 600 ☐

Tide data

High	low	High	low
0338	0900	1546	2211
+4.71	+1.62	+6.17	+0.62

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

Pile No.	Pile Driver (Impact, Vibratory)[5]	Pile Driving Start/End Time	Observation Start/End Time	Mammal Species[6]			Comments: Reference Number
				Species	No.	Time	
H15	impact	0804/0821	0655/	HS	1	0657	(1)
				HS	1	0727	(2) periodically (0717-0807)
H16	impact	0913/0928		/	/	/	
H17	impact	1016/1028		/	/	/	
H18	impact	1127/1140		HS	2	1135	(3)
J22	impact	1322/1344		/	/	/	
J21	impact	1439/1455		HP	192	1448	(4)
J20	impact	1602/1627	/1700	/	/	/	

[5] Steel shell pile driving will include both vibratory (up to the last 10 feet) and impact (last 10 feet) pile drivers
[6] HS=Harbor Seal; SL = Sea Lion; HP=Harbor Porpoise; GW=Gray Whale; O = Other

* Start time = first impact w/ hammer

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

Comments: Reference No.	Monitor's Distance from Pile Driving Activity	Initial Behavior of Marine Mammal	Changes in Marine Mammal Behavior (e.g., orientation, speed, diving, respiration rate, etc.)[7]
(1)	800ft.	slow surface travel, S	no change
(2)	700 ft.	surfacing frequently	spotted once after pile-driving began
		"bottling"	and not seen again.
(3)	700ft.	slow surface travel, E	no change
(4)	900 ft.	slow travel, N	no change

[7] **Note:** If a monitor sees a marine mammal within or approaching the Exclusion Zone prior to the start of impact pile driving, the monitor will notify the on-site resident engineer (or other authorized individual), who will then be required to delay pile driving until the marine mammal has moved outside of the Exclusion Zone, or if the animal has not been re-sighted within 15 minutes for pinnipeds or 30 minutes for cetaceans. If a marine mammal is sighted within or on a path toward the Exclusion Zone, pile driving will cease until that animal has cleared and is on a path away from the Exclusion Zone, or 15/30 minutes (pinnipeds/cetaceans) has lapsed since the last sighting.

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

PHOTOS

Comment: Reference No.	Photo Number	Time of Photo	Photo Taken Before (B), During (D) or After (A) Pile Driving	Description

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

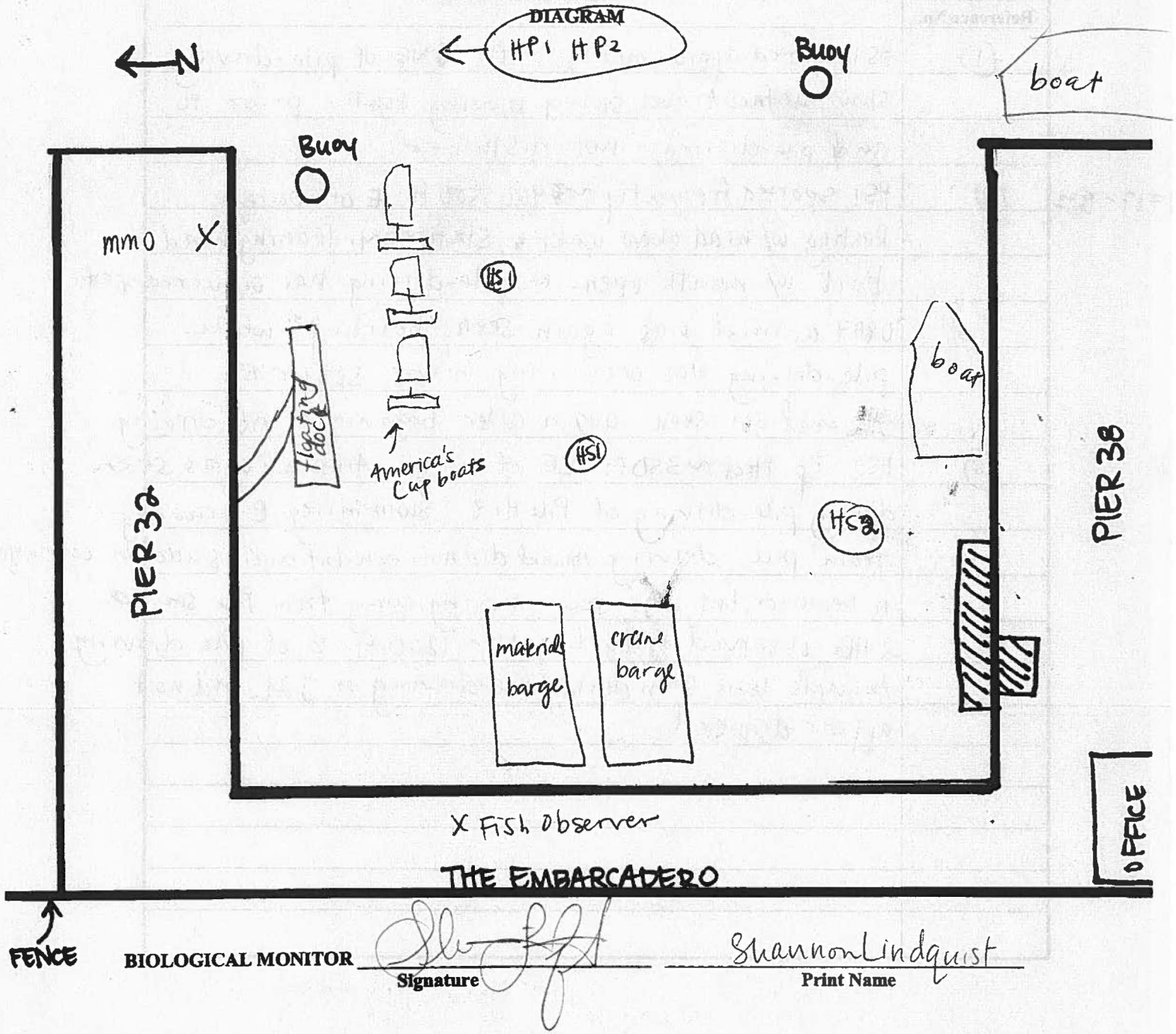
ADDITIONAL COMMENTS

Comment: Reference No.	Additional Comments
(1)	HS1 spotted approximately 800ft. NE of pile-driving.
	Slow surface travel, slowly moving South. prior to
	any pile-driving, not disturbed.
0717-0807 (2)	HS1 spotted frequently ~400-500 ft. E of barge.
	Resting w/ head above water, stationary, leaning head
	back w/ mouth open. No pile-driving has occurred yet
	0807. animal was again seen "bottling" while
	pile-driving was occurring ~400-500ft. E.
	Animal not seen again after beginning of pile-driving
(3)	HS2 spotted ~350ft. SE of barge. Animal was seen
	during pile-driving of Pile H18. Swimming E away
	from pile-driving. Animal did not exhibit and sudden change
	in behavior, but was seen moving away from the sound.
(4)	2 HBs observed traveling N ~1200 ft. E of pile-driving.
	Animals were seen during pile-driving of J21. Did not
	appear disturbed.

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

DIAGRAM



BIOLOGICAL MONITOR _____ Shannon Lindquist

Signature **Print Name**

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

BIRDS[8]

Date 8/22/12 Monitor Shannon & Tom Weather foggy-am, clear-pm - Beaufort 3

Monitoring Locale: Pier 30 ☐ Pier 32 ☑ Pier 38 ☐ 178m from pile driving ☐ 120m from pile driving ☐

1900 m from pile driving on vessels ☐

Pile Type: 24-inch octagonal concrete ☒ 24-inch steel shell ☐ Ambient Conditions ☐ Piles/Day (1-8): 7

Pile Driver: Impact ☒ Vibratory/Impact ☐ Attenuation Device: None ☒ Bubble Curtain: On ☐ Off ☐

Minutes of Vibratory Driving: n/a ☒ 8:00 ☐ 15:00 ☐ Impact Blows per Pile: 800 ☐ 300 ☒ 600 ☐

Pile No.	Pile Driver (Impact, Vibratory)[9]	Pile Driving Start/End Time	Observer Start/End Time	Bird Predation on Fish Observed (Y/N) and Time		General Bird Activity/Behavior	Comment: Reference Number
H15	impact	0804/0821	0655/	/	/	gulls, cormorants	1
H16	impact	0913/0928		/	/	and few pelicans	
H17	impact	1016/1028		/	/	common in the	
H18	impact	1127/1140		/	/	area.	
J22	impact	1322/1314		/	/		
J21	impact	1439/1455		/	/		
J20	impact	1602/1627	/1700				

[8] The bird monitor will have to work closely with the fish monitor because the monitor must attempt to determine the amount of bird predation on fishes, including the size and species of fish affected.

[9] Steel shell pile driving will include both vibratory (up to the last 10 feet) and impact (last 10 feet) pile drivers.

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

BIRDS

Comment: Reference No.	Predation[10]		Dead/Injured Fish Observed[11]		Dead/Injured Fish Collected[8]	
	Bird Strikes Per Minute	Duration	Species	Size	Species	Size

[10] Diving birds that may be present, but which cannot be confirmed to scavenge on injured fish while diving, will be noted on the data sheet, but are not included in the count of bird strikes.

[11] SH = steelhead; G=North American Green Sturgeon; O=Other

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

BIRDS

PHOTOS

Comment: Reference No.	Photo Number	Time of Photo	Photo Taken Before (B), During (D) or After (A) Pile Driving	Description

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

BIRDS

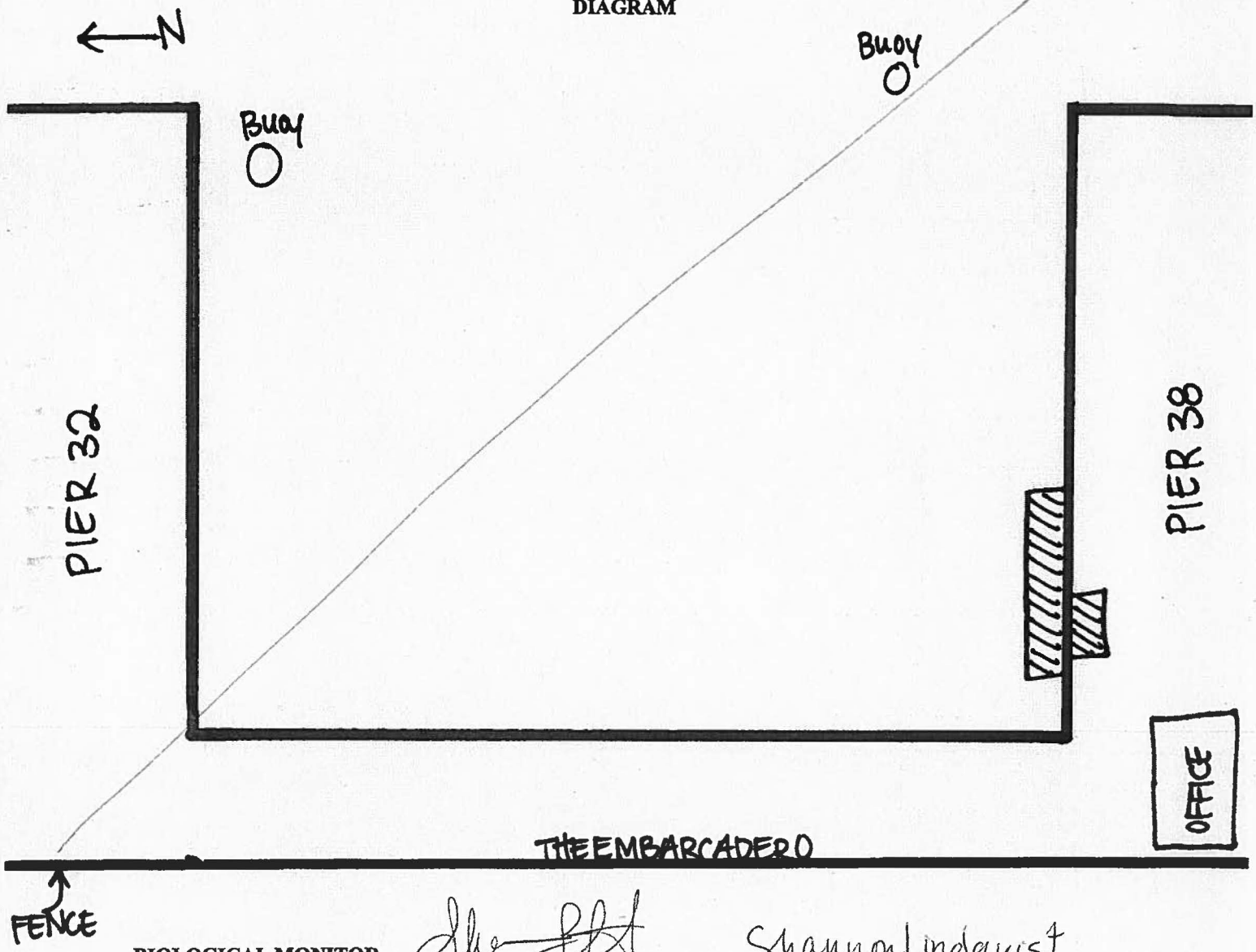
ADDITIONAL COMMENTS

Comment: Reference No.	Additional Comments

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

BIRDS

DIAGRAM



BIOLOGICAL MONITOR _____ Shannon Lindquist

Signature **Print Name**

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

Date 8/23/12 Monitor (s) Shannon & Tom Visibility foggy-am clear-pm Beaufort 3

Tide Level See below Human Activity in the Area pedestrians along Embarcadero Americas Cup work on Pier 32

Monitoring Locale: Pier 30 ☐ Pier 32 ☒ Pier 38 ☐ Boat ☐ 178 m from pile driving ☐

129 m from pile driving ☐ 1900 m from pile driving on vessels ☐

Pile Type: 24-inch octagonal concrete ☒ 24-inch steel shell ☐ Ambient Conditions ☐

Piles/Day (1-8): 5 **Pile Driver**: Impact ☒ Vibratory/Impact ☐

Attenuation Device: None ☒ Bubble Curtain: On ☐ Off ☐

Minutes of Vibratory Driving : n/a ☒ 8:00 ☐ 15:00 ☐ **Impact Blows per Pile**: 800 ☐ 300 ☐ 600 ☐

Tide data

High	low	high	low
0452	0952	1637	2321
+ 4.32	+2.15	+6.2	+0.47

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

Pile No.	Pile Driver (Impact, Vibratory)[5]	*Pile Driving Start/End Time	Observation Start/End Time	Mammal Species[6]			Comments: Reference Number
				Species	No.	Time	
J17	impact	0814/0838	0655/	HS	1	0655	(1)
				HS	1	0715	0722 - 0837 (3)
				SL	1	0727	(2)
J18	impact	0929/0952					
J19	impact	1047/1100		SL	2	1023	(4)
G15	impact	1151/1152		SL	3	1215	(5)
K24	impact	1302/1304		SL	4	1305	(6)
K18	impact	1441/1515		/	/	/	
K19	impact	1619/1638	/1708	HS	2	1550	(7)

eviously placed
e. Hit it down
nother foot.
set of a
eviously driven
pile

K = indicator pile

* start time is time of initial impact

[5] Steel shell pile driving will include both vibratory (up to the last 10 feet) and impact (last 10 feet) pile drivers
[6] HS=Harbor Seal; SL = Sea Lion; HP=Harbor Porpoise; GW=Gray Whale; O = Other

1033 - materials barge removed, empty.
1130 - materials barge loaded w/ more concrete piles arrives.

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

Comments: Reference No.	Monitor's Distance from Pile Driving Activity	Initial Behavior of Marine Mammal	Changes in Marine Mammal Behavior (e.g., orientation, speed, diving, respiration rate, etc.)[7]
(1)	900ft.	Slow surface travel	no change
(2)	900ft.	Slow, feeding, S	no change
(4)	800ft.	surfacing briefly, feeding	no change
(5)	900ft.	surfaced briefly	no change
(6)	900ft.	surfaced briefly	no change
(7)	800ft.	resting @ surface	no change

[7] **Note:** If a monitor sees a marine mammal within or approaching the Exclusion Zone prior to the start of impact pile driving, the monitor will notify the on-site resident engineer (or other authorized individual), who will then be required to delay pile driving until the marine mammal has moved outside of the Exclusion Zone, or if the animal has not been re-sighted within 15 minutes for pinnipeds or 30 minutes for cetaceans. If a marine mammal is sighted within or on a path toward the Exclusion Zone, pile driving will cease until that animal has cleared and is on a path away from the Exclusion Zone, or 15/30 minutes (pinnipeds/cetaceans) has lapsed since the last sighting.

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

PHOTOS

Comment: Reference No.	Photo Number	Time of Photo	Photo Taken Before (B), During (D) or After (A) Pile Driving	Description

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

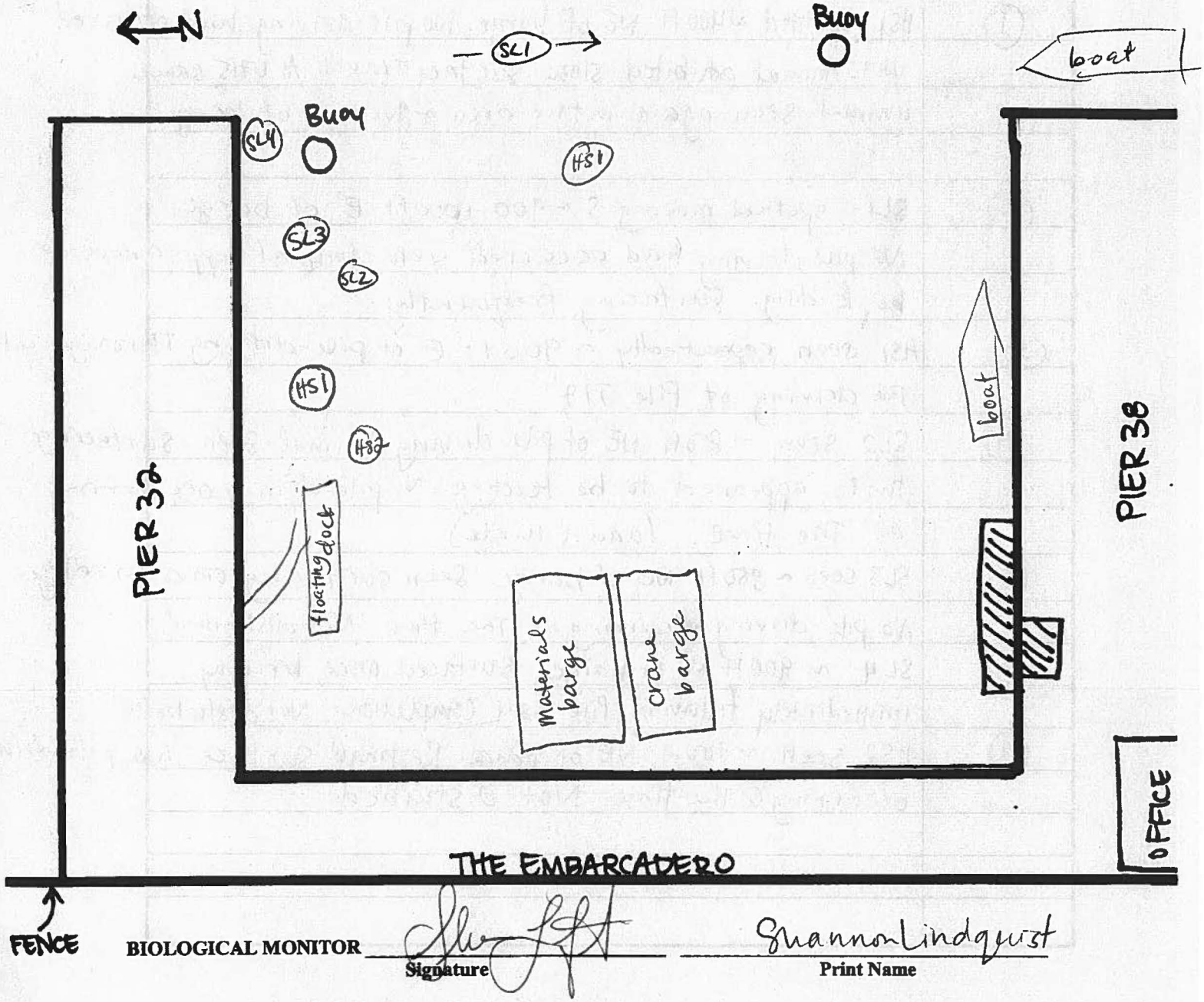
ADDITIONAL COMMENTS

Comment: Reference No.	Additional Comments
(1)	HS1 spotted ~400 ft. NE of barge. No pile-driving had occurred yet. Animal exhibited slow surface travel. At 0715, same animal seen again in the area ~900 ft E of barge.
(2.)	SL1 - spotted moving S ~900-1000 ft E of barge. No pile-driving had occurred yet. Animal appeared to be feeding, surfacing frequently.
(3)	HS1 seen repeatedly ~900 ft E of pile-driving Throughout the driving of Pile J17.
(4)	SL2 seen ~800 ft NE of pile-driving. Animal seen surfacing twice, appeared to be feeding. No pile-driving occurring at the time. (adult male)
(5)	SL3 seen ~850 ft NE of barge. Seen surfacing once briefly. No pile-driving occurring at the time. Not disturbed.
(6)	SL4 ~900 ft NE of barge. Surfaced once, briefly immediately following Pile K24 completion. Not disturbed.
(7)	HS2 seen ~700 ft NE of barge. Resting @ surface. No pile-driv occurring @ the time. Not disturbed.

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

DIAGRAM



BIOLOGICAL MONITOR _____ _____

Signature **Print Name** Shannon Lindquist

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

BIRDS[8]

Date 8/23/12 **Monitor** Shannon & Tom **Weather** foggy-am clear-pm Beaufort-3

Monitoring Locale: Pier 30 ☐ **Pier 32** ☒ **Pier 38** ☐ **178m from pile driving** ☐ **120m from pile driving** ☐

1900 m from pile driving on vessels ☐

Pile Type: 24-inch octagonal concrete ☒ **24-inch steel shell** ☐ **Ambient Conditions** ☐ **Piles/Day (1-8):** 5

Pile Driver: Impact ☒ **Vibratory/Impact** ☐ **Attenuation Device: None** ☒ **Bubble Curtain: On** ☐ **Off** ☐

Minutes of Vibratory Driving: n/a ☒ **8:00** ☐ **15:00** ☐ **Impact Blows per Pile: 800** ☐ **300** ☒ **600** ☐

Pile No.	Pile Driver (Impact, Vibratory)[9]	Pile Driving * Start/End Time	Observer Start/End Time	Bird Predation on Fish Observed (Y/N) and Time		General Bird Activity/Behavior	Comment: Reference Number
J17	impact	0814/0838	0655/	/	/	gulls & cormorants	
J18	impact	0929/0952		/	/	common, few	terns (1)
J19	impact	1047/1100		/	/		
G15	impact	1151/1152		/	/		
K24	impact	1302/1304		/	/		
K18	impact	1441/1515		/	/		
K19	impact	1619/1638	/1508	/	/		

previously driven pile. Drove down another foot

* start time is time of initial impact.

[8] The bird monitor will have to work closely with the fish monitor because the monitor must attempt to determine the amount of bird predation on fishes, including the size and species of fish affected.

[9] Steel shell pile driving will include both vibratory (up to the last 10 feet) and impact (last 10 feet) pile drivers.

K18 = indicator pile

G15, K24 } previously driven piles, reset only.

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

BIRDS

Comment: Reference No.	Predation[10]		Dead/Injured Fish Observed[11]		Dead/Injured Fish Collected[8]	
	Bird Strikes Per Minute	Duration	Species	Size	Species	Size

[10] Diving birds that may be present, but which cannot be confirmed to scavenge on injured fish while diving, will be noted on the data sheet, but are not included in the count of bird strikes.

[11] SH = steelhead; G=North American Green Sturgeon; O=Other

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

BIRDS

PHOTOS

Comment: Reference No.	Photo Number	Time of Photo	Photo Taken Before (B), During (D) or After (A) Pile Driving	Description

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

BIRDS

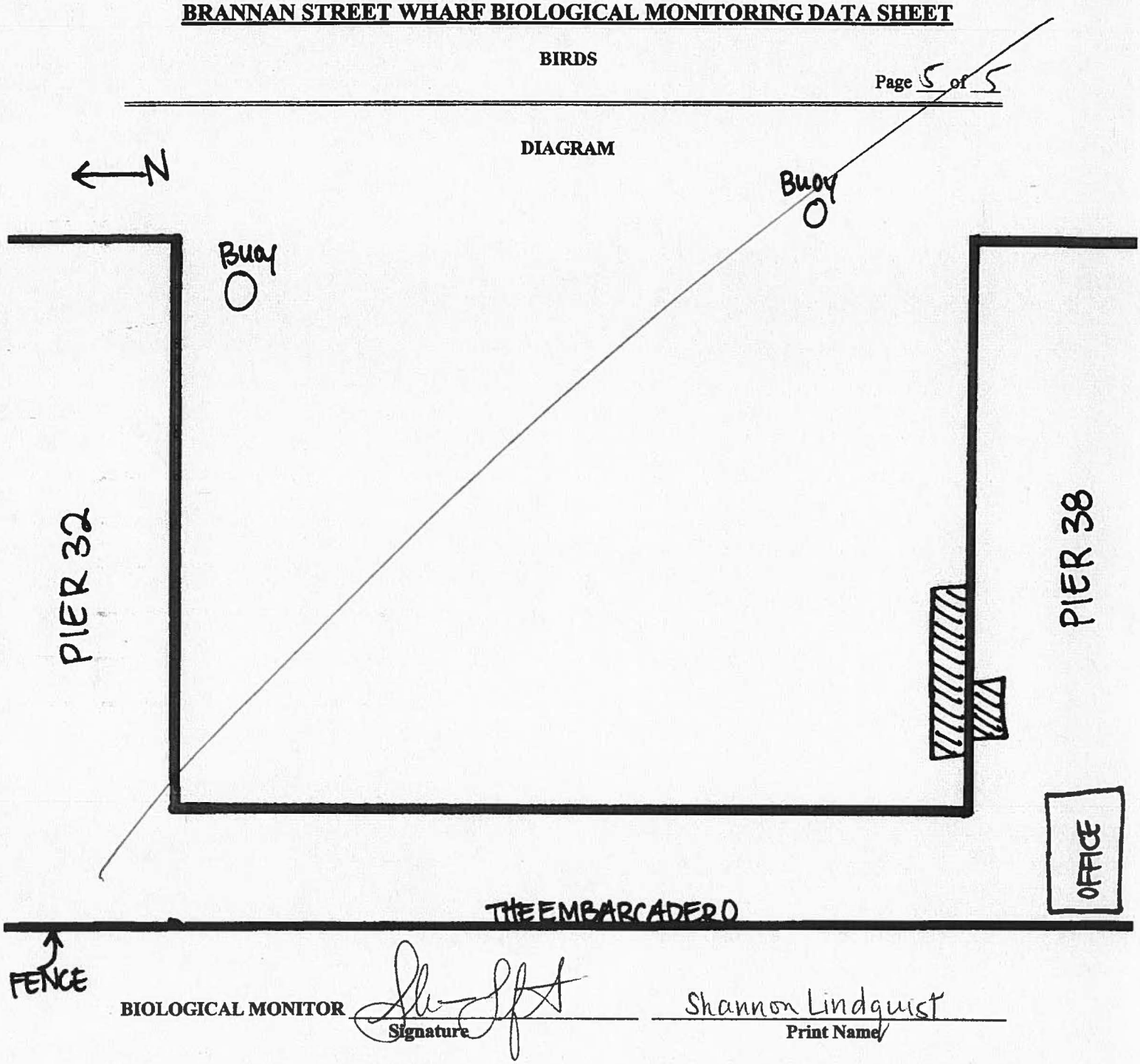
ADDITIONAL COMMENTS

Comment: Reference No.	Additional Comments
(1)	gulls & cormorants observed frequently w/in The area. ~~Terns~~ Terns also seen, although rarer. Birds seen diving & feeding. Although not in relation to any fish kills as a result of pile driving.

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

BIRDS

DIAGRAM



BIOLOGICAL MONITOR _____ Shannon Lindquist
Signature **Print Name**

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

Date 8/24/12 **Monitor (s)** Shannon & Tom **Visibility** Clear, Beaufort 2

Tide Level See below **Human Activity in the Area** pedestrians on Embarcade
Americas Cup work on Pier 32

Monitoring Locale: Pier 30 ☐ Pier 32 ☐ Pier 38 ☒ Boat ☐ 178 m from pile driving ☐

129 m from pile driving ☐ 1900 m from pile driving on vessels ☐

Pile Type: 24-inch octagonal concrete ☒ 24-inch steel shell ☐ Ambient Conditions ☐

Piles/Day (1-8): ☒ **Pile Driver:** Impact ☒ Vibratory/Impact ☐

Attenuation Device: None ☒ Bubble Curtain: On ☐ Off ☐

Minutes of Vibratory Driving: n/a ☒ 8:00 ☐ 15:00 ☐ **Impact Blows per Pile:** 800 ☐ 300 ☒ 600 ☐

Tide data:

High	Low	High
0620	1057	1736
+4.12	+2.59	+6.2

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

Pile No.	Pile Driver (Impact, Vibratory)[5]	* Pile Driving Start/End Time	Observation Start/End Time	Mammal Species[6]			Comments: Reference Number
				Species	No.	Time	
K20	impact	0739/0758	0700/	SL	1	0712	(1)
				HS	1	0723	(2)
K21	impact	0847/0900		HS	2	0835	(3)
K22	impact	0946/0958		SL	2	0951	(4)
K23	impact	1054/ 1130		/	/	/	
J16	impact	1310/1331		HS	3	1335	(5)
K17	impact	1427/1445	/1515	/	/	/	

* start time=first impact

[5] Steel shell pile driving will include both vibratory (up to the last 10 feet) and impact (last 10 feet) pile drivers

[6] HS=Harbor Seal; SL = Sea Lion; HP=Harbor Porpoise; GW=Gray Whale; O = Other

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

Comments: Reference No.	Monitor's Distance from Pile Driving Activity	Initial Behavior of Marine Mammal	Changes in Marine Mammal Behavior (e.g., orientation, speed, diving, respiration rate, etc.)[7]
(1)	900ft.	Slow surface travel, feeding, S	no change
(2)	900ft	Resting/bottling @ surface	no change
(3)	850 ft.	Slow surface travel	no change
(4)	900ft.	surfaced, dove	no change
(5)	900ft	slow surface travel	no change

[7] **Note:** If a monitor sees a marine mammal within or approaching the Exclusion Zone prior to the start of impact pile driving, the monitor will notify the on-site resident engineer (or other authorized individual), who will then be required to delay pile driving until the marine mammal has moved outside of the Exclusion Zone, or if the animal has not been re-sighted within 15 minutes for pinnipeds or 30 minutes for cetaceans. If a marine mammal is sighted within or on a path toward the Exclusion Zone, pile driving will cease until that animal has cleared and is on a path away from the Exclusion Zone, or 15/30 minutes (pinnipeds/cetaceans) has lapsed since the last sighting.

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

PHOTOS

Comment: Reference No.	Photo Number	Time of Photo	Photo Taken Before (B), During (D) or After (A) Pile Driving	Description

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

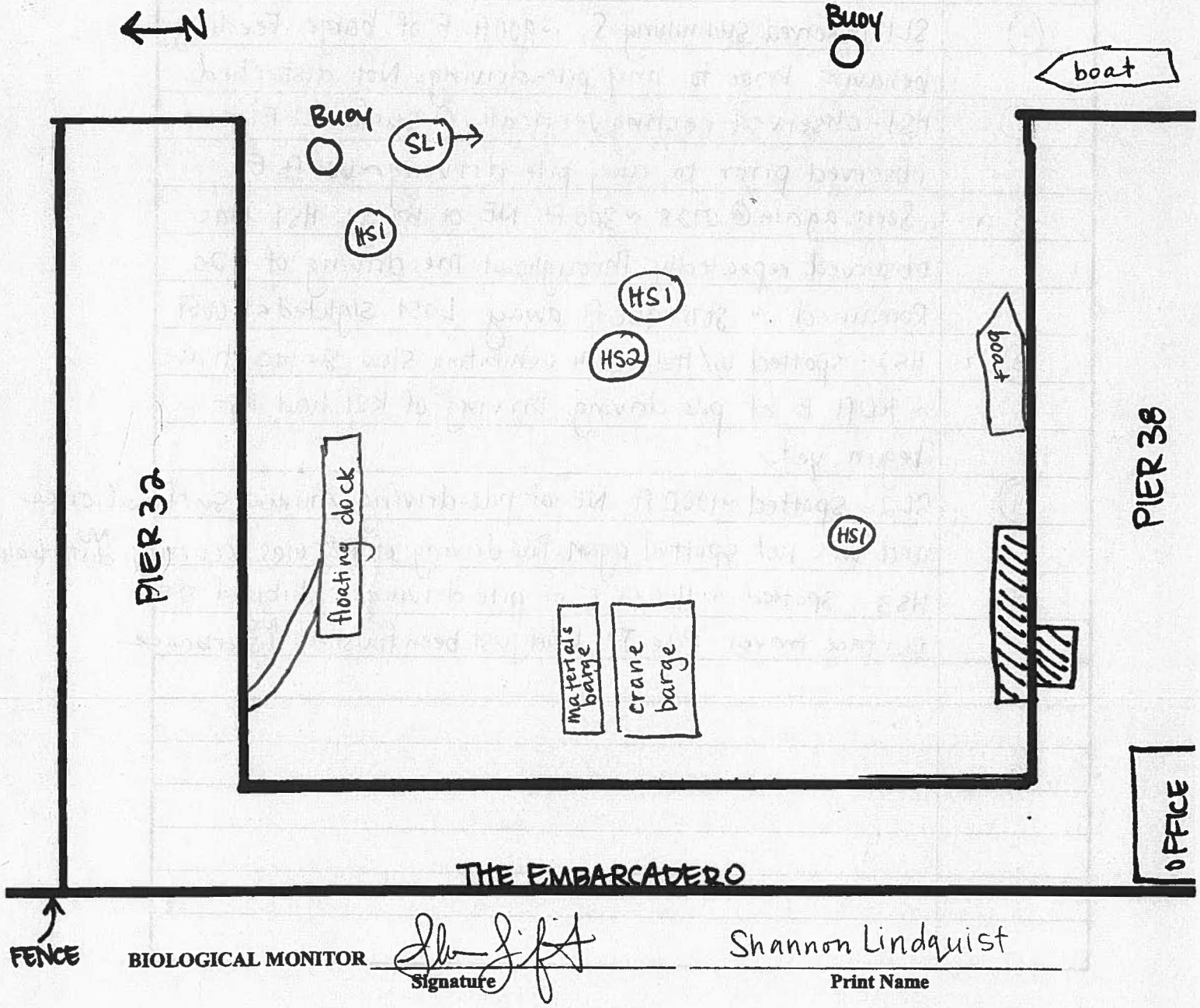
ADDITIONAL COMMENTS

Comment: Reference No.	Additional Comments
(1)	SL1 - observed swimming S, ~900 ft. E of barge. Feeding behavior. Prior to any pile-driving. Not disturbed.
(2)	HS1 - observed resting vertically @ surface. First observed prior to any pile-driving ~600 ft. E. Seen again @ 0728 ~300 ft NE of barge. HS1 was observed repeatedly Throughout the driving of K20 Remained ~ 800-900 ft away. Last sighted at 0837
(3)	HS2 - spotted w/ HS1. Both exhibiting slow surface travel ~700 ft. E of pile-driving. Driving of K21 had not begun yet.
(4)	SL2 - spotted ~1000 ft. NE of pile-driving. Animal surfaced once and was not spotted again. Pile-driving of K22 was occurring. No disturbance
(5)	HS3 - spotted ~400 ft E of pile-driving. Exhibited slow surface travel. Pile J16 had just been finished, No disturbance.

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

DIAGRAM



BIOLOGICAL MONITOR _____ Shannon Lindquist

Signature Print Name

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

BIRDS[8]

Date 8/24/12 **Monitor** Shannon & Tom **Weather** clear, Beaufort 2

Monitoring Locale: Pier 30 ☐ **Pier 32** ☒ **Pier 38** ☐ **178m from pile driving** ☐ **120m from pile driving** ☐

1900 m from pile driving on vessels ☐

Pile Type: 24-inch octagonal concrete ☒ **24-inch steel shell** ☐ **Ambient Conditions** ☐ **Piles/Day (1-8):** ☒

Pile Driver: Impact ☒ **Vibratory/Impact** ☐ **Attenuation Device: None** ☒ **Bubble Curtain: On** ☐ **Off** ☐

Minutes of Vibratory Driving: n/a ☒ **8:00** ☐ **15:00** ☐ **Impact Blows per Pile: 800** ☐ **300** ☒ **600** ☐

Pile No.	Pile Driver (Impact, Vibratory)[9]	Pile Driving Start/End Time	Observer Start/End Time	Bird Predation on Fish Observed (Y/N) and Time		General Bird Activity/Behavior	Comment: Reference Number
K20	impact	0739/0758	0700/	✓	✓	gulls & cormorants	(1)
K21	impact	0847/0900	↓	✓	✓	common in area,	
K22	impact	0946/0958		✓	✓	feeding	
K23	impact	1054/1130		✓	✓		
J16	impact	1310/1331		✓	✓		
K17	impact	1427/1475	/1515	✓	✓		

[8] The bird monitor will have to work closely with the fish monitor because the monitor must attempt to determine the amount of bird predation on fishes, including the size and species of fish affected.

[9] Steel shell pile driving will include both vibratory (up to the last 10 feet) and impact (last 10 feet) pile drivers.

* start time = first impact

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

BIRDS

Comment: Reference No.	Predation[10]		Dead/Injured Fish Observed[11]		Dead/Injured Fish Collected[8]	
	Bird Strikes Per Minute	Duration	Species	Size	Species	Size

[10] Diving birds that may be present, but which cannot be confirmed to scavenge on injured fish while diving, will be noted on the data sheet, but are not included in the count of bird strikes.

[11] SH = steelhead; G=North American Green Sturgeon; O=Other

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

BIRDS

PHOTOS

Comment: Reference No.	Photo Number	Time of Photo	Photo Taken Before (B), During (D) or After (A) Pile Driving	Description

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

BIRDS

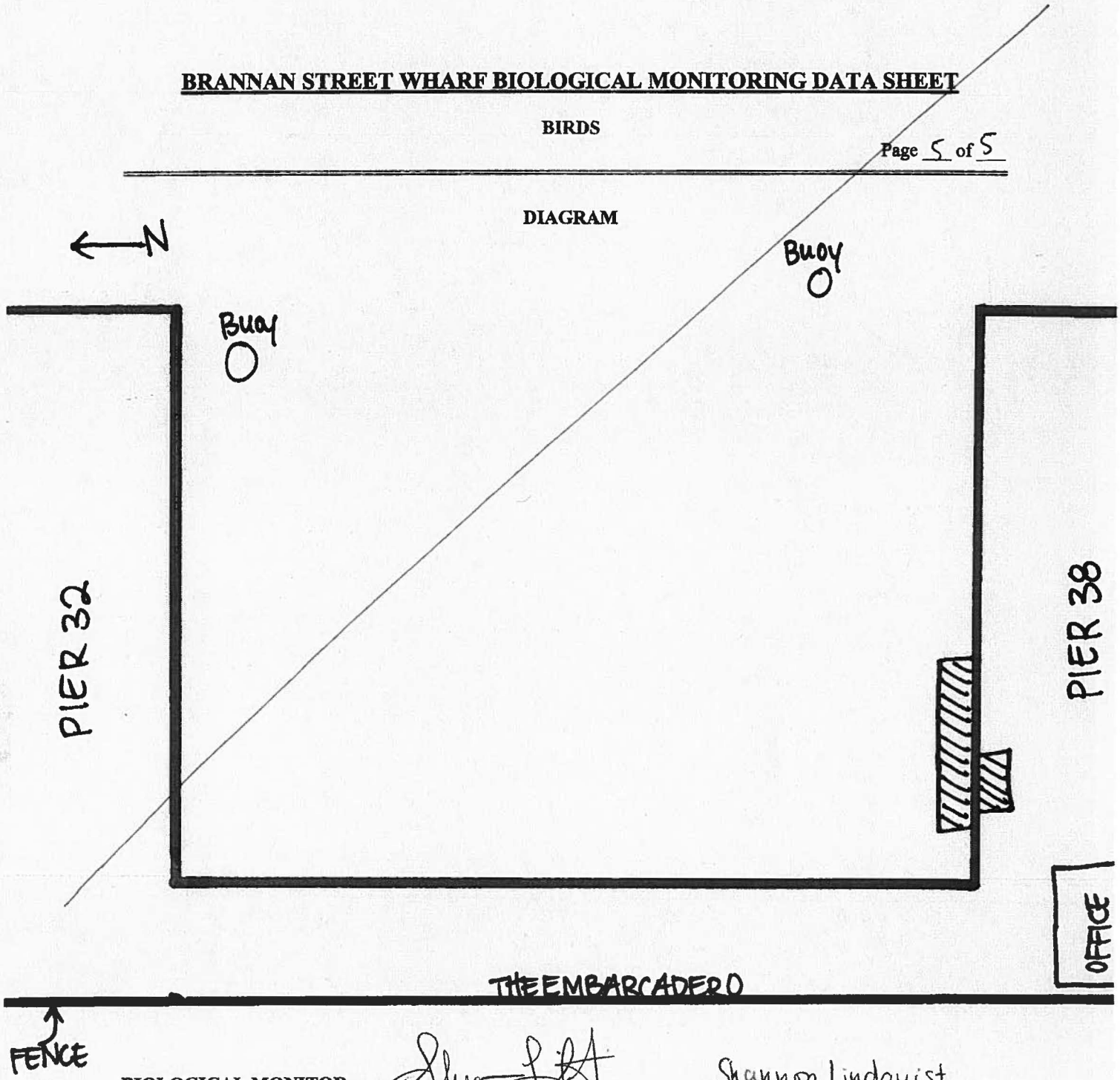
ADDITIONAL COMMENTS

Comment: Reference No.	Additional Comments
(1)	Gulls & cormorants observed feeding in the area. Several cormorants seen diving. None were associated w/ pile-driving activities.

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

BIRDS

DIAGRAM



BIOLOGICAL MONITOR _____ Shannon Lindquist

Signature **Print Name**

Brannan Street Wharf – Biological Monitoring
Weekly Summary – August 27, 2012 through August 31, 2012

Steel pile-driving continued this week.

Fish monitoring for this project is complete. One monitor for birds and marine mammals was stationed at the east end of Pier 32. America's Cup activity at Pier 32 has been completed and boat traffic into and out of Pier 32 was greatly reduced. A second crane barge and materials barge is present onsite now. This barge is installing framework around previously installed piles. The barges are located north of the pile-driving barge.

Monday, August 27, 2012

Biological monitoring at the at the BSW began at 0645 and continued until 1530. Five steel piles were placed on Monday, August 27. Impact pile driving activities occurred from 0948 to 1456. No negative impacts on any animal species were observed.

Biological Monitor-Rebecca Johnson

- **Birds**: Up to 20 gulls, two cormorants, and one pelican were observed throughout the monitoring period. No bird strikes were observed and no dead fish were visible on the surface of the water.
- **Marine Mammals:** Six marine mammals were observed throughout the monitoring period. All were observed outside of the exclusion zone. None were observed to exhibit any change in behavior as a result of project activities.
    - 0645 to 0904- Three to four harbor porpoises were observed feeding 100 to 400 feet east/northeast of Pier 32 prior to start of pile driving activities.
    - 0730- One harbor seal was observed 20 feet north of the barge playing on a buoy and later observed swimming toward the AC boat dock, prior to the start of pile driving activities.
    - 0910- One California sea lion was observed 100 feet south of the north edge of Pier 32, prior to the start of pile driving activities.
    - 1058- One California sea lion was observed swimming 100 feet north and east of Pier 32 between pile driving, no change of behavior was exhibited and sea lion was not observed again after pile driving began.
    - 1235- One harbor seal (most likely the same observed at 0730) observed 200 feet north of ship at the end of Pier 38 swimming north, between pile driving, no change of behavior was exhibited.
    - 1250- One harbor seal (most likely the same observed at 1235) observed after the initial test pile was driven and prior to the start of continuous pile driving, 50 feet north of the west buoy near the AC boat dock; no change of behavior was exhibited. The harbor seal

was observed again at 1256 surfacing east of the buoy near the boat dock between pile driving, no change of behavior was exhibited.

Tuesday, August 28, 2012

Biological monitoring at the BSW began at 0650 and continued until 1538. Eight steel piles were driven (A10, A9.5, A9, A8.5, A8, C12, B11, B10). Little boat activity occurred at Pier 32. No negative impacts on any marine mammals were observed.

Biological Monitor – Shannon Lindquist

- **Birds:** Cormorants and gulls were observed in the area throughout the day, before, during and after pile driving. Terns were very active from 1130 to 1140. A group of 5 terns were actively feeding in the area between Piers 38 and 32. The birds were observed diving frequently. Few were observed catching small, live fish. The activity was not a result of pile-driving. No dead fish were observed.
- **Marine Mammals:** Three harbor seals were observed.
    - 0854-One harbor seal was observed slowly diving and surfacing approximately 800 feet northeast of pile-driving activities, one minute before the pile-driving began of Pile A9.5. Animal was not sighted again once pile-driving began.
    - 1056-One harbor seal was observed approximately 900 feet east of pile-driving. The animal exhibited slow surface travel north during the driving of Pile A8.5. The same animal was seen again at 1108 approximately 1,200 feet northeast of pile-driving. No change in behavior was observed.
    - 1340-One harbor seal was observed approximately 900 feet northeast of pile-driving. The animal surfaced briefly and was not sighted again. No pile-driving was occurring at the time. No change in behavior was observed.
    - No marine mammals were observed during the driving of Piles A10, A9, A8, B11, or B10.

Wednesday, August 29, 2012

Biological monitoring at the BSW began at 0650 and continued until 1504. Seven steel piles were driven (A7.5, A7, A6.5, A6, A5.5, A5, B9). Little boat activity occurred at Pier 32. No negative impacts on any marine mammals were observed.

Biological Monitor – Shannon Lindquist

- **Birds:** Cormorants, gulls and a few pelicans were observed in the area throughout the day, before, during and after pile driving. No feeding or bird strikes were observed.
- **Marine Mammals:** One sea lion, one harbor seal and six harbor porpoises were observed.
    - 0849-One sea lion was observed approximately 750 feet northeast of pile-driving following the completion of Pile A7.5. The animal was swimming south and then turned and swam east and out of the area. The animal was swimming slowly and did not appear disturbed.

- 0919-One harbor porpoise was observed approximately 1,000 feet northeast of pile-driving. The animal was observed swimming/"porpoising" northwest beyond the end of Pier 32 while Pile A7 was being driving. No change in behavior was observed.
- 0955-One harbor porpoise was observed approximately 700 feet east of the pile-driving. The animal swam east and north slowly toward the Bay Bridge just prior to Pile A6.5. No change in behavior was observed.
- 1015-Two harbor porpoises (adult and calf) were observed swimming slowly north approximately 1,000 feet northeast of pile-driving during Pile A6.5. No change in behavior was observed.
- 1241-One harbor seal was observed approximately 500 feet northeast of pile-driving. The animal was seen with its head above water briefly and dove and was not sighted again. No pile-driving was occurring that the time. No change in behavior was observed.
- 1312-Two harbor porpoises (adult and calf) were observed swimming 900 feet northeast of pile-driving. The animals were swimming south during Pile A5. The pair were spotted frequently between 1312-1350. No change in behavior was observed.
- No marine mammals were observed during the driving of Piles A6, A5.5 or B9.

Thursday, August 30, 2012

Biological monitoring at the BSW began at 0650 and continued until 1415. Six steel piles were driven (B8, A4.5, A4, A3.5, A3, A2.5). Little boat activity occurred at Pier 32. No negative impacts on any marine mammals were observed.

Biological Monitor – Shannon Lindquist

- **Birds:** Cormorants, gulls and a few pelicans and terns were observed in the area throughout the day, before, during and after pile driving. No feeding or bird strikes were observed.
- **Marine Mammals:** Four harbor porpoises, one harbor seal and one California sea lion were observed.
  - 0743-Two harbor porpoises (adult and calf) were observed approximately 950 feet northeast of pile-driving during Pile B8. The pair were seen swimming north, slowly. No change in behavior was observed.
  - 0949-One harbor seal was observed approximately 900 feet east of pile-driving during Pile A4. The animal was seen resting vertically at the surface for 2 minutes. No change in behavior was observed.
  - 1024-Two harbor porpoises (adult and calf) were observed swimming north approximately 920 feet northeast of pile-driving just prior to the first drive of Pile A3.5. Likely the same pair as seen earlier. No change in behavior was observed.
  - 1349-One California sea lion was observed approximately 300 feet southeast of pile-driving just after the completion of Pile A2.5. The animal exhibited slow surface travel. No change in behavior was observed.
  - No marine mammals were observed during the driving of Piles A4.5 or A3.

Friday, August 31, 2012

Biological monitoring at the BSW began at 0650 and continued until 1415. Six steel piles were driven (B7, B6, A2, A1.5, A0.5, A1). Little boat activity occurred at Pier 32. No negative impacts on any marine mammals were observed.

Biological Monitor – Shannon Lindquist

- **Birds:** Cormorants and gulls were observed in the area throughout the day, before, during and after pile driving. No feeding or bird strikes were observed.
- **Marine Mammals:** Two harbor seals, two California sea lions and four harbor porpoises were observed.
    - 0703-Two harbor seals were observed approximately 400 to 500 feet east of pile-driving. Both animals exhibited slow surface travel prior to the first pile of the day. No change of behavior was observed.
    - 0806-One California sea lion was observed approximately 900 feet northeast of pile-driving. No pile-driving was occurring at the time. The animal was swimming south, surfacing frequently. No change in behavior was observed.
    - 0928-One harbor porpoise was observed approximately 1,000 feet northeast of pile-driving. No pile-driving was occurring at the time. No change in behavior was observed.
    - 0944-One California sea lion was observed approximately 700 feet northeast of pile-driving. The animal was observed diving several times during Pile A2. No change in behavior was observed.
    - 1324-Two harbor porpoises (adult and calf) were observed swimming approximately 1,000 feet northeast of pile-driving during Pile A0.5. No change in behavior was observed.
    - No marine mammals were observed during the driving of Piles A1.5 or A1.

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

Date 8/27/12 **Monitor (s)** R. Johnson **Visibility** clear, sunny, Beaufort 1-2

L 02:47 -0.14' L 14:42 2.63' 6.96

Tide Level H 09:59 4.9' H 20:53 **Human Activity in the Area** pedestrians on Embarcadero.

Monitoring Locale: Pier 30 ☐ Pier 32 ☒ Pier 38 ☐ Boat ☐ 178 m from pile driving ☐

129 m from pile driving ☐ 1900 m from pile driving on vessels ☐

Pile Type: 24-inch octagonal concrete ☐ 24-inch steel shell ☒ Ambient Conditions ☐

Piles/Day (1-8): ☐ **Pile Driver:** Impact ☒ Vibratory/Impact ☐

Attenuation Device: None ☐ Bubble Curtain: On ☒ Off ☐

Minutes of Vibratory Driving : n/a ☐ 8:00 ☐ 15:00 ☐ **Impact Blows per Pile:** 800 ☐ 300 ☐ 600 ☐

less than 300

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

Pile No.	Pile Driver (Impact, Vibratory)[5]	Pile Driving Start/End Time	Observation Start/End Time	Mammal Species[6]			Comments: Reference Number
				Species	No.	Time	
1	Steel Impact	0948/1006	0645	HS, HP, SL	1, 3-4, 1	0645-0910	Prior to pile driving (1)
2	Steel Impact	1100/1127		SL	1	1058	prior to pile driving (2)
3	Impact	1300/1304		HS	2	1235/1250	prior to driving 1250 driving tests (3)
4	Impact	1340/1403		Ø	—	—	—
5	Impact	1433/1456		Ø	—	—	—

[5] Steel shell pile driving will include both vibratory (up to the last 10 feet) and impact (last 10 feet) pile drivers
[6] HS=Harbor Seal; SL = Sea Lion; HP=Harbor Porpoise; GW=Gray Whale; O = Other

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

Comments: Reference No.	Monitor's Distance from ~~Pile Driving Activity~~ Human **	Initial Behavior of Marine Mammal	Changes in Marine Mammal Behavior (e.g., orientation, speed, diving, respiration rate, etc.)[7]
(1)	100-300'	HP 3-4 feeding 0645-0904	no Δ prior to pile driving
	400'	HS (1) playing on buoy	no Δ prior to pile driving
	100'	CASL (1) swimming off N/E edge Pier 32 100'	no Δ prior to pile driving
(2)	100'	CASL (1) 100' N of E of pier 32	no Δ prior to pile driving
(3)	300'	HS (1) ' 200' N of ship @ end Pier 30	no behavioral change prior to pile driving
(4)	400'	HS (1) 50' North of West Bourgneen AC dock	test driving, no behavioral change
(5)	400'	HS (1) SW-faced east of 2-4 buoy	not during pile driving
(6)	—	No mammals observed	—

[7] **Note:** If a monitor sees a marine mammal within or approaching the Exclusion Zone prior to the start of impact pile driving, the monitor will notify the on-site resident engineer (or other authorized individual), who will then be required to delay pile driving until the marine mammal has moved outside of the Exclusion Zone, or if the animal has not been re-sighted within 15 minutes for pinnipeds or 30 minutes for cetaceans. If a marine mammal is sighted within or on a path toward the Exclusion Zone, pile driving will cease until that animal has cleared and is on a path away from the Exclusion Zone, or 15/30 minutes (pinnipeds/cetaceans) has lapsed since the last sighting.

** Monitor was stationed at the end of Pier 32 about 900' from pile driving barge @ mouth of area for visibility of entire approach of pile driving area

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

PHOTOS

Comment: Reference No.	Photo Number	Time of Photo	Photo Taken Before (B), During (D) or After (A) Pile Driving	Description

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

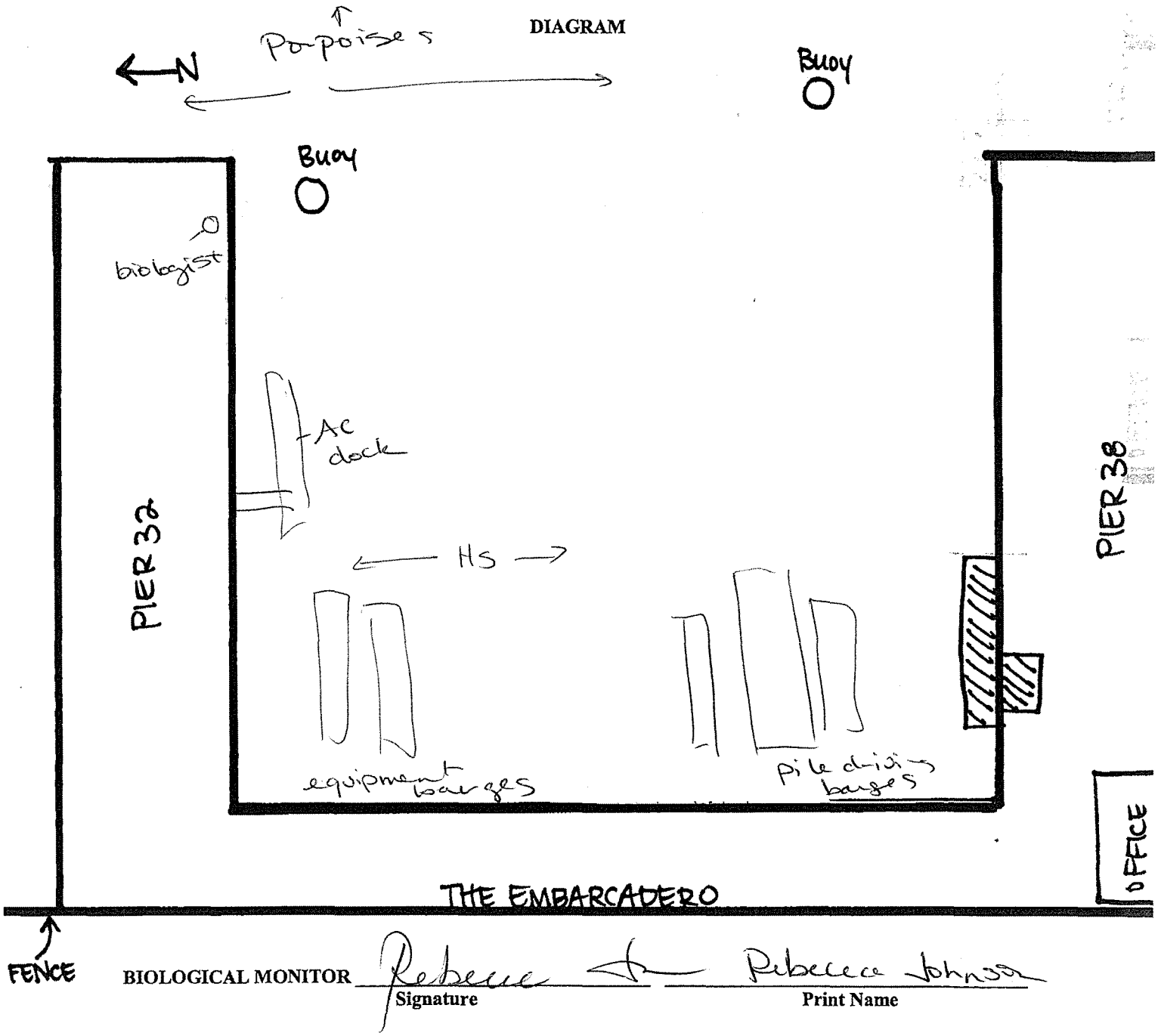
ADDITIONAL COMMENTS

Comment: Reference No.	Additional Comments
1	3 to 4 Harbor Porpoises 100-400' E/NE of Pier 32 0853 to 0904
"	1 HS 20' off barge, playing on buoy closest to shore 0730
"	1 CA Sea Lion 0910 - 100' S. N edge of Pier 32 swimming near Pier
2	1 CA Sea Lion 1058 prior to start swimming 100' N + E of pier
3	1 HS 1235 - 200' N of ship @ end of Pier 38
4	1 HS 1250 test driving prior to start of pile driving 50' north of west buoy near boat dock no Δ
5	1 HS 1256 surfaced east of buoy near between pile driving boat dock no behav. Δ
(6)	No mammals observed after 1256

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

DIAGRAM



BIOLOGICAL MONITOR Rebecca Johnson

Signature — Print Name

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

BIRDS[8]

Date 8/27/12 Monitor R. Johnson Weather Clear, Sunny

Monitoring Locale: Pier 30 ☐ Pier 32 ☒ Pier 38 ☐ 178m from pile driving ☐ 120m from pile driving ☐

1900 m from pile driving on vessels ☐

Pile Type: 24-inch octagonal concrete ☐ 24-inch steel shell ☒ Ambient Conditions ☐ Piles/Day (1-8): ☐

Pile Driver: Impact ☒ Vibratory/Impact ☐ Attenuation Device: None ☐ Bubble Curtain: On ☒ Off ☐

Minutes of Vibratory Driving: n/a ☐ 8:00 ☐ 15:00 ☐ Impact Blows per Pile: 800 ☐ 300 ☐ 600 ☐ less than 300

Pile No.	Pile Driver (Impact, Vibratory)[9]	Pile Driving Start/End Time	Observer Start/End Time	Bird Predation on Fish Observed (Y/N) and Time		General Bird Activity/Behavior	Comment: Reference Number
1	Impact	0948/1006	0645/1530	N	—	cormorants, gulls swimming, floating	(1)
2	Impact	1100/1127		N	—	gulls, feeding, swimming	(2)
3	Impact	1300/1304		N	—	gulls, cormorant	(3)
4	Impact	1340/1403		N	—	gulls, floating, resting	(4)
5	Impact	1433/1456		N	—	gulls, cormorant	(5)

[8] The bird monitor will have to work closely with the fish monitor because the monitor must attempt to determine the amount of bird predation on fishes, including the size and species of fish affected.

[9] Steel shell pile driving will include both vibratory (up to the last 10 feet) and impact (last 10 feet) pile drivers.

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

BIRDS

Comment: Reference No.	Predation[10]		Dead/Injured Fish Observed[11]		Dead/Injured Fish Collected[8]	
	Bird Strikes Per Minute	Duration	Species	Size	Species	Size

No bird strikes observed
No dead fish observed

[10] Diving birds that may be present, but which cannot be confirmed to scavenge on injured fish while diving, will be noted on the data sheet, but are not included in the count of bird strikes.

[11] SH = steelhead; G=North American Green Sturgeon; O=Other

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

BIRDS

ADDITIONAL COMMENTS

Comment: Reference No.	Additional Comments
(1)	cormorants & gulls observed during pile driving. no strikes, no visible dead fish
(2)	pelican (born), 10 gulls, 1 cormorant, feeding. 1 tern, prior to start 2 gulls throughout no Δ in beh, no strikes
(3)	2 gulls, 1 cormorant, no bird strikes no dead fish observed
(4)	5 gulls SO of barge, floating, moved after start of diving continuous
(5)	7 gulls & cormorant in water @ beginning of pile drivers

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

BIRDS

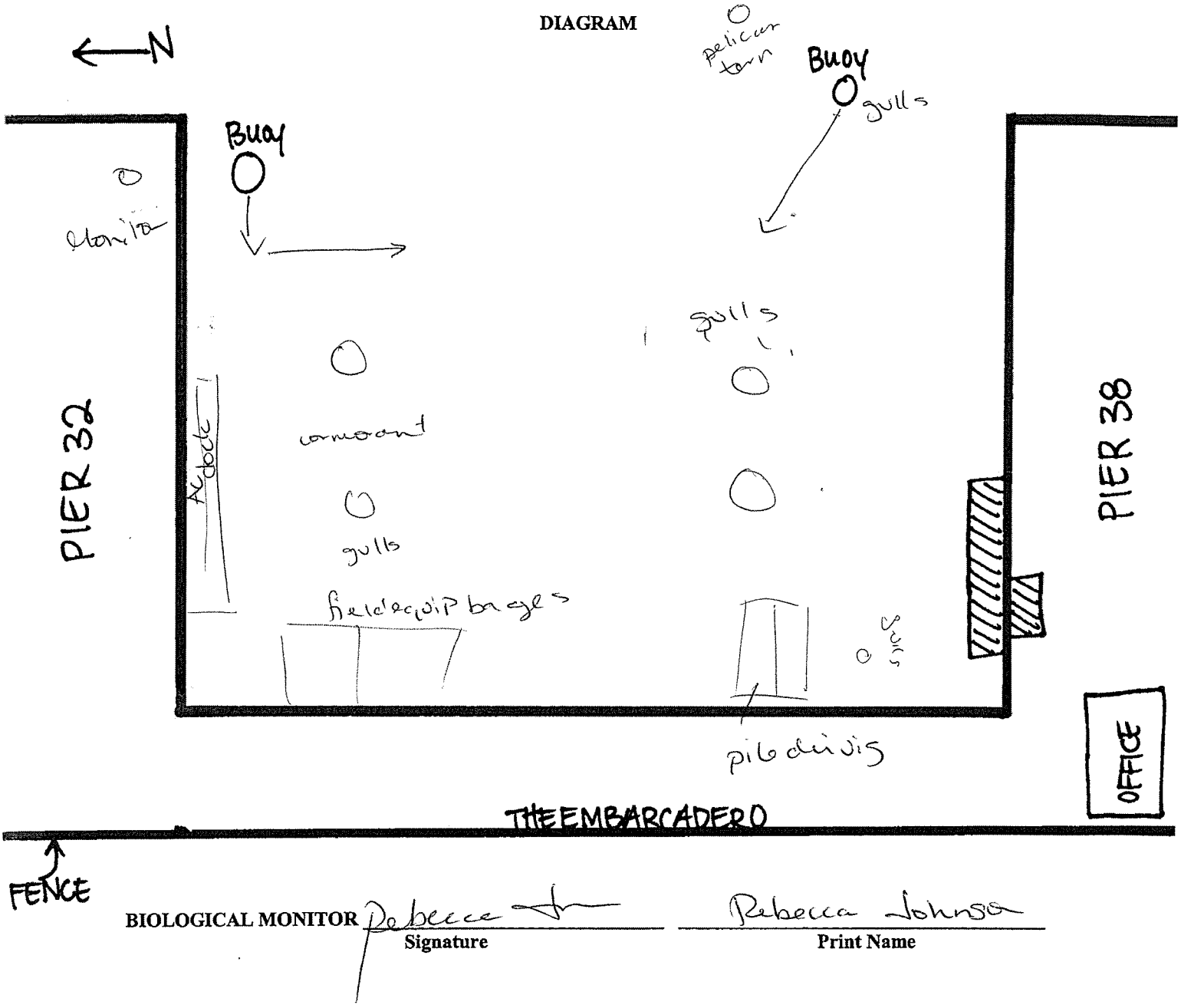
PHOTOS

Comment: Reference No.	Photo Number	Time of Photo	Photo Taken Before (B), During (D) or After (A) Pile Driving	Description

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

BIRDS

DIAGRAM



BIOLOGICAL MONITOR Rebecca — Rebecca Johnson

Signature / **Print Name**

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

Date 8/28/12 **Monitor (s)** Shannon Lindquist **Visibility** clear, sunny

Tide Level See below **Human Activity in the Area** pedestrians along Embarcadero work on Pier 32

Monitoring Locale: Pier 30 ☐ Pier 32 ☒ Pier 38 ☐ Boat ☐ 178 m from pile driving ☐

129 m from pile driving ☐ 1900 m from pile driving on vessels ☐

Pile Type: 24-inch octagonal concrete ☐ 24-inch steel shell ☒ Ambient Conditions ☐

Piles/Day (1-8): 8 **Pile Driver:** Impact ☒ Vibratory/Impact ☐

Attenuation Device: None ☐ Bubble Curtain: On ☒ Off ☐

Minutes of Vibratory Driving: n/a ☒ 8:00 ☐ 15:00 ☐ **Impact Blows per Pile:** 800 ☐ 300 ☒ 600 ☐

Tide data:

High	Low	High	Low
1125	0427	2245	1632
5.36	-0.28	6.36	1.95

* Second crane & materials barge present to the north of pile-driving barges. New barge is installing framework around previously driven piles.

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

Pile No.	Pile Driver (Impact, Vibratory)[5]	Pile Driving Start/End Time	Observation Start/End Time	Mammal Species[6]			Comments: Reference Number
				Species	No.	Time	
① A10	impact	0801/0826	0650/	✓	✓	✓	
② A9.5	impact	0855/0919		HS	1	0854	(1)
③ A9 *	impact	0943/1010		✓	✓	✓	
④ A8.5	impact	1040/1107		HS	2	1056	(2) & 1108
⑤ A8	impact	1132/1157		✓	✓	✓	
⑥ C12	impact	1309/1327		HS	3	1340	(3)
⑦ B11	impact	1356/1424		✓	✓	✓	
⑧ B10	impact	1449/1508	/1538	✓	✓	✓	

* indicator pile - not driven in all the way

[5] Steel shell pile driving will include both vibratory (up to the last 10 feet) and impact (last 10 feet) pile drivers

[6] HS=Harbor Seal; SL = Sea Lion; HP=Harbor Porpoise; GW=Gray Whale; O = Other

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

Comments: Reference No.	Monitor's Distance from Pile Driving Activity	Initial Behavior of Marine Mammal	Changes in Marine Mammal Behavior (e.g., orientation, speed, diving, respiration rate, etc.)[7]
(1)	900ft.	Head above water, looking around	no change
(2)	800 ft.	Slow surface travel, N	no change
(3)	900ft.	Head above water briefly	no change

[7] **Note:** If a monitor sees a marine mammal within or approaching the Exclusion Zone prior to the start of impact pile driving, the monitor will notify the on-site resident engineer (or other authorized individual), who will then be required to delay pile driving until the marine mammal has moved outside of the Exclusion Zone, or if the animal has not been re-sighted within 15 minutes for pinnipeds or 30 minutes for cetaceans. If a marine mammal is sighted within or on a path toward the Exclusion Zone, pile driving will cease until that animal has cleared and is on a path away from the Exclusion Zone, or 15/30 minutes (pinnipeds/cetaceans) has lapsed since the last sighting.

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

PHOTOS

Comment: Reference No.	Photo Number	Time of Photo	Photo Taken Before (B), During (D) or After (A) Pile Driving	Description
	1	1253	B	View to the west of both crane barges. Barge on the left is pile-driving barge.

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

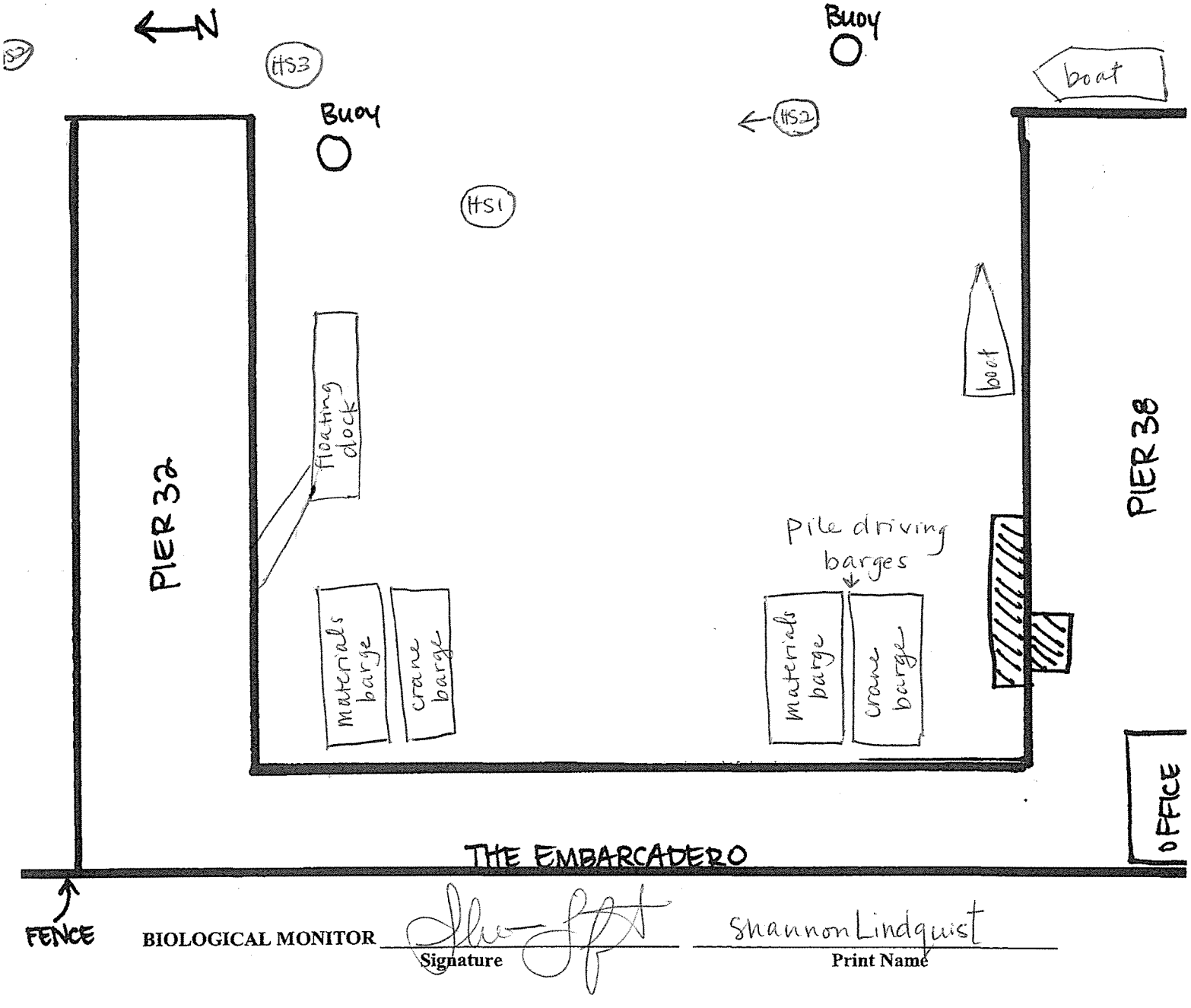
ADDITIONAL COMMENTS

Comment: Reference No.	Additional Comments
(1)	HS1 - ~800ft NE of pile-driving. Only seen once w/ head above water, looking around. 1 min before pile-driving of Pile A9.5. Animal was not sighted again following the start of pile-driving.
(2)	HS2 ~900ft E of pile-driving. Animal exhibited slow surface travel, N. during driving of Pile A8.5. Not disturbed. Spotted again @ 1108 ~1200 ft. NE of pile-driving. No change in behavior.
(3)	HS3 ~ 900ft NE of pile-driving. Surfaced briefly. No pile-driving occurring at the time. Not disturbed.

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

DIAGRAM



BIOLOGICAL MONITOR _____ Shannon Lindquist

Signature **Print Name**

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

BIRDS[8]

Date 8/28/12 **Monitor** Shannon Lindquist **Weather** clear, sunny

Monitoring Locale: Pier 30 ☐ **Pier 32** ☒ **Pier 38** ☐ **178m from pile driving** ☐ **120m from pile driving** ☐

1900 m from pile driving on vessels ☐

Pile Type: 24-inch octagonal concrete ☐ **24-inch steel shell** ☒ **Ambient Conditions** ☐ **Piles/Day (1-8):** 8

Pile Driver: Impact ☒ **Vibratory/Impact** ☐ **Attenuation Device: None** ☐ **Bubble Curtain: On** ☒ **Off** ☐

Minutes of Vibratory Driving : n/a ☒ **8:00** ☐ **15:00** ☐ **Impact Blows per Pile: 800** ☐ **300** ☒ **600** ☐

Pile No.	Pile Driver (Impact, Vibratory)[9]	Pile Driving Start/End Time	Observer Start/End Time	Bird Predation on Fish Observed (Y/N) and Time		General Bird Activity/Behavior	Comment: Reference Number
① A10	impact	0801/0826	0650/	/	/	gulls, cormorants	(1)
② A9.5	impact	0855/0909	↓	/	/	common, feeding	
③ A9	impact	0943/1010		/	/	in area	
④ A8.5	impact	1040/1107		/	/	Terns diving	(2)
⑤ A8	impact	1132/1157		Y	1130	Terns very active	↓
⑥ C12	impact	1309/1327		/	/		
⑦ B11	impact	1356/1424		/	/		
⑧ B10	impact	1449/1508	/1538	/	/		

[8] The bird monitor will have to work closely with the fish monitor because the monitor must attempt to determine the amount of bird predation on fishes, including the size and species of fish affected.

[9] Steel shell pile driving will include both vibratory (up to the last 10 feet) and impact (last 10 feet) pile drivers.

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

BIRDS

Comment: Reference No.	Predation[10]		Dead/Injured Fish Observed[11]		Dead/Injured Fish Collected[8]	
	Bird Strikes Per Minute	Duration	Species	Size	Species	Size
(2)	1/2	10 mins	/	/	/	/

[10] Diving birds that may be present, but which cannot be confirmed to scavenge on injured fish while diving, will be noted on the data sheet, but are not included in the count of bird strikes.

[11] SH = steelhead; G=North American Green Sturgeon; O=Other

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

BIRDS

PHOTOS

Comment: Reference No.	Photo Number	Time of Photo	Photo Taken Before (B), During (D) or After (A) Pile Driving	Description

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

BIRDS

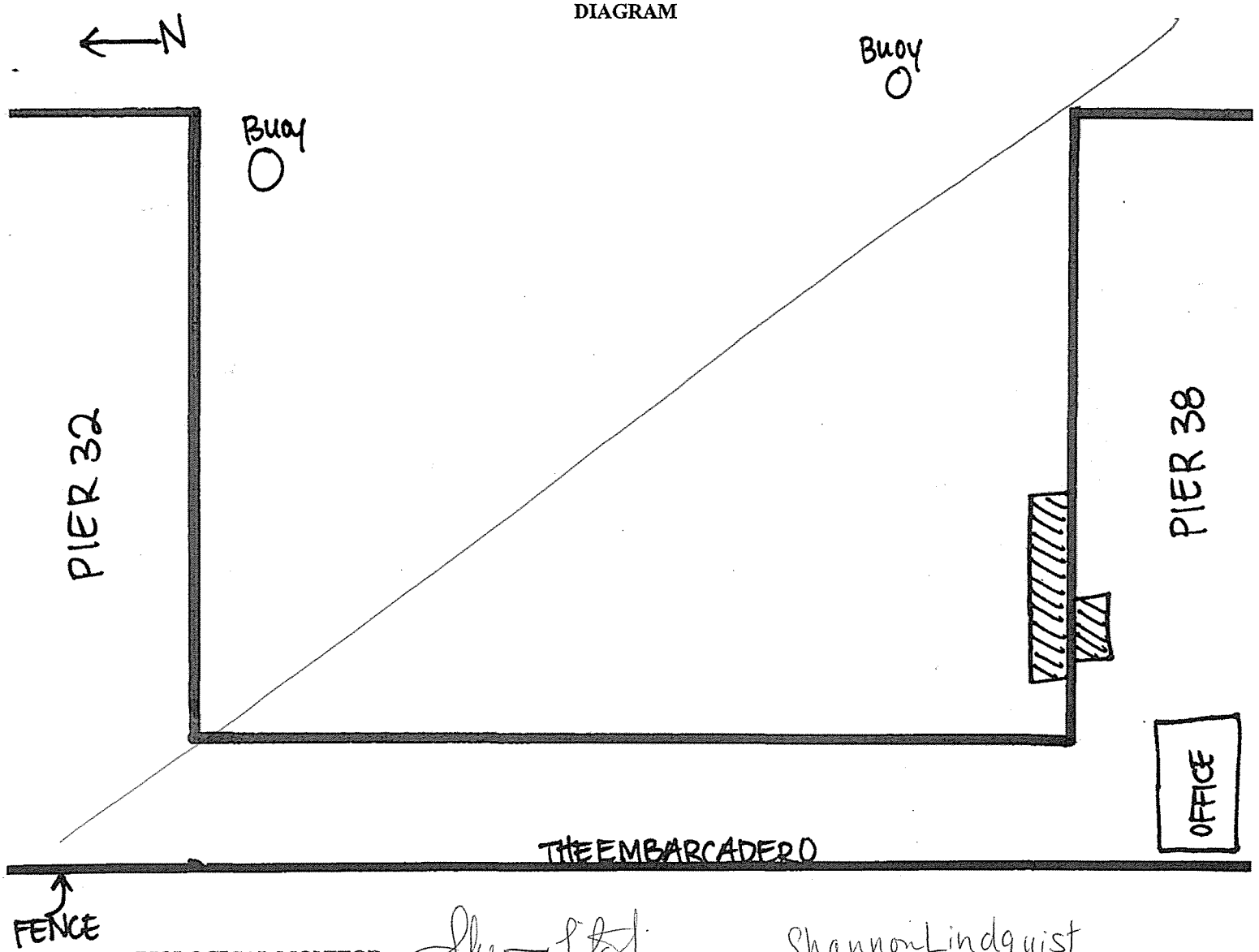
ADDITIONAL COMMENTS

Comment: Reference No.	Additional Comments
2(1)	cormorants & gulls common in the area. Feeding not associated w/ pile-driving.
(2)	Group of 5 terns arrived ~1130am and were actively feeding in the area between piers 32 & 38. Birds were observed diving frequently. Few were observed catching small, live fish. Activity did not appear to have any relation to pile-driving. No dead fish observed. Feeding occurred in a large area. Terns moved out of area ~1140

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

BIRDS

DIAGRAM



BIOLOGICAL MONITOR _____ (**Signature**) Shannon Lindquist (**Print Name**)

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

Date 8/29/12 **Monitor (s)** Shannon Lindquist **Visibility** clear, sunny Beaufort 1

Tide Level See below **Human Activity in the Area** pedestrians along The Embarcadero.

Monitoring Locale: Pier 30 ☐ Pier 32 ☒ Pier 38 ☐ Boat ☐ 178 m from pile driving ☐ work on other barge just North.

129 m from pile driving ☐ 1900 m from pile driving on vessels ☐

Pile Type: 24-inch octagonal concrete ☐ 24-inch steel shell ☒ Ambient Conditions ☐

Piles/Day (1-8): 7 **Pile Driver:** Impact ☒ Vibratory/Impact ☐

Attenuation Device: None ☐ Bubble Curtain: On ☒ Off ☐

Minutes of Vibratory Driving : n/a ☒ 8:00 ☐ 15:00 ☐ **Impact Blows per Pile:** 800 ☐ 300 ☒ 600 ☐

Tide data:

Low	High	Low	High
0508	1201	1719	2335
-0.16	5.54	1.63	6.22

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

Pile No.	Pile Driver (Impact, Vibratory)[5]	Pile Driving Start/End Time	Observation Start/End Time	Mammal Species[6]			Comments: Reference Number
				Species	No.	Time	
① A7.5	impact	0817/0840	0650/	SL	1	0849	(1)
② A7	impact	0909/0939		HP	1	0919	(2)
③ A6.5	impact	0959/1026		HP	2	0955	(3)
				HP	3&4	1015	(4)
④ A6	impact	1050/1104		/	/	/	
⑤ A5.5	impact	1133/1202		/	/	/	
⑥ A5	impact	1303/1329		HS	1	1241	(5)
				HP	5&6	1312	(6) thru 1350
⑦ B9	impact	1412/1434	/1504	/	/	/	

[5] Steel shell pile driving will include both vibratory (up to the last 10 feet) and impact (last 10 feet) pile drivers

[6] HS=Harbor Seal; SL = Sea Lion; HP=Harbor Porpoise; GW=Gray Whale; O = Other

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

Comments: Reference No.	Monitor's Distance from Pile Driving Activity	Initial Behavior of Marine Mammal	Changes in Marine Mammal Behavior (e.g., orientation, speed, diving, respiration rate, etc.)[7]
(1)	900ft.	Swimming S, then E	no change
(2)	900ft.	Swimming NW, "porpoising"	no change
(3)	900ft.	Swimming N, "porpoising"	no change
(4)	900ft.	Swimming N "porpoising"	no change
(5)	900ft.	Head above water briefly	no change
(6)	800ft.	Swimming S	no change

[7] **Note:** If a monitor sees a marine mammal within or approaching the Exclusion Zone prior to the start of impact pile driving, the monitor will notify the on-site resident engineer (or other authorized individual), who will then be required to delay pile driving until the marine mammal has moved outside of the Exclusion Zone, or if the animal has not been re-sighted within 15 minutes for pinnipeds or 30 minutes for cetaceans. If a marine mammal is sighted within or on a path toward the Exclusion Zone, pile driving will cease until that animal has cleared and is on a path away from the Exclusion Zone, or 15/30 minutes (pinnipeds/cetaceans) has lapsed since the last sighting.

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

PHOTOS

Comment: Reference No.	Photo Number	Time of Photo	Photo Taken Before (B), During (D) or After (A) Pile Driving	Description
(4)	(1)	1016	D	HP3or4 - Swimming N.

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

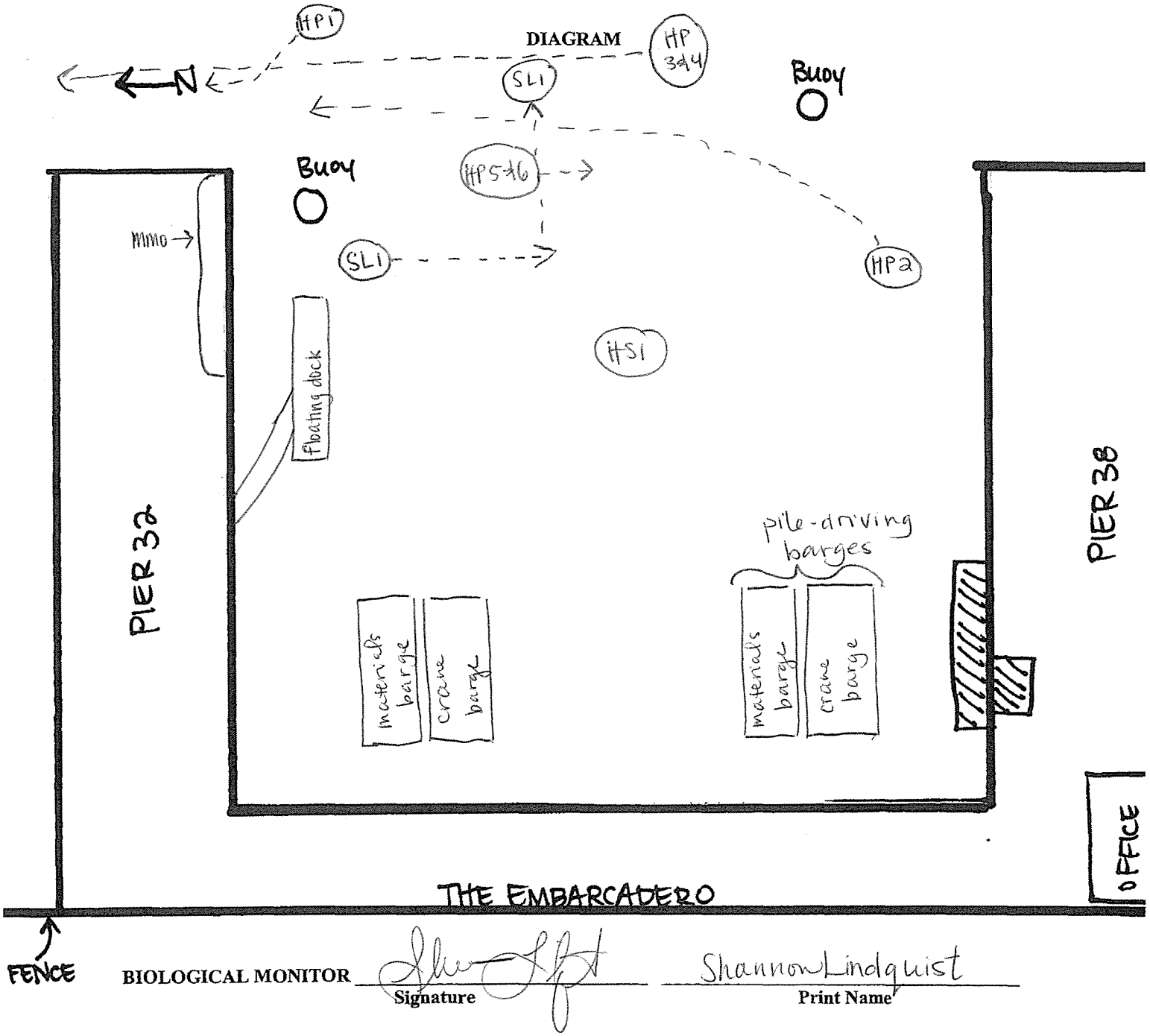
ADDITIONAL COMMENTS

Comment: Reference No.	Additional Comments
(1)	SL1 ~ 750 ft NE of pile-driving following completion of
	Pile A7.5. Animal was swimming S then E and out
	of the area. Not disturbed.
(2)	HP1 ~ 1,000 ft NE of pile-driving. Animal was observed
	swimming/"porpoising" NW beyond the end of Pier 32.
	While pile-driving of Pile A7 was occurring. No change
	in behavior.
(3)	HP2 - initially ~ 700 ft. E of pile-driving. Swam east & north slowly,
	toward the Bay Bridge just prior to driving of Pile A6.5.
	was in the Piers 32/38 are ~5 mins before moving N. not disturbed.
(4)	HP3&4 - observed swimming slowly N, ~1,000 ft NE of
	pile driving during Pile A6.5. No disturbance.
(5)	HS1 - ~ 500 ft. NE of pile-driving. Seen w/ head above
	water briefly. No pile-driving occurring at the time.
(6)	HP5&6 ~ 900 ft. NE of pile-driving. Swimming South during
	Pile A5. ~~were spotted three, not sighted again in area~~
	spotted frequently btwn 1312 - 1350. mom & calf.

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

DIAGRAM



BIOLOGICAL MONITOR _____ _____

Signature **Print Name**

Shannon Lindquist

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

BIRDS[8]

Date 8/29/12 **Monitor** Shannon Lindquist **Weather** clear, sunny, Beaufort 1

Monitoring Locale: Pier 30 ☐ **Pier 32** ☒ **Pier 38** ☐ **178m from pile driving** ☐ **120m from pile driving** ☐

1900 m from pile driving on vessels ☐

Pile Type: 24-inch octagonal concrete ☐ **24-inch steel shell** ☒ **Ambient Conditions** ☐ **Piles/Day (1-8):** 7

Pile Driver: Impact ☒ **Vibratory/Impact** ☐ **Attenuation Device: None** ☑ **Bubble Curtain: On** ☒ **Off** ☐

Minutes of Vibratory Driving : n/a ☒ **8:00** ☐ **15:00** ☐ **Impact Blows per Pile: 800** ☐ **300** ☒ **600** ☐

Pile No.	Pile Driver (Impact, Vibratory)[9]	Pile Driving Start/End Time	Observer Start/End Time	Bird Predation on Fish Observed (Y/N) and Time		General Bird Activity/Behavior	Comment: Reference Number
① A7.5	impact	0817/0840	0650/	/	/	gulls, cormorants,	①
② A7	impact	0909/0939		/	/	few terns & pelicans	
③ A6.5	impact	959/1026		/	/	Common.	
④ A6	impact	1050/1104		/	/		
⑤ A5.5	impact	1133/1202		/	/		
⑥ A5	impact	1303/1329		/	/		
⑦ B9	impact	1412/1434	V/1504	/	/		

[8] The bird monitor will have to work closely with the fish monitor because the monitor must attempt to determine the amount of bird predation on fishes, including the size and species of fish affected.

[9] Steel shell pile driving will include both vibratory (up to the last 10 feet) and impact (last 10 feet) pile drivers.

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

BIRDS

Comment: Reference No.	Predation[10]		Dead/Injured Fish Observed[11]		Dead/Injured Fish Collected[8]	
	Bird Strikes Per Minute	Duration	Species	Size	Species	Size

[10] Diving birds that may be present, but which cannot be confirmed to scavenge on injured fish while diving, will be noted on the data sheet, but are not included in the count of bird strikes.

[11] SH = steelhead; G=North American Green Sturgeon; O=Other

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

BIRDS

PHOTOS

Comment: Reference No.	Photo Number	Time of Photo	Photo Taken Before (B), During (D) or After (A) Pile Driving	Description

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

BIRDS

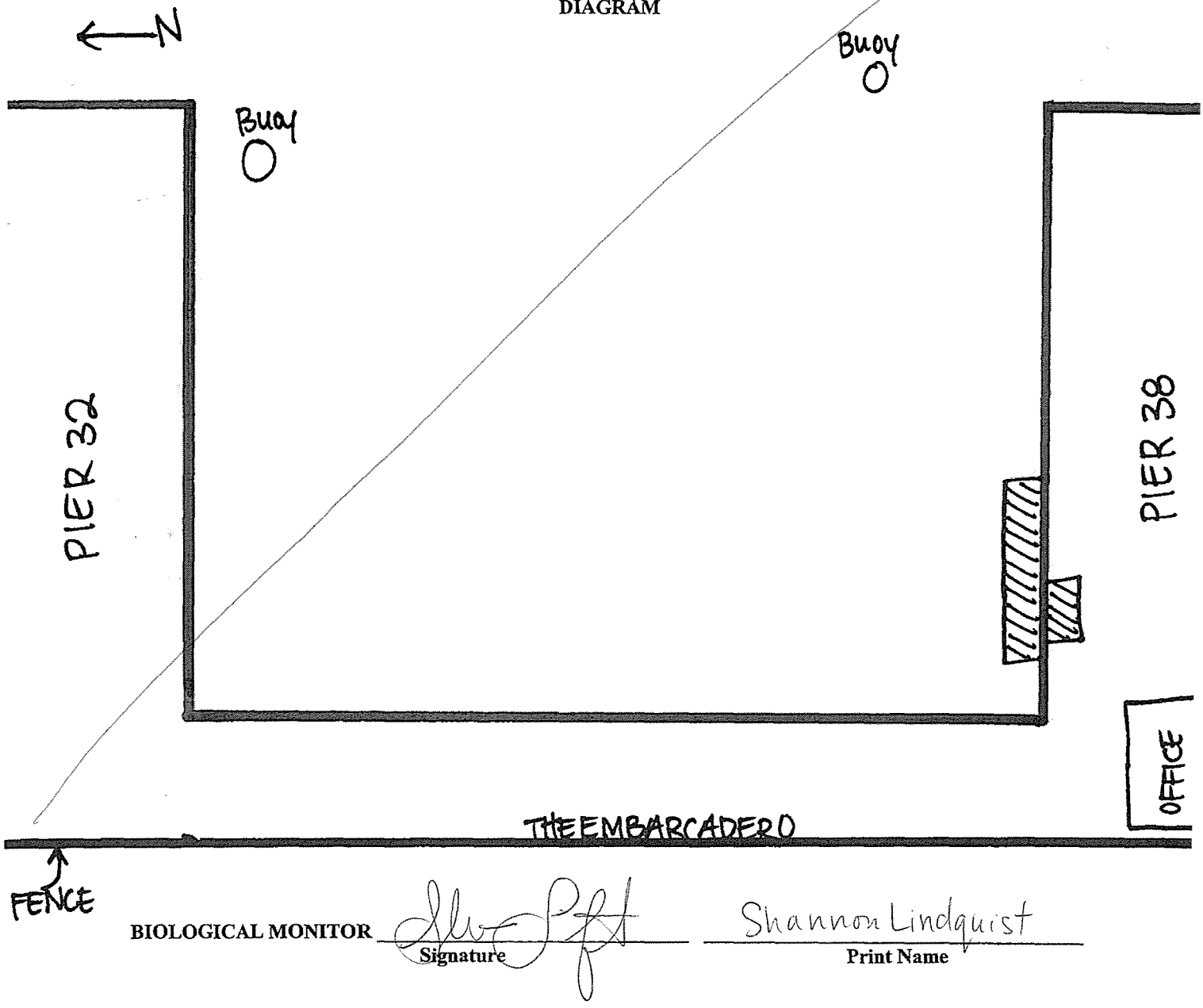
ADDITIONAL COMMENTS

Comment: Reference No.	Additional Comments
(1)	Gulls & cormorants were common in the area. Cormorants observed diving frequently, although not in relation to any fish mortality caused by pile-driving. Terns and pelicans were also present, much fewer in number. No predation observed.

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

BIRDS

DIAGRAM



BIOLOGICAL MONITOR _____ Shannon Lindquist

Signature **Print Name**

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

Date 8/30/12 **Monitor (s)** ShannonLindquist **Visibility** clear Sunny Beaufort 2

Tide Level See below **Human Activity in the Area** pedestrians along the Embarcadero Dutra barge N of pile-driving barge?

Monitoring Locale: Pier 30 ☐ Pier 32 ☒ Pier 38 ☐ Boat ☐ 178 m from pile driving ☐

129 m from pile driving ☐ 1900 m from pile driving on vessels ☐

Pile Type: 24-inch octagonal concrete ☐ 24-inch steel shell ☒ Ambient Conditions ☐

Piles/Day (1-8): 6 **Pile Driver:** Impact ☒ Vibratory/Impact ☐

Attenuation Device: None ☐ Bubble Curtain: On ☒ Off ☐

Minutes of Vibratory Driving : n/a ☒ 8:00 ☐ 15:00 ☐ **Impact Blows per Pile:** 800 ☐ 300 ☒ 600 ☐

Tide data

Low	High	Low	High
0508	1201	1719	2335
-0.16	+5.54	+1.63	+6.22

1315 – 1416: Coast Guard helicopter training ops ~1 mile E of barge. Helicopter flying low for extended amount of time.

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

Pile No.	Pile Driver (Impact, Vibratory)[5]	Pile Driving Start/End Time	Observation Start/End Time	Mammal Species[6]			Comments: Reference Number
				Species	No.	Time	
① B8	impact	0733/0754	0650/	HP	1&2	0743	(1)
② A4.5	impact	0828/0903		/	/	/	
③ A4	impact	0930/0958		HS	1	0949	(2)
④ A3.5	impact	1025/1056		HP	3&4	1024	(3)
⑤ A3	impact	1120/1201		/	/	/	
⑥ A.25	impact	1304/1344	↓/1415	SL	1	1349	(4)

[5] Steel shell pile driving will include both vibratory (up to the last 10 feet) and impact (last 10 feet) pile drivers
[6] HS=Harbor Seal; SL = Sea Lion; HP=Harbor Porpoise; GW=Gray Whale; O = Other

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

Comments: Reference No.	Monitor's Distance from Pile Driving Activity	Initial Behavior of Marine Mammal	Changes in Marine Mammal Behavior (e.g., orientation, speed, diving, respiration rate, etc.)[7]
(1)	900 ft.	adult + calf swimming N	no change
(2)	900 ft.	Resting vertically @ surface	no change
(3)	900ft.	adult + calf swimming N	no change
(4)	900ft.	swimming SE, slow travel	no change

[7] **Note:** If a monitor sees a marine mammal within or approaching the Exclusion Zone prior to the start of impact pile driving, the monitor will notify the on-site resident engineer (or other authorized individual), who will then be required to delay pile driving until the marine mammal has moved outside of the Exclusion Zone, or if the animal has not been re-sighted within 15 minutes for pinnipeds or 30 minutes for cetaceans. If a marine mammal is sighted within or on a path toward the Exclusion Zone, pile driving will cease until that animal has cleared and is on a path away from the Exclusion Zone, or 15/30 minutes (pinnipeds/cetaceans) has lapsed since the last sighting.

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

PHOTOS

Comment: Reference No.	Photo Number	Time of Photo	Photo Taken Before (B), During (D) or After (A) Pile Driving	Description

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

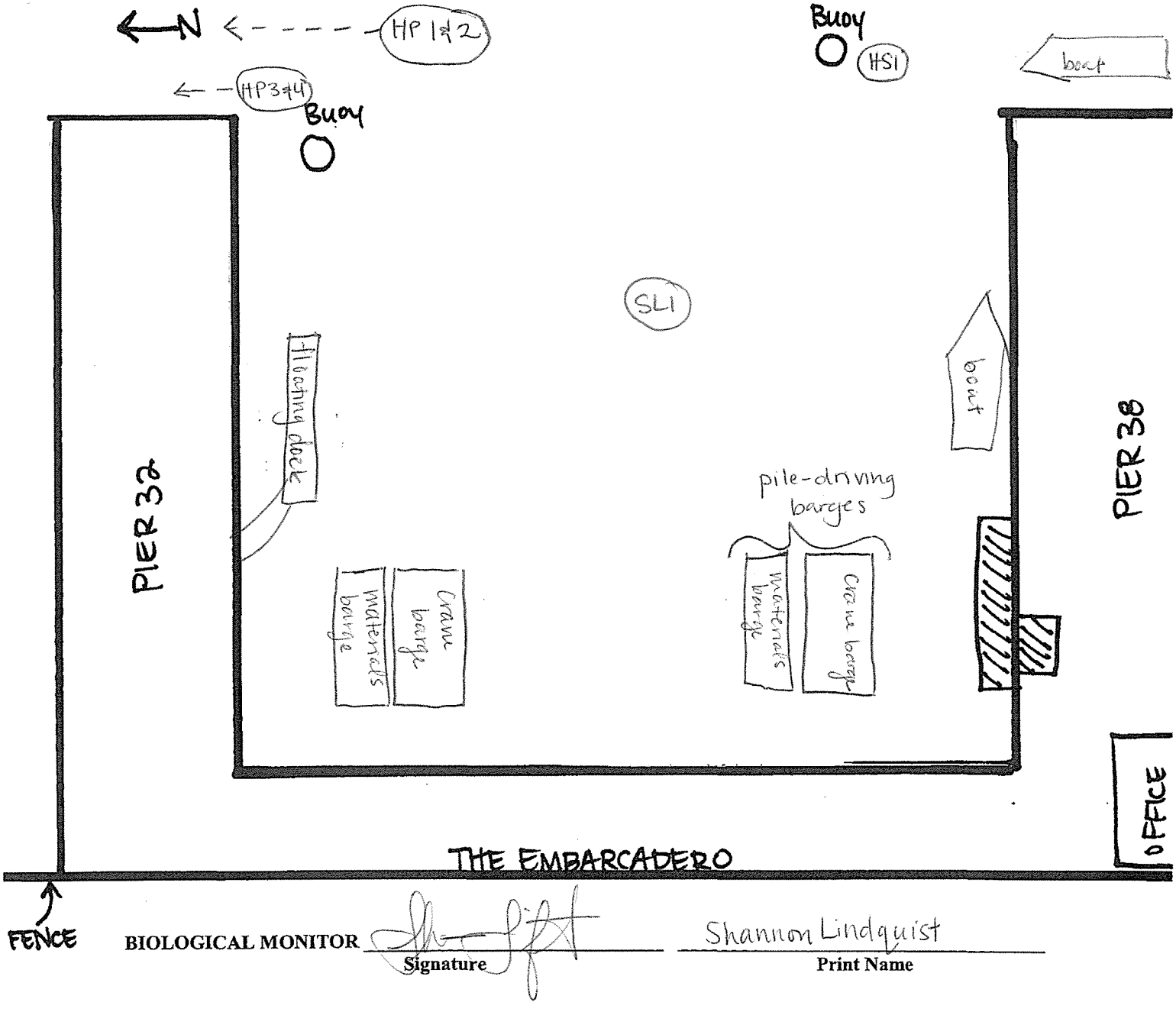
ADDITIONAL COMMENTS

Comment: Reference No.	Additional Comments
(1)	HP 1&2 ~950ft NE of pile driving. During Pile B8
	adult & calf swimming N. No change in behavior
	due to pile-driving. Slow travel.
(2)	HS1 ~ 900ft. E of pile-driving. During Pile A4. Animal
	was resting vertically at the surface for ~2mins. No
	change in behavior.
(3)	HP 3&4- ~920ft. NE of pile-driving. Likely same pair as
	HP 1&2. Adult and calf. Swimming N, just prior to first
	drive of Pile A3.5. Slow travel.
(4)	SL1 ~300ft. SE of pile-driving, just after the Completion
	of Pile A2.5. Animal exhibited slow surface travel.
	No sign of disturbance.

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

DIAGRAM



BIOLOGICAL MONITOR _____ Shannon Lindquist

Signature **Print Name**

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

BIRDS[8]

Date 8/30/12 **Monitor** Shannon Lindquist **Weather** clear, sunny Beaufort 2

Monitoring Locale: Pier 30 ☐ **Pier 32** ☒ **Pier 38** ☐ **178m from pile driving** ☐ **120m from pile driving** ☐

1900 m from pile driving on vessels ☐

Pile Type: 24-inch octagonal concrete ☐ **24-inch steel shell** ☒ **Ambient Conditions** ☐ **Piles/Day (1-8):** 6

Pile Driver: Impact ☒ **Vibratory/Impact** ☐ **Attenuation Device: None** ☐ **Bubble Curtain: On** ☒ **Off** ☐

Minutes of Vibratory Driving : n/a ☒ **8:00** ☐ **15:00** ☐ **Impact Blows per Pile: 800** ☐ **300** ☒ **600** ☐

Pile No.	Pile Driver (Impact, Vibratory)[9]	Pile Driving Start/End Time	Observer Start/End Time	Bird Predation on Fish Observed (Y/N) and Time		General Bird Activity/Behavior	Comment: Reference Number
①	impact	0733/0754	0650/	/	/	cormorants &	①
②	impact	0828/0903	|	/	/	gulls common.	
③	impact	0930/0958	|	/	/	Few pelicans	
④	impact	1025/1056	|	/	/		
⑤	impact	1120/1201	|	/	/		
⑥	impact	1304/1344	↓ 1915	/	/		

[8] The bird monitor will have to work closely with the fish monitor because the monitor must attempt to determine the amount of bird predation on fishes, including the size and species of fish affected.

[9] Steel shell pile driving will include both vibratory (up to the last 10 feet) and impact (last 10 feet) pile drivers.

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

BIRDS

Comment: Reference No.	Predation[10]		Dead/Injured Fish Observed[11]		Dead/Injured Fish Collected[8]	
	Bird Strikes Per Minute	Duration	Species	Size	Species	Size

[10] Diving birds that may be present, but which cannot be confirmed to scavenge on injured fish while diving, will be noted on the data sheet, but are not included in the count of bird strikes.

[11] SH = steelhead; G=North American Green Sturgeon; O=Other

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

BIRDS

PHOTOS

Comment: Reference No.	Photo Number	Time of Photo	Photo Taken Before (B), During (D) or After (A) Pile Driving	Description

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

BIRDS

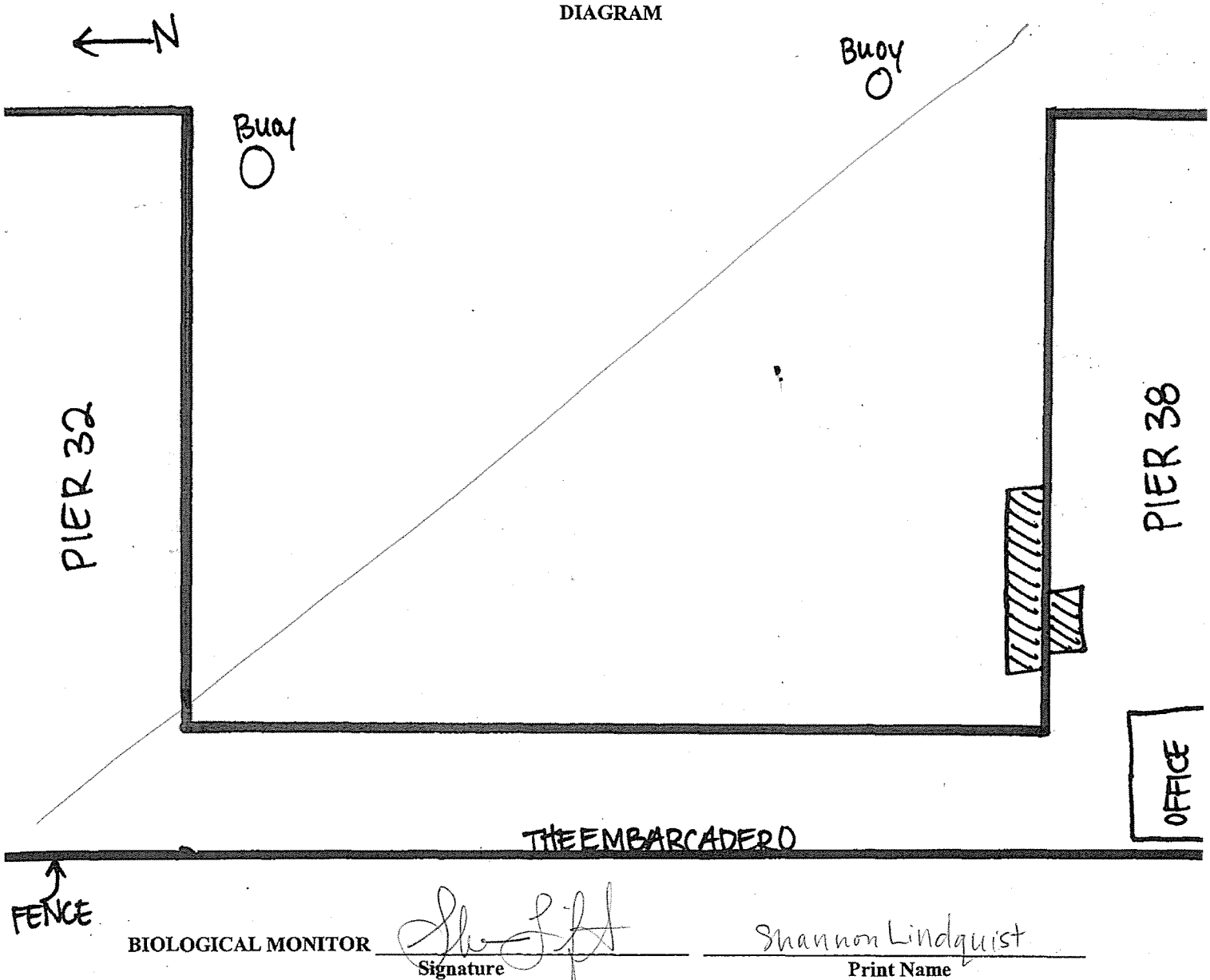
ADDITIONAL COMMENTS

Comment: Reference No.	Additional Comments
(1.)	Cormorants & gulls commonly feeding in the area. None were observed to prey on any dead fish as a result of the pile-driving. Few pelicans were present as well.

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

BIRDS

DIAGRAM



BIOLOGICAL MONITOR _____ Shannon Lindquist

Signature **Print Name**

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

Date 8/31/12 **Monitor (s)** Shannon Lindquist **Visibility** foggy am. Beaufort 2 pedestrians along Embarcadero.

Tide Level see below **Human Activity in the Area** Dutra barge N of pile-driving barge

Monitoring Locale: Pier 30 ☐ Pier 32 ☒ Pier 38 ☐ Boat ☐ 178 m from pile driving ☐

129 m from pile driving ☐ 1900 m from pile driving on vessels ☐

Pile Type: 24-inch octagonal concrete ☐ 24-inch steel shell ☒ Ambient Conditions ☐

Piles/Day (1-8): 6 **Pile Driver:** Impact ☒ Vibratory/Impact ☐

Attenuation Device: None ☐ Bubble Curtain: On ☒ Off ☐

Minutes of Vibratory Driving : n/a ☒ 8:00 ☐ 15:00 ☐ **Impact Blows per Pile:** 800 ☐ 300 ☒ 600 ☐

Tide data

Low	High	Low
0546	1234	1804
0.07	5.67	1.36

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

Pile No.	Pile Driver (Impact, Vibratory)[5]	Pile Driving Start/End Time	Observation Start/End Time	Mammal Species[6]			Comments: Reference Number
				Species	No.	Time	
⑥ B7	impact	0717/0750	0650/	HS	192	0703	①
				SL	1	0806	②
⑦ B6	impact	0841/0907		HP	1	0928	③
⑧ A2	impact	0936/1015		SL	2	0944	④
⑩ A1.5	impact	1038/1124		/	/	/	
⑪ A0.5	Impact	1234/1332		HP	2+3	1324	⑤
⑨ A1	impact	1359/1440	↓ /1310	/	/	/	

[5] Steel shell pile driving will include both vibratory (up to the last 10 feet) and impact (last 10 feet) pile drivers

[6] HS=Harbor Seal; SL = Sea Lion; HP=Harbor Porpoise; GW=Gray Whale; O = Other

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

Comments: Reference No.	Monitor's Distance from Pile Driving Activity	Initial Behavior of Marine Mammal	Changes in Marine Mammal Behavior (e.g., orientation, speed, diving, respiration rate, etc.)[7]
(1)	900ft.	slow surface travel	no change
(2)	900ft.	surfacing frequently, swimming S	no change
(3)	900ft.	swimming N	no change
(4)	800ft.	swimming/diving. E	no change
(5)	900ft.	swimming N	no change

[7] **Note:** If a monitor sees a marine mammal within or approaching the Exclusion Zone prior to the start of impact pile driving, the monitor will notify the on-site resident engineer (or other authorized individual), who will then be required to delay pile driving until the marine mammal has moved outside of the Exclusion Zone, or if the animal has not been re-sighted within 15 minutes for pinnipeds or 30 minutes for cetaceans. If a marine mammal is sighted within or on a path toward the Exclusion Zone, pile driving will cease until that animal has cleared and is on a path away from the Exclusion Zone, or 15/30 minutes (pinnipeds/cetaceans) has lapsed since the last sighting.

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

PHOTOS

Comment: Reference No.	Photo Number	Time of Photo	Photo Taken Before (B), During (D) or After (A) Pile Driving	Description

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

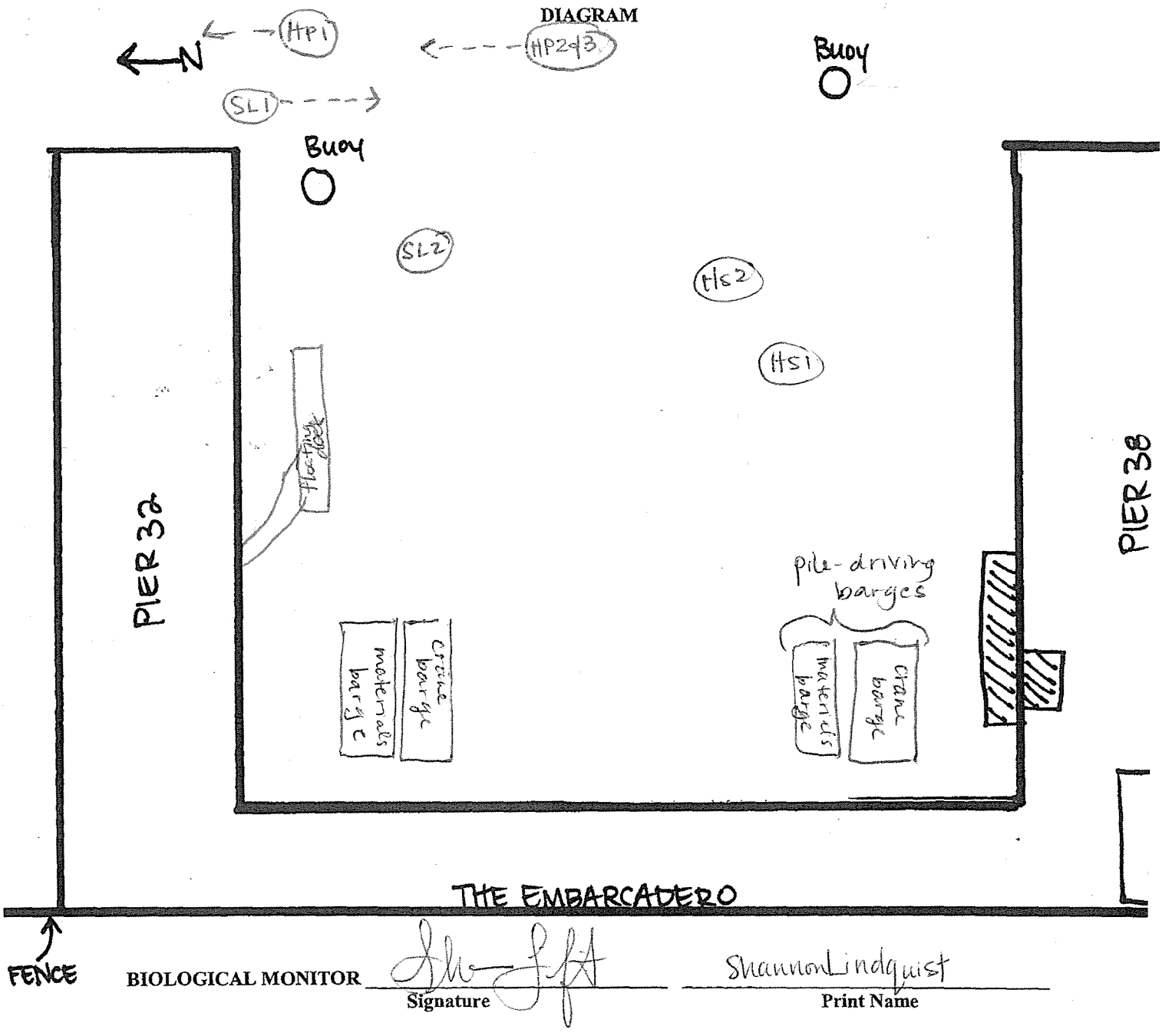
ADDITIONAL COMMENTS

Comment: Reference No.	Additional Comments
(1)	2 HSs ~400-500ft. E of pile-driving. Both animals exhibiting slow surface travel prior to first pile of the day being driven.
(2)	SL1 ~900ft NE of pile-driving. No driving occurring at the time. Animal swimming & surfacing frequently
(3)	HP1 ~1,000ft NE of pile-driving. No pile-driving occurring at the time. Swimming N.
(4)	SL2 ~700ft NE of pile-driving. Observed diving several times while heading east during Pile #2
(5)	HP2#3 ~1,000 ft NE of pile-drivind during Pile A0.5 adult & calf, no change in behavior.

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

DIAGRAM



BIOLOGICAL MONITOR _____ _____

Signature **Print Name** Shannon Lindquist

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

BIRDS[8]

Date 8/31/12 **Monitor** Shannon Lindquist **Weather** foggy-am Beaufort 2

Monitoring Locale: Pier 30 ☐ **Pier 32** ☒ **Pier 38** ☐ **178m from pile driving** ☐ **120m from pile driving** ☐

1900 m from pile driving on vessels ☐

Pile Type: 24-inch octagonal concrete ☐ **24-inch steel shell** ☒ **Ambient Conditions** ☐ **Piles/Day (1-8):** 6

Pile Driver: Impact ☒ **Vibratory/Impact** ☐ **Attenuation Device: None** ☐ **Bubble Curtain: On** ☑ **Off** ☐

Minutes of Vibratory Driving : n/a ☒ **8:00** ☐ **15:00** ☐ **Impact Blows per Pile: 800** ☐ **300** ☒ **600** ☐

Pile No.	Pile Driver (Impact, Vibratory)[9]	Pile Driving Start/End Time	Observer Start/End Time	Bird Predation on Fish Observed (Y/N) and Time		General Bird Activity/Behavior	Comment: Reference Number
① B7	impact	0717/0750	0650/	✓	✓	gulls & cormorants	(1)
② B6	impact	0841/0907	↓	✓	✓	Common	
③ A7	impact	0936/1015		✓	✓		
④ A1.5	impact	1033/1124		✓	✓		
⑤ A0.5	impact	1234/1332		✓	✓		
⑥ A1	impact	1351/1440	/ 1310	✓	✓		

[8] The bird monitor will have to work closely with the fish monitor because the monitor must attempt to determine the amount of bird predation on fishes, including the size and species of fish affected.

[9] Steel shell pile driving will include both vibratory (up to the last 10 feet) and impact (last 10 feet) pile drivers.

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

BIRDS

Comment: Reference No.	Predation[10]		Dead/Injured Fish Observed[11]		Dead/Injured Fish Collected[8]	
	Bird Strikes Per Minute	Duration	Species	Size	Species	Size

[10] Diving birds that may be present, but which cannot be confirmed to scavenge on injured fish while diving, will be noted on the data sheet, but are not included in the count of bird strikes.

[11] SH = steelhead; G=North American Green Sturgeon; O=Other

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

BIRDS

PHOTOS

Comment: Reference No.	Photo Number	Time of Photo	Photo Taken Before (B), During (D) or After (A) Pile Driving	Description

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

BIRDS

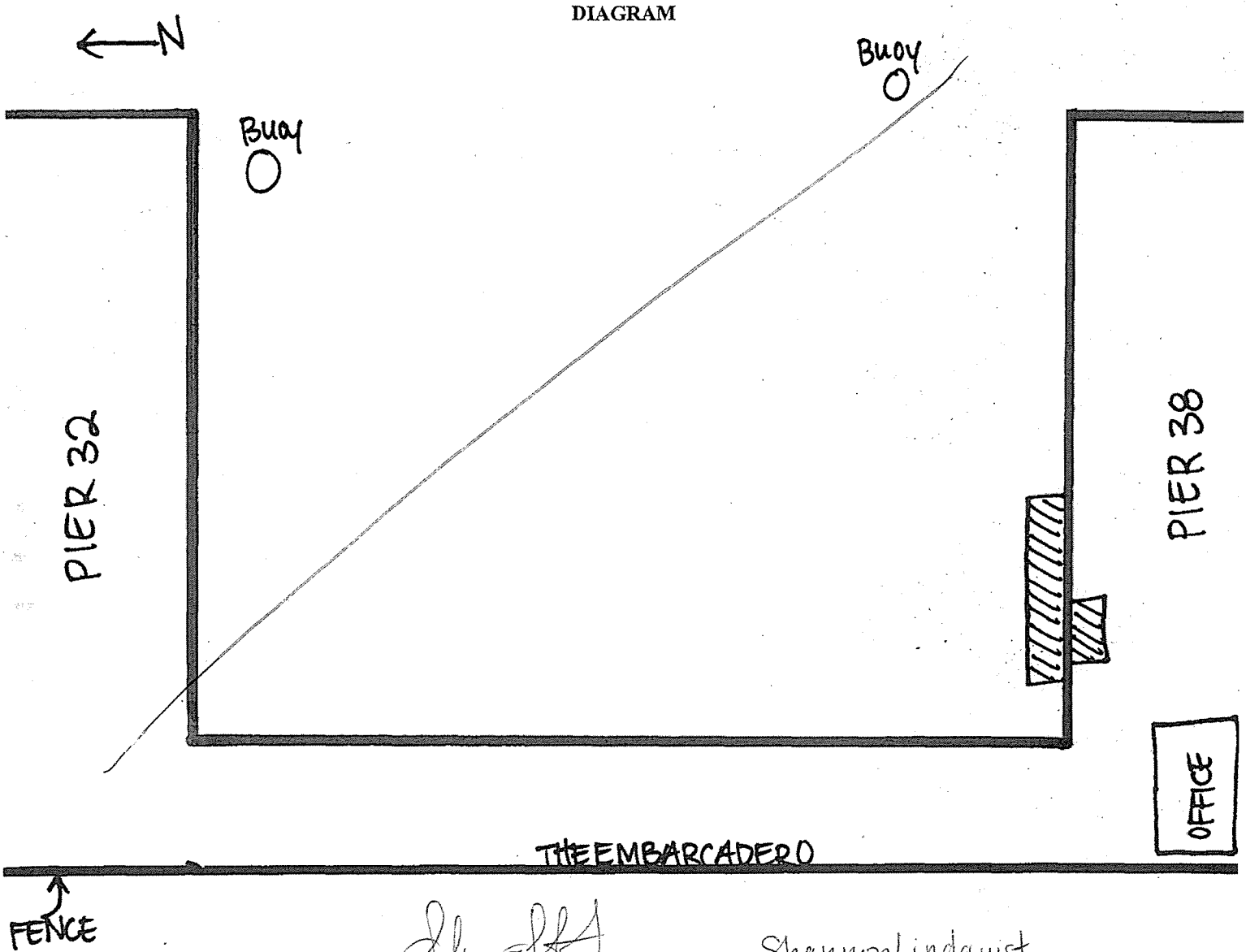
ADDITIONAL COMMENTS

Comment: Reference No.	Additional Comments
(1)	Gulls & cormorants feeding. Not associated w/ pile-driving

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

BIRDS

DIAGRAM



BIOLOGICAL MONITOR _____ (Signature) Shannon Lindquist (Print Name)

Brannan Street Wharf – Biological Monitoring
Weekly Summary – September 3, 2012 through September 7, 2012

Addendum 10/2/12: Track changes indicate corrections to 9/4/12 pile numbers based on information received from Dutra. Original data sheets from 9/4/12 have been edited accordingly.

Steel pile-driving continued this week through Wednesday, September 5 when concrete pile-driving resumed. No further monitoring of concrete pile-driving is required.

One monitor for marine mammals was stationed at the east end of Pier 32. America's Cup activity at Pier 32 has been completed and boat traffic into and out of Pier 32 was minimal. A second crane barge and materials barge is still present. This barge is installing framework around previously installed piles. The barges are located north of the pile-driving barge.

Monday, September 3, 2012

Labor Day Holiday

Tuesday, September 4, 2012

Biological monitoring at the BSW began at 0650 and continued until 1600. ~~Five~~ Four steel piles were driven (B5, B4, B3, B2~~, B1~~). And ~~four~~ five previously driven indicator piles were completed (A1, A3, A6, A9, A12). Little boat activity occurred at Pier 32. No negative impacts on any marine mammals were observed.

Biological Monitor – Shannon Lindquist

- **Marine Mammals:** Three harbor seals and one California sea lion were observed.
  - 0738-One harbor seal was observed resting vertically at the surface approximately 300 feet east of pile-driving activities, one minute before the pile-driving began of Pile B5. Animal was not sighted again once pile-driving began.
  - 0901-One California sea lion was observed approximately 800 feet northeast of pile-driving activities while Pile B4 was being driven. No change in behavior was observed.
  - 0957-One harbor seal was observed approximately 600 feet northeast of pile-driving activities while Pile B3 was being driven. The animal was seen resting at the surface. No change in behavior was observed.
  - 1047- One harbor seal was observed approximately 700 feet northeast of pile-driving activities. The animal was seen resting near the surface for about 30 minutes while Pile B2 was being driven. No change in behavior was observed.
  - No marine mammals were observed during the driving of Piles ~~B1,~~ A1, A3, A6, A9 or A12.

Wednesday, September 5, 2012

Biological monitoring at the BSW began at 0700 and continued until 0915. One steel pile was driven (~~I was told by the surveyor this was number~~ B1~~; however, this might be an error because Shannon recorded that B1 was driven yesterday~~). The materials barge was moved off-site during the driving of the steel pile, and a new materials barge containing concrete piles moved in. No boat activity occurred at Pier 32. No negative impacts on any marine mammals were observed.

Biological Monitor – Mandi McElroy

- **Marine Mammals:** One California sea lion was observed.
    - 0739 - One California sea lion was observed briefly surfacing, then diving approximately 900 feet northeast of pile-driving activities before the start of Pile B1. No change in behavior was observed.

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

Date 9/4/12 **Monitor (s)** Shannon Lindquist **Visibility** Clear, Beaufort 2

Tide Level See below **Human Activity in the Area** pedestrians along Embarcadero
Dutra barge N of pile-driving

Monitoring Locale: Pier 30 ☐ Pier 32 ☒ Pier 38 ☐ Boat ☐ 178 m from pile driving ☐

129 m from pile driving ☐ 1900 m from pile driving on vessels ☐

Pile Type: 24-inch octagonal concrete ☐ 24-inch steel shell ☒ Ambient Conditions ☐

Piles/Day (1-8): 5 **Pile Driver:** Impact ☒ Vibratory/Impact ☐

Attenuation Device: None ☐ Bubble Curtain: On ☒ Off ☐

Minutes of Vibratory Driving : n/a ☒ 8:00 ☐ 15:00 ☐ **Impact Blows per Pile:** 800 ☐ 300 ☒ 600 ☐

Tide data:

High	Low	High	Low
0241	0809	1435	2056
4.84	1.74	5.63	1.0

4 new piles
5 indicators piles

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

9/4/12

MARINE MAMMALS

	Pile No.	Pile Driver (Impact, Vibratory)[5]	Pile Driving Start/End Time	Observation Start/End Time	Mammal Species[6]			Comments: Reference Number
					Species	No.	Time	
①	B5	impact	0739/0807	0650/	HS	1	0738	①
②	B4	impact	0828/0916		SL	1	0901	②
③	B3	impact	0946/1014		HS	2	0957	③
④	B2	impact	1037/1110		HS	3	1047	④ to 1111
previously driven indicator pile → ⑤	~~A6~~ A6	impact	1128/1151		/	/	/	
" " → ⑥	A1	impact	1243/1307		/	/	/	
→ ⑦	A3	impact	1331/1359		/	/	/	
→ ⑧	A9	impact	1416/1442		/	/	/	
→ ⑨	A12	impact	1504/1528	/1600	/	/	/	
(inaccessible)	~~B6~~	i						

[5] Steel shell pile driving will include both vibratory (up to the last 10 feet) and impact (last 10 feet) pile drivers
[6] HS=Harbor Seal; SL = Sea Lion; HP=Harbor Porpoise; GW=Gray Whale; O = Other

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET 9/4/12

MARINE MAMMALS

Comments: Reference No.	Monitor's Distance from Pile Driving Activity	Initial Behavior of Marine Mammal	Changes in Marine Mammal Behavior (e.g., orientation, speed, diving, respiration rate, etc.)[7]
(1)	900 ft.	Resting vertically	~~Not~~ dove once pile-driving started
(2)	900ft.	swimming NE	no change
(3)	900ft.	Resting at surface	no change
(4)	900ft.	Resting at surface	no change

[7] **Note:** If a monitor sees a marine mammal within or approaching the Exclusion Zone prior to the start of impact pile driving, the monitor will notify the on-site resident engineer (or other authorized individual), who will then be required to delay pile driving until the marine mammal has moved outside of the Exclusion Zone, or if the animal has not been re-sighted within 15 minutes for pinnipeds or 30 minutes for cetaceans. If a marine mammal is sighted within or on a path toward the Exclusion Zone, pile driving will cease until that animal has cleared and is on a path away from the Exclusion Zone, or 15/30 minutes (pinnipeds/cetaceans) has lapsed since the last sighting.

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET 9/4/12

MARINE MAMMALS

PHOTOS

Comment: Reference No.	Photo Number	Time of Photo	Photo Taken Before (B), During (D) or After (A) Pile Driving	Description

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

9/4/12

MARINE MAMMALS

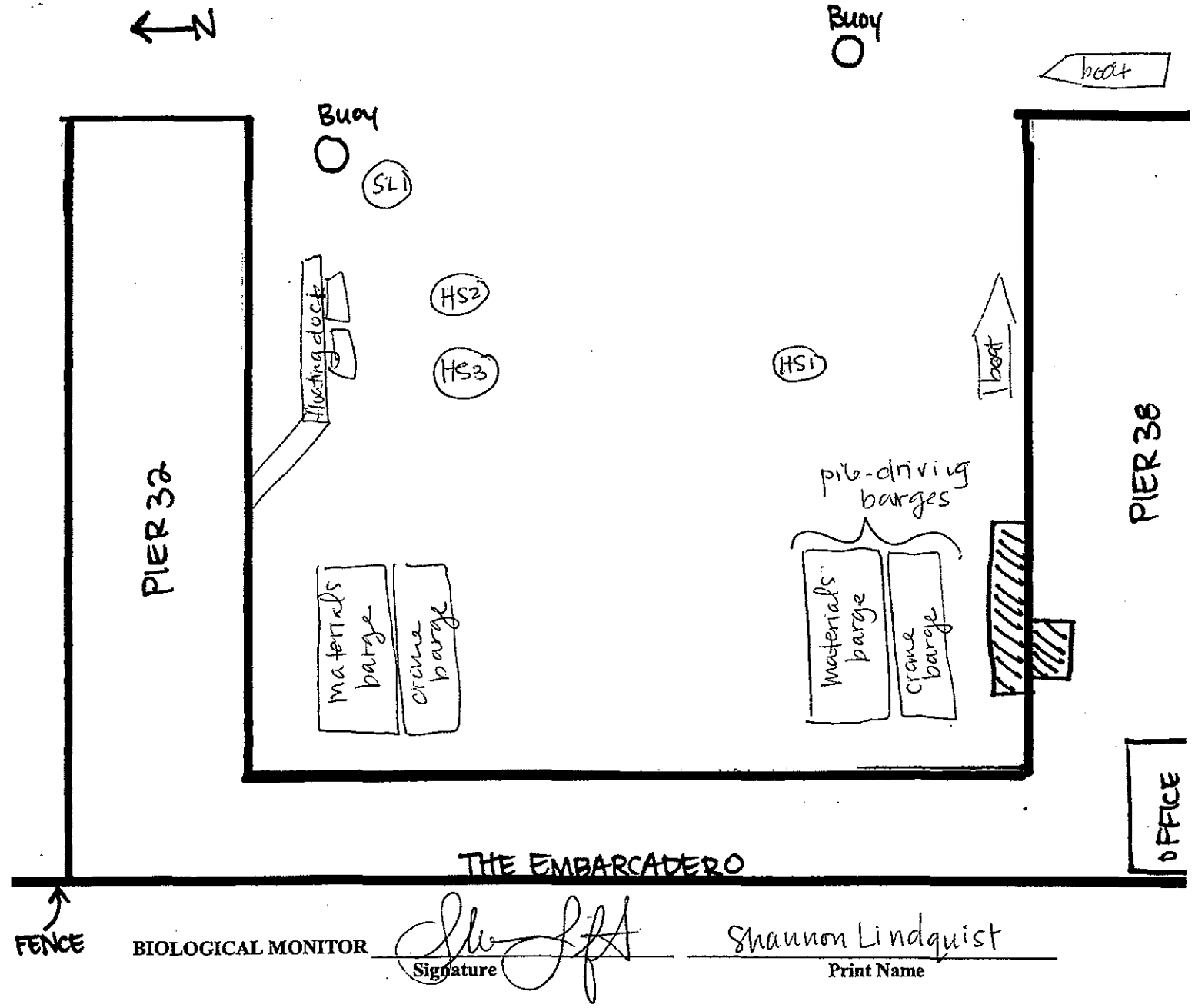
ADDITIONAL COMMENTS

Comment: Reference No.	Additional Comments
(1)	HS1 ~300ft E of pile-driving. Resting vertically on surface just before initial pile. Not seen again once pile-driving started.
(2)	SL1 ~ 800ft. NE of pile-driving. During Pile B4 but no driving was occurring at the time due to a broken piece. Swimming, NE
(3)	HS2 - ~600ft. NE of pile-driving. During Pile B3 Animal Resting at surface. No change in behavior.
(4)	HS3. ~ 700ft. NE of pile-driving. Resting at surface for ~ 30 mins. No change in behavior during Pile B2.

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET 9/4/12

MARINE MAMMALS

DIAGRAM



BIOLOGICAL MONITOR _____ (Signature) Shannon Lindquist (Print Name)

start 0645
departed 0915

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

Date 9/5/12 Monitor (s) Mandi Visibility light fog

Tide Level BSS 1 Human Activity in the Area second barge to the north of pile-driving barge, placing wooden deck.

Monitoring Locale: Pier 30 ☐ Pier 32 ☐ Pier 38 ☒ Boat ☐ 178 m from pile driving ☐

129 m from pile driving ☐ 1900 m from pile driving on vessels ☐

Pile Type: 24-inch octagonal concrete ☐ 24-inch steel shell ☑ Ambient Conditions ☐

Piles/Day (1-8): 1 **Pile Driver**: Impact ☑ Vibratory/Impact ☐

(steel)

Attenuation Device: None ☐ Bubble Curtain: On ☐ Off ☑

Minutes of Vibratory Driving: n/a ☑ 8:00 ☐ 15:00 ☐ **Impact Blows per Pile**: 800 ☐ 300 ☑ 600 ☐

0754: materials barge empty, moving off-site. Steel pile being positioned.

0759: 1st tap

0832: still driving pile B1
materials barge holding concrete piles coming on-site.

0840: end

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS **Date** 9/5/12

Pile No.	Pile Driver (Impact, Vibratory)[1]	Pile Driving Start/End Time	Observation Start/End Time	Mammal Species[2]			Comments: Reference Number
				Species	No.	Time	
B1	impact	0759/0840	0700/0915	SL	1	0739	SL 1

[1] Steel shell pile driving will include both vibratory (up to the last 10 feet) and impact (last 10 feet) pile drivers
[2] HS=Harbor Seal; SL = Sea Lion; HP=Harbor Porpoise; GW=Gray Whale; O = Other

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

Date 9/5/12 Page 3 of 6

Comments: Reference No.	Monitor's Distance from Pile Driving Activity	Initial Behavior of Marine Mammal	Changes in Marine Mammal Behavior (e.g., orientation, speed, diving, respiration rate, etc.)[3]
SL1	~900 ft	slow moving / diving	none

[3] **Note:** If a monitor sees a marine mammal within or approaching the Exclusion Zone prior to the start of impact pile driving, the monitor will notify the on-site resident engineer (or other authorized individual), who will then be required to delay pile driving until the marine mammal has moved outside of the Exclusion Zone, or if the animal has not been re-sighted within 15 minutes for pinnipeds or 30 minutes for cetaceans. If a marine mammal is sighted within or on a path toward the Exclusion Zone, pile driving will cease until that animal has cleared and is on a path away from the Exclusion Zone, or 15/30 minutes (pinnipeds/cetaceans) has lapsed since the last sighting.

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS Date 9/5/12 Page 4 of 12

PHOTOS

Comment: Reference No.	Photo Number	Time of Photo	Photo Taken Before (B), During (D) or After (A) Pile Driving	Description

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS Date 9/5/12 Page 5 of 6

ADDITIONAL COMMENTS

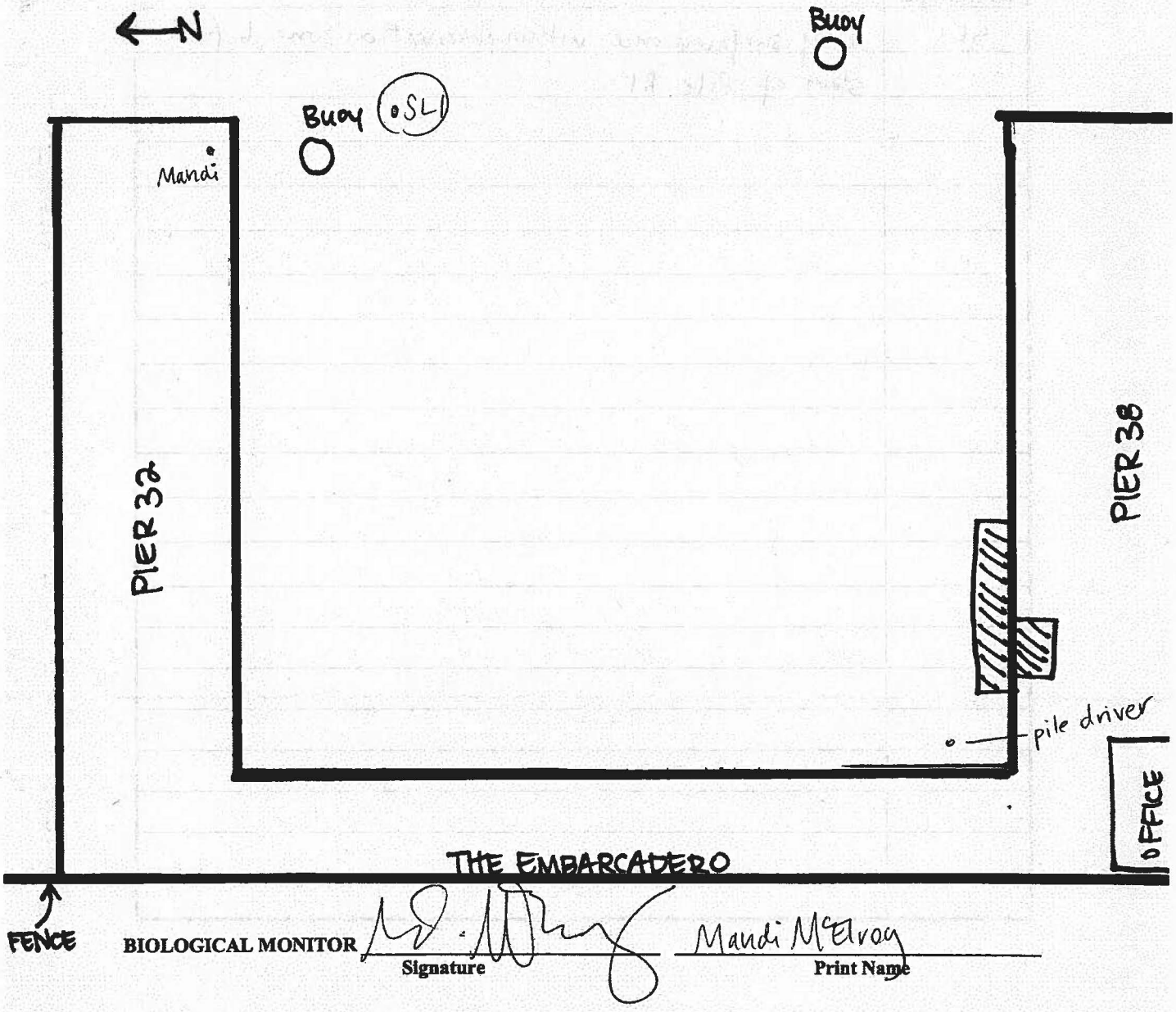
Comment: Reference No.	Additional Comments
SL1	only surfaced once within observation zone, before start of Pile B1.

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

Date: 9/5/12 Page 6 of 6

DIAGRAM



BIOLOGICAL MONITOR Signature Mandi McElroy Print Name

Tetra Tech Inc.

Brannan Street Wharf – Biological Monitoring
Weekly Summary – November 7, 2012 through November 9, 2012

Steel pile-driving resumed this week starting November 7, 2012 through Friday, November 9.

One monitor for marine mammals was stationed at the east end of Pier 32. Construction related to the demolition of part of the Embarcadero and the construction of the new wharf has commenced and traffic into and out of Pier 32 was limited to construction crew access primarily at the beginning and end of the day.

Wednesday, November 7, 2012

Biological monitoring at the BSW began at 0700 and continued until 1700. Four steel piles were driven (31AA-34AA). No negative impacts on any marine mammals were observed.

A barge with an excavator and demolition debris was removed from the site in the early morning. There are three other barges on site and materials barge is still present. One barge not in use was located south of the pile-driving barge. The pile driving barge and materials barge with steel piles were located directly east of the Embarcadero adjacent to Pier 32. No boat activity occurred at Pier 32.

Biological Monitor – Rebecca Johnson

- **Marine Mammals:** Three harbor seals and two California sea lion were observed.
    - 0730-One California sea lion was observed swimming east approximately 200 feet south of Pier 32 prior to pile-driving.
    - 0900-One harbor seal was observed approximately 100 feet from the Embarcadero near the materials barge prior to pile driving.
    - 1030- One California sea lion was observed swimming north towards Pier 32 400 feet east of the pile driving barge while Pile 31 AA was being driven. No change in behavior was observed and the sea lion was not seen again.
    - No marine mammals were observed during the driving of Pile 32AA.
    - 1430-One harbor seal was observed resting approximately 600 feet east of pile-driving activities while Pile 33 AA was being driven. The animal dove under after the first test blow and surfaced again further east during pile driving, no behavioral change was observed, and the animal was seen swimming south towards Pier 38.
    - 1600- One harbor seal was observed resting vertically approximately 600 feet east of pile-driving activities during driving of Pile 34 AA. The animal was seen resting near the surface for about 30 minutes while Pile 34 AA was being driven. No change in behavior was observed.

Thursday, November 8, 2012

Biological monitoring at the BSW began at 0700 and continued until 1610. Five steel piles were driven (A35, A36, A37, A39, A38). No negative impacts on any marine mammals were observed.

Four barges, including the crane barge located between Piers 38 and 32. Two barges holding materials remained stationary south of the crane barge. The materials barge holding the piles is north of the crane barge. The crane barge and materials barge with steel piles were located directly east of the Embarcadero adjacent to Pier 32. No boat activity occurred at Pier 32.

Biological Monitor – Shannon Lindquist

- **Marine Mammals:** Four harbor seals were observed.
    - 0830-One harbor seal was observed resting at the surface approximately 500 feet east of pile driving activity. No pile driving had begun yet.
    - No marine mammals were observed during the driving of Piles A35 and A36.
    - 1243-One harbor seal was observed moving slowly at the surface approximately 500 feet east of pile driving activity during the driving of Pile A37. No change in behavior was observed.
    - 1304-One harbor seal was observed swimming slowly at the surface approximately 600 feet east of pile driving activity during the driving of Pile A37. No change in behavior was observed.
    - 1338-One harbor seal was observed resting at the surface approximately 400 feet east of the piles. No pile driving was occurring at the time. The seal remained in the area during the driving of Pile A39. No change in behavior was observed.
    - No marine mammals were observed during the driving of Pile A38.

Friday, November 9, 2012

Biological monitoring at the BSW began at 0700 and continued until 1623. Five steel piles were driven (CC31, BB31, BB32, BB33, BB34). No negative impacts on any marine mammals were observed.

Four barges, including the crane barge located between Piers 38 and 32. Two barges holding materials remained stationary south of the crane barge. The materials barge holding the piles is north of the crane barge. The crane barge and materials barge with steel piles were located directly east of the Embarcadero adjacent to Pier 32. No boat activity occurred at Pier 32.

Biological Monitor – Shannon Lindquist

- **Marine Mammals:** One California sea lion and one harbor seal were observed.
    - No marine mammals were observed during the driving of Pile CC31.
    - 1110-One California sea lion was observed approximately 300 feet southeast of pile driving activity during the driving of Pile BB31. The sea lion surfaced a couple times and

then swam east away from the pile driving. No change in behavior was observed and the sea lion was not seen again.

- No marine mammals were observed during the driving of Pile BB32.
- 1500-One harbor seal was observed approximately 900 feet east of pile driving activity during the driving of Pile BB33. The seal was swimming south. No change in behavior was observed.
- No marine mammals were observed during the driving of Pile BB34.

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

Date 11/7/12 Monitor (s) Rebecca Johnson Visibility PM wind 12mph 8miles, overcast, Beaufort 1

Tide Level See below Human Activity in the Area Pier construction, pedestrian along embarcadero on Embarcadero

Monitoring Locale: Pier 30 ☐ Pier 32 ☒ Pier 38 ☐ Boat ☐ 178 m from pile driving ☐

129 m from pile driving ☐ 1900 m from pile driving on vessels ☐

Pile Type: 24-inch octagonal concrete ☐ 24-inch steel shell ☒ Ambient Conditions ☐

Piles/Day (1-8): ☒ 4 **Pile Driver**: Impact ☒ Vibratory/Impact ☐

Attenuation Device: None ☐ Bubble Curtain: On ☒ Off ☐

Minutes of Vibratory Driving : n/a ☒ 8:00 ☐ 15:00 ☐ **Impact Blows per Pile**: 800 ☐ 300 ☒ 600 ☐

Tide Data

High	Low	High	Low
00:30	07:00	14:18	19:48
4.66	0.98	5.09	2.62

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

Date 11/7/12 Page 2 of 6

Pile No.	Pile Driver (Impact, Vibratory)[1]	Pile Driving Start/End Time	Observation Start/End Time	Mammal Species[2]			Comments: Reference Number
				Species	No.	Time	
31 AA	Impact	1011/1130	0700/	SL	1	1012 0730	(1)
32 AA		1248/1400		—			
33 AA		1428/1502		HS	1	1430	(2)
34 AA		1550/1622	/1700	HS	1	1600	(3)

[1] Steel shell pile driving will include both vibratory (up to the last 10 feet) and impact (last 10 feet) pile drivers
[2] HS=Harbor Seal; SL = Sea Lion; HP=Harbor Porpoise; GW=Gray Whale; O = Other

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

Date 11/7/12 Page 3 of 6

Comments: Reference No.	Monitor's Distance from Pile Driving Activity	Initial Behavior of Marine Mammal	Changes in Marine Mammal Behavior (e.g., orientation, speed, diving, respiration rate, etc.)[3]
1	300'	swimming N 500' E of pile	kept swimming - no change
2	1	resting at surface 600' E	dove under after 1st blast
3	1	resting vertically	no change

[3] **Note:** If a monitor sees a marine mammal within or approaching the Exclusion Zone prior to the start of impact pile driving, the monitor will notify the on-site resident engineer (or other authorized individual), who will then be required to delay pile driving until the marine mammal has moved outside of the Exclusion Zone, or if the animal has not been re-sighted within 15 minutes for pinnipeds or 30 minutes for cetaceans. If a marine mammal is sighted within or on a path toward the Exclusion Zone, pile driving will cease until that animal has cleared and is on a path away from the Exclusion Zone, or 15/30 minutes (pinnipeds/cetaceans) has lapsed since the last sighting.

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

Date 11/7/12 Page 4 of 6

PHOTOS

Comment: Reference No.	Photo Number	Time of Photo	Photo Taken Before (B), During (D) or After (A) Pile Driving	Description
NA	01	1235	NA	observation location

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

Date 11/7/12 Page 5 of 6

ADDITIONAL COMMENTS

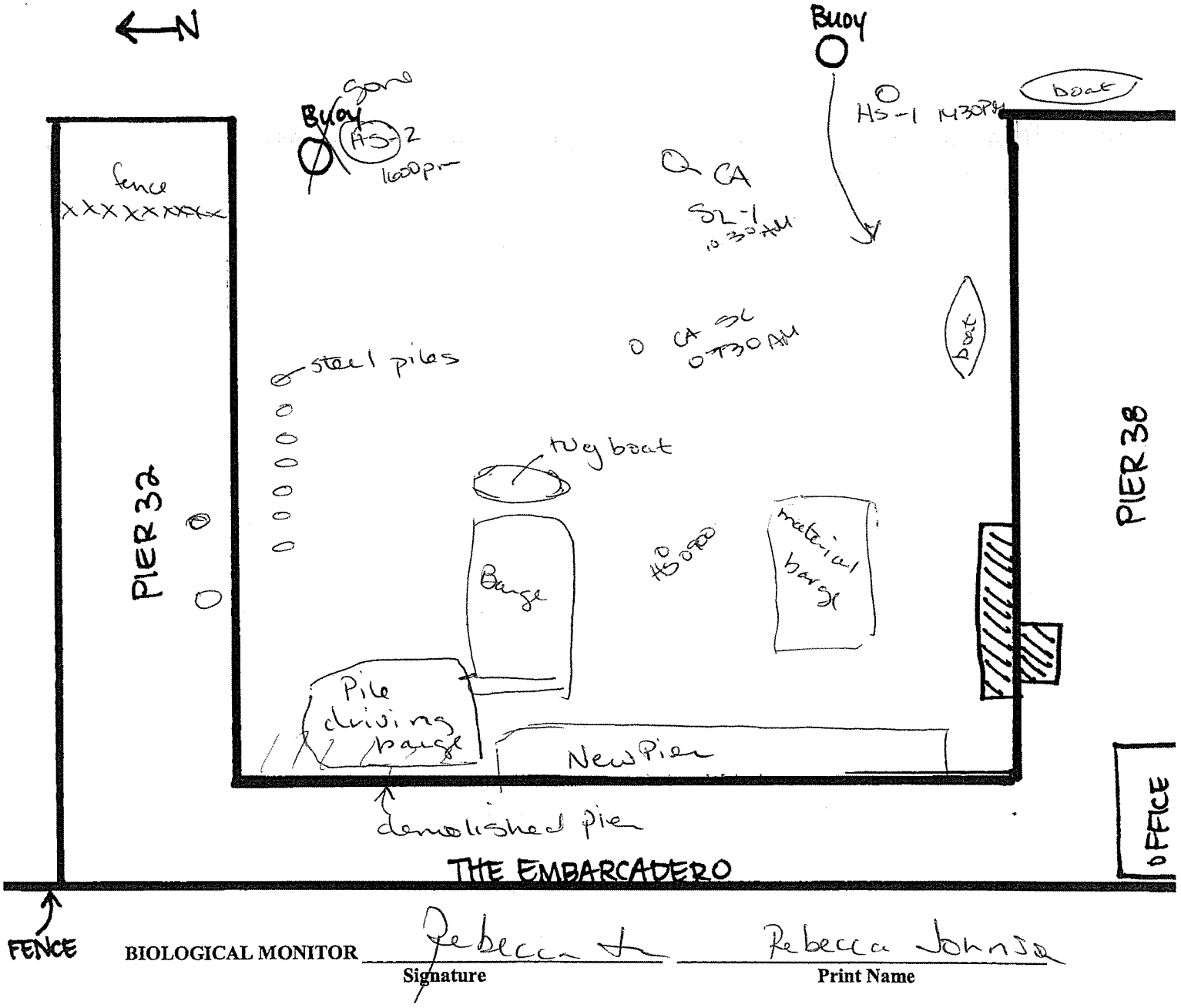
Comment: Reference No.	Additional Comments
(1)	SL (1) 400' east of barge 100' South Pier 32.
	Swimming north towards Pier 32. Not
	seen again
(2)	HS(1) - 250' South Pier 38 600' from Pile Driving
	resting @ surface initially dove under after 1st test blow
	surfaced again former east no
	behavior change during pile driving
	Spotted swimming toward pier 38.
(3)	HS 2 - probably same seal
	seen previously, initially seen
	resting vertically 600' east of pile
	driving near end of Pier 32
	no behavior change observed.

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

Date: 11/7/12 Page 6 of 6

DIAGRAM



BIOLOGICAL MONITOR Rebecca Johnson / Rebecca Johnson

Signature **Print Name**

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

Date 11/8/12 **Monitor (s)** Shannon Lindquist **Visibility** clear - am

Tide Level See below **Human Activity in the Area** work crew on wharf & pedestrians along The Embarcadero

Monitoring Locale: Pier 30 ☐ Pier 32 ☒ Pier 38 ☒ Boat ☐ 178 m from pile driving ☒

129 m from pile driving ☐ 1900 m from pile driving on vessels ☐

Pile Type: 24-inch octagonal concrete ☐ 24-inch steel shell ☒ Ambient Conditions ☐

Piles/Day (1-8): 5 **Pile Driver:** Impact ☒ Vibratory/Impact ☐

Attenuation Device: None ☐ Bubble Curtain: On ☒ Off ☐

Minutes of Vibratory Driving: n/a ☒ 8:00 ☐ 15:00 ☐ **Impact Blows per Pile:** 800 ☐ 300 ☐ 600 ☐

Tide level:

High	low	high
0659	1257	1842
5.15	1.93	4.36

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

Date 11/8/12 **Page** 1 of 6

Pile No.	Pile Driver (Impact, Vibratory)[1]	Pile Driving Start/End Time	Observation Start/End Time	Mammal Species[2]			Comments; Reference Number
				Species	No.	Time	
① A35	impact	0919 / 0957	0700 /	HS	1	0830	①
② A36	impact	1024 / 1110		/	/	/	
③ A37	impact	1231 / 1310		HS	2	1243	②
				HS	3	1304	③
				HS	4	1338	④
A39	impact	1401 / 1442		↓	↓	1415	
A38	impact	1508 / 1540	↓ / 1610	/	/	/	

[1] Steel shell pile driving will include both vibratory (up to the last 10 feet) and impact (last 10 feet) pile drivers
[2] HS=Harbor Seal; SL = Sea Lion; HP=Harbor Porpoise; GW=Gray Whale; O = Other

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

Date 11/8/17 Page 3 of 6

Comments: Reference No.	Monitor's Distance from Pile Driving Activity	Initial Behavior of Marine Mammal	Changes in Marine Mammal Behavior (e.g., orientation, speed, diving, respiration rate, etc.)[3]
(1)	500 ft.	Slow surface travel.	no change
(2)	500ft	slow surface travel.	no change
(3)	400ft.	slow surface travel	no change
(4)	400ft.	Resting at surface	no change

[3] **Note:** If a monitor sees a marine mammal within or approaching the Exclusion Zone prior to the start of impact pile driving, the monitor will notify the on-site resident engineer (or other authorized individual), who will then be required to delay pile driving until the marine mammal has moved outside of the Exclusion Zone, or if the animal has not been re-sighted within 15 minutes for pinnipeds or 30 minutes for cetaceans. If a marine mammal is sighted within or on a path toward the Exclusion Zone, pile driving will cease until that animal has cleared and is on a path away from the Exclusion Zone, or 15/30 minutes (pinnipeds/cetaceans) has lapsed since the last sighting.

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

Date 11/8/12 Page 4 of 6

PHOTOS

Comment: Reference No.	Photo Number	Time of Photo	Photo Taken Before (B), During (D) or After (A) Pile Driving	Description

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

Date 11/8/12 Page 5 of 6

ADDITIONAL COMMENTS

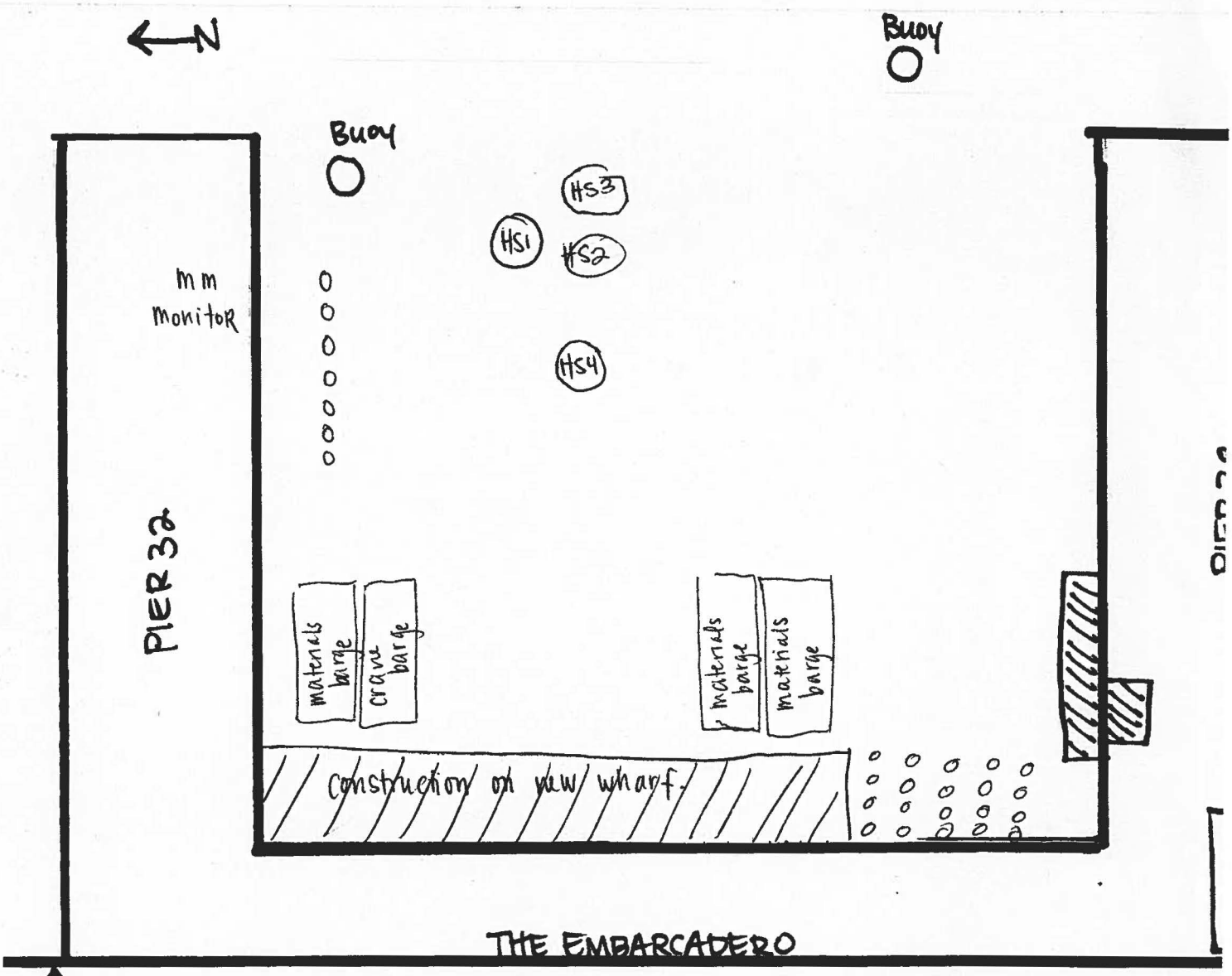
Comment: Reference No.	Additional Comments
(1)	HS1 observed resting at surface, traveling slowly ~500 ft E from pile driving. No pile driving had begun yet.
(2)	HS2 observed moving slowly at the surface ~500ft E from pile driving. During Pile A37. No behavior change.
(3)	HS3 observed swimming slowly at the surface ~600ft E of pile driving. During Pile A37. No behavior change
(4)	HS4 observed resting at surface ~400ft. E of piles No pile driving occurring at the time. HS4 stayed in area during pile driving of Pile A39 No change in behavior observed

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

Date: 11/8/12 Page 6 of 6

DIAGRAM



BIOLOGICAL MONITOR _____ Shannon Lindquist

Signature Print Name

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

Date 11/9/12 **Monitor (s)** Shannon Lindquist **Visibility** clear - ani

Tide Level See below **Human Activity in the Area** Work crew on new wharf. Pedestrians along Embarcadero

Monitoring Locale: Pier 30 ☐ Pier 32 ☒ Pier 38 ☐ Boat ☐ 178 m from pile driving ☒

129 m from pile driving ☐ 1900 m from pile driving on vessels ☐

Pile Type: 24-inch octagonal concrete ☐ 24-inch steel shell ☒ Ambient Conditions ☐

Piles/Day (1-8): ☒ 5 **Pile Driver:** Impact ☒ Vibratory/Impact ☐

Attenuation Device: None ☐ Bubble Curtain: On ☒ Off ☐

Minutes of Vibratory Driving : n/a ☒ 8:00 ☐ 15:00 ☐ **Impact Blows per Pile:** 800 ☐ 300 ☐ 600 ☐

tide level:

Low	high	low	high
0038	0735	1346	1954
1.09	5.5	1.2	4.46

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

Date 11/9/12

	Pile No.	Pile Driver (Impact, Vibratory)[1]	Pile Driving Start/End Time	Observation Start/End Time	Mammal Species[2]			Comments: Reference Number
					Species	No.	Time	
1	CC31	impact	0732/0815	0700/	/	/	/	
2	BB31	impact	0932/1118	|	SL	1	1110	(1)
3	BB32	impact	1254/1409	|	/	/	/	
4	BB33	impact	1441/1507	|	HS	1	1500	(2)
5	BB34	impact	1529/1553	V/1623	/	/	/	

[1] Steel shell pile driving will include both vibratory (up to the last 10 feet) and impact (last 10 feet) pile drivers

[2] HS=Harbor Seal; SL = Sea Lion; HP=Harbor Porpoise; GW=Gray Whale; O = Other

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

Date 11/9/12 Page 3 of 6

Comments: Reference No.	Monitor's Distance from Pile Driving Activity	Initial Behavior of Marine Mammal	Changes in Marine Mammal Behavior (e.g., orientation, speed, diving, respiration rate, etc.)[3]
(1)	500 ft.	surfaced multiple times.	no change
		swimming east.	
(2)	400 ft.	Head above water. Swimming	no change
		South.	

[3] **Note:** If a monitor sees a marine mammal within or approaching the Exclusion Zone prior to the start of impact pile driving, the monitor will notify the on-site resident engineer (or other authorized individual), who will then be required to delay pile driving until the marine mammal has moved outside of the Exclusion Zone, or if the animal has not been re-sighted within 15 minutes for pinnipeds or 30 minutes for cetaceans. If a marine mammal is sighted within or on a path toward the Exclusion Zone, pile driving will cease until that animal has cleared and is on a path away from the Exclusion Zone, or 15/30 minutes (pinnipeds/cetaceans) has lapsed since the last sighting.

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

Date 11/9/12 Page 4 of 6

PHOTOS

Comment: Reference No.	Photo Number	Time of Photo	Photo Taken Before (B), During (D) or After (A) Pile Driving	Description

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

Date 11/9/12 Page 5 of 6

ADDITIONAL COMMENTS

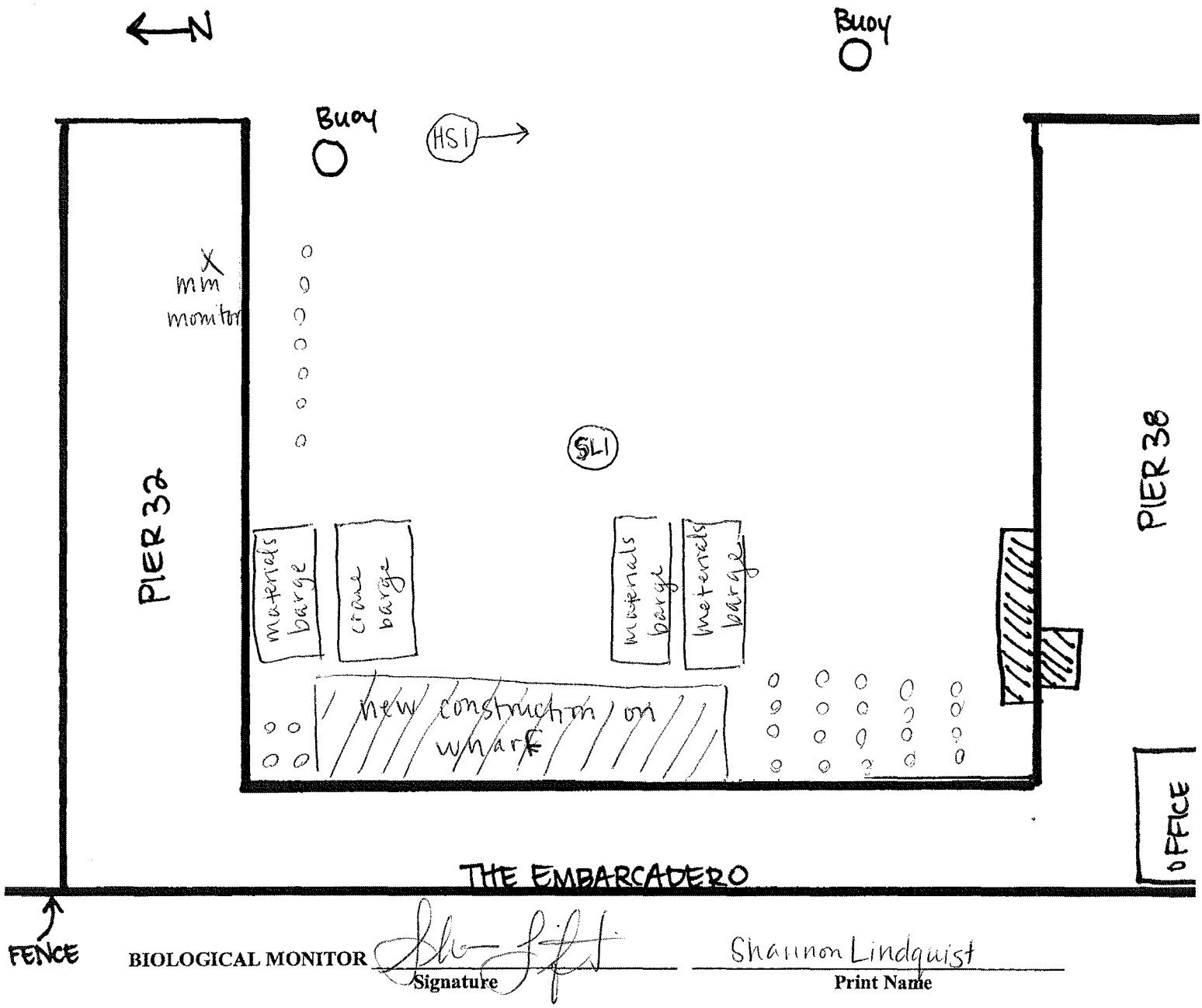
Comment: Reference No.	Additional Comments
(1)	SL1 observed ~300ft. SE of pile driving during Pile BB31.
	surfaced a couple times as it swam east away from
	pile driving activity. No behavioral change. Slow movement.
(2)	HS1 observed ~900 ft. E of pile driving during Pile BB33
	swimming South. No behavioral change.

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

Date: 11/9/12 Page 6 of 6

DIAGRAM



BIOLOGICAL MONITOR _____ Shannon Lindquist

Signature **Print Name**

Brannan Street Wharf – Biological Monitoring
Weekly Summary – November 12, 2012 through November 15, 2012

Steel pile-driving continued this week starting November 12, 2012 and was completed on Thursday, November 15. No pile-driving occurred on Tuesday, November 13.

One monitor for marine mammals was stationed at the east end of Pier 32. Construction related to the demolition of part of the Embarcadero and the construction of the new wharf continues and traffic into and out of Pier 32 was limited to construction crew access primarily at the beginning and end of the day.

Monday, November 12, 2012

Biological monitoring at the BSW began at 0700 and continued until 1623. Six steel piles were driven (BB35-BB39 and CC32). No negative impacts on any marine mammals were observed.

Four barges, including the crane barge located between Piers 38 and 32. Two barges holding materials remained stationary south of the crane barge. The materials barge holding the piles is north of the crane barge. The crane barge and materials barge with steel piles were located directly east of the Embarcadero adjacent to Pier 32. No boat activity occurred at Pier 32.

Biological Monitor – Shannon Lindquist

- **Marine Mammals:** Four harbor seals and one California sea lion were observed.
    - 0724-One harbor seal was observed several times between approximately 200-500 feet east of the crane barge prior to any pile driving.
    - No marine mammals were observed during the driving of Pile BB35.
    - 0858-One harbor seal was observed approximately 400 feet east of the crane barge, resting at the surface. No pile driving was occurring at the time.
    - No marine mammals were observed during the driving of Pile BB36.
    - 1008- One harbor seal was observed resting at the surface approximately 200 feet east of pile driving activity. No pile driving was occurring at the time. The seal remained in the area for about 5 minutes before swimming away. No change in behavior was observed and the seal was not seen again.
    - No marine mammals were observed during the driving of Pile BB37.
    - 1137-One harbor seal was observed resting at the surface approximately 200 feet southeast of pile-driving activities while Pile BB38 was being driven. No change in behavior was observed.
    - No marine mammals were observed during the driving of Pile BB39
    - 1453- One California sea lion was observed swimming south slowly, approximately 900 feet east of pile driving while Pile CC32 was being driven. No change in behavior was observed.

Wednesday, November 14, 2012

Biological monitoring at the BSW began at 0700 and continued until 1700. Eight steel piles were driven (CC33-CC37, KK37-KK39). No negative impacts on any marine mammals were observed.

There are four barges on site and two materials barges and two crane operation barges. The pile driving barge and materials barge with steel piles were located directly east of the Embarcadero adjacent to Pier 32. No boat activity occurred at Pier 32.

Biological Monitor – Rebecca Johnson

- Marine Mammals: Three harbor seals and two California sea lion were observed.
    - 0752-One California sea lion was observed swimming east approximately 100 feet south of the east end of Pier 32 prior to pile-driving.
    - 0830- One California sea lion was observed resting 50 north of the buoy near the eastern end of Pier 38 prior to continuous pile driving of the first pile, CC33. No behavioral change was observed and the animal was not seen again.
    - No marine mammals were observed during the driving of Pile CC34
    - 0944- One harbor seal was observed approximately 100 feet east of the pile driving barge swimming south/southeast between the completion of pile CC34 and commencement of CC35. The seal was not seen again after pile driving of CC35 began at 0950.
    - No marine mammals were observed during the driving of Pile CC36
    - 1240- One harbor seal was observed swimming north of the buoy near the eastern end of Pier 38 prior to beginning of the driving of CC37 at 1304. The animal was not seen again.
    - No marine mammals were observed during the driving of Pile KK39
    - No marine mammals were observed during the driving of Pile KK38
    - No marine mammals were observed during the driving of Pile KK37
    - 1634 One harbor seal observed swimming south/southwest from the eastern end of Pier 32 toward the middle of Pier 38 after the completion of the 8th Pile KK37

Thursday, November 15, 2012

Biological monitoring at the BSW began at 0700 and continued until 0821. One steel pile was driven (KK36). No negative impacts on any marine mammals were observed. This concluded the steel pile driving activities for this project.

Four barges, including the crane barge located between Piers 38 and 32. Two barges holding materials remained stationary south of the crane barge. The materials barge holding the piles is north of the crane barge. The crane barge and materials barge with steel piles were located directly east of the Embarcadero adjacent to Pier 32. No boat activity occurred at Pier 32.

Biological Monitor – Shannon Lindquist

- **Marine Mammals:** One harbor seal was observed.
    - 0730-One harbor seal was observed several times prior to the driving of Pile KK36. The animal remained in the area, approximately 300 to 500 feet east of the crane barge as pile driving activity began. The seal showed no change in behavior.

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

Date 11/12/12 **Monitor (s)** Shannon Lindquist **Visibility** clear

Tide Level See below **Human Activity in the Area** work crew on new wharf. pedestrians on Embarcadero

Monitoring Locale: Pier 30 ☐ Pier 32 ☒ Pier 38 ☐ Boat ☐ 178 m from pile driving ☒

129 m from pile driving ☐ 1900 m from pile driving on vessels ☐

Pile Type: 24-inch octagonal concrete ☐ 24-inch steel shell ☒ Ambient Conditions ☐

Piles/Day (1-8): 6 **Pile Driver:** Impact ☒ Vibratory/Impact ☐

Attenuation Device: None ☐ Bubble Curtain: On ☒ Off ☐

Minutes of Vibratory Driving: n/a ☐ 8:00 ☐ 15:00 ☐ **Impact Blows per Pile:** 800 ☐ 300 ☐ 600 ☐

tide data

low	high	low	high
0300	0927	1607	2257
1.77	6.61	-0.95	4.97

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS **Date** 11/12/12

Pile No.	Pile Driver (Impact, Vibratory)[1]	Pile Driving Start/End Time	Observation Start/End Time	Mammal Species[2]			Comments: Reference Number
				Species	No.	Time	
1 BB35	impact	0807/0838	0700/	HS	1	0724	(1)
2 BB36	impact	0902/0928		HS	2	0858	(2)
3 BB37	impact	1026/1101		HS	3	1008	(3)
4 BB38	impact	1134/1159		HS	4	1137	(4)
5 BB39	impact	1321/1344		/	/	/	
6 CC32	impact	1435/1553	V/1623	SL	1	1453	(5)

[1] Steel shell pile driving will include both vibratory (up to the last 10 feet) and impact (last 10 feet) pile drivers
[2] HS=Harbor Seal; SL = Sea Lion; HP=Harbor Porpoise; GW=Gray Whale; O = Other

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

Date 11/12/12 Page 3 of 6

Comments: Reference No.	Monitor's Distance from Pile Driving Activity	Initial Behavior of Marine Mammal	Changes in Marine Mammal Behavior (e.g., orientation, speed, diving, respiration rate, etc.)[3]
①	500 ft.	Resting at surface	no change
②	~500ft.	Resting at surface	no change
③	500 ft.	Resting at surface	no change
④	500ft.	Resting at surface	no change
⑤	500ft.	swimming south	no change

[3] **Note:** If a monitor sees a marine mammal within or approaching the Exclusion Zone prior to the start of impact pile driving, the monitor will notify the on-site resident engineer (or other authorized individual), who will then be required to delay pile driving until the marine mammal has moved outside of the Exclusion Zone, or if the animal has not been re-sighted within 15 minutes for pinnipeds or 30 minutes for cetaceans. If a marine mammal is sighted within or on a path toward the Exclusion Zone, pile driving will cease until that animal has cleared and is on a path away from the Exclusion Zone, or 15/30 minutes (pinnipeds/cetaceans) has lapsed since the last sighting.

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS Date 4/12/12 Page 4 of 6

PHOTOS

Comment: Reference No.	Photo Number	Time of Photo	Photo Taken Before (B), During (D) or After (A) Pile Driving	Description

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

Date 11/12/12 Page 5 of 6

ADDITIONAL COMMENTS

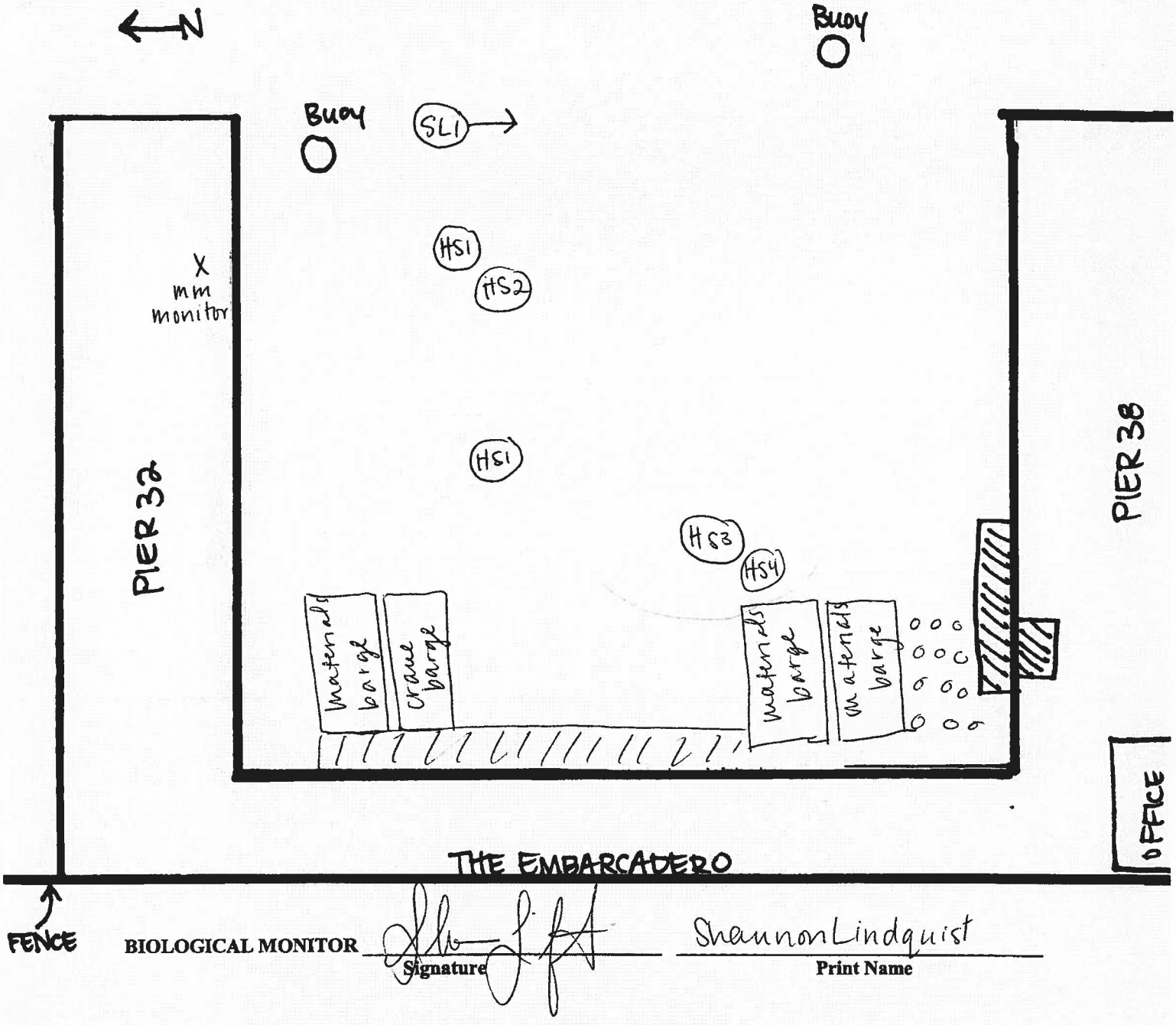
Comment: Reference No.	Additional Comments
(1)	HS1 observed several times between 500 - 200 ft from (E)
	pile driving. No pile driving had occurred yet. Not seen
	again.
(2)	HS2 observed resting at the surface ~400ft E of
	pile driving. No pile driving was occurring at the time.
(3)	HS3 observed resting at the surface ~200ft SE of
	pile driving. No pile driving occurring at the time.
	Remained in area for ~5 mins.
(4)	HS4 observed Resting at the surface ~200ft. SE of
	pile driving during driving of Pile BB38. Seal did not
	exhibit any change in behavior.
(5)	SL1 was observed swimming south slowly ~900 ft. E of
	pile driving during the driving of Pile CC32. No change
	in behavior observed.

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

Date: 11/12/12 Page 6 of 6

DIAGRAM



BIOLOGICAL MONITOR _____ Shannon Lindquist

Signature **Print Name**

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

Date 11/14/12 **Monitor (s)** R. Johnson **Visibility** partly cloudy

Tide Level see below **Human Activity in the Area** Pedestrians on Embarcadero. work crew on new pier

Monitoring Locale: Pier 30 ☐ Pier 32 ☒ Pier 38 ☐ Boat ☐ 178 m from pile driving ☒

129 m from pile driving ☐ 1900 m from pile driving on vessels ☐

Pile Type: 24-inch octagonal concrete ☐ 24-inch steel shell ☒ Ambient Conditions ☐

Piles/Day (1-8): ☒ **Pile Driver:** Impact ☒ Vibratory/Impact ☐

Attenuation Device: None ☐ Bubble Curtain: On ☒ Off ☐

Minutes of Vibratory Driving: n/a ☐ 8:00 ☐ 15:00 ☐ **Impact Blows per Pile:** 800 ☐ 300 ☐ 600 ☐

tide data

Low	High	Low	High
0106	0812	1254	1912
-1.38	5.44	2.27	7.36

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

Date 11/14/12 Page 2 of 6

	Pile No.	Pile Driver (Impact, Vibratory)[1]	Pile Driving Start/End Time	Observation Start/End Time	Mammal Species[2]			Comments: Reference Number
					Species	No.	Time	
1	CC33	Impact	0753/0847	0700-1700	SL (1)	1	0830	(1) CASL ~600' E of driving
2	CC34	Impact	0906/0927		NA	—	—	—
3	CC35	Impact	0950/1014		—	—	—	(2) HS @ 0944 prior to driving
4	CC36	Impact	1118/1142		—	—	—	—
5	CC37	Impact	1304/1328		—	—	—	(3) HS @ 1244 prior to pile driving
6	KK37	Impact	1415/1430		—	—	—	—
7	KK38	Impact	1450/1507		—	—	—	—
	KK39	Impact	1600/1630		—	—	—	(4) HS @ 1634 after last pile driven

[1] Steel shell pile driving will include both vibratory (up to the last 10 feet) and impact (last 10 feet) pile drivers
[2] HS=Harbor Seal; SL = Sea Lion; HP=Harbor Porpoise; GW=Gray Whale; O = Other

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

Date 1/14/17 Page 3 of 6

Comments: Reference No.	Monitor's Distance from Pile Driving Activity	Initial Behavior of Marine Mammal	Changes in Marine Mammal Behavior (e.g., orientation, speed, diving, respiration rate, etc.)[3]
(1)	500	CA SL resting near buoy	no change not during active driving
(2)	500	HS swimming South/ SW Thenext	pile prior to driving, no change
(3)	500	HS swimming toward Pier 38 South	pile prior to driving no change
(4)	500	HS swimming SO/SW from Pier 32 → 38	just after final pile driven

[3] **Note:** If a monitor sees a marine mammal within or approaching the Exclusion Zone prior to the start of impact pile driving, the monitor will notify the on-site resident engineer (or other authorized individual), who will then be required to delay pile driving until the marine mammal has moved outside of the Exclusion Zone, or if the animal has not been re-sighted within 15 minutes for pinnipeds or 30 minutes for cetaceans. If a marine mammal is sighted within or on a path toward the Exclusion Zone, pile driving will cease until that animal has cleared and is on a path away from the Exclusion Zone, or 15/30 minutes (pinnipeds/cetaceans) has lapsed since the last sighting.

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

Date 11/14/12 Page 4 of 6

PHOTOS

Comment: Reference No.	Photo Number	Time of Photo	Photo Taken Before (B), During (D) or After (A) Pile Driving	Description

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

Date 11/14/12 Page 5 of 6

ADDITIONAL COMMENTS

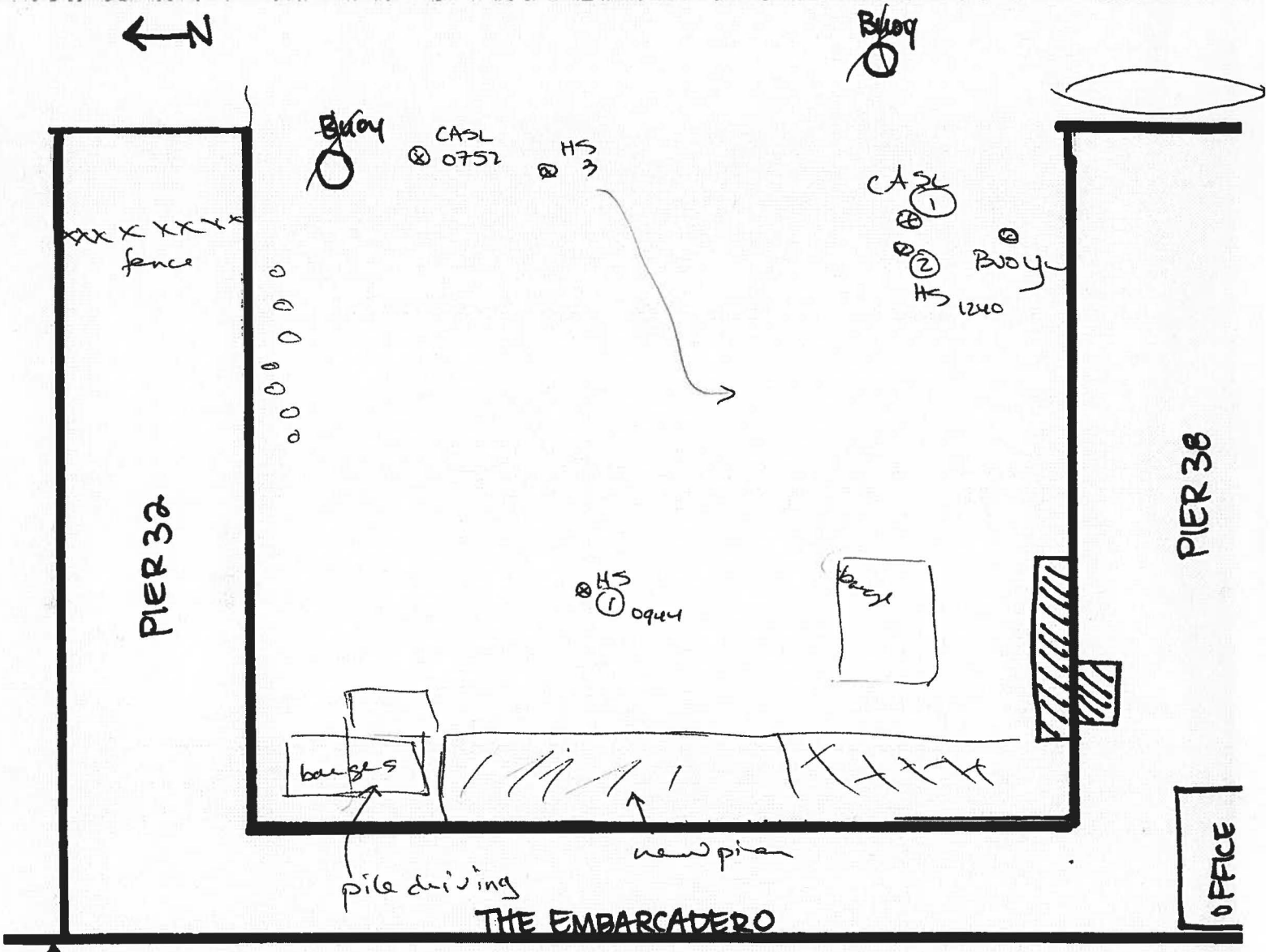
Comment: Reference No.	Additional Comments
(1)	CASL spotted 50' N of buoy near Pier 38, not diving actively diving not seen again, resting @ surface of water
(2)	Harbor seal observed surfacing approximately 100 feet south/southeast of pile diving barge swimming. Prior to pile diving not seen surfacing again
(3)	Harbor Seal observed swimming south/southwest southwest approx 100' ~~south~~ north of Pier 38 near eastern buoy did not re-surface observed prior to pile driving
(4)	Harbor Seal observed swimming SO/SW from end (E) Pier 32 toward middle of Pier 38 after pile driving complete

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

Date: 11/14/12 Page 6 of 6

DIAGRAM



BIOLOGICAL MONITOR Rebecca Johnson / Rebecca Johnson

Signature Print Name

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

Date 11/15/12 **Monitor (s)** Shannon Lindquist **Visibility** clear

Tide Level See below **Human Activity in the Area** workcrew on new wharf. pedestrians along Embarcader

Monitoring Locale: Pier 30 ☐ Pier 32 ☒ Pier 38 ☐ Boat ☐ 178 m from pile driving ☒

129 m from pile driving ☐ 1900 m from pile driving on vessels ☐

Pile Type: 24-inch octagonal concrete ☐ 24-inch steel shell ☒ Ambient Conditions ☐

Piles/Day (1-8): ☐1☐ **Pile Driver:** Impact ☒ Vibratory/Impact ☐

Attenuation Device: None ☐ Bubble Curtain: On ☒ Off ☐

Minutes of Vibratory Driving: n/a ☐ 8:00 ☐ 15:00 ☐ **Impact Blows per Pile:** 800 ☐ 300 ☐ 600 ☐

Tide data:

High	Low	High	Low
1246	0524	1139	1824
5.1	2.41	6.91	-1.62

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS **Date** 11/15/12 Page 2 of 6

Pile No.	Pile Driver (Impact, Vibratory)[1]	Pile Driving Start/End Time	Observation Start/End Time	Mammal Species[2]			Comments: Reference Number
				Species	No.	Time	
KK36	impact	0733/0751	0700/0821	HS	1	0730	(1) 0730-0741

[1] Steel shell pile driving will include both vibratory (up to the last 10 feet) and impact (last 10 feet) pile drivers
[2] HS=Harbor Seal; SL = Sea Lion; HP=Harbor Porpoise; GW=Gray Whale; O = Other

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

Date 11/15/12 Page 3 of 6

Comments: Reference No.	Monitor's Distance from Pile Driving Activity	Initial Behavior of Marine Mammal	Changes in Marine Mammal Behavior (e.g., orientation, speed, diving, respiration rate, etc.)[3]
(1)	500ft.	Slow surface travel. Resting at surface.	no change

[3] **Note:** If a monitor sees a marine mammal within or approaching the Exclusion Zone prior to the start of impact pile driving, the monitor will notify the on-site resident engineer (or other authorized individual), who will then be required to delay pile driving until the marine mammal has moved outside of the Exclusion Zone, or if the animal has not been re-sighted within 15 minutes for pinnipeds or 30 minutes for cetaceans. If a marine mammal is sighted within or on a path toward the Exclusion Zone, pile driving will cease until that animal has cleared and is on a path away from the Exclusion Zone, or 15/30 minutes (pinnipeds/cetaceans) has lapsed since the last sighting.

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS Date 11/15/12 Page 4 of 6

PHOTOS

Comment: Reference No.	Photo Number	Time of Photo	Photo Taken Before (B), During (D) or After (A) Pile Driving	Description

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

Date 11/15/12 Page 5 of 6

ADDITIONAL COMMENTS

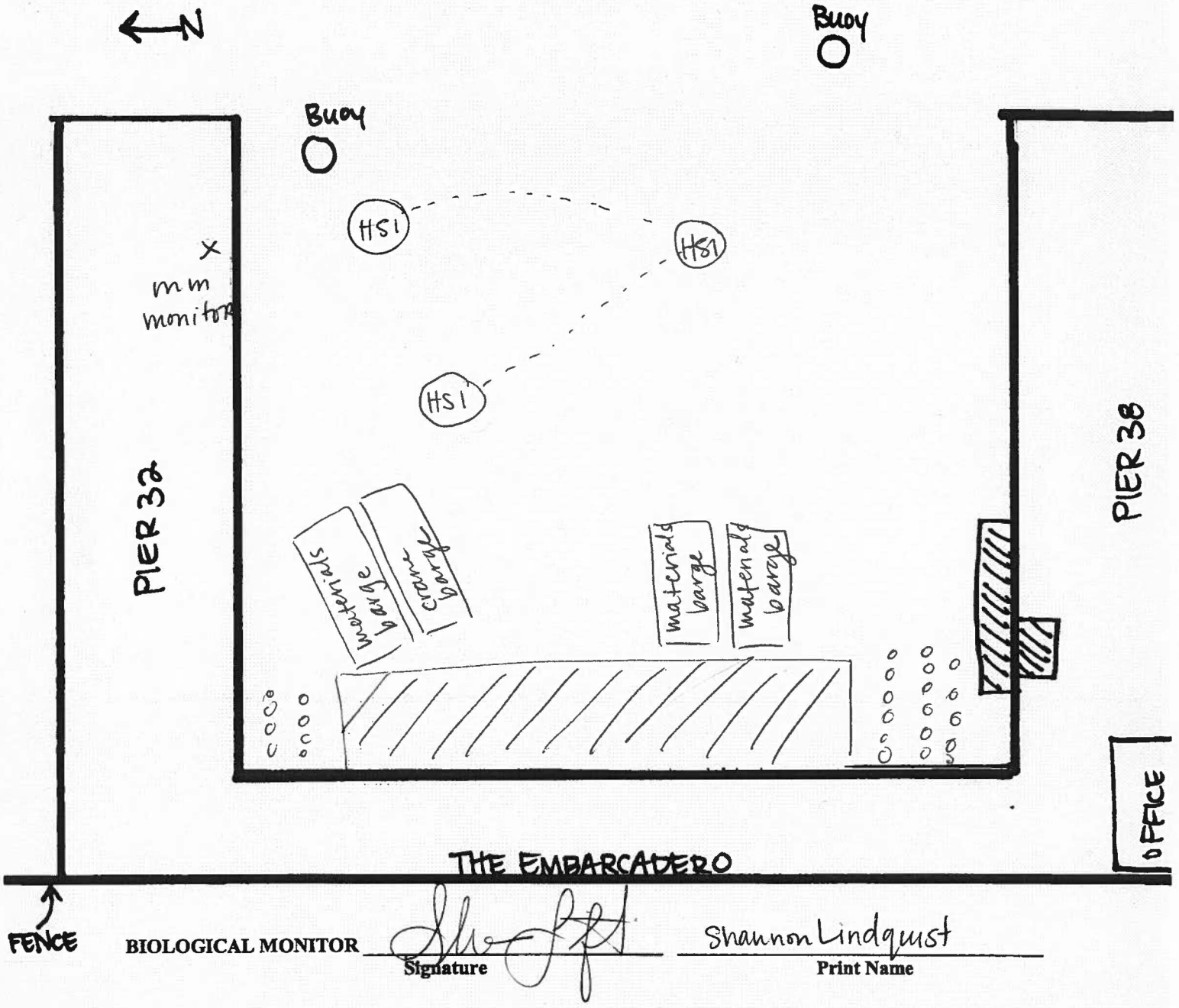
Comment: Reference No.	Additional Comments
(1.)	HSI observed several times during and before driving of Pile KK36 Seal ~300-500ft. E from pile driving. No change in behavior.

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

MARINE MAMMALS

Date: 11/15/12 Page 6 of 6

DIAGRAM



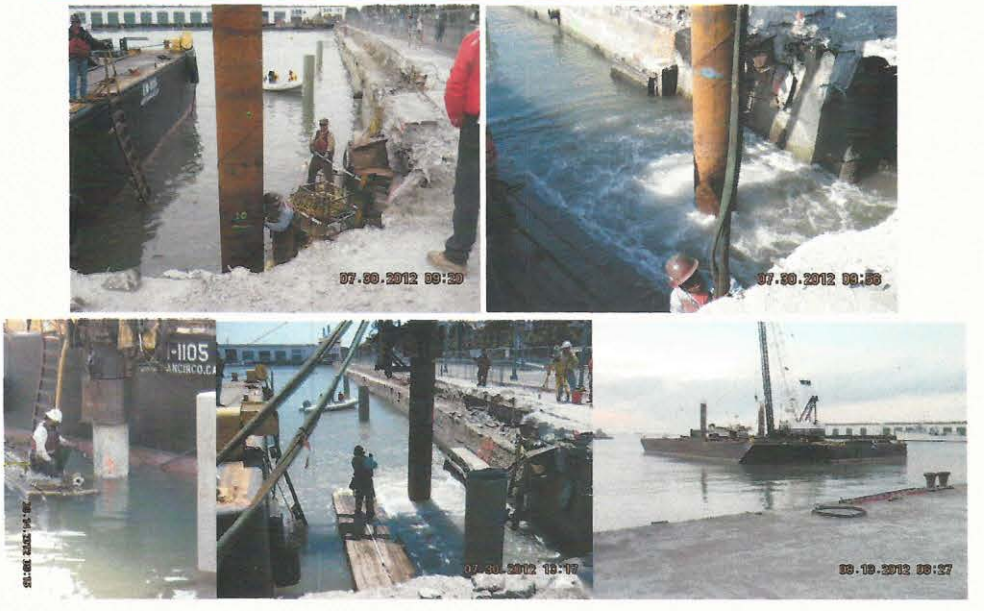
BIOLOGICAL MONITOR _____ Shannon Lindquist

Signature **Print Name**

APPENDIX F

AAR REPORT: BRANNAN STREET WHARF PILE DRIVING PROJECT, SAN FRANCISCO, CALIFORNIA – FISHERY RESOURCES MONITORING FINAL REPORT

Brannan Street Wharf Pile Driving Project
San Francisco, California
Fishery Resources Monitoring Final Report



Prepared for:

Tetra Tech Inc. and
AEW Engineering
1999 Harrison Street, Suite 500
Oakland, California 94670

Prepared by:

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December 27, 2012

TABLE OF CONTENTS

I. INTRODUCTION/BACKGROUND

The U.S. Army Corps of Engineers authorized the Port of San Francisco (Port) to construct the new Brannan Street Wharf (BSW) under the Nationwide Permit provisions of Section 404 of the Clean Water Act. The BSW will provide a new public open space atop a pile-supported deck over the San Francisco Bay. As a part of the BSW project, biological monitoring was required by the National Oceanic and Atmospheric Administration's National Marine Fisheries Service (NMFS) (NMFS, 2011). Of specific interest, with regard to fishery resources, are the effects of pile driving on two federally-listed threatened fish species, the steelhead (*Oncorhynchus mykiss*) and the Northern American green sturgeon (*Acipenser medirostris*).

Reasonable and Prudent Measures for monitoring of fishery resources stated in the NMFS (2011) Biological Opinion (BO) included:

(1) Ensuring that the fisheries and hydroacoustic monitoring program minimized harm and mortality of steelhead and green sturgeon, and assisted in the evaluation of project effects on salmonids and green sturgeon;
(2) Preparing and submitting reports, regarding the results of the fisheries and hydroacoustic monitoring program;
(3) Evaluating fish mortality and injury rates through the use of visual observations during pile driving events;
(4) Observing bird predation on fishes, and behavior; and,
(5) Providing a report that included a discussion of: (a) any unanticipated effects, or unanticipated levels of effects, on steelhead and green sturgeon; (b) the number of fish killed, or injured, during the pile driving; and, (c) any observed bird predation and behavior.[1]

For the BSW pile driving project, both 24-inch steel shell and 24-inch octagonal concrete pile driving were used. The Port contracted with Tetra Tech (**Tt**) to conduct and report on the biological monitoring. A. A. Rich and Associates (***AAR***) contracted with **Tt** to conduct and report on the fishery resources monitoring (fish monitoring).

[1] Tetra Tech was responsible for monitoring and reporting on bird predation and behavior.

This *Fishery Resources Monitoring Report* (Fish Report) provides a discussion of the fish monitoring effort conducted by ***AAR,*** and includes objectives, methods, results, discussion, conclusions, and recommendations for the fish monitoring effort.

II. OBJECTIVES

The objectives of this Fish Report are to:

(1) Describe the methodology used for the fish monitoring;
(2) Summarize the results of the fish monitoring;
(3) Describe any unanticipated effects or unanticipated levels of effects on steelhead and the North American green sturgeon;
(4) Describe any measures taken to minimize those unanticipated effects;
(5) Provide a statement as to whether or not the unanticipated effects had any effect on the ESA-listed fish;
(6) Provide the number and species of fish injured or killed during the pile driving activities; and,
(7) Provide some photos taken before, during, and after the pile driving activities.

III. METHODS USED TO MONITOR FISHERY RESOURCES

A. PROJECT OUTSET

Before beginning the monitoring, the fishery resources monitors (fish monitors) reviewed the species of fishes that could be seen in the area during monitoring activities and reviewed the following documents:

- BSW proposal submitted to the Port by **Tt** and ***AAR***;
- Brannan Street Wharf Biological Monitoring Protocol;
- Brannan Street Wharf Fishery Resources Monitoring Data Sheets;
- Pier 36 Demolition/Brannan Street Wharf Project Hydroacoustic Monitoring Plan;
- The NMFS BO for the Pier 36 Demolition/Brannan Street Wharf Project;
- The NMFS Fisheries Incidental Harassment Authorization for the Pier 36/Brannan Street Wharf Project;
- ***AAR's*** and **Tt's** Health and Safety Plans; and,
- Municon Work Plan for Underwater Sound Monitoring.

B. DAILY MONITORING OPERATIONS

1. Contact List

Each monitor carried a project contact list that included all participants that they might need to contact throughout the duration of the monitoring.

2. Data Sheets

The fish monitoring data sheets were pre-approved by NMFS. After several days of monitoring, it became clear that there was not enough space for the tidal information on the data sheets. Therefore, on August 1st, the data sheets were revised to include the tidal information.

3. Daily Communications

Communication between the fish monitors and the others working on the project, including the biological monitors, occurred throughout each day via VHF radios and in-person conversations. To discuss the day's activities, fish monitors arrived at the site each field day no later than 6:45 am to meet with the **Tt** biological monitors, and Dutra and Municon employees. Each fish monitor had the necessary equipment and supplies (Appendix A) for the daily monitoring. At the end of each day, the fish monitors met with the biological monitors from **Tt**, and Dutra and Municon employees, to discuss the tasks and schedule for the next day of monitoring. In addition, the fish monitors met with the biological monitors from **Tt** to review the data to make certain that there were no discrepancies, or missing data, on any of the data sheets.

4. Data Collection

The fish monitors began collecting relevant data as soon as they arrived at the project site. The time periods for data collection included pre-, during, and post-pile driving activities. All information, including pile type, start/end time, and pile driving method was recorded for each pile. Photos were taken throughout each day of monitoring and logged on the data sheets. A diagram of the project site was included on the data sheet each day. Before leaving the project site, the fish monitors reviewed their data to make certain that there were no discrepancies or missing data on any of the data sheets.

5. Dead, Injured, or Disorientated Fishes

Any dead, injured, or disoriented fish were to be identified through direct observation with binoculars or dip-net collection, either from shore, or using the **Tt**-contracted boat or the Dutra boat, depending on the nature of the specific event and the location of the fish. Information would be recorded on the data sheets. If any dead, injured, or disoriented salmonids or green sturgeon were identified, lengths would be recorded, collected and processed, as described in the NMFS BO (NMFS, 2011).

6. Daily and Weekly Reporting

There were two types of data reporting: daily and weekly. For the first three days of each pile type (i.e., steel or concrete), ***AAR*** provided **Tt** with both electronic and hard copies of the data sheets. Each Monday morning, throughout the fish monitoring, ***AAR*** provided **Tt** with both electronic and hard copies of the data sheets, a CD containing the photos taken the previous week, and a brief summary of the results of the fish monitoring for the previous week.

IV. RESULTS OF THE FISHERY RESOURCES MONITORING

A. LOCATION OF MONITORING

Except for the first day (July 27th) of fish monitoring, when the monitor was on the barge, all monitoring was conducted along the shoreline. When the fish monitor arrived on-site on July 30th, Steve Hutchinson, from Dutra, requested that the fish monitoring be conducted from shore whenever possible, as he felt that it was unsafe to monitor from the barge at that time.

B. DATES AND DURATION OF MONITORING[2]

Fish monitoring was conducted for 10 days for each pile type. Steel pile driving was conducted on July 27, 30, 31, August 1-3, and, August 6-9; concrete pile driving was conducted on August 13-17, and August 20-24. From July 27th - August 6th, the fish monitor began searching for fishes before pile driving began, but at about the same time (6:45 am) that various other activities (e.g., shuttling people to the barge) had begun. From the onset of the fish monitoring, the monitors reported that the visibility in the water was very poor, even prior to pile driving activities, and no fishes were observed. Thus, beginning on August 7th to the end of the monitoring, the fish monitors began searching for fishes earlier, between 6:15-6:30 am. To assist with seeing fish, the fish monitors used a high-powered flashlight throughout each day of monitoring.

[2] The data sheets for the fish monitoring during steel and concrete pile driving are provided in Appendices B and C, respectively. Representative photos are provided in Appendix D.

C. FISHES OBSERVED

On August 9th, when the water was exceptionally calm, at about 6:15 am, approximately 50 small (1-2 inches long) fishes were observed. Although the monitors had collecting nets and other collecting gear within reach, the fishes disappeared within a minute or so, and it was not possible to collect or identify any of the fish species.

V. DISCUSSION, CONCLUSIONS, AND RECOMMENDATIONS

Due to the high level of turbidity in the water before, during and after pile driving each day, turbulence during pile driving activities, and generally dark conditions in the water early in the morning, visibility was very poor. No fishes were seen except once on August 9th, when fishes were observed at about 6:15 am, prior to pile driving and other activities, when the water was exceptionally calm. No injured or dead fish were noted in the project vicinity at any time. Given the poor water visibility, it is not known whether or not there were any effects on the ESA-listed steelhead and the North American green sturgeon, or any other fishes that might have been in the area. And, due to the poor visibility, it is not known whether or not any fish were injured or killed.

Due to the extremely poor visibility, even prior to pile driving activities, direct observation was not an effective method for: (1) identifying unanticipated effects, or unanticipated levels of effects, on steelhead and green sturgeon; or, (b) determining the number of fish killed, or injured, during the pile driving.

Although pile driving is required for a wide range of construction activities throughout the world, little is known about the effects of pile driving on fishes. While there have been studies, most have been difficult to design and, in many cases, poorly executed. It is very difficult to control the sounds to which fish are exposed from pile driving operations because such operations are often very large and very expensive. In addition, construction workers need to work as quickly as possible and cannot easily manage the rate of their pile driving activities to fit an experimental protocol (Popper and Hastings, 2009).

It is recommended that a method, other than direct observation, be used to determine whether or not pile driving along the Port of San Francisco has effects on steelhead, green sturgeon, or other ESA-listed fishes. Methods that have been attempted, with varying success, in other pile-driving-related studies elsewhere include: (1) hydroacoustic studies; (2) fish caging studies; and, (3) laboratory-based studies (Casper et al., 2012; Halvorsen et al., 2011, 2012; Popper and Hastings, 2009).

VI. LITERATURE CITED

Casper, B. C., A. N. Popper, F. Matthews, T. J. Carlson, and M. B. Halvorsen. 2012. Recovery of barotrauma injuries in Chinook salmon, *Oncorhynchus tshawytscha* from exposure to pile driving sound. PLoS ONE, 7(6).

Halvorsen, M. B., B. M. Casper, C. M. Woodley, T. J. Carson, and A. N. Popper. 2011. Predicting and mitigating hydroacoustic impacts on fish from pile installations. NCHRP Research Results Digest 363, Project 25-28, National Cooperative Highway Research Program, Transportation Research Board, National Academy of Sciences, Washington, D. C.

Halvorsen, M. B., B. M. Casper, C. M. Woodley, T. J. Carson, and A. N. Popper. (in press). Threshold for onset of injury in Chinook salmon from exposure to impulsive pile driving sounds. PLoS ONE, 7(6).

NMFS. 2011. Pier 36 Demolition/Brannan Street Wharf Project in San Francisco, California-Biological Opinion. 45 pages. September 16, 2011.

Popper, A. N. and M. C. Hastings. 2009. The effect of anthropogenic sources of sound on fishes. *Journal of Fish Biology* 75, 455-489.

APPENDICES

APPENDIX A

Equipment List for Fish Monitoring

Equipment List for Fish Monitoring

- □ alcohol ("pickle" dead, non-listed fishes)
- □ appropriate clothing
- □ binoculars
- □ buckets (for dead or injured fishes)
- □ business cards
- □ camera, digital (2)
- □ cell phone
- □ chapstick and sunscreen
- □ clipboard
- □ compass, if needed
- □ polaroid dark glasses
- □ data sheets, water proof
- □ ear plugs
- □ fish keys and identification cards
- □ flashlight
- □ food and water
- □ gps
- □ hard hat
- □ jars, collecting, with water proof labels
- □ knapsack with belongings (wallet, keys, etc.)
- □ life jacket
- □ measuring boards (for injured or dead fishes)
- □ measuring tape (200-foot long)
- □ nets (for collecting fish)
- □ pens, pencils, sharpies
- □ steel-toed boots
- □ tide tables
- □ vest, high visibility (orange, green, red)
- □ VHF radio

APPENDIX B

Fishery Resources Monitoring Data Sheets Used During Steel Pile Driving

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

FISHERY RESOURCES

Date 7/27/12 Monitor Ian / Marques Visibility Clear, 10+NM vis, Beaufort 3

Tide Level Low at 05:21AM 0.15'; Human Activity in the Area Kayaker, Pedestrians

Latitude 37.7787 °N Longitude 122.3974 °W

Monitoring Locale: Pier 30 ☐ Pier 32 ☐ Pier 38 ☐ 178m from pile driving ☐ 129m from pile driving ☐
☑ On Barge

Pile Type: 24-inch octagonal concrete ☐ 24-inch steel shell ☑

Piles/Day (1-8): 1 Pile Driver: Impact ☑ Vibratory/Impact ☐ Attenuation Device: None ☐

Bubble Curtain: On ☑ Off ☐ Minutes of Vibratory Driving: n/a ☑ 8:00 ☐

Impact Blows per Pile: 800 ☐ 300 ☑

High at 748AM 3.8'; Low at 1216, 2.4'; High 1901PM 6.4'

Pile No.	Pile Driver (Impact, Vibratory)[1]	Pile Driving Start/End Time	Observer Start/End Time	Dead/Injured Fish Observed (Number/Species)[2] and Time		Dead/Injured Fish Collected (Number/Species) and Time		Comment: Reference Number
1	Impact	12:48/1300	7:00/1635	0	-	0		1

[1] Steel shell pile driving will include both vibratory (up to the last 10 feet) and impact (last 10 feet) pile drivers
[2] SH=Steelhead; GS=North American Green Sturgeon; O=Other

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

FISHERY RESOURCES

PHOTOS

Comment: Reference No.	Photo Number	Time of Photo	Photo Taken Before (B), During (D) or After (A) Pile Driving	Description
	1	0732	B	Pile driven the day before Observers not present.
	2	1107	B	Acoustic Boat
	3	1108	B	Crane & Pile Driver
	4	1108	B	View of bay from stern of Barge
	5	"	"	"
	6	1109	B	Harbor seal head outside of exclusion zone
	7	12:02	B	Pile Driver put in position
	8	12:04	B	Pile driver problem, readjusted
	9	12:23	B	Pile driver re-aligned
	10	12:44	D	Pile being driven
	11	12:46	D	Pile being driven
	12	12:52	D	Pile being driven
	13	1253	D	Bubble skirt in use
	14	1253	D	Video of bubble skirt in use
	15	1253	D	Bubble skirt in use
	16	1256	D	Smoke from pile driver
	17	1301	D	Bubble skirt turned of for pile calibration

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

FISHERY RESOURCES

ADDITIONAL COMMENTS

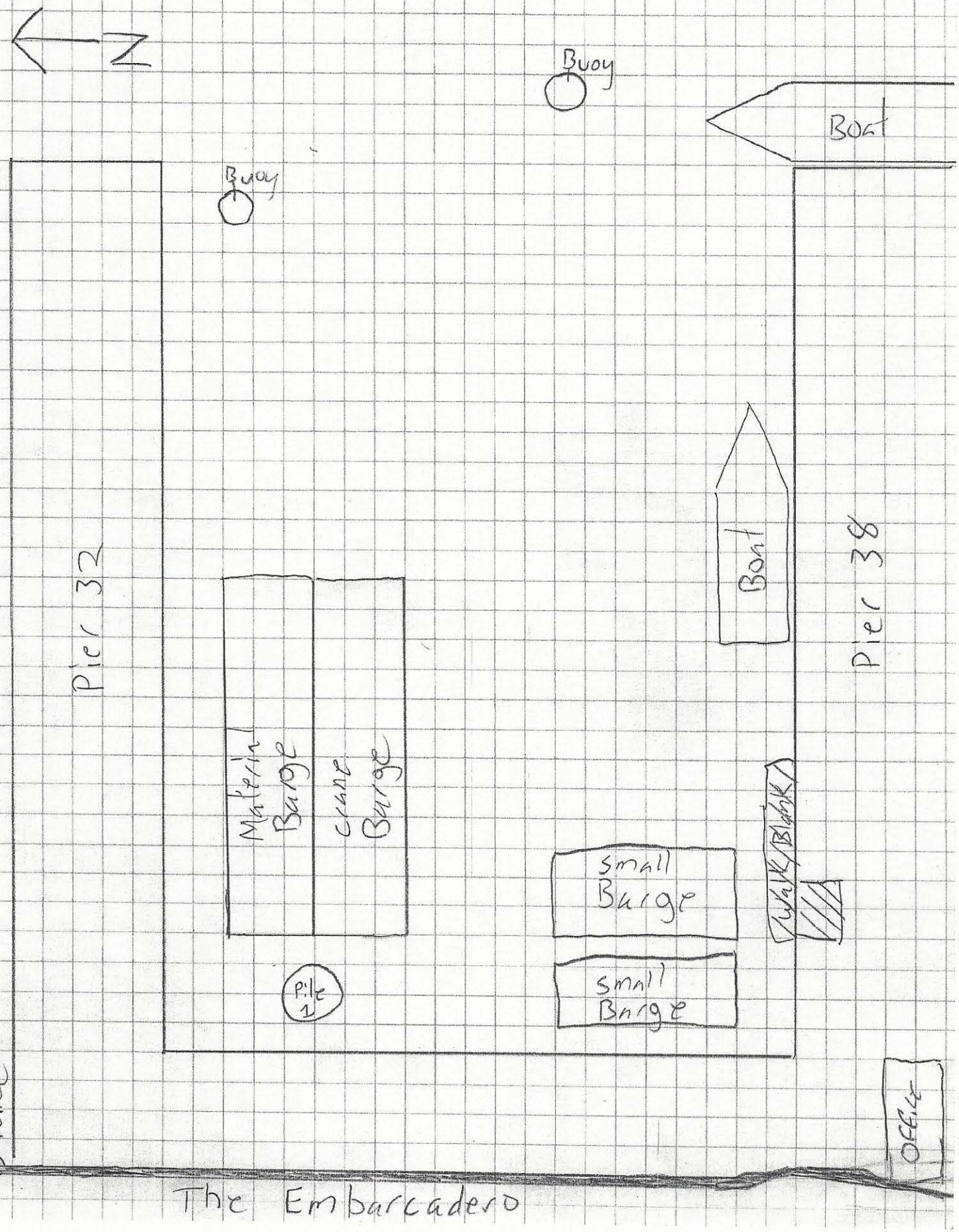
Comment: Reference No.	Additional Comments
1	Bubble curtain malfuncioning, only releasing bubbles of one side of pile
	Arrived onsite at 0645, one pile had been driven already without monitors present.
1	Pile #1 for July 27th is the second steel pile driven since July 26th

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

7/27/12

FISHERY RESOURCES

Pile #	Photos #	time	D/A/B	Comments
1	18	13:06	D	Driving continueing observing w bubbles
1	19	13:17	A	Removal of pile driver
1	20	13:17	A	Picture of pile
2	21	14:00	B	Picking up pile off material barge
2	22	1405	B	Positioning pile 2
2	23	1420	B	Positioning pile 2
2	24	1423	B	Plumbing pile
2	25	1425	B	Plumbing pile
2	26	1445	D	First tap of second pile
2	27	1449	D	Setting bubble Stirk
2	28	1449	D	" "
2	29	1456	D	Bubbles
2	30	1604	A	Removing pile driver


N
Buoy
Boat
Buoy
Pier 32
Boat
Pier 38
Material Barge
Crane Barge
small Barge
small Barge
Walk/Blank
Pile 1
Fence
Gate
The Embarcadero

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

FISHERY RESOURCES

7/27/12

DIAGRAM

BIOLOGICAL MONITOR _____ IAN COLE

Signature **Print Name** 7/29/2012

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

FISHERY RESOURCES

7/27/12

Page 7 of 7

DIAGRAM

BIOLOGICAL MONITOR _____ _____

Signature Print Name

Tetra Tech Inc./A. A. Rich and Associates

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

FISHERY RESOURCES

Date 7/30/2012 Monitor Ian Cole Visibility Clear, 15NM+, Beaufort 3

Tide Level[1]

Date	Low		High		Low		High	
	Time	Tide (ft)	Time	Tide (ft)	Time	Tide (ft)	Time	Tide (ft)
7/30/2012	0359	-0.7	1111	4.7	1538	2.6	2156	0.8

Human Activity in the Area Kayakers, Pedestrians

Latitude 37.7787°N Longitude 122.3974°W

Monitoring Locale: Pier 30 ☐ Pier 32 ☐ Pier 38 ☐ 178m from pile driving ☐ 129m from pile driving ☐ ☑ sidewalk

Pile Type: 24-inch octagonal concrete ☐ 24-inch steel shell ☑

Piles/Day (1-8): 2 Pile Driver: Impact ☑ Vibratory/Impact ☐ Attenuation Device: None ☐

Bubble Curtain: On ☑ Off ☐ Minutes of Vibratory Driving: n/a ☑ 8:00 ☐

Impact Blows per Pile: 800 ☐ 300 ☑

Pile No.	Pile Driver (Impact, Vibratory)[2]	Pile Driving Start/End Time	Observer Start/End Time	Dead/Injured Fish Observed (Number/Species)[3] and Time		Dead/Injured Fish Collected (Number/Species) and Time		Comment: Reference Number
3	Impact	9:26/10:53	7:00/3:45	0		0		1
4	Impact	12:05/13:30	7:00/3:45	0		0		2
5	Impact	14:39/15:06	7:00/3:45	0		0		3

[1] At Golden Gate Bridge, NOAA Fisheries data
[2] Steel shell pile driving will include both vibratory (up to the last 10 feet) and impact (last 10 feet) pile drivers
[3] SH=Steelhead; GS=North American Green Sturgeon; O=Other

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

7/30/12

FISHERY RESOURCES

PHOTOS

Comment: Reference No.	Photo Number	Time of Photo	Photo Taken Before (B), During (D) or After (A) Pile Driving	Description
0	295	7:05	B	Job site at 7am
↓	296	8:12	B	Positioning Barge
↓	297	8:37	B	Adjusting Hammer
↓	298	8:38	B	Acoustic Boat
1	299	8:42	B	Picking up pile #3
↓	300	9:01	B	Positioning pile in crane
↓	301	9:15	B	Positioning pile
↓	302	9:20	B	Plumbing pile
↓	303	9:26	D	Pile driving begins #3 pile
↓	304	9:27	D	Preparing bubbe curtain
↓	305	9:54	D	Bubble curtain installed
↓	306	9:56	D	Pile Driving w/ bubble curtain
↓	307	10:36	D	Pile Driving w/ bubble curtain
↓	308	10:53	A	Pile # 3 finished
2	309	11:12	B	Picking up Pile # 4
↓	310-312	11:31	B	Positioning pile # 4
↓	313	12:05	D	Pile Driving begins

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

7/30/12

FISHERY RESOURCES

PHOTOS

Comment: Reference No.	Photo Number	Time of Photo	Photo Taken Before (B), During (D) or After (A) Pile Driving	Description
2	314	12:18	D	Installing bubble curtain #4
|	315	13:17	D	Pile driving begins w/ bubble curtain
|	316	13:30	A	Pile #4 Finished
|	317	13:31	A	Water muddied from pile driving
|	318	13:34	A	Hammer is removed from pile
↓	319	13:37	A	Bubble curtain removed from Pile #4
3	320	14:01	B	Pile #5 positioned in hammer
|	321	14:14	B	" "
|	322	14:21	B	Pile #5 positioned
|	323	1421	B	Pile #5 plumbing
|	324-325	1439	D	Pile driving begins
|	326	1443	D	Bubble curtain instklled
|	327	1452	D	Driving w/ bubbles begins
↓	328	1506	A	Pile # 5 finished
	329	1528	A	Barge back in place

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

FISHERY RESOURCES

7/30/12

ADDITIONAL COMMENTS

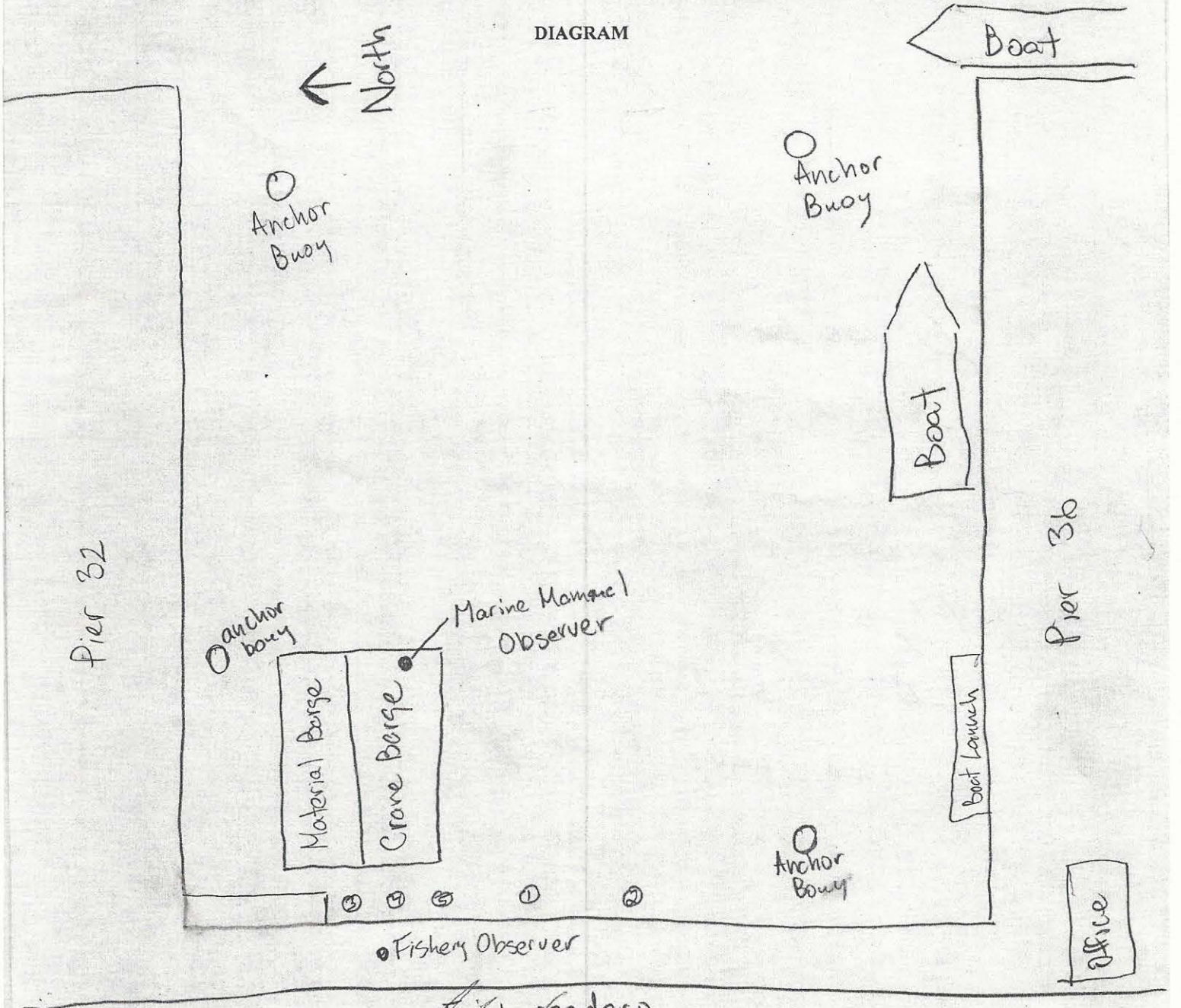
Comment: Reference No.	Additional Comments
0	Arrived on site. PM Steve notified me that
	he would prefer that I monitored the immediate
	area surrounding the pile from shore while it is
	possible to do so. He felt that it was unsafe
	to monitor from the barge end for the time
	being.

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

FISHERY RESOURCES

7/30/12

DIAGRAM



BIOLOGICAL MONITOR _____ Ian Cole

Signature **Print Name**

Tetra Tech Inc./A. A. Rich and Associates

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

FISHERY RESOURCES

Date 7/31/2012 Monitor Ian Cole Visibility Clear, 15+NM vis, Beaufort 2

Tide Level[1]

Date	Low		High		Low		High	
	Time	Tide (ft)	Time	Tide (ft)	Time	Tide (ft)	Time	Tide (ft)

Human Activity in the Area Pedestrians, Kayakers, Sail Boats

Latitude 37.7787°N Longitude 122.3974°W

Monitoring Locale: Pier 30 ☐ Pier 32 ☐ Pier 38 ☐ 178m from pile driving ☐ 129m from pile driving ☐ ☑ Shore

Pile Type: 24-inch octagonal concrete ☐ 24-inch steel shell ☑

Piles/Day (1-8): ☐ Pile Driver: Impact ☑ Vibratory/Impact ☐ Attenuation Device: None ☐

Bubble Curtain: On ☑ Off ☐ Minutes of Vibratory Driving: n/a ☐ 8:00 ☑

Impact Blows per Pile: 800 ☐ 300 ☑

Pile No.	Pile Driver (Impact, Vibratory)[2]	Pile Driving Start/End Time	Observer Start/End Time	Dead/Injured Fish Observed (Number/Species)[3] and Time		Dead/Injured Fish Collected (Number/Species) and Time		Comment: Reference Number
6	Impact	8:37/9:04	7:00/2:45	0		0		
7	Impact	10:17/13:01	↓	0		0		1

[1] At Golden Gate Bridge, NOAA Fisheries data
[2] Steel shell pile driving will include both vibratory (up to the last 10 feet) and impact (last 10 feet) pile drivers
[3] SH=Steelhead; GS=North American Green Sturgeon; O=Other

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

FISHERY RESOURCES

7/31/12

PHOTOS

Comment: Reference No.	Photo Number	Time of Photo	Photo Taken Before (B), During (D) or After (A) Pile Driving	Description
0	330	7:40	B	Barge Arrives at Piles
↓	331	7:41	B	Tt Boat
↓	332	7:58	B	Pile #6 being picked up
	333	8:29	B	Positioning pile #6
	334	8:37	D	Driving begins on pile #6
	335	8:41	D	Bubble curtain installed
	336	8:44	D	Driving begins w/ bubble curtain
	337	9:04	A	Driving Complete pile # 6
	338	10:01	B	To Boat
↓	339	10:08	B	Positioning pile #7
↓	340	10:17	D	Driving Begins pile #7
↓	341	10:20	D	Installing Bubble Curtain
↓	342	10:23	D	Driving Begins pile #7 w/ bubbles
	343	10:55	D	Pile driving incomplete, making repairs on pile driver
	344	11:25	D	Driving resumes w/ bubbles
	345	11:43	D	Pile driver being repaired, driving stopped
	346	12:20	D	Pile driver being repaired, driving stopped

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

7/31/12

FISHERY RESOURCES

PHOTOS

Comment: Reference No.	Photo Number	Time of Photo	Photo Taken Before (B), During (D) or After (A) Pile Driving	Description
	347	1247	D	Pile driving resumes w/ bubbles
	348	13:01	A	Pile driving finishes for day with Pile #7 incomplete
	349	13:38	A	Crew working on broken fuel line
	350	14:19	A	Pile #7 incomplete

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

FISHERY RESOURCES

7/31/12

ADDITIONAL COMMENTS

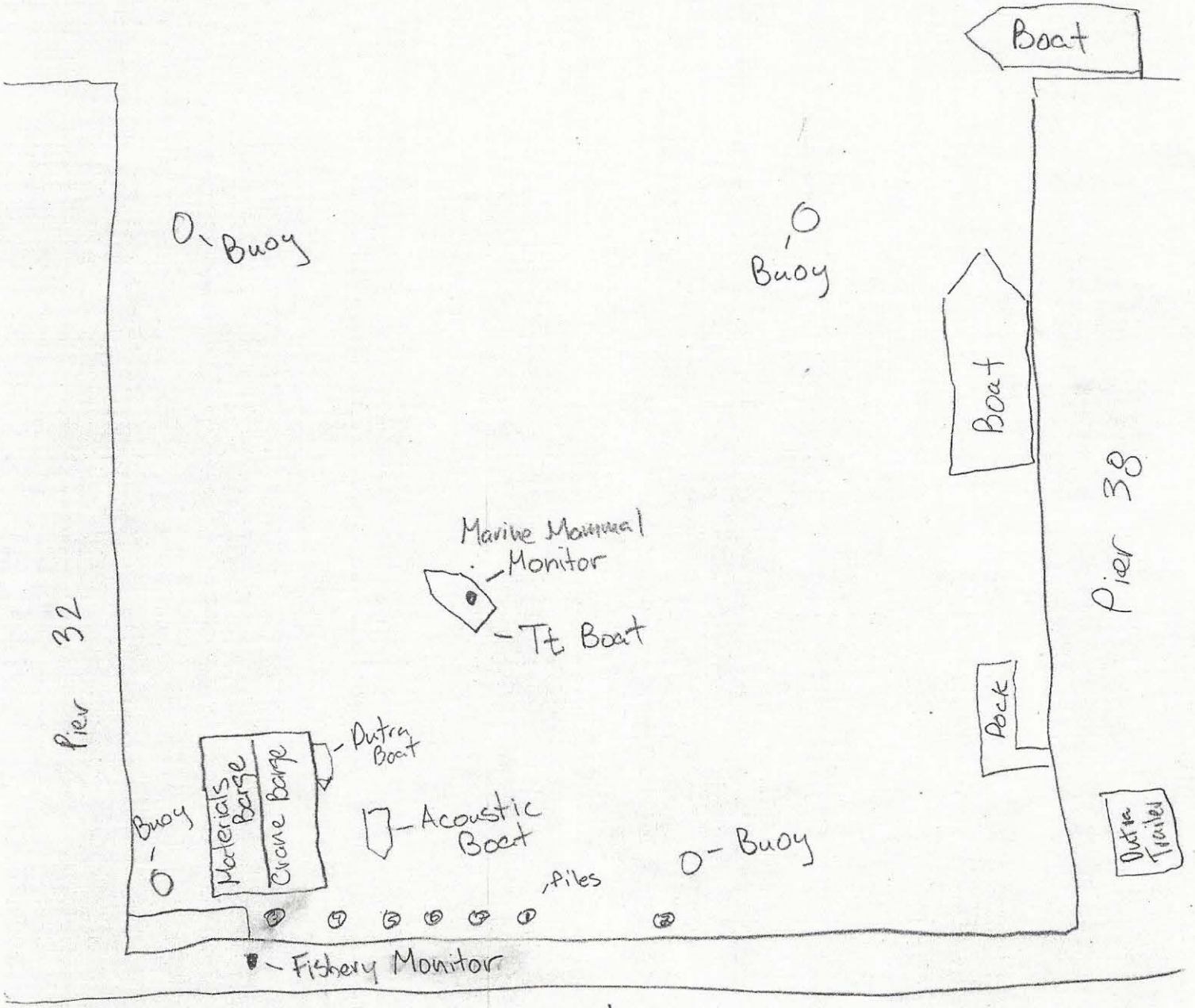
Comment: Reference No.	Additional Comments
1	Problems with Hammer fuel line, driving has stopped & started intermittently as they have to make repairs

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

7/31/12

FISHERY RESOURCES

DIAGRAM



BIOLOGICAL MONITOR Embarcadero
Signature

Ian Cole
Print Name

Tetra Tech Inc./A. A. Rich and Associates

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

FISHERY RESOURCES

Date 8/1/2012 Monitor Ian Cole Visibility Clear, 15+NM vis, Beaufort 2

Tide Level[1]

Date	Low		High		Low		High	
	Time	Tide (ft)	Time	Tide (ft)	Time	Tide (ft)	Time	Tide (ft)
8/1/12	0532	-0.9	12:36	5.3	17:27	2.2	23:40	6.7

Human Activity in the Area Pedestrians, Sail boats

Latitude 37.7787 °N Longitude 122.3974° W

Monitoring Locale: Pier 30 ☐ Pier 32 ☐ Pier 38 ☐ 178m from pile driving ☐ 129m from pile driving ☐ ☑ Shore

Pile Type: 24-inch octagonal concrete ☐ 24-inch steel shell ☑

Piles/Day (1-8): ☐ Pile Driver: Impact ☑ Vibratory/Impact ☐ Attenuation Device: None ☐

Bubble Curtain: On ☑ Off ☐ Minutes of Vibratory Driving: n/a ☑ 8:00 ☐

Impact Blows per Pile: 800 ☐ 300 ☑

Dated

Pile No.	Pile Driver (Impact, Vibratory)[2]	Pile Driving Start/End Time	Observer Start/End Time	Dead/Injured Fish Observed (Number/Species)[3] and Time		Dead/Injured Fish Collected (Number/Species) and Time		Comment: Reference Number
A24 7	Impact	7:34 / 1755	6:45 / 15:15	0		0		
A26.5 8	Impact	856 / 9:25		0		0		
A26 9	Impact	10:03 / 10:36		0		0		
A25.5 10	Impact	11:58 / 13:09		0		0		
A25 11	Impact	13:53 / 14:37		0		0		

[1] At Golden Gate Bridge, NOAA Fisheries data
[2] Steel shell pile driving will include both vibratory (up to the last 10 feet) and impact (last 10 feet) pile drivers
[3] SH=Steelhead; GS=North American Green Sturgeon; O=Other

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

FISHERY RESOURCES

8/1/12

PHOTOS

Comment: Reference No.	Photo Number	Time of Photo	Photo Taken Before (B), During (D) or After (A) Pile Driving	Description
	351	6:48	B	Site w/ pile # 7 incomplete
	352	7:31	B	Barge Moving into position
	353	7:34	D	Driving pile #7 w/ bubbles
	354	7:55	A	Pile #7 complete
	355	8:19	B	problem w/ driver, fixing
	356	8:37	B	Moving pile # 8 into position
	357	8:56	D	Driving begins pile #8
	358-359	9:04	D	Driving continues, bubble start
	360	9:25	A	Driving Complete pile #8
	361	9:48	B	Positioning pile #9
	362	10:08	D	Driving begins pile # 9
	363	10:11	D	Installing bubble curtain
	364	10:14	D	Driving continues, bubble begin
	365	10:36	A	Driving complete pile # 9
	366	11:40	B	Positioning pile # 10 in sleeve
	367	11:58	D	Driving begins pile # 10
	368	12:44	D	installing bubble curtain
	369	12:46	D	Bubbles start
	370	13:09	D	Driving complete pile # 10
	371	13:43	D	Positioning pile # 11
	372	1353	D	Driving begins
	373	1413	D	Bubbles begin
	374	1437	A	Pile # 11 complete

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

8/1/12 ~~BIRDS~~ Fishery Resources

PHOTOS

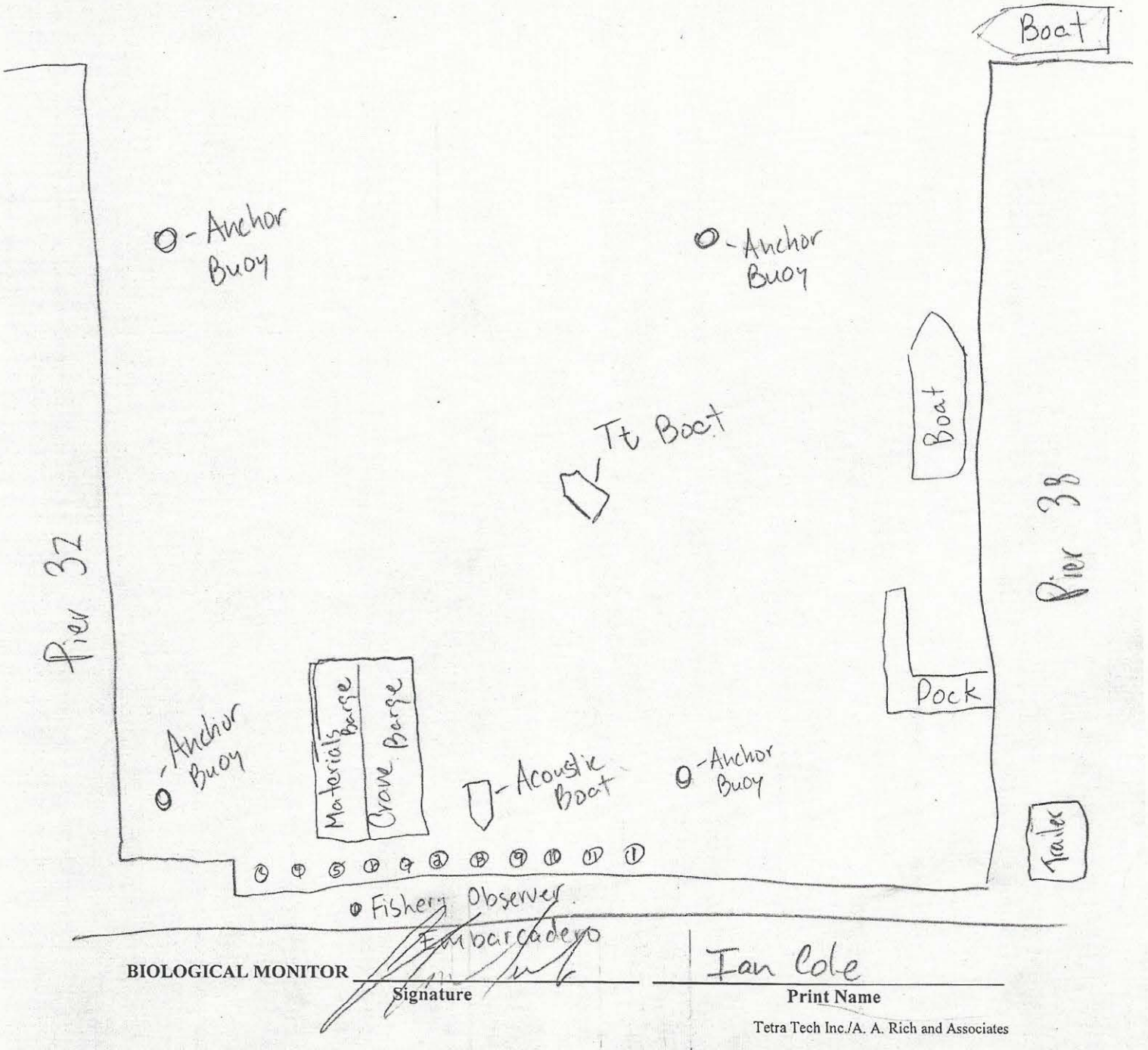
Comment: Reference No.	Photo Number	Time of Photo	Photo Taken Before (B), During (D) or After (A) Pile Driving	Description
	369	12:46	D	Bubbles Start
	370	13:09	D	Driving complete pile #10
	371	13:43	D	Positioning pile #11
	372	13:53	D	Driving begins
	373	1413	D	Bubbles begin
	374	1437	A	Pile #3 Complete

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

8/1/12

FISHERY RESOURCES

DIAGRAM



BIOLOGICAL MONITOR _____ Ian Cole

Signature **Print Name**

Tetra Tech Inc./A. A. Rich and Associates

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

FISHERY RESOURCES

Date 8/2/12 Monitor Ian Cole Visibility Clear, 15+NM vis, Beaufort 2

Tide Level[1]

Date	Low		High		Low		High	
	Time	Tide (ft)	Time	Tide (ft)	Time	Tide (ft)	Time	Tide (ft)
Thursday	06:13	-0.8	13:14	5.4	18:17	2.0	00:28	6.4
Friday								

Human Activity in the Area Pedestrians, Pleasure boats

Latitude 37.7787° N Longitude 122.3974° W

Monitoring Locale: Pier 30 ☐ Pier 32 ☐ Pier 38 ☐ 178m from pile driving ☐ 129m from pile driving ☐ ☑ Shore

Pile Type: 24-inch octagonal concrete ☐ 24-inch steel shell ☑

Piles/Day (1-8): ☐ Pile Driver: Impact ☑ Vibratory/Impact ☐ Attenuation Device: None ☐

Bubble Curtain: On ☑ Off ☐ Minutes of Vibratory Driving: n/a ☑ 8:00 ☐

Impact Blows per Pile: 800 ☐ 300 ☑

	Pile No.	Pile Driver (Impact, Vibratory)[2]	Pile Driving Start/End Time	Observer Start/End Time	Dead/Injured Fish Observed (Number/Species)[3] and Time		Dead/Injured Fish Collected (Number/Species) and Time		Comment: Reference Number
12	A24.5	Impact	10:05/10:35	06:45/16:30	0		0		
13	A23.5	Impact	11:27/11:54		0		0		1
14	A23	Impact	13:23/13:37		0		0		1
15	A22.5	Impact	14:26/14:53		0		0		1
16	A21	Impact	15:50/16:03		0		0		

[1] At Golden Gate Bridge, NOAA Fisheries data

[2] Steel shell pile driving will include both vibratory (up to the last 10 feet) and impact (last 10 feet) pile drivers

[3] SH=Steelhead; GS=North American Green Sturgeon; O=Other

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

8/2/12

FISHERY RESOURCES

PHOTOS

Comment: Reference No.	Photo Number	Time of Photo	Photo Taken Before (B), During (D) or After (A) Pile Driving	Description
	375	6:46	B	Barge at 0645
	376	8:27	B	Barge moving into position
	377	9:46	B	Positioning pile #12
2	378	10:05	D	Driving begins pile # 12
	379	10:23	D	Driving w/ bubbles begins
	380	10:35	A	Driving complete pile # 12
	381	11:13	B	Positioning Pile # 13
	382	11:27	D	Driving begins pile # 13
	383	11:41	D	Driving w/ bubbles begins
	384	11:54	D	Pile # 13 complete
	385	12:59	B	Positioning pile # 14
	386	13:23	D	Driving begins w/ bubbles
	387	13:37	A	Pile # 14 complete
	388	14:14	B	Positioning pile # 15
	389	14:26	D	Driving begins pile # 15
	390	14:39	D	Driving begins w/ bubbles
	391	14:53	A	Pile # 15 complete
	392	15:50	D	Driving begins pile # 16
	393	16:06	A	Done for the day # 16 incomplete

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

FISHERY RESOURCES

8/2/12

ADDITIONAL COMMENTS

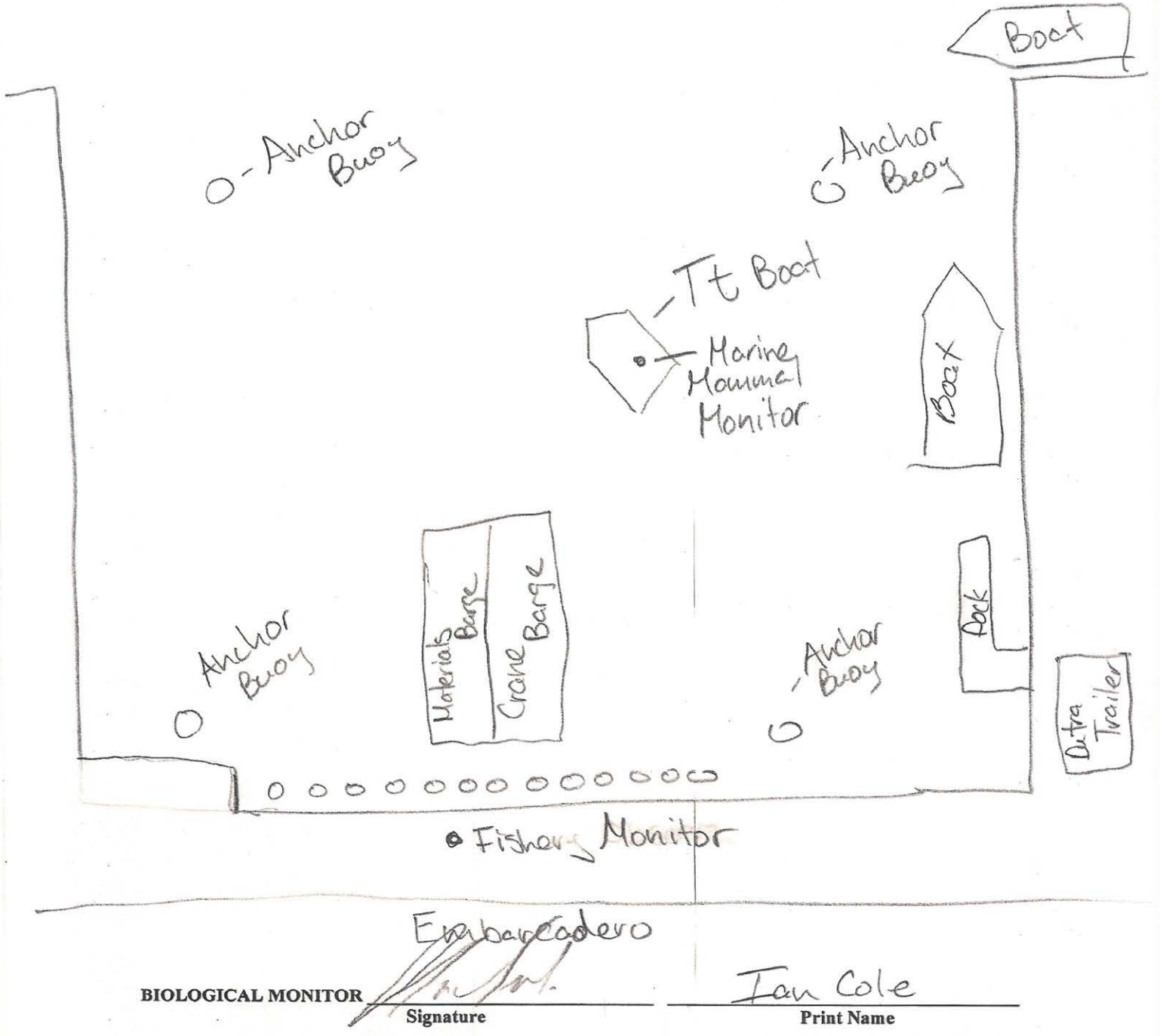
Comment: Reference No.	Additional Comments
1	13,14 & 15th piles Had difficulty setting due to uneven
	sea floor.
2	Driving did not begin until 10:05 due to repairs
	on hammer & safety meetings

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

FISHERY RESOURCES

8/2/12

DIAGRAM



BIOLOGICAL MONITOR _____ Ian Cole

Signature **Print Name**

Tetra Tech Inc./A. A. Rich and Associates

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

FISHERY RESOURCES

Date 8/3/12 Monitor Ian Cole Visibility Clear, 20NM+, Beaufort 2

Tide Level[1]

Date	~~Low~~ High		~~High~~ Low		~~Low~~ High		~~High~~ low	
	Time	Tide (ft)	Time	Tide (ft)	Time	Tide (ft)	Time	Tide (ft)
8/3/12	00:29	6.4	06:53	-0.5	13:51	5.6	19:06	1.8

Human Activity in the Area Pedestrians, Sailboats

Latitude 37.7787°N Longitude 122.3974°W

Monitoring Locale: Pier 30 ☐ Pier 32 ☐ Pier 38 ☐ 178m from pile driving ☐ 129m from pile driving ☐ ☑ Shore

Pile Type: 24-inch octagonal concrete ☐ 24-inch steel shell ☑

Piles/Day (1-8): ☐ Pile Driver: Impact ☑ Vibratory/Impact ☐ Attenuation Device: None ☐

Bubble Curtain: On ☑ Off ☐ Minutes of Vibratory Driving: n/a ☑ 8:00 ☐

Impact Blows per Pile: 800 ☐ 300 ☑

	Pile No.	Pile Driver (Impact, Vibratory)[2]	Pile Driving Start/End Time	Observer Start/End Time	Dead/Injured Fish Observed (Number/Species)[3] and Time		Dead/Injured Fish Collected (Number/Species) and Time		Comment: Reference Number
18A	17	Impact	8:46/9:03	06:45/16:15	0		0		1
15A	18	Impact	10:58/11:17		0		0		2
22A	19	Impact	13:01/13:32		0		0		
21.5A	20	Impact	14:06/14:32		0		0		
20.5A	21	Impact	15:28/14:07		0		0		

[1] At Golden Gate Bridge, NOAA Fisheries data

[2] Steel shell pile driving will include both vibratory (up to the last 10 feet) and impact (last 10 feet) pile drivers

[3] SH=Steelhead; GS=North American Green Sturgeon; O=Other

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

6/3/12

FISHERY RESOURCES

PHOTOS

Comment: Reference No.	Photo Number	Time of Photo	Photo Taken Before (B), During (D) or After (A) Pile Driving	Description
	394	07:13	B	Site w/ pile # 16 incomplete
	395	08:39	B	Positioning pile # 17
	396	08:46	D	Driving begins pile # 17
	397	09:01	D	Bubbles start, driving continues
	398	09:03	A	Driving finish, pile # 17 incomplete
	399	09:40	B	Repositioning anchor Buoy
	400	10:51	B	Positioning pile # 18
	401	10:58	D	Driving begins pile # 18
	402	11:12	D	Bubbles start, Driving continues
	403	11:17	A	Driving finished, pile # 18 incomplete
	404	12:47	B	Positioning pile # 19
	405	13:01	D	Driving begins pile # 19
	406	13:14	D	Bubbles begin, driving continues
	407	13:32	A	Driving complete pile # 19
	408	14:02	B	Positioning pile # 20
	409	14:06	D	Driving begins pile # 20
	410	14:15	D	Bubbles begins, driving continues

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

FISHERY RESOURCES

8/3/12

PHOTOS

Comment: Reference No.	Photo Number	Time of Photo	Photo Taken Before (B), During (D) or After (A) Pile Driving	Description
	411	14:32	A	Driving complete pile # 20
	412	15:20	B	Positioning pile # 21
	413	15:28	D	Driving begins pile # 21
	414	15:50	D	Bubbles start, Driving continues
	415	16:07	A	Driving complete pile # 21

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

8/3/12

FISHERY RESOURCES

ADDITIONAL COMMENTS

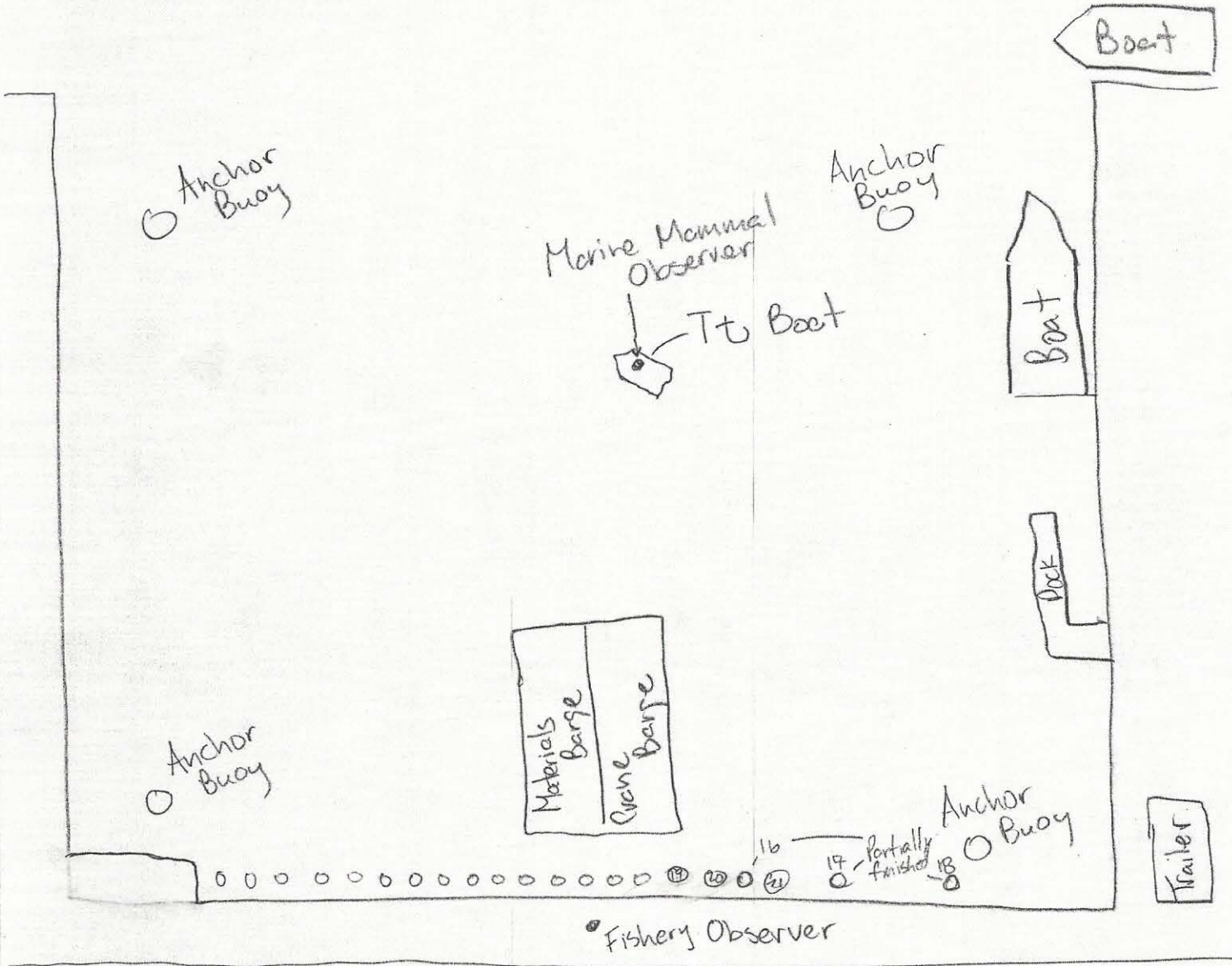
Comment: Reference No.	Additional Comments
1	Pile driven incompletly: Indicator pile
2	Pile driven incompletly: Indicator pile

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

8/3/12

FISHERY RESOURCES

DIAGRAM



Embarcadero

BIOLOGICAL MONITOR _____ Ian Cole

Signature Print Name

Tetra Tech Inc./A. A. Rich and Associates

timing

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

PILE #

#9 - V

DUTRA. 1, 7

FISHERY RESOURCES

Dutra channel

80 RADIO

Date 08/06/12 Monitor Tom COPPER Visibility Slight overcast

Tom-SWEVERPE

Tide Level

Date	Low		High		Low		High	
	Time	Tide (ft)	Time	Tide (ft)	Time	Tide (ft)	Time	Tide (ft)
08/06/12	0847	1.0	0253	5.0	2140	1.6	1534	5.6

Human Activity in the Area PEDESTRIANS, SMALL BOAT, SCUBA DIVER

Latitude 37.784372 °N Longitude 122.387699 °W

Monitoring Locale: Pier 30 ☐ Pier 32 ☐ Pier 38 ☐ 178m from pile driving ☐ 129m from pile driving ☐ ☒ SHORE

Pile Type: 24-inch octagonal concrete ☐ 24-inch steel shell ☒

Piles/Day (1-8): ☐ Pile Driver: Impact ☒ Vibratory/Impact ☐ Attenuation Device: None ☐

Bubble Curtain: On ☒ Off ☐ Minutes of Vibratory Driving: n/a ☒ 8:00 ☐

Impact Blows per Pile: 800 ☐ 300 ☒

↓ DUTRA

Pile No.	Pile Driver (Impact, Vibratory)[1]	Pile Driving Start/End Time	Observer Start/End Time	Dead/Injured Fish Observed (Number/Species)[2] and Time		Dead/Injured Fish Collected (Number/Species) and Time		Comment: Reference Number
A20 12	Impact	07:54 / 08:20	0645 / 15:15	0		0		"0"
A19.5 23	Impact	0915 / 0951		0		0		
A 19.0 24	Impact	10:26 / 11:16		0		0		
A 18.5 25	Impact	12:28 / 1:03		0		0		1
J 30 26	Impact	14:22 / 14:49		0		0		2
			0645/					
			15:15					3

[1] Steel shell pile driving will include both vibratory (up to the last 10 feet) and impact (last 10 feet) pile drivers

[2] SH=Steelhead; GS=North American Green Sturgeon; O=Other

-STEEL OR CONCRETE PILES

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

FISHERY RESOURCES

08/06/12 –

Dutra #

J 30

Pile No.	Pile Driver (Impact, Vibratory)[3]	Pile Driving Start/End Time	Observer Start/End Time	Dead/Injured Fish Observed (Number/Species)[4] and Time		Dead/Injured Fish Collected (Number/Species) and Time		Comment: Reference Number
126	IMPACT	14:22 / 14:49	06:45					

[3] Steel shell pile driving will include both vibratory (up to the last 10 feet) and impact (last 10 feet) pile drivers
[4] SH=Steelhead; GS=North American Green Sturgeon; O=Other

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

FISHERY RESOURCES

8/06/12

Comment: Reference No.	Fish Species	Life Stage and Status (A,J,L,E,FT,ST, FE,SE,CF, CS)	Time of observation	Comments
1			11:30	Crane needed adjustment crew went to lunch 11:30
2			14:22	New row for piles – row "J"
0				

A=adult; J=juvenile; L=larva; E=egg; FT = federal threatened; ST=state threatened; FE=federal endangered SE=state endangered; CF = federal candidate; CS=state candidate

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

FISHERY RESOURCES

8/06/12

PHOTOS

Comment: Reference No.	Photo Number	Time of Photo	Photo Taken Before (B), During (D) or After (A) Pile Driving	Description
	416	06:49	B	SITE VIEW
	417	06:49	B	SITE BEFOEE WORK
	418	07:10	B	DUTRA'S PILE # A20
	419	07:11	B	BARGE / PILES STEEL
	420	07:11	B	PILES ON BARGE
	421	07:18	B	CRANE LIFTING PILE #A20
	422	07:19	B	CRANE LIFTING PILE #A20
	423	07:24	B	LIFTING PILE into PLACE
	424	07:25	B	PLACING PILE into POSITION
	425	07:36	B	MEN POSITIONING
	426	07:36	B	MAN ON PONTOFF -
	427	07:37	B	" " "
	428	07:56	B	LEVELING off PILE #A20
	429	08:03	B	INSTALLING BUBBLE CURTAIN
	430	08:04	B	BUBBLE CURTAIN WORKING
	431	08:37	A	PILE IN PLACE #A20
	432	08:58	B	DUTRA'S PILE #A19.5
	433	09:24	D	INSTALLING BUBBLE ~~CAGE~~ CURTAIN
	434	09:30	D	" " "
	435	09:32	D	BUBBLE CURTAIN OPERATIONAL
	436	09:51	A	PILE #A19.5 IN PLACE

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

FISHERY RESOURCES

8/06/12

PHOTOS

Comment: Reference No.	Photo Number	Time of Photo	Photo Taken Before (B), During (D) or After (A) Pile Driving	Description
	437	10:14	B	Pile # A19
	438	10:15	B	Positioning Pile # A19
	439	10:24	B	" " "
	440	10:38	D	fixing cable
	441	10:56	D	BUBBLE CURTAIN WORKING
	442	11:16	A	Pile # A19 completed
	443	11:55	B	2ND Barge + Crane
	444	12:25	B	Position Pile # 18.5A
	445	12:32	D	SEATING Pile # 18.5A
	446	12:42	D	BUBBLE Case
	447	13:00	D	DRIVING Pile # 18.5A
	448	13:08	A	Pile # 18.5A COMPLETED
	449	13:17	B	Position of Barge ON "J" row
	450	14:21	B	Setting of Pile # 30J
	451	14:29	D	BEGIN of Pile DRIVE # 30J
	452	14:37	D	BUBBLE CASE ACTIVE
	453	14:49	A	Placemnt Pile # 30J

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

FISHERY RESOURCES

6/06/12

ADDITIONAL COMMENTS

Comment: Reference No.	Additional Comments
3	No fish seen at all; Turbid; lots of
	water disturbance during pile driving -
	See photos

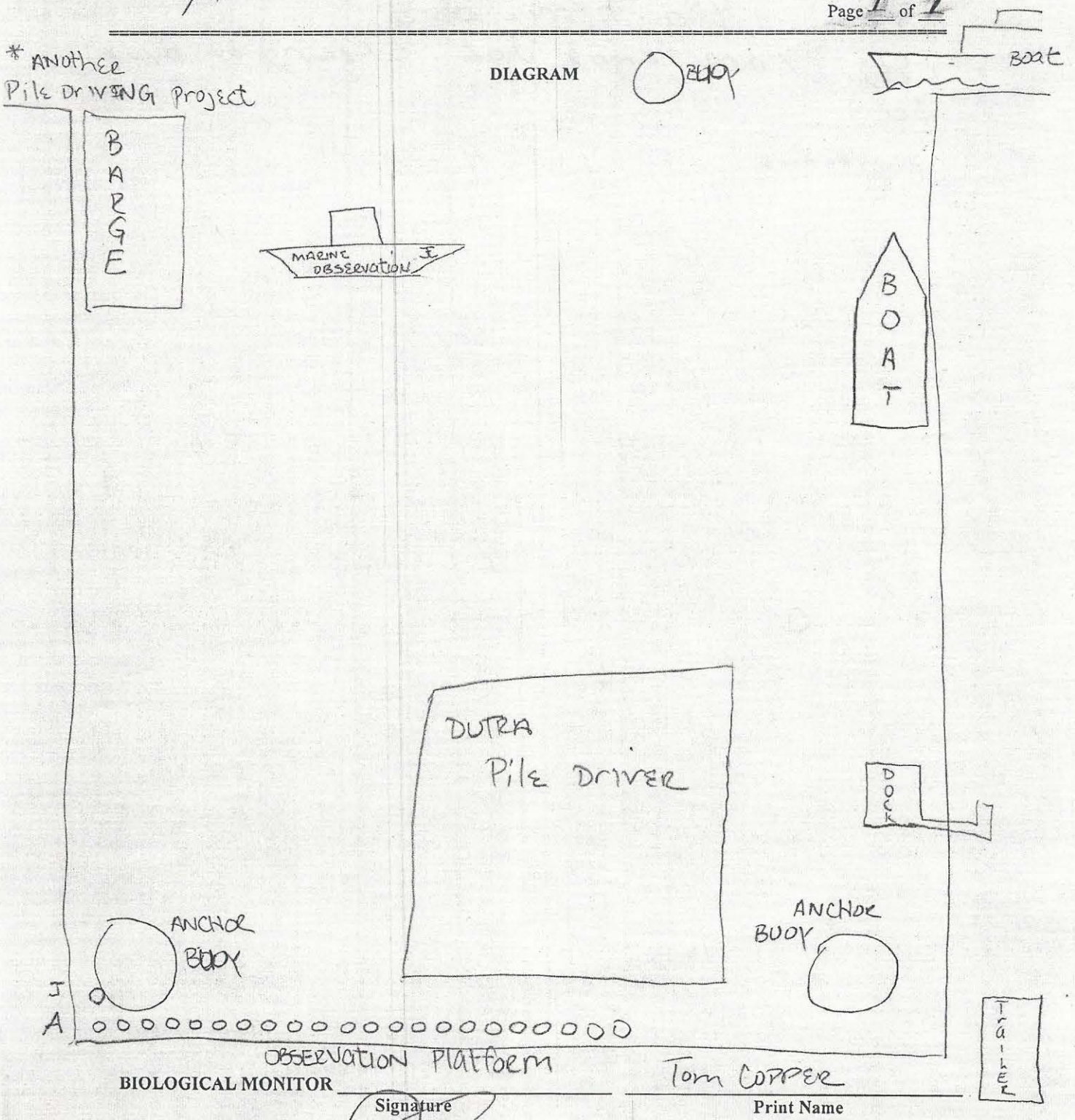
BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

FISHERY RESOURCES

06/06/12

* ANOTHER PILE DRIVING PROJECT

DIAGRAM



BIOLOGICAL MONITOR _____ Tom Copper

Signature **Print Name**

Tetra Tech Inc./A. A. Rich and Associates

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

FISHERY RESOURCES

Date 08/07/12 Monitor Tom Copper Visibility CLEAR

Tide Level[1]

Date	Low		High		Low		High	
	Time	Tide (ft)	Time	Tide (ft)	Time	Tide (ft)	Time	Tide (ft)
08/07	0927	1.5	0348	4.5	2239	1.5	1610	5.6

Human Activity in the Area PEDESTRIANS, TUG BOAT, ADDITIONAL BARGE

Latitude 37.785642 N° Longitude 122.388297 W°

Monitoring Locale: Pier 30 ☐ Pier 32 ☐ Pier 38 ☐ 178m from pile driving ☐ 129m from pile driving ☐ ☑ Shore

Pile Type: 24-inch octagonal concrete ☐ 24-inch steel shell ☒

Piles/Day (1-8): ☐ Pile Driver: Impact ☒ Vibratory/Impact ☐ Attenuation Device: None ☐

Bubble Curtain: On ☒ Off ☐ Minutes of Vibratory Driving : n/a ☒ 8:00 ☐

Impact Blows per Pile: 800 ☐ 300 ☒

Dutra #'s

Pile No.	Pile Driver (Impact, Vibratory)[2]	Pile Driving Start/End Time	Observer Start/End Time	Dead/Injured Fish Observed (Number/Species)[3] and Time		Dead/Injured Fish Collected (Number/Species) and Time		Comment: Reference Number
B27 27	IMPACT	07:35 / 08:02	06:30 / 15:30	O		O		
A15 28	IMPACT	08:49 / 09:04		O		O		1
A18 29	IMPACT	09:42 / 09:55		O		O		2
A21 30	IMPACT	10:36 / 10:52		O		O		3
C21 31	IMPACT	11:25 / 11:51		O		O		
B22 32	IMPACT	1:03 / 1:25		O		O		
B23 33	IMPACT	1:55 / 2:17		O		O		
B24 34	IMPACT	2:55 / 3:16		O		O		

4

[1] At Golden Gate Bridge, NOAA Fisheries data

[2] Steel shell pile driving will include both vibratory (up to the last 10 feet) and impact (last 10 feet) pile drivers

[3] SH=Steelhead; GS=North American Green Sturgeon; O=Other

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

FISHERY RESOURCES

08/07/12

PHOTOS

Comment: Reference No.	Photo Number	Time of Photo	Photo Taken Before (B), During (D) or After (A) Pile Driving	Description
	454	06:37	B	Barge Position - START of day
	455	06:39	B	Pilings placement
	456	07:31	B	Positioning Pile (#B 27)
	457	07.44	D	Placement of BUBBLE CURTAIN
	458	07:49	D	BUBBLE CURTAIN FUNCTIONING
	459	07:56	D	Pile BEING SET (#B 27)
	460	08:02	A	Pile SET (#B 27)
1	461	08:11	B	STATUS Pile (#A 15) - BUBBLE CURTAIN
	462	08:21	B	STATUS Pile (#A15) - BUBBLE CURTAIN
	463	08:52	D	STATUS Pile (#A15) DRIVEN DOWN
2	464	09:04	A	STATUS Reader BEING REMOVED from Pile (#A15)
	465	09:40	B	BUBBLE CURTAIN installed (#A 18)
	466	09:53	D	BUBBLE CURTAIN activated (#A18)
	467	09:55	A	STATUS Reader Pile (#A 18)
3	468	10:15	B	BUBBLE CURTAIN INSTALLED (#A 21)
	469	10:37	D	BUBBLE CURTAIN ACTIVE DURING DRIVING (#A 21)
	470	10:52	A	STATUS Reader AFTER DRIVING (#A 21)
	471	11:17	B	Placement of BUBBLE CURTAIN (#C 21)
	472	11:35	D	BUBBLE CURTAIN ACTIVE (#C 21)
	473	11:51	A	Placement of Pile (#C 21)
	474	13:03	B	SETTLING DOWN Pile (#B 22)
	475	13:11	D	BUBBLE CURTAIN ACTIVE (#B 22)

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

08/07/12

FISHERY RESOURCES

PHOTOS

Comment: Reference No.	Photo Number	Time of Photo	Photo Taken Before (B), During (D) or After (A) Pile Driving	Description
	476	13:27	A	Pile (#B22) in Place
	477	13:47	B	Placing Pile # (B23)
	478	14:01	D	Bubble curtain active (B23)
	479	14:17	A	Pile (#B23) in Place
	480	14:43	B	Pile (#B24) in Place
	481	15:02	D	Bubble curtain active #(B24)
	482	15:16	A	Pile (#B24) in Place

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

8/7/12

FISHERY RESOURCES

ADDITIONAL COMMENTS

Comment: Reference No.	Additional Comments
1	STATUS pile #A15, previous placed but not driven down (no data receptor available before)
2	STATUS pile #A18, previous placed, but not driven until today (data receptor available)
3	STATUS pile #A21, previously placed, but not driven in until today (data receptor available)

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

FISHERY RESOURCES

8/7/12

ADDITIONAL COMMENTS

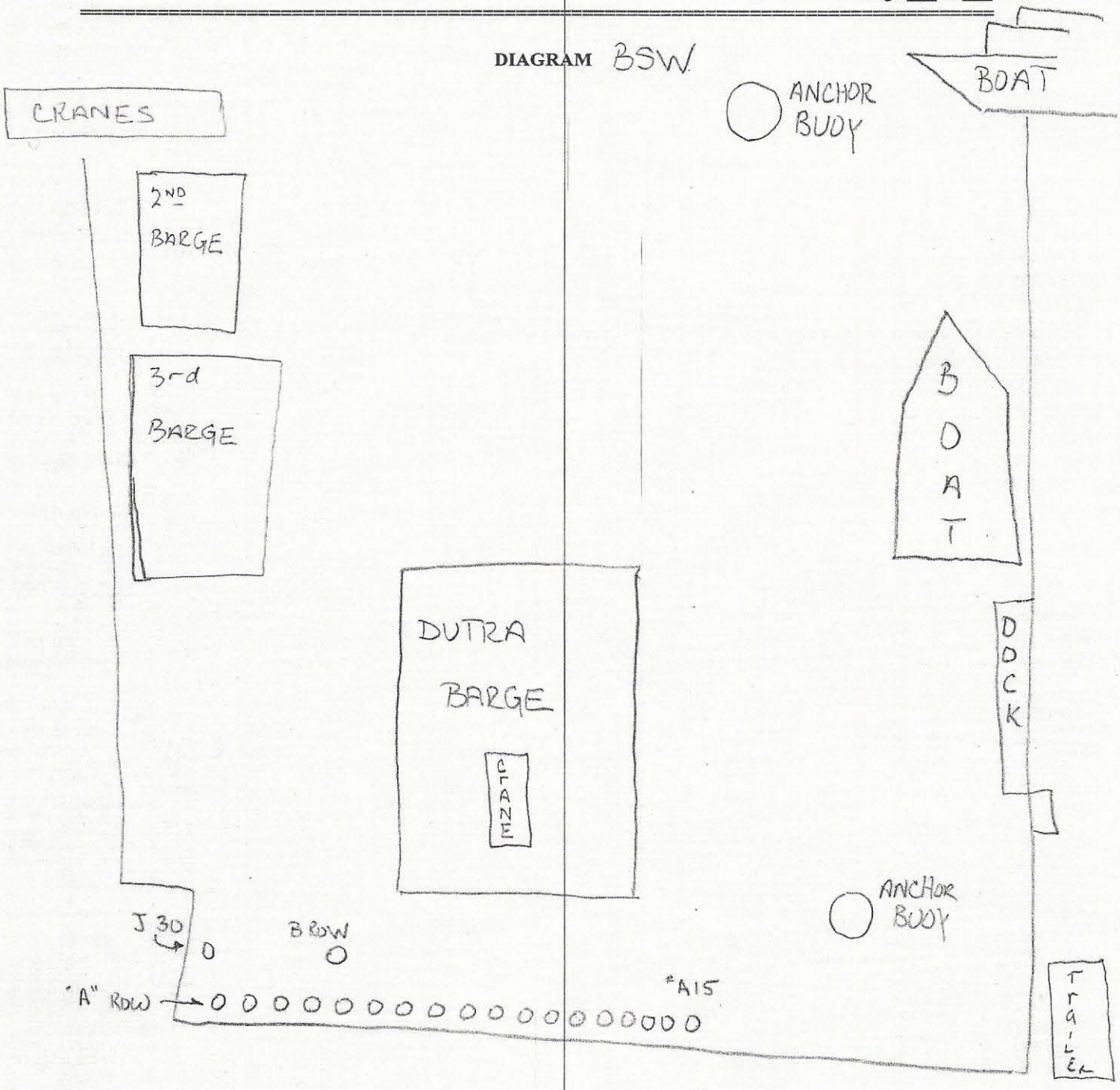
Comment: Reference No.	Additional Comments
4	No fish seen; Turbid; LOTS of water
	disturbance during pile driving - See
	photos

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

8/7/12

FISHERY RESOURCES

DIAGRAM BSW



BIOLOGICAL MONITOR _____ Tom Copper

Signature **Print Name**

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

FISHERY RESOURCES

Date 08/08/12 Monitor Tom COPPER Visibility CLEar

Tide Level[1]

Date	Low		High		Low		High	
08/08	Time	Tide (ft)	Time	Tide (ft)	Time	Tide (ft)	Time	Tide (ft)
	1013	2.1	1654	4.0	2344	1.4	1650	5.5

Human Activity in the Area Pedestrians, tug Boat, American Boat;

Latitude 37.784930 °N Longitude 122.387709 °W

Monitoring Locale: Pier 30 ☐ Pier 32 ☐ Pier 38 ☐ 178m from pile driving ☐ 129m from pile driving ☐ ☒ Shore

Pile Type: 24-inch octagonal concrete ☐ 24-inch steel shell ☑

Piles/Day (1-8): ☐ Pile Driver: Impact ☑ Vibratory/Impact ☐ Attenuation Device: None ☐

Bubble Curtain: On ☒ Off ☐ Minutes of Vibratory Driving: n/a ☒ 8:00 ☐

Impact Blows per Pile: 800 ☐ 300 ☑

Outrás #

Pile No.	Pile Driver (Impact, Vibratory)[2]	Pile Driving Start/End Time	Observer Start/End Time	Dead/Injured Fish Observed (Number/Species)[3] and Time		Dead/Injured Fish Collected (Number/Species) and Time		Comment: Reference Number
B26 35	IMPACT	07:50 / 08:12	06:30	0		0		
B25 36	IMPACT	08:48 / 09:12		0		0		
C20 37	IMPACT	10:08 / 10:27		0		0		
A18 38	IMPACT	11:26 / 11:28		0		0		1
A15 39	IMPACT	11:53 / 11:55		0		0		2
A15.5 40	IMPACT	13:10 / 13:42		0		0		
B16 41	IMPACT	14:13 / 14:43	15:05	0		0		
								3

[1] At Golden Gate Bridge, NOAA Fisheries data
[2] Steel shell pile driving will include both vibratory (up to the last 10 feet) and impact (last 10 feet) pile drivers
[3] SH=Steelhead; GS=North American Green Sturgeon; O=Other

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

8/8/12

FISHERY RESOURCES

ADDITIONAL COMMENTS

Comment: Reference No.	Additional Comments
1	Reset on Pile (#A 13) Will restrike down 14" Indicator pile
2	Restrike down on PDA Pile (#A 15)
3	Although flashlight used previously was very powerful and has been used successfully on other pile driving projects, a more powerful one was used today. It will be used throughout the rest of the project. No fishes seen

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

08/08/12

~~BIRDS~~ FISHERIES

PHOTOS

Comment: Reference No.	Photo Number	Time of Photo	Photo Taken Before (B), During (D) or After (A) Pile Driving	Description
	483	06:41	B	START OF DAY
	484	06:41	B	START OF DAY
	485	07:43	B	PLACEMENT OF PILE (#B_{26})
	486	07:58	D	BUBBLE CURTAIN ACTIVE
	487	08:12	A	PILE IN PLACE (#B_{26})
	488	08:35	B	PLACEMENT OF PILE (#B_{25})
	489	08:59	D	BUBBLE CURTAIN ACTIVE (#B_{25})
	490	09:12	A	PILE IN PLACE (#B_{25})
	491	10:02	B	PLACEMENT OF PILE (#C_{20})
	492	10:14	D	BUBBLE CURTIN ACTIVE (#C_{20})
	493	10:27	A	PILE IN PLACE (#C_{20})
	494	11:07	B	DIFFERENT BUBBLE CURTAIN (INDICATOR PILE #A_{18})
	495	11:08	B	DIFFERENT VIEW BUBBLE CURTAIN
	496	11:17	B	PLACING IMPACT SENSORS (#A_{18})
	497	11:28	A	INDICATOR MARKS 14" (#A_{18})
	498	11:28	A	INDICATOR SENSORS (#A_{18})
	499	11:42	B	PLACE BUBBLE CURTAIN (#A_{15})
	500	11:53	D	INDICATOR SENSORS / BUBBLE CURTAIN ACTIVE (#A_{15})
	501	11:58	A	PDA PILE IN PLACE (#A_{15})
	502	13:01	B	PLACEMENT OF PILE (#$A_{15.5}$)
	503	13:26	D	BUBBLE CURTAIN ACTIVATED (#$A_{15.5}$)
	504	13:45	A	PILE IN PLACE (#$A_{15.5}$)
	505	14:06	B	PILE IN PLACE (#A_{16})

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

Fishery Resource

03/08/12

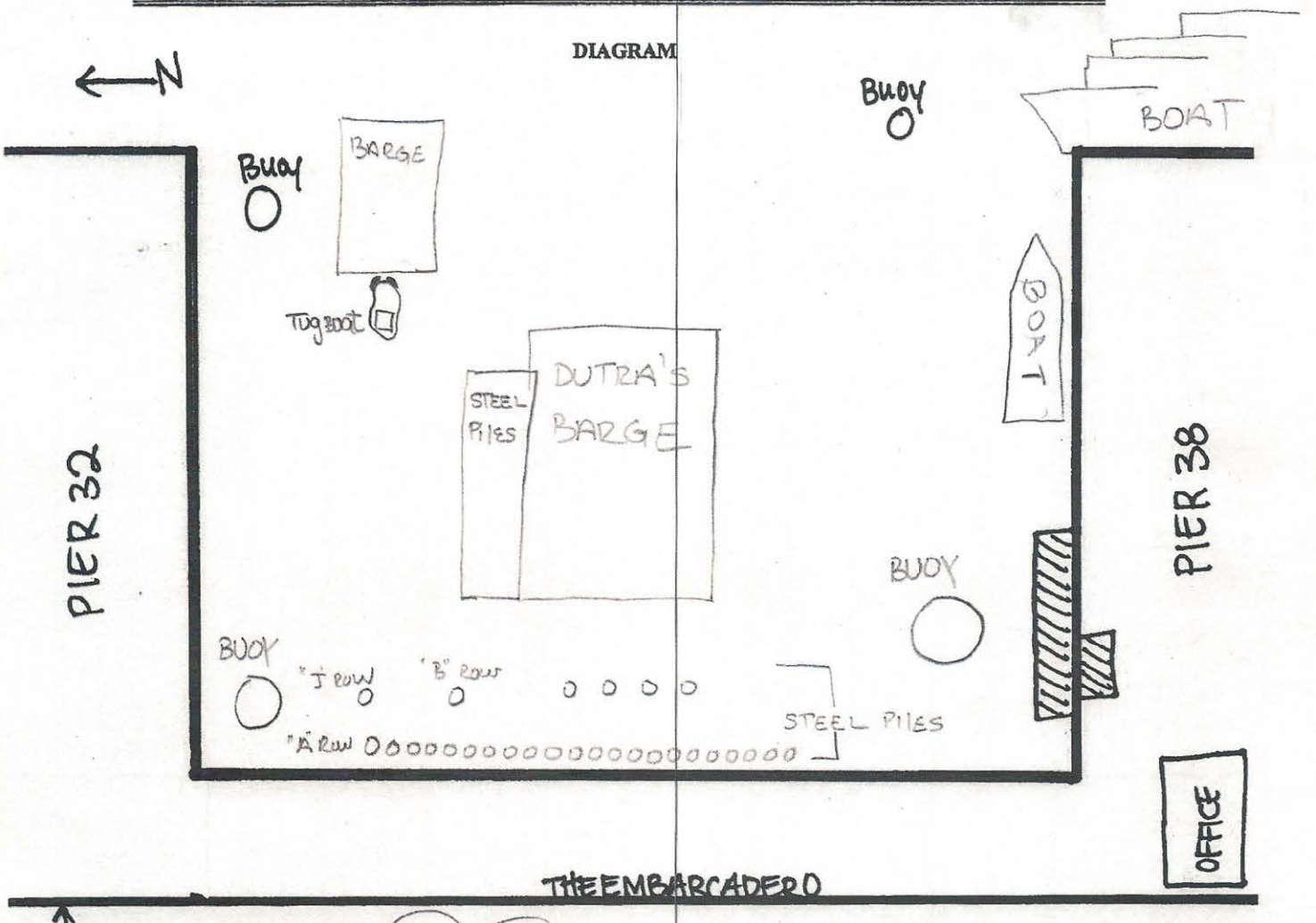
PHOTOS

Comment: Reference No.	Photo Number	Time of Photo	Photo Taken Before (B), During (D) or After (A) Pile Driving	Description
	506	14:26	D	Bubble Curtain Active (#A16)
	507	14:43	A	Pile in Place (#A16)

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

08/08/12 ~~BIRDS~~ FISHERY Page 5 of 5

DIAGRAM



BIOLOGICAL MONITOR _____ Tom Copper

Signature **Print Name**

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

FISHERY RESOURCES

Date 08/09/12 Monitor Tom Coppse Visibility Clear

Tide Level

Date	Low		High		Low		High	
08/09	Time	Tide (ft)	Time	Tide (ft)	Time	Tide (ft)	Time	Tide (ft)
	1106	2.05	0617	3.07	VOID	VOID	1736	5.05

Human Activity in the Area PEDESTRIANS, SAILBOATS, KAYAKS

Latitude 37.784916 °N Longitude 122.387783 °W

Monitoring Locale: Pier 30 ☐ Pier 32 ☐ Pier 38 ☐ 178m from pile driving ☐ 129m from pile driving ☐ ☒ Shore

Pile Type: 24-inch octagonal concrete ☐ 24-inch steel shell ☒

Piles/Day (1-8): ☐ Pile Driver: Impact ☒ Vibratory/Impact ☐ Attenuation Device: None ☐

Bubble Curtain: On ☒ Off ☐ Minutes of Vibratory Driving: n/a ☒ 8:00 ☐

Impact Blows per Pile: 800 ☐ 300 ☒

Pile No.	Pile Driver (Impact, Vibratory)[1]	Pile Driving Start/End Time	Observer Start/End Time	Dead/Injured Fish Observed (Number/Species)[2] and Time		Dead/Injured Fish Collected (Number/Species) and Time		Comment: Reference Number
A 17.5	42	IMPACT	07:40 / 08:17	0630	O		O		1
C 19	43	IMPACT	08:54 / 09:13		O		O		
C 18	44	IMPACT	09:41 / 09:59		O		O		
A 17	45	IMPACT	10:44 / 11:13		O		O		
A 16.5	46	IMPACT	11:42 / 12:04		O		O		
C 17	47	IMPACT	13:07 / 13:28		O		O		
C 16	48	IMPACT	13:59 / 14:19	15:00	O		O		
									2

[1] Steel shell pile driving will include both vibratory (up to the last 10 feet) and impact (last 10 feet) pile drivers
[2] SH=Steelhead; GS=North American Green Sturgeon; O=Other

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

8/09/12

FISHERY RESOURCES

Comment: Reference No.	Fish Species	Life Stage and Status (A,J,L,E,FT,ST, FE,SE,CF, CS)	Time of observation	Comments
1	UNKNOWN	J	06:15	FISH WERE SPOTTED AT SURFACE WATER UNDERNEATH PIER APPROX 50 @ 06:15

A=adult; J=juvenile; L=larva; E=egg; FT = federal threatened; ST=state threatened; FE=federal endangered SE=state endangered; CF = federal candidate; CS=state candidate

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

FISHERY RESOURCES

8/09/12

PHOTOS

Comment: Reference No.	Photo Number	Time of Photo	Photo Taken Before (B), During (D) or After (A) Pile Driving	Description
	508	06:49	B	Place of Barge, first thing IN MORNING
	509	07:50	B	Placemnt of Pile (#A17.5)
	510	08:03	D	BUBBLE CURTAIN ACTIVE (#A17.5)
	511	08:16	A	PLACED PILE (#A17.5)
	512	08:45	B	PLACEMNT of PILE (#C19)
	513	09:04	D	BUBBLE CURTAIN ACTIVE (#C19)
	514	09:14	A	PLACED PILE (#C19)
	515	09:34	B	Placement of Pile (#C18)
	516	09:47	D	BUBBLE CURTAIN ACTIVE (#C18)
	517	10:00	A	PLACED PILE (#C18)
	518	10:01	A	REMOVAL of BUBBLE CURTAIN (#C18)
	519	10:33	———	VIEW from PIER DOWN to WHERE FISH WERE SPOTTED
	520	10:37	———	VIEW of PILES A ROW ON Rt B ROW ON Lft
	521	10:52	B	PLACEMNT of PILE (#A17)
	522	10:55	D	BUBBLE CURTAIN ACTIVE (#A17)
	523	11:16	A	PLACED PILE (#A17)
	524	11:32	B	Placement of Pile (#A16.5)
	525	11:50	D	BUBBLE CURTAIN SUBMERGED (#A16.5)
	526	11:50	D	BUBBLE CURTAIN ACTIVE (#A16.5)
	527	12:05	A	Placement of Pile (#A16.5)

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

FISHERY RESOURCES

8/09/12

ADDITIONAL COMMENTS

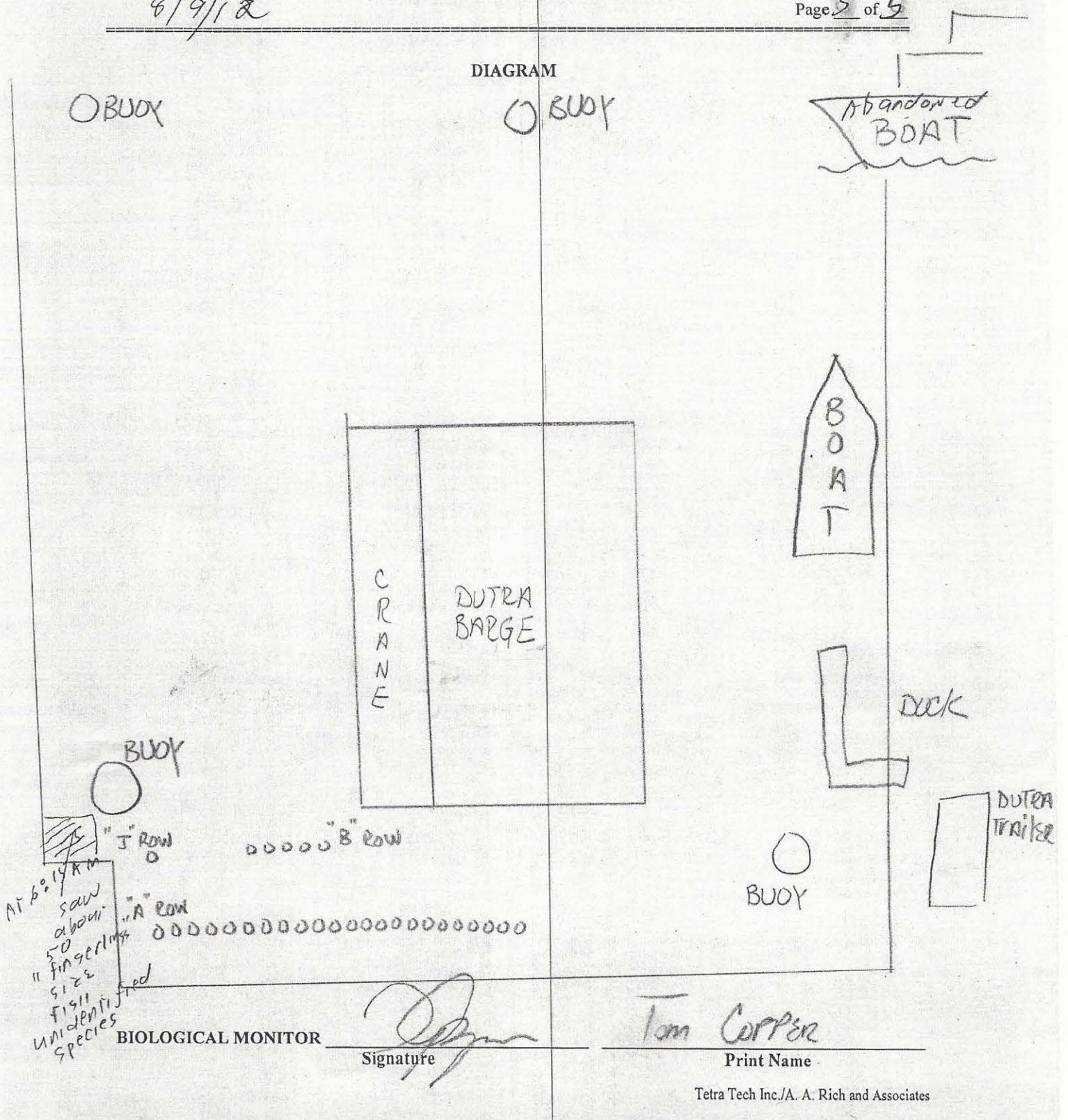
Comment: Reference No.	Additional Comments
2	Fishes (about 50) ("fingerling") size
	seen at 6:15 AM (see Diagram
	using flashlight. Time seen: 6:15 AM,
	just as it was getting light.
	Very calm water before pile driving
	and other human activities began

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

FISHERY RESOURCES

8/9/12

DIAGRAM



BIOLOGICAL MONITOR _____ Tom Corper

Signature **Print Name**

Tetra Tech Inc./A. A. Rich and Associates

APPENDIX C

Fishery Resources Monitoring Data Sheets Used During Concrete Pile Driving

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

FISHERY RESOURCES

Date 8/13/12 Monitor Tom COPPER Visibility Clear

Tide Level

Date	Low		High		Low		High	
	Time	Tide (ft)	Time	Tide (ft)	Time	Tide (ft)	Time	Tide (ft)
08/13	0334	0.4	1048	4.4	1512	3.0	2109	5.9

Human Activity in the Area PEDESTRIANS, tug BOAT, small BOATS, sail BOATS

Latitude 37.784916 °W Longitude 122.387783 °N

Monitoring Locale: Pier 30 ☐ Pier 32 ☐ Pier 38 ☐ 178m from pile driving ☐ 129m from pile driving ☐ ☒ SHORE

Pile Type: 24-inch octagonal concrete ☒ 24-inch steel shell ☐

Piles/Day (1-8): ☐ Pile Driver*: Impact ☒ Vibratory/Impact ☐ Attenuation Device: None ☐

Bubble Curtain: On ☐ Off ☒ Minutes of Vibratory Driving: n/a ☐ 8:00 ☐

Impact Blows per Pile: 800 ☐ 300 ☒

DUTRA'S * J29

Pile No.	Pile Driver (Impact, Vibratory)[1]	Pile Driving Start/End Time	Observer Start/End Time	Dead/Injured Fish Observed (Number/Species)[2] and Time		Dead/Injured Fish Collected (Number/Species) and Time		Comment: Reference Number
52	IMPACT	11:47 / 13:36	06:30 / 14:25	0		0		1
								2

[1] Steel shell pile driving will include both vibratory (up to the last 10 feet) and impact (last 10 feet) pile drivers
[2] SH=Steelhead; GS=North American Green Sturgeon; O=Other

* USING water hose down center of cement pile to move sediment away at the bottom of pile. SEE PHOTO'S #533

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

FISHERY RESOURCES

8/13/12

PHOTOS

Comment: Reference No.	Photo Number	Time of Photo	Photo Taken Before (B), During (D) or After (A) Pile Driving	Description
	528	06:27	B	START of DAY 08/13
	529	07:28	B	Load of Cement piles
	530	10:33	B	Cement piles on Barge.
	531	10:48	B	monitoring pt for pile# J_{29}
	532	11:02	B	UNICON - accoustic survey boat monitoring pile (#J_{29})
	533	11:05	B	Placement of pile (#J_{29}) along w/ water hose
	534	12:00	D	water hose repair pile (#J_{29})
	535	12:10	D	Sediment being flushed to surface (#J_{29}) w/ water jet
	536	13:31	D	Hose is removed during impact Driving (#J_{29})
	537	13:36	A	Pile(#J_{29}) Placed in Position
	538	14:25	A	Barge crew clean up

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

FISHERY RESOURCES

8/13/12

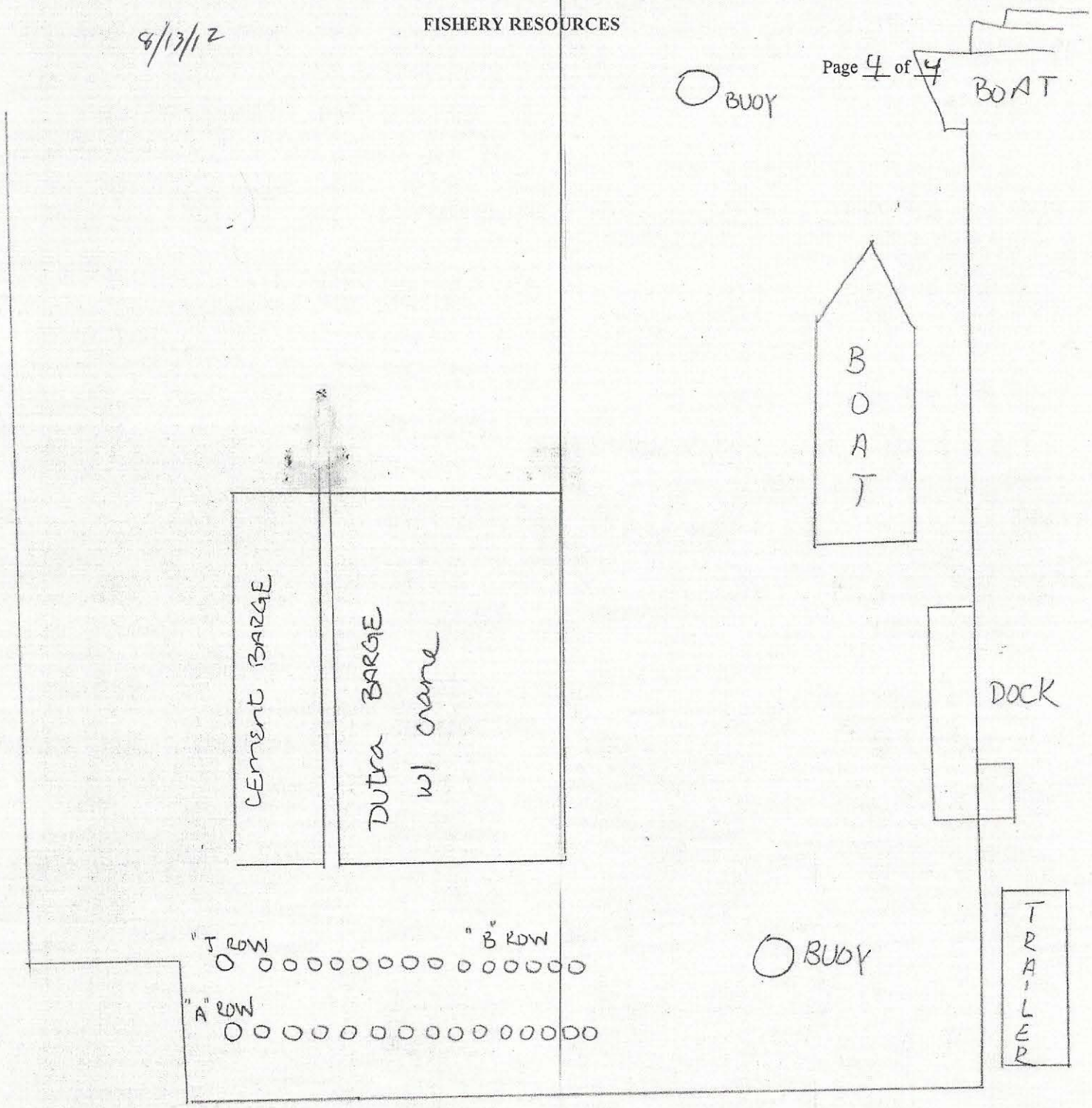
ADDITIONAL COMMENTS

Comment: Reference No.	Additional Comments
1	arrived on site 06:15 - used flashlight to search for fish started along "J" row where fish were spotted
	Lost time. continued along shoreline until trailer (Outra)
	on the south end. sunrise approx 06:25 NO fish present. used binoculars to scan work area
	for water disturbance or additional fish along
	barge none were located. crew boarded barge at
	06:50 awaiting load of cement piles. set up time
	took approx - 3 1/2 hrs: NO BUBBLE CURTAIN
	Pile driving will commence Nrth → South
	Starting at #J29 - monitoring will be staged
	at drive impact + proceed along shore line
	from Nrth → South
2	IMPACT DRIVING Pile (#J29) 1:14 Started

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

FISHERY RESOURCES

8/13/12



Tetra Tech Inc./A. A. Rich and Associates

08/13/12

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

FISHERY RESOURCES

Date 08/14/12 Monitor Tom COPPER Visibility Slight overcast

Tide Level

Date	Low		High		Low		High	
	Time	Tide (ft)	Time	Tide (ft)	Time	Tide (ft)	Time	Tide (ft)
8/14	0414	0.2	1121	4.6	1557	2.8	2156	6.1

Human Activity in the Area PEDESTRIANS, SMALL BOAT, SAIL BOATS

Latitude 37.785134°W Longitude 122.387663°N

Monitoring Locale: Pier 30 ☐ Pier 32 ☐ Pier 38 ☐ 178m from pile driving ☐ 129m from pile driving ☐ SHORE ☑

Pile Type: 24-inch octagonal concrete ☑ 24-inch steel shell ☐

Piles/Day (1-8): ☐ Pile Driver: Impact ☑ Vibratory/Impact ☐ Attenuation Device: None ☐

Bubble Curtain: On ☐ Off ☑ Minutes of Vibratory Driving: n/a ☐ 8:00 ☐

Impact Blows per Pile: 800 ☐ 300 ☑

Pile No.	Pile Driver (Impact, Vibratory)[1]	Pile Driving Start/End Time	Observer Start/End Time	Dead/Injured Fish Observed (Number/Species)[2] and Time		Dead/Injured Fish Collected (Number/Species) and Time		Comment: Reference Number
DUTRA'S # / K30 52	IMPACT	0827 / 0913	6:30 /	O		O		1
								2
								3
J28 53	IMPACT	10:36 / 11:06		O		O		4
J27 54	IMPACT	13:10 / 13:36		O		O		5
H25 55	IMPACT	15:10 / 15:46		O		O		6
			16:00					

[1] Steel shell pile driving will include both vibratory (up to the last 10 feet) and impact (last 10 feet) pile drivers
[2] SH=Steelhead; GS=North American Green Sturgeon; O=Other

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

FISHERY RESOURCES

8/14/12

PHOTOS

Comment: Reference No.	Photo Number	Time of Photo	Photo Taken Before (B), During (D) or After (A) Pile Driving	Description
	539	06:43	B	START of DAY - DUTRA BARGE
	540	08:07	B	Placemnt of INDICATOR pile # (K_{30})
	541	08:41	D	Impact Driving Pile # (K_{30})
	542	09:15	A	UNABLE to stop impact mechanism DRIVE pile too deep (K_{30})
	543	09:22	A	comparison picture. Pile (J_{29}) + (K_{30})
	544	10:25	B	Placemnt of Pile* (J_{28})
	545	10:56	D	DRIVING impact Pile # (J_{28})
	546	11:07	A	IN PLACE Pile # (J_{28})
	547	13:10	B	Placemnt of Pile # (J_{27})
	548	13:24	D	DRIVING IMPACT Pile # (J_{27})
	549	13:40	A	IN PLACE Pile # (J_{27})
	550	14:55	B	tuping to Place Pile # (H_{25}) INTO POSITION
	551	15:00	B	Placemnt of Pile # (H_{25})
		15:27		*NOTICE tar like substance ON BHM?
	552	15:27	D	DRIVING impact Pile # (H_{25})
	553	15:47	A	In Place Pile # (H_{25})

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

FISHERY RESOURCES

8/14/12

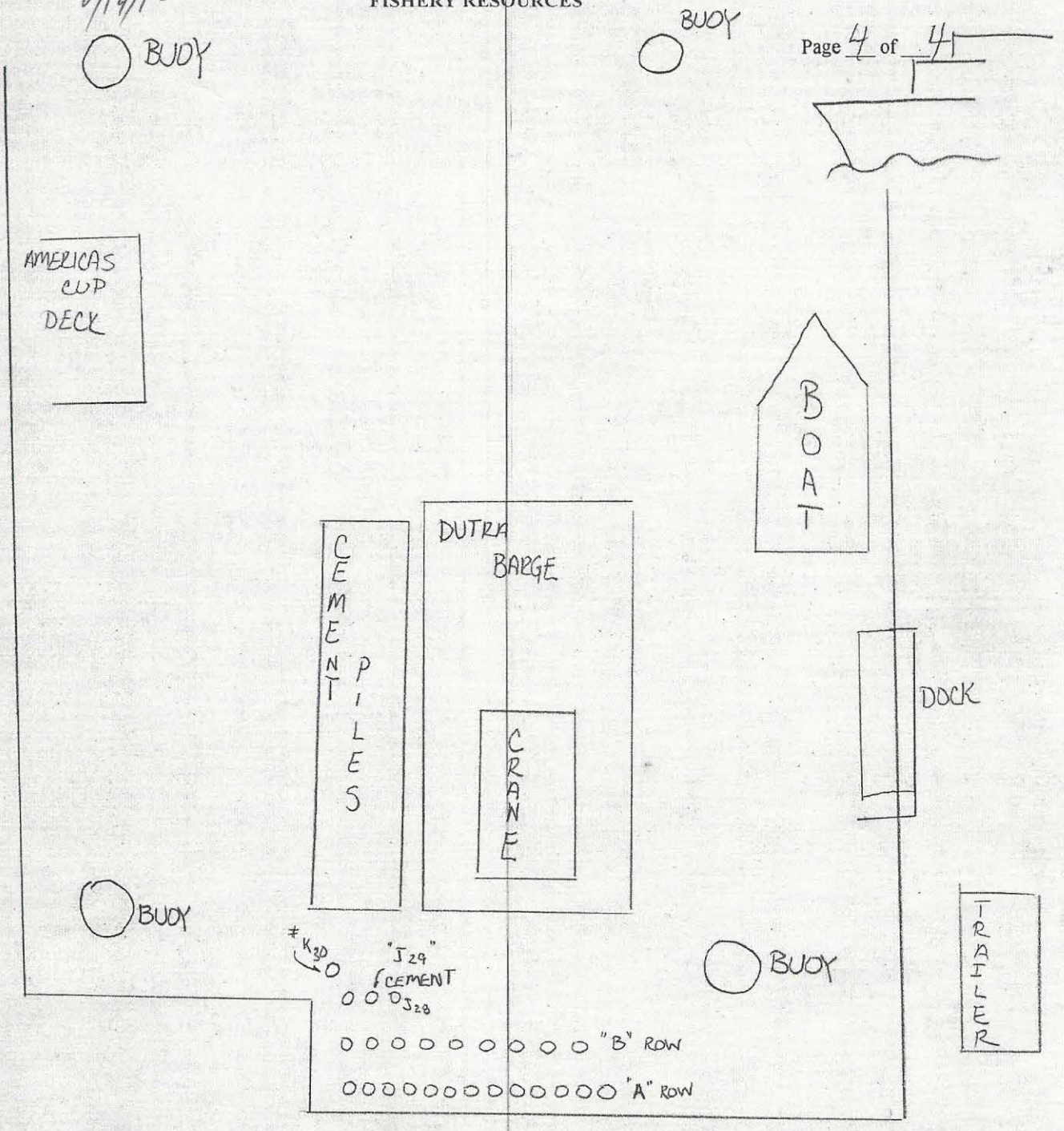
ADDITIONAL COMMENTS

Comment: Reference No.	Additional Comments
1	First pile (K_{30}) is an INDICATOR pile which is USED to DETERMINE stress for concrete piles in the area. A NEW SECTION of hose was ADDED + guide posts to help speed up the setting of piles. Monitoring will take place AT pile DRIVING location + along walkway from Nrth → South. No fish were located this morning w/ flashlight along shoreline approx 06:10
2	#K_{30} DRIVING started 08:27
	Impact started 08:39
	Impact ENDED 09:13
3	UNABLE to stop impact mechanism; pile was DRIVEN too deep by approx 2'1/2 ft (K_{30})
4	#J_{28} DRIVING STARTED 10:36
	IMPACT STARTED 10:52
	IMPACT ENDED 11:02
5	#J_{27} DRIVING STARTED 13:10
	IMPACT STARTED 13:24
	IMPACT ENDED 13:36
6	#H_{25} TROUBLE SETTING Pile into ready position HOSE ripped open –
	IMPACT STARTED 15:20
	IMPACT ENDED

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

8/14/12

FISHERY RESOURCES



Tetra Tech Inc./A. A. Rich and Associates

08/14/12

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

FISHERY RESOURCES

Date 08/15/12 Monitor Tom COPPER Visibility OVERCAST

Tide Level

Date	Low		High		Low		High	
	Time	Tide (ft)	Time	Tide (ft)	Time	Tide (ft)	Time	Tide (ft)
08/15/12	0449	0.0	1151	4.8	1638	2.6	2241	6.2

Human Activity in the Area PEDESTRIANS, SAILBOATS, TUGBOATS,

Latitude 37.785424 °W Longitude 122.387738 °N

Monitoring Locale: Pier 30 ☐ Pier 32 ☐ Pier 38 ☐ 178m from pile driving ☐ 129m from pile driving ☐ Shore ☒

Pile Type: 24-inch octagonal concrete ☒ 24-inch steel shell ☐

Piles/Day (1-8): ☐ Pile Driver: Impact ☒ Vibratory/Impact ☐ Attenuation Device: None ☐

Bubble Curtain: On ☐ Off ☒ Minutes of Vibratory Driving: n/a ☐ 8:00 ☐

Impact Blows per Pile: 800 ☐ 300 ☒

Pile No.	Pile Driver (Impact, Vibratory)[1]	Pile Driving Start/End Time	Observer Start/End Time	Dead/Injured Fish Observed (Number/Species)[2] and Time		Dead/Injured Fish Collected (Number/Species) and Time		Comment: Reference Number
Outrds*								
H24 56	IMPACT	08:39 / 09:08	06:30	0		0		2
H23 57	IMPACT	10:12 / 10:38		0		0		3
H22 58	IMPACT	11:38 / 12:01		0		0		4
G20 59	IMPACT	1332 / 14:01		0		0		5
			14:25					

[1] Steel shell pile driving will include both vibratory (up to the last 10 feet) and impact (last 10 feet) pile drivers
[2] SH=Steelhead; GS=North American Green Sturgeon; O=Other

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

FISHERY RESOURCES

8/15/12

PHOTOS

Comment: Reference No.	Photo Number	Time of Photo	Photo Taken Before (B), During (D) or After (A) Pile Driving	Description
	554	06:40	B	Before work got underway
1	555	07:10	B	moving Barge into position
	556	08:22	B	Positioning Pile # (H_{24})
	557	08:57	D	Impact drive Pile # (H_{24})
	558	09:11	A	Pile # (H_{24}) in place
	559	09:53	B	Positioning Pile # (H_{23})
	560	10:30	D	Impact drive Pile # (H_{23})
	561	10:39	A	Pile # (H_{23}) in Place
	562	11:20	B	Positioning Pile # (H_{22})
	563	11:39	D	Impact drive Pile # (H_{22})
	564	12:44	A	Pile # (H_{22}) in Place
	565	12:48	—	Americas cup activity
	566	13:26	B	Positioning Pile # (G_{20})
	567	13:46	D	Impact drive Pile # (G_{20})
	568	14:03	A	Pile # (G_{20}) in Place

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

FISHERY RESOURCES

8/15/12

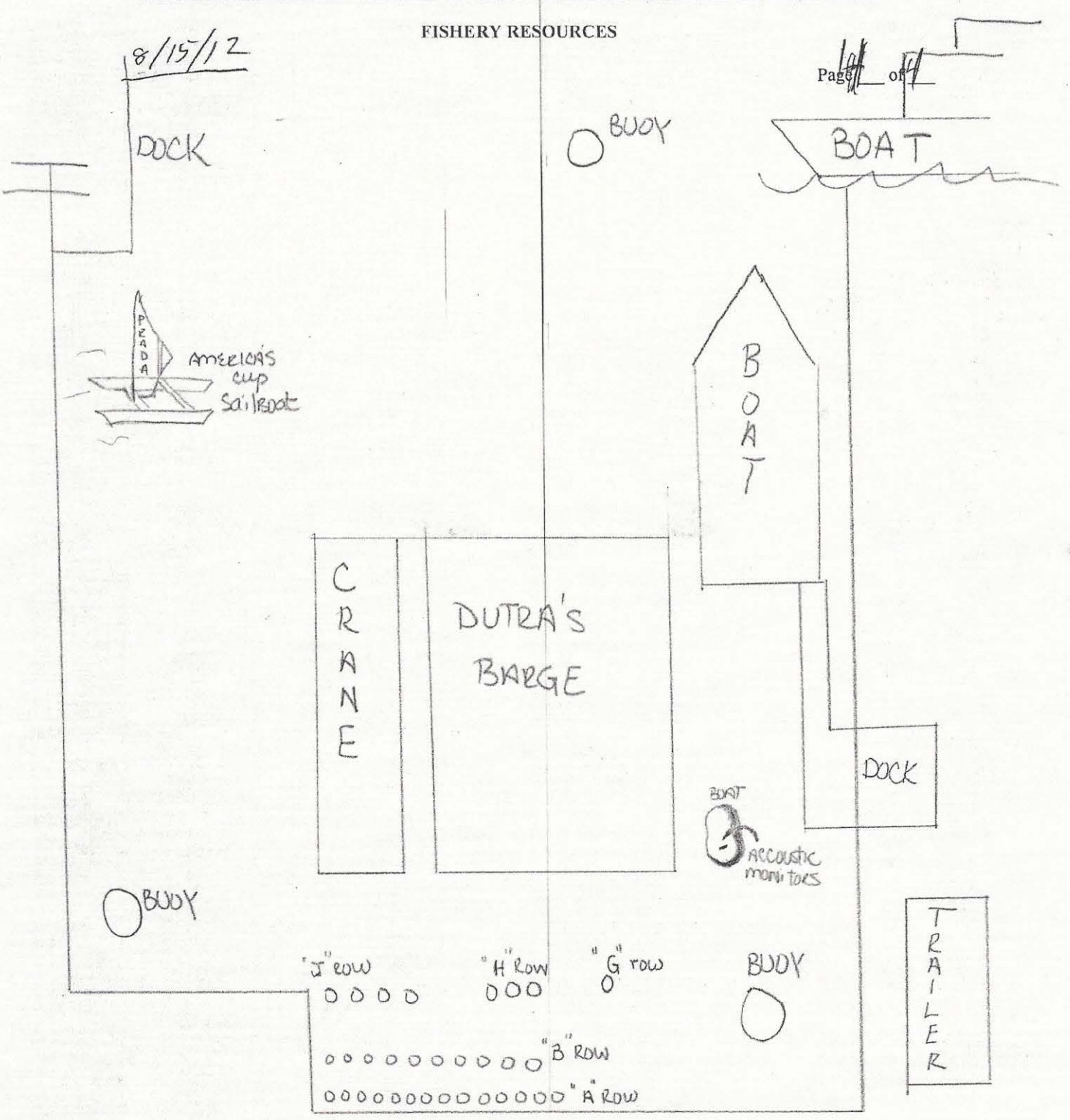
ADDITIONAL COMMENTS

Comment: Reference No.	Additional Comments
1	Pile DRIVING will commence along "H" row: monitoring
	Began around 06:15 w/flashlight along shoreline + under neath the piers, approx 25 minutes
	No fish were seen. monitor is positioned approx 15' from barge. No visual obstructions
2	Impact Driver started 08:44 # (H24)
	Impact Driver ended 09:08 # (H24)
3	Impact Driver Started 10:18 # (H23)
	Impact Driver ended 10:38 # (H23)
4	Impact Driver Started 11:40 # (H22)
	Impact Driver ended 12:01 # (H22)
	* Afternoon alot more boat activity from Americas Cup sailboats - 4 catamarans in water along w/ supporting crew
5	Impact Driver started 13:45 # (G20)
	Impact Driver ended 14:01 # (G20)

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

FISHERY RESOURCES

8/15/12



Tetra Tech Inc./A. A. Rich and Associates

08/15/12

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

FISHERY RESOURCES

Date 08/16/12 Monitor Tom Copper Visibility OVERCAST

Tide Level

Date	Low		High		Low		High	
	Time	Tide (ft)	Time	Tide (ft)	Time	Tide (ft)	Time	Tide (ft)
08/16/12	0521	-0.1	1220	5.0	1717	2.3	2324	6.2

Human Activity in the Area Pedestrians, sailboats, small boats

Latitude 37.785424°W Longitude 122.387738°N

Monitoring Locale: Pier 30 ☐ Pier 32 ☐ Pier 38 ☐ 178m from pile driving ☐ 129m from pile driving ☐ ☒ shoes

Pile Type: 24-inch octagonal concrete ☒ 24-inch steel shell ☐

Piles/Day (1-8): ☐ Pile Driver: Impact ☒ Vibratory/Impact ☐ Attenuation Device: None ☐

Bubble Curtain: On ☐ Off ☒ Minutes of Vibratory Driving: n/a ☒ 8:00 ☐

Impact Blows per Pile: 800 ☐ 300 ☒

Pile No.	Pile Driver (Impact, Vibratory)[1]	Pile Driving Start/End Time	Observer Start/End Time	Dead/Injured Fish Observed (Number/Species)[2] and Time		Dead/Injured Fish Collected (Number/Species) and Time		Comment: Reference Number
Dutra *								
G19 57	IMPACT	0804 0854	6:30	0		0		1
G17 58	IMPACT	0933 1040		0		0		2
F15 59	IMPACT	12:19 12:47		0		0		3
F14 60	IMPACT	13:37 1408		0		0		4
G16 61	IMPACT	14:57 15:22		0		0		5

[1] Steel shell pile driving will include both vibratory (up to the last 10 feet) and impact (last 10 feet) pile drivers
[2] SH=Steelhead; GS=North American Green Sturgeon; O=Other

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

FISHERY RESOURCES

8/16/12

PHOTOS

Comment: Reference No.	Photo Number	Time of Photo	Photo Taken Before (B), During (D) or After (A) Pile Driving	Description
	569	07:02	B	BARGE IN PLACE
	570	07:39	B	PILING IN PLACE (#G19)
	571	07:55	B	PILING IN PLACE (#G19)
	572	08:04	D	IMPACT DRIVING (#G19)
	573	08:37	D	IMPACT HAMMER OVER HEAT (G19)
	574	08:37	D	IMPACT HAMMER SMOKE (G19)
	575	0856	A	IMPACT DRIVING ENDED PILE (G19)
	576	0933	B	PLACEMNT OF PILING (#G17)
	577	0946	D	IMPACT DRIVING (#G17)
	578	1036	D	PILE #(G17) DDD ANGLE
	579	1043	A	PILE SEATED (#G17)
	580	12:03	B	PLACEMNT PILE (#F15)
	581	12:32	D	IMPACT DRIVING (#F15)
	582	12:49	A	PILE SEATED #(F15)
	583	13:35	B	PLACEMNT OF PILE #(F14)
	584	13:48	D	IMPACT DRIVING (#F14)
	585	14:08	A	PILE SEATED (#F14)
	586	14:10	—	DUTRA BOATSMAN STUCK -
	587	14:47	B	PLACEMNT OF PILE #(G16)
	588	15:01	D	IMPACT DRIVING #(G16)
	589	15:23	A	PILE SEATED #(G16)

08/16/12

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

FISHERY RESOURCES

06/16/12

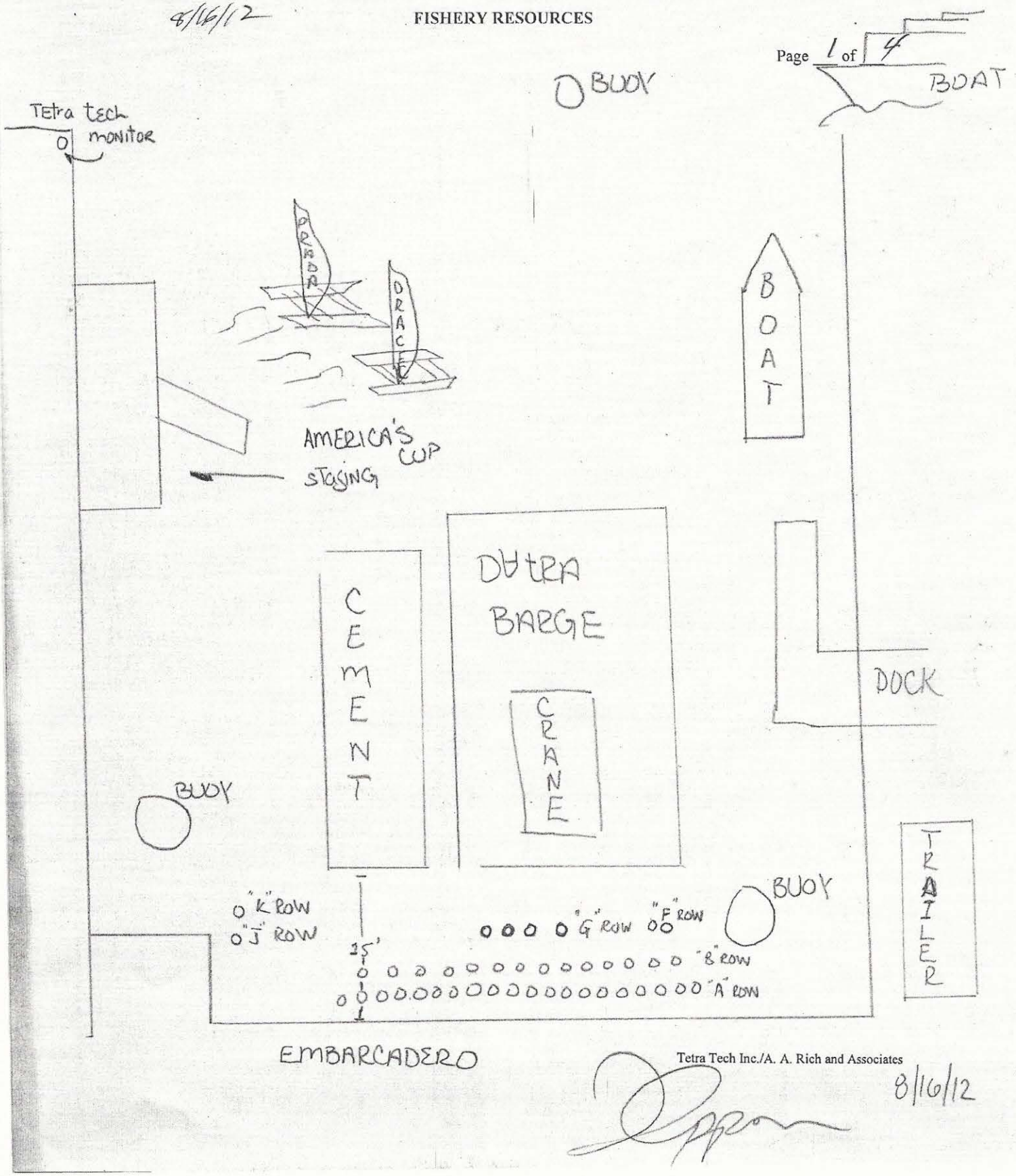
ADDITIONAL COMMENTS

Comment: Reference No.	Additional Comments
	BEGAN monitoring approx 06:20 AM - USED flashlight along pier to spot fish. North → South
	No fish located. scanned AREA w/ Binoculars for water disturbance or other signs of water
	activity. calm. Dutra Barge moved into place approx 07:10
	Will Begin cement driving w/ G19
1	IMPACT DRIVING STARTED 08:04 #(G19)
	IMPACT DRIVING ENDED 08:54 #(G19)
	* Problem w/ HOSE connection - UNABLE to USE water jet
	Slows DOWN impact DRIVING approx 08:20
2	IMPACT DRIVING STARTED 0933 #(G17)
	IMPACT DRIVING ENDED 1040 #(G17)
	Pile went in at ODD ANGLE, took longer to set
3	IMPACT DRIVING Started 12:20 #(F15)
	IMPACT DRIVING ENDED 12:47 #(F15)
4	activity around the Americas cup has increased. more
	equipment, people + sailboat
4	IMPACT DRIVING STARTED 13:38 #(F14)
	IMPACT DRIVING ENDED 14:08 #(F14)
5	IMPACT DRIVING STARTED 14:57 #(G16)
	IMPACT DRIVING ENDED 15:22 #(G16)

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

8/16/12

FISHERY RESOURCES



Tetra Tech Inc./A. A. Rich and Associates

8/16/12

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

FISHERY RESOURCES

Date 08/17/12 Monitor Tom Copper Visibility Overcast

Tide Level

Date	Low		High		Low		High	
	Time	Tide (ft)	Time	Tide (ft)	Time	Tide (ft)	Time	Tide (ft)
08/17/12	0554	-0.1	1248	5.3	1757	1.9	—	—

Human Activity in the Area Pedestrians, Sail Boats, small "run about" Boats

Latitude 37.785424° W Longitude 122.387738° N

Monitoring Locale: Pier 30 ☐ Pier 32 ☐ Pier 38 ☐ 178m from pile driving ☐ 129m from pile driving ☐ Shore ☒

Pile Type: 24-inch octagonal concrete ☑ 24-inch steel shell ☐

Piles/Day (1-8): ☐ Pile Driver: Impact ☑ Vibratory/Impact ☐ Attenuation Device: None ☐

Bubble Curtain: On ☐ Off ☑ Minutes of Vibratory Driving: n/a ☑ 8:00 ☐

Impact Blows per Pile: 800 ☐ 300 ☑

Dutra's

Pile No.	Pile Driver (Impact, Vibratory)[1]	Pile Driving Start/End Time	Observer Start/End Time	Dead/Injured Fish Observed (Number/Species)[2] and Time		Dead/Injured Fish Collected (Number/Species) and Time		Comment: Reference Number
J26 62	IMPACT	0834 / 0850	06:30	0		0		1
J25 63	IMPACT	0952 / 10:04		0		0		2
J24 64	IMPACT	1053 / 1108		0		0		3
J23 65	IMPACT	1235 / 1256		0		0		4
K29 66	IMPACT	1344 / 1359		0		0		5
			14:15					

[1] Steel shell pile driving will include both vibratory (up to the last 10 feet) and impact (last 10 feet) pile drivers
[2] SH=Steelhead; GS=North American Green Sturgeon; O=Other

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

FISHERY RESOURCES

8/17/12

PHOTOS

Comment: Reference No.	Photo Number	Time of Photo	Photo Taken Before (B), During (D) or After (A) Pile Driving	Description
	590	0648	—	start of day
	591	0718	B	Barge in Place
	592	0816	B	Placemnt of Pile # (J26)
	593	0843	D	IMPACT DRIVING Pile # (J26)
	594	0902	A	Pile set # (J26)
	595	0939	B	Placemnt Pile (# J25)
	596	0953	B	Water Jet activated (# J25)
	597	1002	D	Impact DRIVING Pile (# J25)
	598	1005	A	Pile set (# J25)
	599	1044	B	Placemnt Pile (# J24)
	600	1102	D	IMPACT DRIVING Pile (# J24)
	601	1111	A	Pile set (# J24)
	602	1223	B	Placement Pile (# J23)
	603	1247	D	Impact Drive Pile (# J23)
	605	1301	A	Pile set (# J23)
	606	1351	D	Pile placemnt (# K29)
	607	1400	A	Pile Placed (set) (# K29)

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

FISHERY RESOURCES

8/17/12

ADDITIONAL COMMENTS

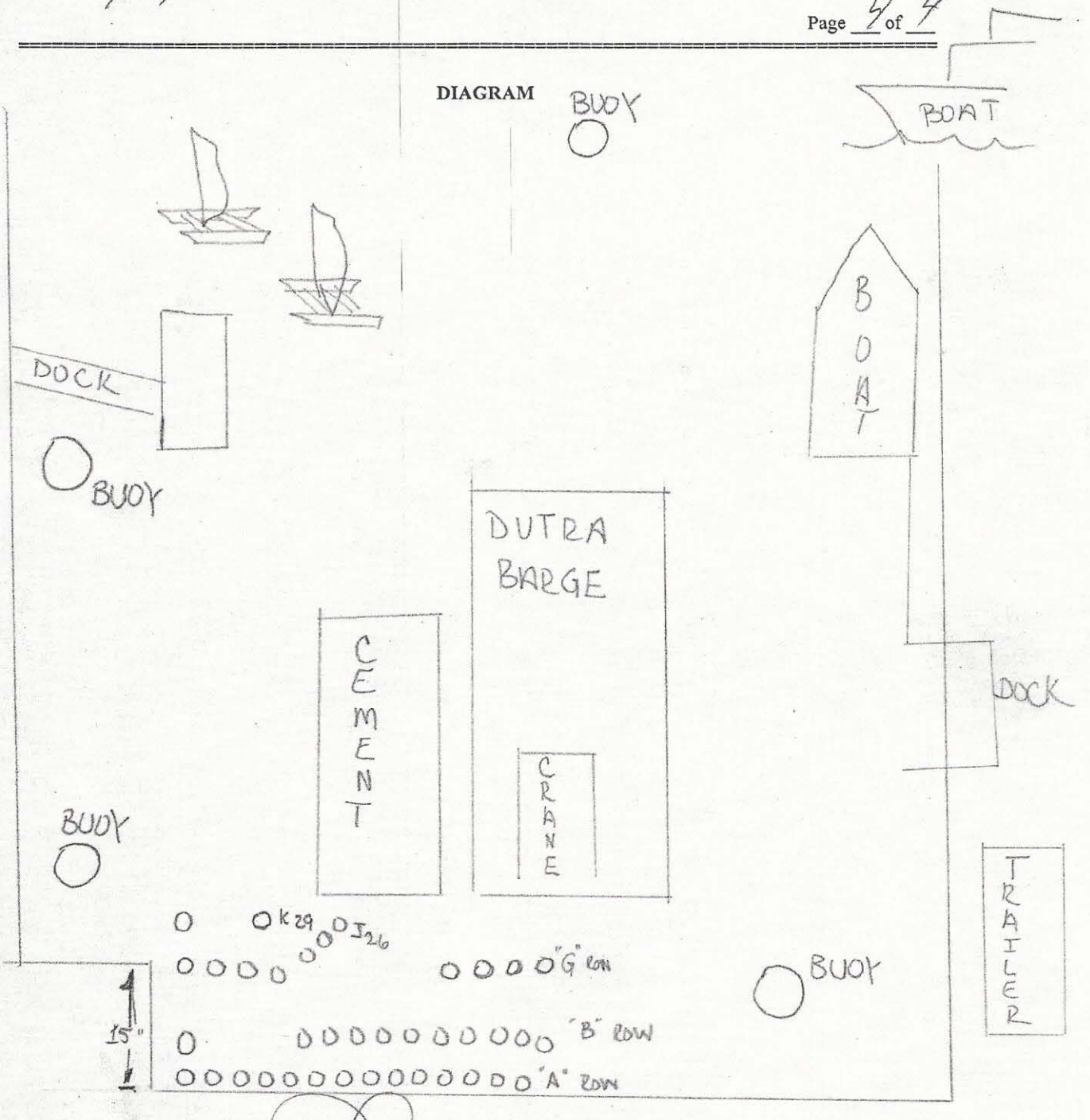
Comment: Reference No.	Additional Comments
	overcast day - USED flashlight to spot for fish approx 06:15
	up + day walkway Nrth-South. NOTHING spotted USED BINOCULARS to scan area NO SIGN. Dutra moved Barge into place
	approx 07:15 will start on 'J'26
1	Impact started 08:39 Pile (#J26)
	Impact ENDED 08:50 Pile (#J26)
2	Impact STARTED 09:53 Pile (#J25)
	Impact ENDED 10:04 Pile (#J25)
3	Impact STARTED 11:01 Pile (#J24)
	IMPACT ENDED 11:08 Pile (#J24)
4	Impact STARTED 12:44 Pile (#J23)
	IMPACT ENDED 12:56 (#J23)
	Alot of harbor activity w/ the approach of the
	America's cup - small boats shuffling people
	on + off dock
5	IMPACT STARTED 1351 (#K29)
	IMPACT ENDED 1359 (#K29)
**	USED up cement piles on Barge. Will position new stock for Monday

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

8/17/12

FISHERY RESOURCES

DIAGRAM



BIOLOGICAL MONITOR _____ Tom Copper 08/17/12

Signature **Print Name**

Embarcadero

Tetra Tech Inc./A. A. Rich and Associates

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

FISHERY RESOURCES

Date 08/20/12 Monitor Tom Coppee Visibility overcast

Tide Level

Date	Low		High		Low		High	
	Time	Tide (ft)	Time	Tide (ft)	Time	Tide (ft)	Time	Tide (ft)
08/20	0737	0.6	0142	5.6	2014	1.0	1424	5.9

Human Activity in the Area Pedestrians, sailboats, small boats

Latitude 37.784916 °W Longitude 122.387783 °N

Monitoring Locale: Pier 30 ☐ Pier 32 ☐ Pier 38 ☐ 178m from pile driving ☐ 129m from pile driving ☐ SHORE ☒

Pile Type: 24-inch octagonal concrete ☒ 24-inch steel shell ☐

Piles/Day (1-8): ☐ Pile Driver: Impact ☒ Vibratory/Impact ☐ Attenuation Device: None ☐

Bubble Curtain: On ☐ Off ☒ Minutes of Vibratory Driving: n/a ☒ 8:00 ☐

Impact Blows per Pile: 800 ☐ 300 ☒

Pile No.	Pile Driver (Impact, Vibratory)[1]	Pile Driving Start/End Time	Observer Start/End Time	Dead/Injured Fish Observed (Number/Species)[2] and Time		Dead/Injured Fish Collected (Number/Species) and Time		Comment: Reference Number
Dutra* G15	IMPACT	0858/947	0630	0		0		1
G13	IMPACT	1102 1153		0		0		2
K24 G8	IMPACT	1313 1349		0		0		3
K28 G9	IMPACT	1453 1518		0		0		4
			15:30					

[1] Steel shell pile driving will include both vibratory (up to the last 10 feet) and impact (last 10 feet) pile drivers
[2] SH=Steelhead; GS=North American Green Sturgeon; O=Other

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

FISHERY RESOURCES

8/20/12

PHOTOS

Comment: Reference No.	Photo Number	Time of Photo	Photo Taken Before (B), During (D) or After (A) Pile Driving	Description
	0609	0645	B	START of day
	0611	0646	B	Pile configuration (CURRENT)
	0612	0850	B	Placemnt of Pile (# G15)
	0613	0918	D	IMPACT DRIVING (# G15)
	0614	0949	A	Pile set (# G15)
	0615	1103	B	Placemnt of Pile (# G18)
	0616	1114	D	IMPACT DRIVING (# G18)
	0617	1155	A	Pile set (# G18)
	0619	1307	B	Placemnt of Pile (# K24)
	0620	1331	D	IMPACT DRIVING (# K24)
	0621	1355	A	Pile set (# K24)
	0622	1445	B	Placemnt of Pile (# K28)
	0623	1506	D	IMPACT DRIVING (# K28)
	0624	1521	A	Pile set (# K28)

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

FISHERY RESOURCES

8/20/12

ADDITIONAL COMMENTS

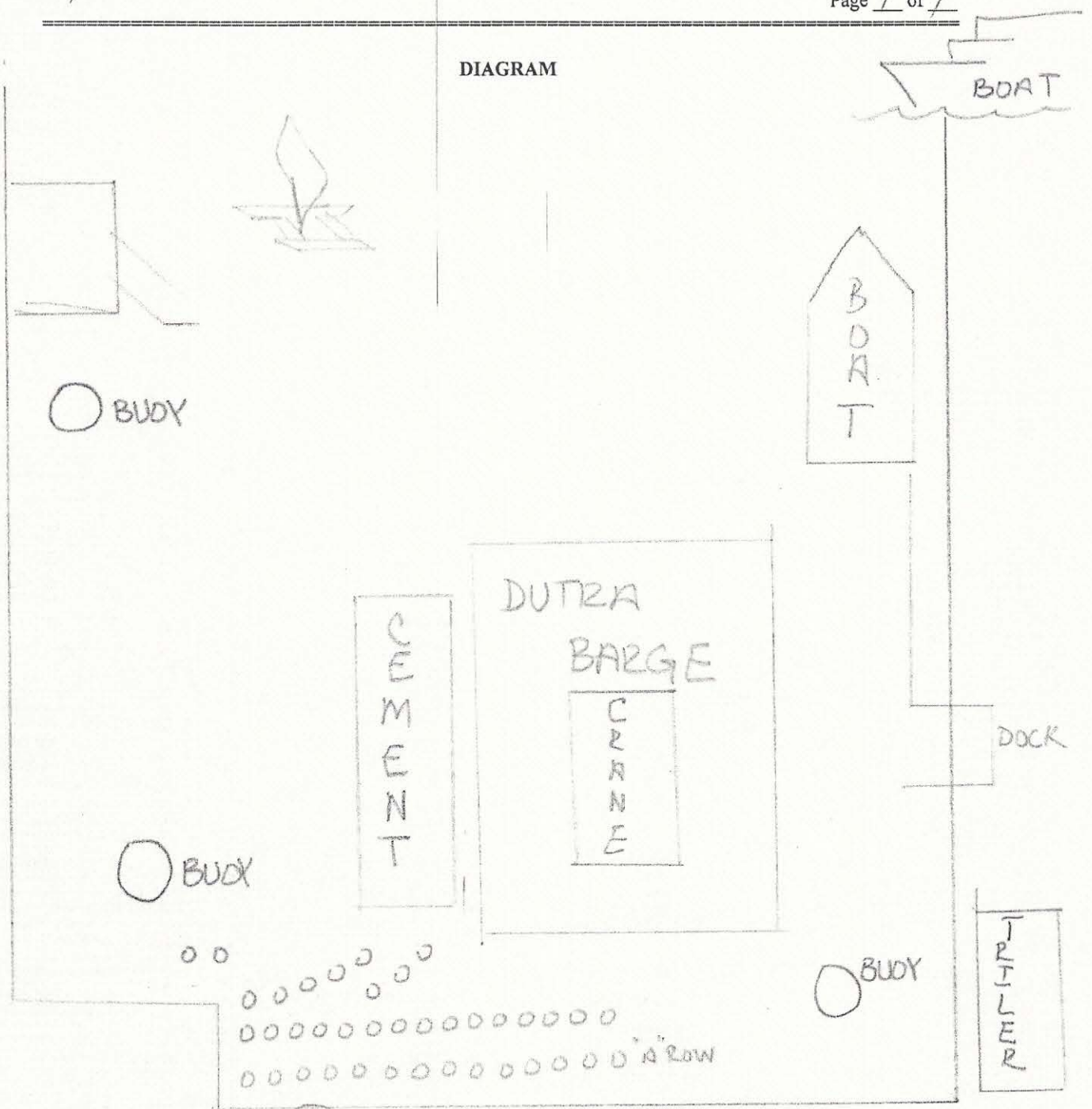
Comment: Reference No.	Additional Comments	
	Overcast morning – used flashlight to spot for fish. North – South no fish.	
	Starting w/ G15 indicator pile. Approx 0845 harbor seal spotted just outside zone "A" before pile Began.	DRIVING
1	Impact Driving started 09:15 (#G15)	INDICATOR PILE
	Impact Driving ended 09:47 (#G15)	
	Harbor seal continued to stay just outside zone "A"	
	during pile drive.	
2	Impact Driving started 11:13 (#G18)	INDICATOR PILE
	Impact Driving ended 11:53 (#G18)	
*	No longer any sign of harbor seal –	
	Impact drive started 13:23 #(K24)	INDICATOR PILE
3	Impact drive ended 13:49 #(K24)	
*	Indicator piles require more time to install	
	because of the placement of sensors on the	
	pile. Will restrike Pile #(K24) in a few days.	
4	Impact drive started 15:02 (#K28)	
	Impact drive ended 15:18 (#K28)	

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

FISHERY RESOURCES

8/20/12

DIAGRAM



Embarcadero

BIOLOGICAL MONITOR _____ Tom Copper

Signature **Print Name**

Tetra Tech Inc./A. A. Rich and Associates

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

FISHERY RESOURCES

Date 08/21/12 Monitor Tom Copper Visibility Slight overcast

Tide Level

Date	Low		High		Low		High	
	Time	Tide (ft)	Time	Tide (ft)	Time	Tide (ft)	Time	Tide (ft)
8/21	0816	1.1	0256	5.2	2110	0.9	1502	6.1

Human Activity in the Area Pedestrians, small vessels, sailboats, Kayaks

Latitude 37.784916°W Longitude 122.387783°N

Monitoring Locale: Pier 30 ☐ Pier 32 ☐ Pier 38 ☐ 178m from pile driving ☐ 129m from pile driving ☐ Shore ☒

Pile Type: 24-inch octagonal concrete ☒ 24-inch steel shell ☐

Piles/Day (1-8): ☐ Pile Driver: Impact ☒ Vibratory/Impact ☐ Attenuation Device: None ☐

Bubble Curtain: On ☐ Off ☒ Minutes of Vibratory Driving: n/a ☒ 8:00 ☐

Impact Blows per Pile: 800 ☐ 300 ☒

Pile No.	Pile Driver (Impact, Vibratory)[1]	Pile Driving Start/End Time	Observer Start/End Time	Dead/Injured Fish Observed (Number/Species)[2] and Time		Dead/Injured Fish Collected (Number/Species) and Time		Comment: Reference Number
Dstra#								
K27 70	Impact	0813 / 0833	06:30	0	0			1
K26 71	IMPACT	0911 / 0943		0	0			2
K25 72	IMPACT	1031 / 1049		0	0			3
H21 73	IMPACT	1313 / 1343		0	0			4
H20 74	IMPACT	1431 / 1455		0	0			5
H19 75	IMPACT	1530 / 1601		0	0			6
			16:15					

[1] Steel shell pile driving will include both vibratory (up to the last 10 feet) and impact (last 10 feet) pile drivers
[2] SH=Steelhead; GS=North American Green Sturgeon; O=Other

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

FISHERY RESOURCES

8/21/12

PHOTOS

Comment: Reference No.	Photo Number	Time of Photo	Photo Taken Before (B), During (D) or After (A) Pile Driving	Description
	0626	0621	B	START OF DAY 08/21/12
	0627	0750	B	Placemnt of Pile # (K27)
	0628	0804	D	DURING Impact # (K27)
	0629	0821	D	Impact drive # (K27)
	0630	0837	A	Pile Set # (K27)
	0631	0918	B	Placement of Pile # (K26)
	0632	0932	D	Impact drive # (K26)
	0633	0945	A	Setting of Pile # (K26)
	0636	1026	B	Placemnt of Pile # (K25)
	0637	1047	D	IMPACT DRIVE # (K25)
	0638	1101	A	Pile Set # (K25)
	0639	1307	B	Placemnt of Pile # (H21)
	0640	1326	D	Impact drive # (H21)
	0641	1345	A	Pile Set # (H21)
	0642	1430	B	Placemnt of Pile # (H20)
	0643	1452	D	Impact drive # (H20)
	0644	1458	A	Pile Set # (H20)
	0645	1528	B	Placemnt of Pile # (H19)
	0646	1549	D	Impact drive # (H19)
	0647	1603	A	Pile Set # (H19)

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

FISHERY RESOURCES

8/21/12

ADDITIONAL COMMENTS

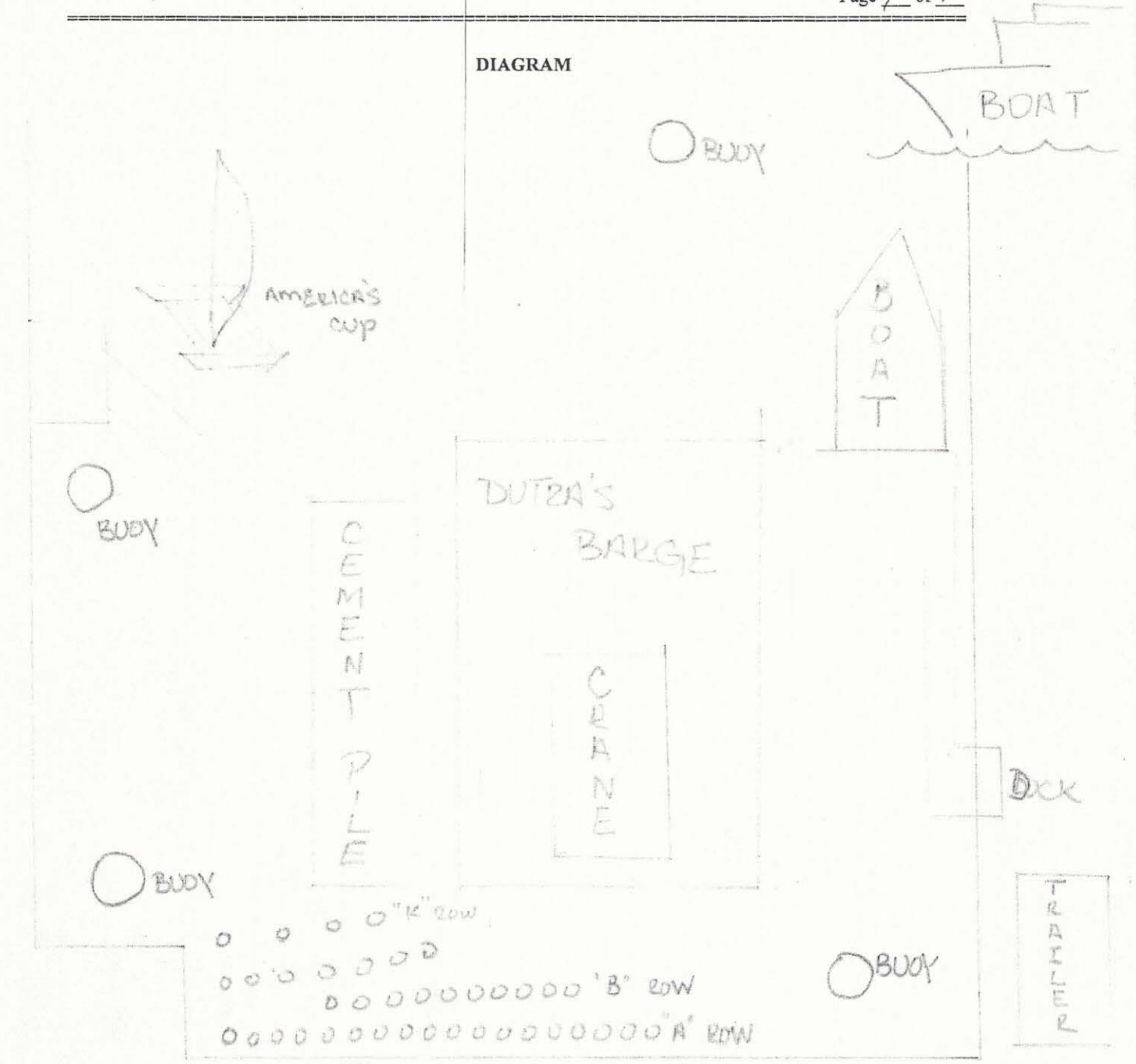
Comment: Reference No.	Additional Comments
	START of monitoring - w/ flashlight along shoreline
	Nrth - South along seated Piles * No fish sighted.
1	IMPACT DRIVING Started 0818 (K27)
	IMPACT DRIVING ENDED 0833 (K27)
2	IMPACT DRIVING STARTED 0931 (K26)
	IMPACT DRIVING ENDED 0943 (K26)
3	IMPACT DRIVING STARTED 1039 (K25)
	IMPACT DRIVING ENDED 1049 (K25)
4	IMPACT DRIVING STARTED 1324 (H_{21})
	IMPACT DRIVING ENDED 1343 (H_{21})
5	IMPACT DRIVING STARTED 1439 (H_{20})
	IMPACT DRIVING ENDED 1455 (H_{20})
6	IMPACT DRIVING STARTED 1534 (H_{19})
	IMPACT DRIVING ENDED 1601 (H_{19})
	No major occurrences today. fairly smooth

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

8/21/12

FISHERY RESOURCES

DIAGRAM



Embarcadero

BIOLOGICAL MONITOR _____ Tom Copper 08/21/12

Signature **Print Name**

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

FISHERY RESOURCES

Date 08/22/12 Monitor Tom Copper Visibility overcast

Tide Level

Date	Low		High		Low		High	
	Time	Tide (ft)	Time	Tide (ft)	Time	Tide (ft)	Time	Tide (ft)
08/22	0900	3.10	0338	4.7	2212	0.6	1037	6.2

Human Activity in the Area Pedestrians, small boats, sail boats

Latitude 37.784911 6°N Longitude 122.387783°W

Monitoring Locale: Pier 30 ☐ Pier 32 ☐ Pier 38 ☐ 178m from pile driving ☐ 129m from pile driving ☐ Shore ☒

Pile Type: 24-inch octagonal concrete ☒ 24-inch steel shell ☐

Piles/Day (1-8): ☐ Pile Driver: Impact ☒ Vibratory/Impact ☐ Attenuation Device: None ☐

Bubble Curtain: On ☐ Off ☒ Minutes of Vibratory Driving: n/a ☒ 8:00 ☐

Impact Blows per Pile: 800 ☐ 300 ☒

Pile No.	Pile Driver (Impact, Vibratory)[1]	Pile Driving Start/End Time	Observer Start/End Time	Dead/Injured Fish Observed (Number/Species)[2] and Time		Dead/Injured Fish Collected (Number/Species) and Time		Comment: Reference Number
H15 DURA'S								
76	IMPACT	0750 0821	06:30	0		0		1
H16 77	IMPACT	0904 0927		0		0		2
H17 78	IMPACT	1008 10:27		0		0		3
H18. 79	IMPACT	1117 1140		0		0		4
J22 80	IMPACT	13:11 1344		0		0		5
J21 81	IMPACT	14:24 14:54		0		0		6
J20 82	IMPACT	1547 16:27						7
			16:25					

[1] Steel shell pile driving will include both vibratory (up to the last 10 feet) and impact (last 10 feet) pile drivers
[2] SH=Steelhead; GS=North American Green Sturgeon; O=Other

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

FISHERY RESOURCES

8/22/12

PHOTOS

Comment: Reference No.	Photo Number	Time of Photo	Photo Taken Before (B), During (D) or After (A) Pile Driving	Description
	0648	0637	B	Start of day
	0649	0638	B	Pile Layout
	0650	0738	B	Placement of Pile (#H15)
	0651	0805	D	IMPACT DRIVING (#H15)
	0652	0822	A	Pile Set (#H15)
	0653	0848	B	Placement of Pile (#H16)
	0654	0906	D	IMPACT DRIVING (#H16)
	0655	0929	A	Pile Set (#H16)
	0656	10:01	B	Placemnt of pile (#H17)
	0657	10:21	D	IMPACT DRIVING (#H17)
	0658	10:29	A	Pile Set (#H17)
	0659	11:15	B	Placemnt of pile (#H18)
	0660	11:28	D	IMPACT DRIVING (#H18)
	0661	11:40	A	Pile Set (#H18)
	0662	13:07	B	Placemnt of pile (#J22)
	0663	13:24	D	IMPACT DRIVING (#J22)
	0664	13:44	A	Pile SET (#J22)
	0665	14:25	B	Placement of pile (#J21)
	0666	14:41	D	IMPACT DRIVING (#J21)
	0667	14:56	A	Pile SET (#J21)
	0668	15:42	B	Placemnt of Pile (#J20)
	0669	16:03	D	Impact DRIVING (#J20)
	0670	16:29	A	Pile SET (#J20)

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

FISHERY RESOURCES

8/22/12

ADDITIONAL COMMENTS

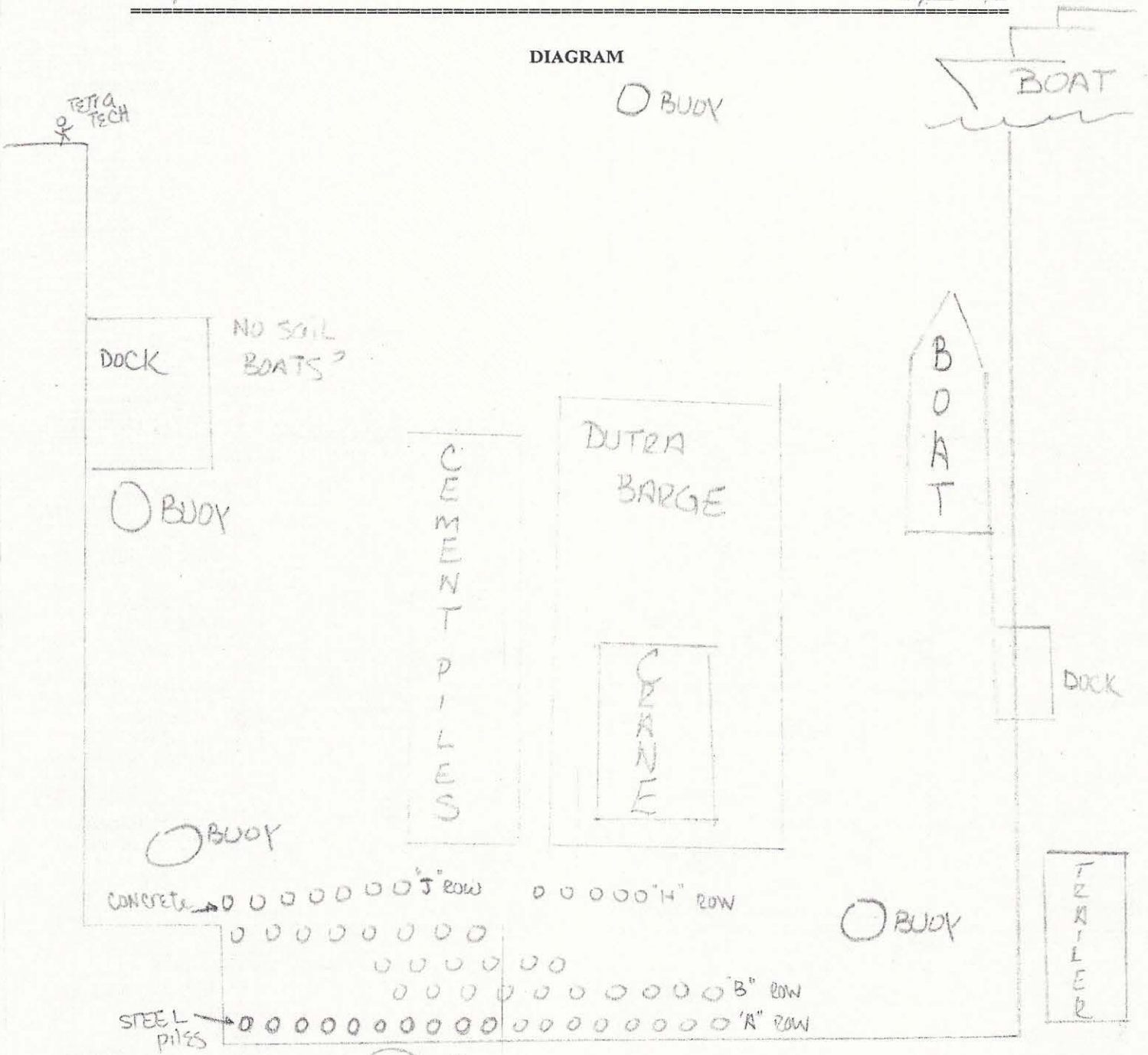
Comment: Reference No.	Additional Comments
	MONITORING BEGAN W/ flashlight search before DAWN
	all along PIERS & SET piles. NO fish SPOTTED
	Pile crew BEGAN earlier - approx 06:45 to position
	BARGE. NO America's cup sailboats present
1	IMPACT DRIVING STARTED 08:04 (# H15)
	IMPACT DRIVING ENDED 08:21 (# H15)
2	IMPACT DRIVING STARTED 09:13 (# H16)
	IMPACT DRIVING ENDED 09:27 (# H16)
3	IMPACT DRIVING STARTED 10:16 (# H17)
	IMPACT DRIVING ENDED 10:27 (# H17)
4	IMPACT DRIVING STARTED 11:26 (# H18)
	IMPACT DRIVING ENDED 11:48 (# H18)
5	IMPACT DRIVING STARTED 13:22 (# J22)
	IMPACT DRIVING ENDED 13:43 (# J22)
6	IMPACT DRIVING STARTED 14:39 (# J21)
	IMPACT DRIVING ENDED 14:54 (# J21)
7	IMPACT DRIVING STARTED 16:03 (# J20)
	IMPACT DRIVING ENDED 16:27 (# J20)

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

FISHERY RESOURCES

8/22/12

DIAGRAM



BIOLOGICAL MONITOR _____ Tom Copper 08/22/12

Signature **Print Name**

Tetra Tech Inc./A. A. Rich and Associates

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

FISHERY RESOURCES

Date 8/23/12 Monitor Tom Copper Visibility OVERCAST

Tide Level

Date	Low		High		Low		High	
	Time	Tide (ft)	Time	Tide (ft)	Time	Tide (ft)	Time	Tide (ft)
08/23	0952	2.1	0452	4.3	2322	0.5	1637	6.2

Human Activity in the Area Pedestrians, Sailboats, small BOATS

Latitude 37.784916°W Longitude 122.387783°N

Monitoring Locale: Pier 30 ☐ Pier 32 ☐ Pier 38 ☐ 178m from pile driving ☐ 129m from pile driving ☐ Shore ☒

Pile Type: 24-inch octagonal concrete ☑ 24-inch steel shell ☐

Piles/Day (1-8): ☐ Pile Driver: Impact ☑ Vibratory/Impact ☐ Attenuation Device: None ☐

Bubble Curtain: On ☐ Off ☑ Minutes of Vibratory Driving: n/a ☑ 8:00 ☐

Impact Blows per Pile: 800 ☐ 300 ☑

OUTER'S

Pile No.	Pile Driver (Impact, Vibratory)[1]	Pile Driving Start/End Time	Observer Start/End Time	Dead/Injured Fish Observed (Number/Species)[2] and Time		Dead/Injured Fish Collected (Number/Species) and Time		Comment: Reference Number
J17 83	IMPACT	0759 0838	06:30	0		0		1
J18 81	IMPACT	0920 0950		0		0		2
J19 85	IMPACT	1037 1100		0		0		3
G15 —	IMPACT	11:50 11:51		0		0		4
K24 —	IMPACT	13:01 13:03		0		0		5
K18 86	IMPACT	14:15 15:14		0		0		6
K19 87	IMPACT	16:06 1638		0		0		7
			16:45					

[1] Steel shell pile driving will include both vibratory (up to the last 10 feet) and impact (last 10 feet) pile drivers
[2] SH=Steelhead; GS=North American Green Sturgeon; O=Other

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

FISHERY RESOURCES

8/23/12

PHOTOS

Comment: Reference No.	Photo Number	Time of Photo	Photo Taken Before (B), During (D) or After (A) Pile Driving	Description
	0672	06:33	B	Barge Start of day
	0673	06:33	B	Piles start of day
	0674	07:40	B	Placemnt of Pile (#J17)
	0676	08:16	D	IMPACT DRIVING (#J17)
	0677	08:40	A	Pile set (#J17)
	0678	09:21	B	Placemnt of Pile (#J18)
	0679	09:30	D	IMPACT DRIVING (#J18)
	0680	09:52	A	Pile set (#J18)
	0681	10:26	B	Placemnt of Pile (#J19)
	0682	10:47	D	IMPACT DRIVING (#J19)
	0683	11:24	A	Pile set (#J19)
**	0684	11:45	B	INDICATOR pile - SENSOR BEING PLACED
**	0685	12:49	B	INDICATOR Pile (#K24)
	0686	1357	B	Placemnt INDICATOR Pile (#K18)
	0687	1442	D	IMPACT DRIVING #(K18)
	0688	15:16	A	Pile set #(K18)
	0689	16:02	B	Placemnt Pile #(K19)
	0690	16:19	D	IMPACT DRIVING #(K19)
	0691	16:40	A	Pile set #(K19)

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

FISHERY RESOURCES

6/27/12

ADDITIONAL COMMENTS

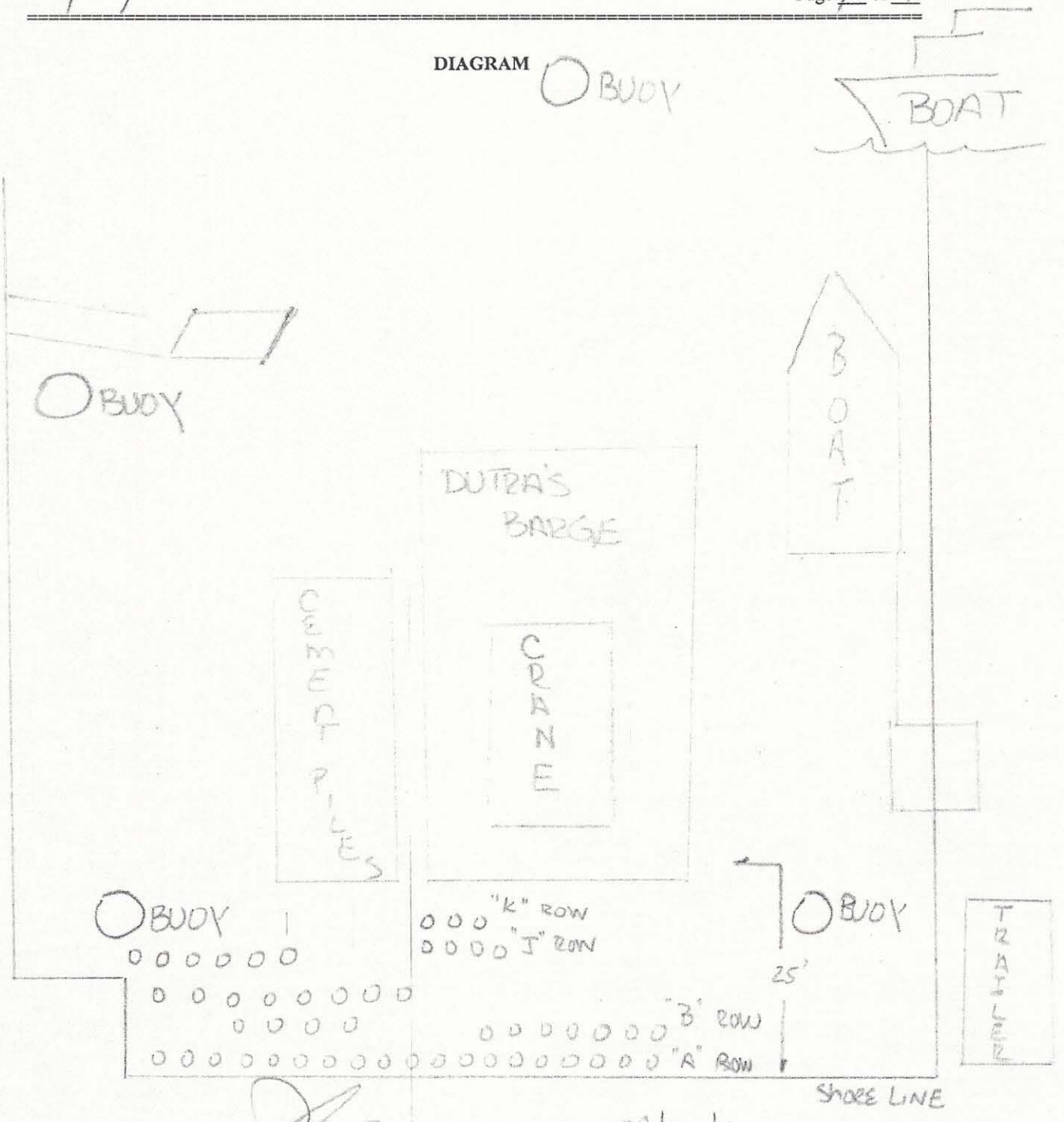
Comment: Reference No.	Additional Comments
	OVERCAST MORNING - USED SPOTLIGHT UP + DOWN SHORELINE TO LOOK FOR FISH - NONE PRESENT
	CREW BEGAN EARLY TODAY 06:35 AM 3 CEMENT PILES LEFT ON BARGE. 5 WILL BEING IN OTHER BARGE.
1	IMPACT DRIVING STARTED 08:14 #(J17)
	IMPACT DRIVING ENDED 08:38 #(J17)
**	WATER HOSE BUSTED.
2	IMPACT DRIVING STARTED 09 28 #(J18)
	IMPACT DRIVING ENDED 09:51 #(J18)
3	IMPACT DRIVING STARTED 10:47 #(J19)
	IMPACT DRIVING ENDED 11:00 #(J19)
4	* G15 INDICATOR PILE - BEING RE-TAPPED APPROX 1 ft
5	* K24 INDICATOR PILE - BEING RE-TAPPED APPROX 3 ft
6	* K18 INDICATOR PILE BEING INSTALLED
	IMPACT DRIVING STARTED 14:42 #(K18)
	IMPACT DRIVING ENDED 15:14 #(K18)
7	IMPACT DRIVING STARTED 16:19 #(K19)
	IMPACT DRIVING ENDED 16:38 #(K19)

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

FISHERY RESOURCES

8/23/12

DIAGRAM



BIOLOGICAL MONITOR _____ 08/23/12

Signature **Print Name**

Embarcadero

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

FISHERY RESOURCES

Date 09/24/12 Monitor Tom Coppse Visibility overcast – SUNNY

Tide Level

Date	Low		High		Low		High	
	Time	Tide (ft)	Time	Tide (ft)	Time	Tide (ft)	Time	Tide (ft)
9/24	10:57	2.4	06:20	4.1	—	—	17:36	6.2

Human Activity in the Area Pedestrians, small boats, tugs.

Latitude 37.784916 °N Longitude 122.397783 °W

Monitoring Locale: Pier 30 ☐ Pier 32 ☐ Pier 38 ☐ 178m from pile driving ☐ 129m from pile driving ☐ Shore ☒

Pile Type: 24-inch octagonal concrete ☑ 24-inch steel shell ☐

Piles/Day (1-8): ☐ Pile Driver: Impact ☑ Vibratory/Impact ☐ Attenuation Device: None ☐

Bubble Curtain: On ☐ Off ☒ Minutes of Vibratory Driving: n/a ☑ 8:00 ☐

Impact Blows per Pile: 800 ☐ 300 ☒

Pile No.	Pile Driver (Impact, Vibratory)[1]	Pile Driving Start/End Time	Observer Start/End Time	Dead/Injured Fish Observed (Number/Species)[2] and Time		Dead/Injured Fish Collected (Number/Species) and Time		Comment: Reference Number
88 (DUPES K20)	IMPACT	07:33 / 07:57	06:30	0		0		1
89 (K21)	IMPACT	08:36 / 08:59		0		0		2
90 (K22)	IMPACT	09:34 / 09:57		0		0		3
91 (K23)	IMPACT	10:38 / 11:30		0		0		4
92 (J16)	IMPACT	12:59 / 13:31		0		0		5
93 (K17)	IMPACT	14:15 / 14:44		0		0		6
94	IMPACT	/						7

[1] Steel shell pile driving will include both vibratory (up to the last 10 feet) and impact (last 10 feet) pile drivers

[2] SH=Steelhead; GS=North American Green Sturgeon; O=Other

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

FISHERY RESOURCES

8/24/12

PHOTOS

Comment: Reference No.	Photo Number	Time of Photo	Photo Taken Before (B), During (D) or After (A) Pile Driving	Description
	0692	0629	B	START of Day - Pile formation
	0693	0723	B	Placement of Pile #(K20)
	0694	0741	D	IMPACT DRIVING #(K20)
	0695	0759	A	Pile IN Place #(K20)
	0696	0830	B	Placement of Pile #(K21)
	0697	0849	D	IMPACT DRIVING #(K21)
	0698	0900	A	Pile IN Place #(K21)
	0699	0930	B	Placement of Pile #(K22)
	0700	0946	D	IMPACT DRIVING #(K22)
	0701	10:00	A	Pile IN Place #(K22)
	0702	10:29	B	Placement of Pile #(K23)
	0703	10:54	D	IMPACT DRIVING #(K23)
	0704	12:27	A	Pile IN Place #(K23)
	0706	13:12	D	IMPACT DRIVING #(J16)
	0707	13:32	A	Pile IN Place #(J16)
	0708	14:05	B	Placement of Pile #(K17)
	0709	14:29	D	IMPACT DRIVE #(K17)
	0710	14:45	A	Pile IN Place #(K17)
	0711			

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

FISHERY RESOURCES

8/24/12

ADDITIONAL COMMENTS

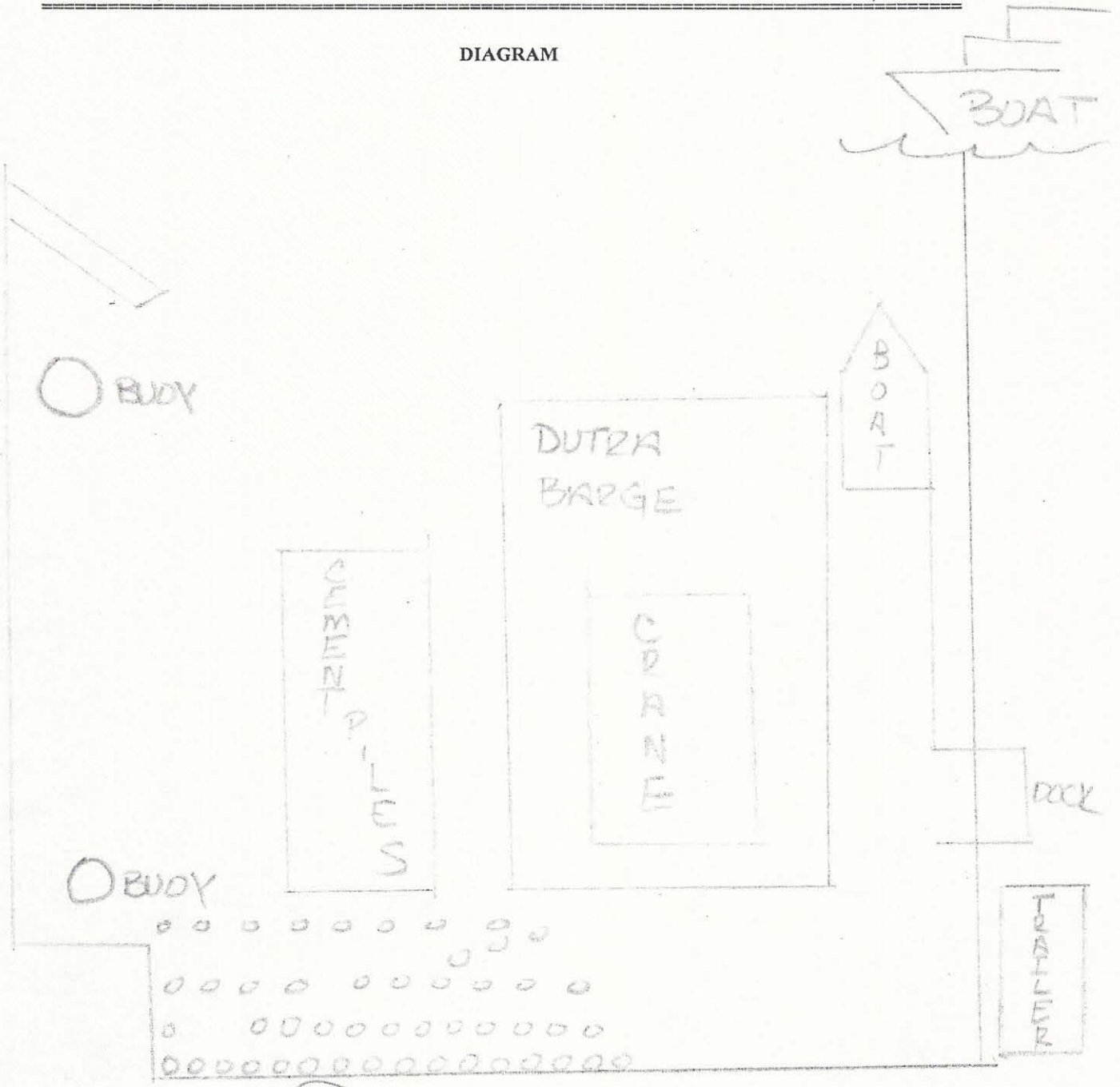
Comment: Reference No.	Additional Comments
	OVERCAST Day - STARTED OUT W/ Flash Light ALONG
	PILE - North - South Looking for FISH. NONE SPOTTED.
	PILE goal for the day = 7
1	IMPACT DRIVING START 07:40 (#K20)
	IMPACT DRIVING END 07:57 (#K20)
2	IMPACT DRIVING START 08:47 (#K21)
	IMPACT DRIVING END 08:59 (#K21)
3	IMPACT DRIVING START 09:45 (#K22)
	IMPACT DRIVING END 09:57 (#K22)
4	IMPACT DRIVING START 10:53 (#K23)
	IMPACT DRIVING END 11:30 (#K23)
5	IMPACT DRIVING START 13:10 (#J16)
	IMPACT DRIVING END 13:31 (#J16)
6	IMPACT DRIVING START 14:29 (#K17)
	IMPACT DRIVING END 14:44 (#K17)
7	IMPACT DRIVING START
	IMPACT DRIVING END

BRANNAN STREET WHARF BIOLOGICAL MONITORING DATA SHEET

FISHERY RESOURCES

8/24/12

DIAGRAM



BIOLOGICAL MONITOR _____ _____ 08/24/12

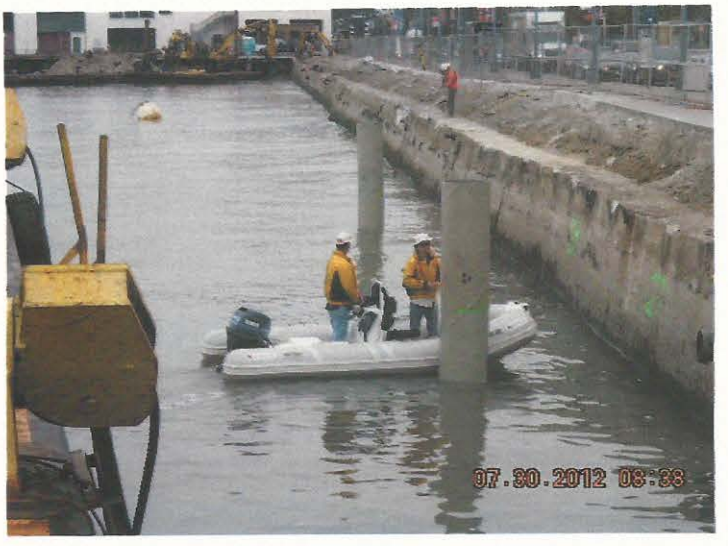
Signature **Print Name**

Tetra Tech Inc./A. A. Rich and Associates

APPENDIX D

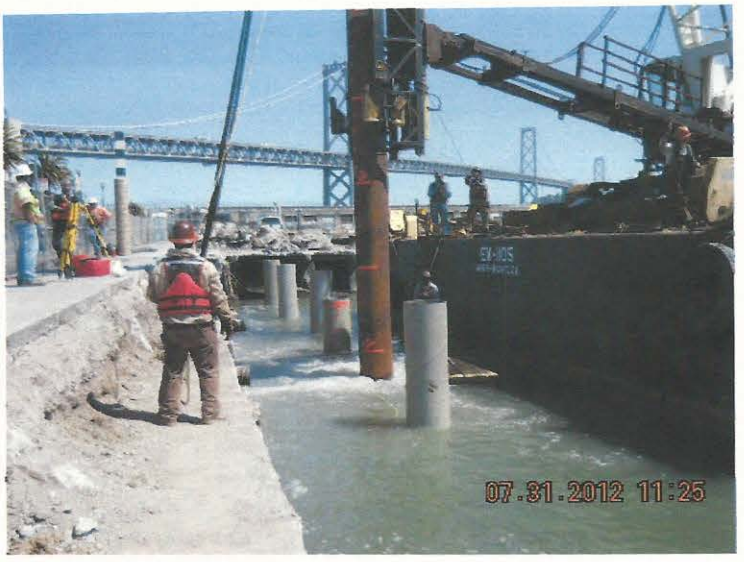
Representative Photographs

Pile Driving Barge



Boat for Transporting People to and from the Barge from Shore

Pile Driving Barge with Steel Piles



Driving a Steel Pile

Driving a Steel Pile

Driving a Concrete Pile

Finished Steel Piles

Finished Concrete Pile

Turbulence Caused by Pile Driving

Turbidity Caused by Pile Driving

APPENDIX E

Weekly Data Summaries

A.A. RICH AND ASSOCIATES

Alice A. Rich, Ph.D.
Principal

150 Woodside Drive
San Anselmo, CA 94960
Tel: (415) 485-2937
Fax: (415) 485-9221
alice@aarichandassociates.com
www.aarichandassociates.com

July 30, 2012

Ann M. Zoidis
Tetra Tech
1999 Harrison Street, Suite 500
Oakland, CA 94612

RE: Brannan Street/Pier 36 Project/Fishery Resources Data Monitoring-Summary for July 27, 2012

Dear Ann:

Attached is a summary for the fishery resources data monitoring for July 27, 2012. If you have any questions, please do not hesitate to contact me.

Sincerely,

Alice A. Rich, Ph.D.

Alice A. Rich, Ph.D.

cc: Marques, Humpal, AAR
Ian Cole, AAR
Mandi McElroy, Tetra Tech
file (BSW Fishery Resources Summary for 072712 revised)

A.A. RICH AND ASSOCIATES

July 30, 2012

Ann M. Zoidis
Tetra Tech
1999 Harrison Street, Suite 500
Oakland, CA 94612

RE: Brannan Street/Pier 36 Project/Fishery Resources Data Monitoring-Summary for July 27, 2012

On July 27, 2012, the following occurred during the fishery resources monitoring:

(1) The fishery resources monitors stationed themselves on the crane barge;

(2) A harbor seal appeared outside of the exclusion zone at 11:09 a.m. before the pile driving commenced;

(3) Pile driving commenced at 12:45 pm;

(4) The bubble curtain was repaired after it was noticed that it was malfunctioning, only releasing bubbles on one side of the pile;

(5) There were no fish observed throughout the day and only the harbor seal was in the area that was noted outside of the exclusion zone; and,

(6) There appeared to be no negative impacts on any animal species from the day's pile driving operations.

A.A. RICH AND ASSOCIATES

Alice A. Rich, Ph.D.
Principal

150 Woodside Drive
San Anselmo, CA 94960
Tel: (415) 485-2937
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August 5, 2012

Ann M. Zoidis
Tetra Tech
1999 Harrison Street, Suite 500
Oakland, CA 94612

RE: Brannan Street/Pier 36 Project/Fishery Resources Data Monitoring-Summary for July 30, 2012-August 3, 2012

Dear Ann:

Attached is a summary for the fishery resources data monitoring for July 30-August 3, 2012. If you have any questions, please do not hesitate to contact me.

Sincerely,

Alice A. Rich, Ph.D.

Alice A. Rich, Ph.D.

cc: Mandi McElroy, Tetra Tech
file (BSW Fishery Resources Summary for 073012-080312)

A.A. RICH AND ASSOCIATES

August 3, 2012

Ann M. Zoidis
Tetra Tech
1999 Harrison Street, Suite 500
Oakland, CA 94612

RE: Brannan Street/Pier 36 Project/Fishery Resources Data Monitoring-Summary for July 30-August 3, 2012

Summary: No fish were observed during the biological monitoring from July 30-August 3, 2012.

On July 30, 2012, the following occurred during the fishery resources monitoring:

(1) The fishery resources monitor stationed himself on the sidewalk along the Embarcadero at the request of Dutra's Steve Hutchinson. The fishery resources monitor told Steve that if visibility became a problem in the future that he would have to be stationed on the barge, or at another site where the potential effects of pile driving on fishery resources could be seen;

(2) Pile driving commenced at 9:26 a.m and finished around 3 p.m; and,
(3) There were no fish observed throughout the day.

On July 31, the following occurred during the fishery resources monitoring:

(1) The fishery resources monitor stationed himself on the sidewalk along the Embarcadero;
(2) Pile driving commenced at 8:37 a.m and finished at 1 p.m;
(3) In the late morning, the pile driving ceased a number of times, due to problems with its operation; and,
(4) There were no fish observed throughout the day.

On August 1, the following occurred during the fishery resources monitoring:

(1) The fishery resources monitor stationed himself on the sidewalk along the Embarcadero;
(2) Pile driving commenced at 7:34 a.m and finished at around 2:30 p.m;
(3) In the early morning, the pile driving ceased once, due to problems with the driver; and,
(4) There were no fish observed throughout the day.

On August 2, the following occurred during the fishery resources monitoring:

(1) The fishery resources monitor stationed himself on the sidewalk along the Embarcadero;
(2) Pile driving commenced late (at10:05 a.m), due to repairs on the hammer and safety meeting, and finished at around 4 p.m;
(3) There were problems sinking piles A23, A22.5, and A21, due to the uneven sea floor; and,
(4) There were no fish observed throughout the day.

On August 3, the following occurred during the fishery resources monitoring:

(1) The fishery resources monitor stationed himself on the sidewalk along the Embarcadero;
(2) Pile driving commenced at 8:46 a.m and finished at around 2 p.m; and,
(3) There were no fish observed throughout the day.

A.A. RICH AND ASSOCIATES

Alice A. Rich, Ph.D.
Principal

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August 12, 2012

Ann M. Zoidis
Tetra Tech
1999 Harrison Street, Suite 500
Oakland, CA 94612

RE: Brannan Street/Pier 36 Project/Fishery Resources Data Monitoring-Summary for August 6-9, 2012

Dear Ann:

Attached is a summary for the fishery resources data monitoring for August 6-9, 2012. If you have any questions, please do not hesitate to contact me.

Sincerely,

Alice A. Rich, Ph.D.

Alice A. Rich, Ph.D.

cc: Mandi McElroy, Tetra Tech
file (BSW Fishery Resources Summary for 080612-080912)

A.A. RICH AND ASSOCIATES

August 12, 2012

Ann M. Zoidis
Tetra Tech
1999 Harrison Street, Suite 500
Oakland, CA 94612

RE: Brannan Street/Pier 36 Project/Fishery Resources Data Monitoring-Summary for August 6-9, 2012

Summary: Fish were observed on August 9th at 6:15 a.m. during the fishery resources monitoring from August 6-9, 2012. The combination of the use of a stronger flashlight, together with beginning to look for fishes just after dawn, resulted in about 50 "fingerling"-size fishes being seen, although they dispersed rather quickly. After that, due to the high turbidity and water turbulence from the pile driving, no other fishes were observed. And, no dead salmonids or green sturgeon were seen.

On August 6, 2012, the following occurred during the fishery resources monitoring:

(1) Dr. Alice A. Rich accompanied Tom Copper, who will be doing the fishery resources monitoring for the rest of the project, barring any unforeseen circumstances;

(2) The fishery resources monitor stationed himself on the sidewalk along the Embarcadero and began to look for fish at 6:45 a.m.;

(3) Pile driving commenced at 7:54 a.m. and finished around 2:50 p.m.;

(4) There was a lot of turbidity, with increased turbidity noted when pile driving started; and,

(5) There were no fish observed throughout the day.

On August 7, the following occurred during the fishery resources monitoring:

(1) The fishery resources monitor stationed himself on the sidewalk along the Embarcadero and began to look for fish at 6:30 a.m.;

(2) Pile driving commenced at 7:35 a.m. and finished around 3:15 p.m.;

(3) There was a lot of turbidity, with the turbidity increasing beginning with the pile driving; and,

(4) There were no fish observed throughout the day.

On August 8, the following occurred during the fishery resources monitoring:

(1) The fishery resources monitor stationed himself on the sidewalk along the Embarcadero and began to look for fish at 6:30 a.m. Dr. Rich thought that if fish were present they might be seen earlier in the morning before there is much human activity. In addition, while the fisheries monitors have been using a very strong flashlight to observe fishes that has been very effective on other pile driving projects, Dr. Rich thought that a stronger flashlight might yield better results;

(2) Pile driving commenced at 7:50 a.m. and finished around 2:45 p.m.

(3) There was a lot of turbidity with the turbidity increasing beginning with the pile driving; and,

(4) There were no fish observed throughout the day.

On August 9, the following occurred during the fishery resources monitoring:

(1) The fishery resources monitor stationed himself on the sidewalk along the Embarcadero and, at Dr. Rich's instructions, began to look for fish at 6:15 a.m.;

(2) Immediately, a school of fishes (approximately 50 "fingerling"-size) were observed to the left of the "J row" (see diagram), when viewed from Pier 30/32. Due to the height of the pier, it was not possible to net any of the fish to identify them. As the Tetra Tech biologist was not due to arrive until 6:45 a.m.), the boat was not available to use to collect the fishes to determine what species were present. The combination of the early time, no human activity, very calm water, and the use of a higher-powered flashlight resulted in seeing the fishes at 6:15 a.m. However, the fishes dispersed rather quickly.

(3) Pile driving commenced at 7:50 a.m and finished around 2:20 p.m;

(4) There was a lot of turbidity, with the turbidity increasing beginning with the pile driving and,

(5) Fishes were observed only at 6:15 a.m.

A.A. RICH AND ASSOCIATES

Alice A. Rich, Ph.D.
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August 19, 2012

Ann M. Zoidis
Tetra Tech
1999 Harrison Street, Suite 500
Oakland, CA 94612

RE: Brannan Street/Pier 36 Project/Fishery Resources Data Monitoring-Summary for August 13-17, 2012

Dear Ann:

Attached is a summary for the fishery resources data monitoring for August 13-17, 2012. If you have any questions, please do not hesitate to contact me.

Sincerely,

Alice A. Rich, Ph.D.

Alice A. Rich, Ph.D.

cc: Mandi McElroy, Tetra Tech
file (BSW Fishery Resources Summary for 081312-081712)

A.A. RICH AND ASSOCIATES

August 19, 2012

Ann M. Zoidis
Tetra Tech
1999 Harrison Street, Suite 500
Oakland, CA 94612

RE: Brannan Street/Pier 36 Project/Fishery Resources Data Monitoring-Summary for August 13-17, 2012

Summary: Although the fishery resources monitor began monitoring at 6:15 am each morning, prior to pile driving and other human activities, no fish were observed during the fishery resources monitoring from August 13-17, 2012. And, no dead salmonids or green sturgeon were seen. However, as the days get shorter and dawn begins later, it is difficult to see in the water along the shoreline, even with powerful binoculars, and calm water prior to much human activity in the area.

On August 13, 2012, the following occurred during the fishery resources monitoring:

(1) The fishery resources monitored arrived at the site at 6:15 am to begin searching for fishes that might be present prior to pile driving and other human activity; no fish were observed;

(2) The fishery resources monitor then stationed himself at the drive impact site and proceeded along the shoreline from north to south throughout the day;

(3) Pile driving commenced at about 11:45 am and finished around 2:35 p.m.;

(4) There was a lot of turbidity, with increased turbidity noted when pile driving started; and,

(5) There were no fish observed throughout the day.

On August 14, the following occurred during the fishery resources monitoring:

(1) The fishery resources monitored arrived at the site at 6:10 am to begin searching for fishes that might be present prior to pile driving and other human activity; no fish were observed;

(2) The fishery resources monitor then stationed himself at the drive impact site and along the shoreline from north to south throughout the day;

(3) Pile driving commenced at about 8:25 am and finished around 3:45 p.m.;

(4) There was a lot of turbidity, with increased turbidity noted when pile driving started; and,

(5) There were no fish observed throughout the day.

On August 15, the following occurred during the fishery resources monitoring:

(1) The fishery resources monitored arrived at the site at 6:15 am to begin searching for fishes that might be present prior to pile driving and other human activity; no fish were observed;

(2) The fishery resources monitor then stationed himself at the drive impact site and proceeded along the shoreline from north to south throughout the day;

(3) Pile driving commenced at about 8:40 am and finished around 2:00 p.m.;

(4) There was a lot of turbidity, with increased turbidity noted when pile driving started;

(5) There was a lot more boat activity from America's Cup sailboats, compared to activity previously; and,

(6) There were no fish observed throughout the day.

On August 16, the following occurred during the fishery resources monitoring:

(1) The fishery resources monitored arrived at the site at 6:20 am to begin searching for fishes that might be present prior to pile driving and other human activity; no fish were observed;

(2) The fishery resources monitor then stationed himself at the drive impact site and proceeded along the shoreline from north to south throughout the day;

(3) Pile driving commenced at about 8:00 am and finished around 2:20 p.m.;

(4) There was a lot of turbidity, with increased turbidity noted when pile driving started; and,

(5) There were no fish observed throughout the day.

On August 17, the following occurred during the fishery resources monitoring:

(1) The fishery resources monitored arrived at the site at 6:15 am to begin searching for fishes that might be present prior to pile driving and other human activity; no fish were observed;

(2) The fishery resources monitor then stationed himself at the drive impact site and proceeded along the shoreline from north to south throughout the day;

(3) Pile driving commenced at about 8:35 am and finished around 2:00 p.m.;

(4) There was a lot of turbidity, with increased turbidity noted when pile driving started; and,

(5) There were no fish observed throughout the day.

A.A. RICH AND ASSOCIATES

Alice A. Rich, Ph.D.
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August 26, 2012

Ann M. Zoidis
Tetra Tech
1999 Harrison Street, Suite 500
Oakland, CA 94612

RE: Brannan Street/Pier 36 Project/Fishery Resources Data Monitoring-Summary for August 20-24, 2012

Dear Ann:

Attached is a summary for the fishery resources data monitoring for August 20-24, 2012. If you have any questions, please do not hesitate to contact me.

Sincerely,

Alice A. Rich, Ph.D.

Alice A. Rich, Ph.D.

cc: Mandi McElroy, Tetra Tech
file (BSW Fishery Resources Summary for 082012-082412)

A.A. RICH AND ASSOCIATES

August 24, 2012

Ann M. Zoidis
Tetra Tech
1999 Harrison Street, Suite 500
Oakland, CA 94612

RE: Brannan Street/Pier 36 Project/Fishery Resources Data Monitoring-Summary for August 20-24, 2012

Summary: Although the fishery resources monitor began monitoring between 6:15-6:20 am each morning, prior to pile driving and other human activities, no fish were observed during the fishery resources monitoring from August 20-24, 2012. And, no dead salmonids or green sturgeon were seen. Due to the low light, as dawn arrives later, it was difficult to see in the water along the shoreline, even with powerful binoculars, and calm water prior to much human activity in the area.

On August 20, 2012, the following occurred during the fishery resources monitoring:

(1) The fishery resources monitored arrived at the site at 6:20 am to begin searching for fishes that might be present prior to pile driving and other human activity; no fish were observed;

(2) The fishery resources monitor then stationed himself near the "indicators" pile sites and proceeded along the shoreline from north to south throughout the day;

(3) Pile driving commenced at about 9:00 am and finished around 3:20 pm;

(4) There was a lot of turbidity, with increased turbidity noted when pile driving started; and,

(5) There were no fish observed throughout the day.

On August 21, the following occurred during the fishery resources monitoring:

(1) The fishery resources monitored arrived at the site at 6:20 am to begin searching for fishes that might be present prior to pile driving and other human activity; no fish were observed;

(2) The fishery resources monitor then stationed himself near the drive impact sites and along the shoreline from north to south throughout the day;

(3) Pile driving commenced at about 8:15 am and finished around 4:00 pm;

(4) There was a lot of turbidity, with increased turbidity noted when pile driving started; and,

(5) There were no fish observed throughout the day.

On August 22, the following occurred during the fishery resources monitoring:

(1) The fishery resources monitored arrived at the site at 6:15 am to begin searching for fishes that might be present prior to pile driving and other human activity; no fish were observed;

(2) The fishery resources monitor then stationed himself near the drive impact sites and proceeded along the shoreline from north to south throughout the day;

(3) Pile driving commenced at about 7:50 am and finished around 4:30 pm;

(4) There was a lot of turbidity, with increased turbidity noted when pile driving started; and,

(5) There were no fish observed throughout the day.

On August 23, the following occurred during the fishery resources monitoring:

(1) The fishery resources monitored arrived at the site at 6:20 am to begin searching for fishes that might be present prior to pile driving and other human activity; no fish were observed;

(2) The fishery resources monitor then stationed himself near the drive impact sites and proceeded along the shoreline from north to south throughout the day;

(3) Pile driving commenced at about 8:00 am and finished around 4:40 pm;

(4) There was a lot of turbidity, with increased turbidity noted when pile driving started; and,

(5) There were no fish observed throughout the day.

On August 24, the following occurred during the fishery resources monitoring:

(1) The fishery resources monitored arrived at the site at 6:15 am to begin searching for fishes that might be present prior to pile driving and other human activity; no fish were observed;

(2) The fishery resources monitor then stationed himself near the drive impact sites and proceeded along the shoreline from north to south throughout the day;

(3) Pile driving commenced at about 7:30 am and finished around 2:45 pm;

(4) There was a lot of turbidity, with increased turbidity noted when pile driving started; and,

(5) There were no fish observed throughout the day.