US Army Corps of Engineers®

Oakland Harbor Turning Basins Widening

Integrated Feasibility Report and Environmental Assessment

APPENDIX A08:

Noise Monitoring Methodology

To characterize the noise environment in the project sites and surrounding area, both long-term (48 hours or more) and short-term (20-minute) noise monitoring was conducted. Long-term noise monitoring was conducted at seven locations, and short-term noise monitoring was conducted at three locations. Long-term noise monitoring locations were selected based on the proximity of potential locations of residential use to different noise sources: UPRR rail tracks, Schnitzer Steel, and vessel operation in the Inner Harbor Channel. A quantitative assessment of each long-term and short-term noise monitoring location is provided below.

Airborne noise measurements were conducted using a Larson Davis Model 831 Type 1 sound-level meter for short-term measurements, and modal LxT2 for long-term measurements. The meters were laboratory-certified within the past year and were calibrated prior to each measurement using a laboratory-certified calibrator (Larson Davis model CAL-200). For short-term measurements, the sound-level meter was placed on a tripod at an approximate microphone height of 5 feet. Some long-term measurements necessitated a higher microphone height of approximately 12 feet to ensure equipment safety.

Underwater noise measurements were conducted using Cetacean Research Model CR1 hydrophone, SpectraDAQ precision data acquisition sound card (SpDAQ-200), and Spectra-PLUS-SC signal analyzer software. The CR1 hydrophones have a transducer sensitivity of -199.63 and -198.17 dB, referenced to 1 volt per µPa. The SpDAQ-200 was set to a sampling rate of 48 kilohertz (kHz) (48,000 bits per second) and a frequency response between 4 and 22 kHz. The input channels in the SpDAQ-200 provide four fixed-gain steps, which allow the system to be calibrated directly to the transducer sensitivity of the CR1 hydrophone on each start-up. Prior to daily deployment of the hydrophone, the CR1 hydrophone was calibrated to the SpDAQ-200 data acquisition sound card by manually entering the transducer sensitivity of the CR1 hydrophone into the Spectra PLUS-SC dual-channel signal analyzer software. The Spectra PLUS-SC software is able to convert the detected voltage of the transducer to the corresponding engineering units, based on the transducer sensitivity provided by the user. The transducer sensitivity of the CR1 hydrophone was obtained from the calibration certificate provided by the manufacturer.

Noise Monitoring Location LT-1: This noise monitoring location is on the northern side of military housing on the northern side of Barbers Point Road. This location is approximately 1,100 feet from the nearest work areas, on the southern side of the Inner Harbor Turning Basin. Observations during the deployment and collection of noise monitoring equipment indicated that existing daytime noise contributions at this location were generated by intermittent traffic on Main Street. Noise monitoring data indicate a consistent average noise level during both daytime and nighttime hours of 63 and 60 dBA, respectively. The data were collected in 2021. A large container vessel (*One Ibis*) entered and departed the Inner Harbor Turning Basin during the monitoring period, during which noise levels for the hour were consistent with the same hour on other weekdays when no vessels were in the Inner Harbor Turning Basin. This indicates that vessel movements in the Inner Harbor Turning Basin do not meaningfully contribute to the local noise environment.

Noise Monitoring Location LT-2: This noise monitoring location is on the northern side of Mosely Avenue, across from an existing multi-family housing complex and adjacent to Estuary Park. This location is approximately 500 feet from the nearest work areas on the southern side of the Inner Harbor Turning Basin. Observations during the deployment and collection of noise monitoring equipment indicated that existing daytime noise contributions at this location were generated by intermittent

vehicle traffic on Mosely Avenue. Noise monitoring data indicate a consistent average noise level during both daytime and nighttime hours of 55 and 50 dBA, respectively. The data were collected in 2021. A large container vessel (*One Aquila*) entered and departed the Inner Harbor Turning Basin during the monitoring period, during which noise levels for the hour were consistent with the same hour on other weekdays when no vessels were in the Inner Harbor Turning Basin. This indicates that vessel movements in the Inner Harbor Turning Basin do not meaningfully contribute to the local noise environment.

Noise Monitoring Location LT-3: This noise monitoring location is on the southern side of Mitchell Avenue, adjacent to an existing multi-family housing complex. This location is approximately 1,000 feet from the nearest work areas on the southern side of the Inner Harbor Turning Basin. Observations during the deployment and collection of noise monitoring equipment indicated that existing daytime noise contributions at this location were generated by intermittent vehicle traffic on Mitchell Avenue. Noise monitoring data indicate an average noise level during both daytime and nighttime hours of 58 and 52 dBA, respectively. The data were collected in 2019.

Noise Monitoring Location LT-4: This monitoring location is at the terminus of Clay Street on the western side of the Port office building, south of Embarcadero West. It is approximately 2,000 feet from the nearest work areas on the northeastern side of the Inner Harbor Turning Basin. Observations during the deployment and collection of noise monitoring equipment indicated that existing daytime noise contributions at this location were generated by UPRR train activity, including warning bells and train horns, and operations of the Oakland Ferry Terminal. Noise monitoring data indicate average hourly noise levels of 73 dBA during daytime hours and 70 dBA during nighttime hours. The data were collected in 2019.

Noise Monitoring Location LT-5: This noise monitoring location is on the Howard Terminal wharf, east of the project site along the Inner Harbor Channel. It was selected for monitoring due to its potential to have the public trust designation removed and potentially be developed with a new ballpark as part of the Waterfront Ballpark District Project, and to characterize the noise environment nearest work areas on the northeastern side of the Inner Harbor Turning Basin. Noise monitoring data indicate a consistent average noise level during both daytime and nighttime hours of 58 to 59 dBA. The data were collected in 2019.

Monitoring Location LT-6: This noise monitoring location is on the western Howard Terminal boundary, along the property line with the adjacent Schnitzer Steel heavy metal recycling operation. It was selected due to its potential to be developed for residential or other noise-sensitive land use as part of the Waterfront Ballpark District Project, and to assess the noise contributions from the neighboring recycling activities. This location is currently occupied by XPO Logistics, which operates a truck transport business at 1 Market Street. Observations during the deployment and collection of monitoring equipment indicated that existing daytime noise contributions at this location were generated by multiple mobile cranes sorting incoming metals and operations in the easternmost shed of the adjacent Schnitzer Steel site. Trucking operations in the XPO Logistics trucking facility site, where the noise monitor was installed, were infrequent. Noise monitoring data indicate that operations at the Schnitzer Steel site occur 24 hours a day, with average noise level during both daytime and nighttime hours of 69 dBA. Based on the noise monitoring data, the only downtime in activity for Schnitzer Steel operations occurred between Sunday 3:00 a.m. and Monday 4:00 a.m. The data were collected in 2019.

Noise Monitoring Location LT-7: This noise monitoring location is on the eastern end of Matson Terminal, adjacent to Berth 63, along the property line with the adjacent Schnitzer Steel heavy metal recycling operation. It was selected due to its proximity to the Inner Harbor Turning Basin, approximately 700 feet to the southeast. Observations during the deployment and collection of monitoring equipment indicated that existing daytime noise contributions at this location were generated by truck operations on Matson Terminal and multiple mobile cranes sorting incoming metals at Schnitzer Steel. Noise monitoring data indicate an average noise level during both daytime and nighttime hours of 66 and 63 dBA, respectively. The data were collected in 2021. A large container vessel (*One Ibis*) entered and departed the Inner Harbor Turning Basin during the monitoring period, during which noise levels for the hour were consistent with the same hour on other weekdays when no vessels were in the Inner Harbor Turning Basin. This indicates that vessel movements in the Inner Harbor Turning Basin do not meaningfully contribute to the local noise environment. The data were collected in 2021.

Noise Monitoring Location ST-1: This short-term noise monitoring location is on the Howard Terminal wharf, immediately adjacent to the Inner Harbor Turning Basin. It was selected for monitoring due to its proximity to large vessels actively operating in the Inner Harbor Turning Basin. Airborne and underwater noise monitoring was conducted at this location on June 4, 2021. During the monitoring period, a large container vessel (the *One Aquila*) entered, was turned, and departed the Inner Harbor Turning Basin along with three assist tugboats; this operation occurred over an approximately 30-minute period. Maximum airborne noise levels during the turning activity were recorded to be 69 dBA at an approximate distance of 68 meters (225 feet). Underwater noise monitoring during the vessel turning period recorded a maximum sound pressure level of 174 dB and an RMS level of 151 dB at a depth of half the water column (25 feet).

Noise Monitoring Location ST-2: This short-term noise monitoring location is at Middle Harbor Shoreline Park, a recreational area approximately 2,500 feet south of the Outer Harbor Turning Basin. This location was selected as a nearby recreational receptor because there are no residential area or other noise-sensitive receptors within 1 mile of the Outer Harbor Turning Basin. The park is open to the public during daytime hours only, and a short-term daytime monitor recorded a daytime noise levels of 58 dBA. The primary sources of noise at this location were truck traffic along 7th Avenue, and ground-based equipment activity at the TraPac Terminal. The data were collected in 2021.

Noise Monitoring Location ST-3: This short-term noise monitoring location is on the TraPac Terminal wharf, immediately adjacent to the Outer Harbor Turning Basin. It was selected for monitoring due to its proximity to large vessels actively operating in the Outer Harbor Turning Basin. Airborne and underwater noise monitoring was conducted at this location on August 20, 2021. During the monitoring period, a large container vessel (the *Hyundai Hongkong*) entered, was turned, and departed the Outer Harbor Turning Basin along with three assist tugboats; this operation occurred over an approximately 30-minute period. Maximum airborne noise levels during the turning activity were recorded to be 70 dBA at an approximate distance of 200 meters (625 feet). Underwater noise monitoring during the vessel turning period recorded a maximum sound pressure level of 175 dB and an RMS level of 141 dB at a depth of half the water column (45 feet). Observations of the monitoring technician indicated that airborne noise levels were dominated by ground-based equipment activity of the TraPac Terminal even during vessel turning activity.