4.11 Noise and Vibration

This section assesses the potential for the Project to result in significant adverse noise impacts, or exposing people or structures to vibration impacts, and identifies feasible mitigation measures to avoid or reduce potential adverse impacts. Potential impacts are discussed and evaluated, and appropriate mitigation measures are identified, as necessary. Project-related noise and vibration effects on biological resources are discussed in Section 4.3, *Biological Resources*, while potential vibration-related impacts to historic structures are also considered in Section 4.4, *Cultural and Tribal Cultural Resources*. While Section 4.10, *Land Use, Plans, and Policies*, addresses noise-related impacts in the context of land use compatibility in Impact LUP-2, the discussion refers to assessments made within this section in Impact NOI-4.

CEQA requires the analysis of potential adverse effects of a project on the environment. The potential effects of the environment on the project are not legally required to be analyzed or mitigated under CEQA, except where the project impacts exacerbate the existing conditions. As discussed in this section, Project impacts will exacerbate existing noise and vibration conditions. Therefore, this section analyzes potential effects of noise and vibration conditions on the Project (as well as other users) as set forth in the City of Oakland's CEQA Guidelines and Thresholds. As such, the potential adverse effect of existing risk levels for noise and vibration exposure to proposed residential uses of the Project is analyzed in this section.

This section also analyzes the Maritime Reservation Scenario, focused on environmental conditions, regulations, impacts and mitigation measures that are different from those identified for the Project.

Comments on the Notice of Preparation (NOP) for this EIR identified topics of concern that included potential increases in train horn activity due to the increase in pedestrians near the existing rail line, locating new noise-sensitive land uses within an area with multiple 24-hour noise sources, the introduction of noise from ball park and concert events and fireworks, the generation of construction-related noise, and the loss of buffer areas between industrial and residential land uses.

4.11.1 Environmental Setting

Technical Background

Sound is mechanical energy transmitted by pressure waves through a medium such as air. Noise is defined as unwanted sound. Sound is characterized by various parameters that include the rate of oscillation of sound waves (frequency), the speed of propagation, and the pressure level or energy content (amplitude). In particular, the sound pressure level has become the most common descriptor used to characterize the "loudness" of an ambient sound level. Sound pressure level is measured in decibels (dB), with zero dB corresponding roughly to the threshold of human hearing, and 120 to 140 dB corresponding to the threshold of pain.

Sound pressure fluctuations can be measured in units of hertz (Hz), which correspond to the frequency of a particular sound. Typically, sound does not consist of a single frequency, but

rather a broad band of frequencies varying in levels of magnitude (sound power). The typical human ear is not equally sensitive to all frequencies of the audible sound spectrum. As a consequence, when assessing potential noise impacts, sound is measured using an electronic filter that de-emphasizes the frequencies below 1,000 Hz and above 5,000 Hz in a manner corresponding to the human ear's decreased sensitivity to low and extremely high frequencies. This method of frequency weighting is referred to as A-weighting and is expressed in units of decibels (dBA).[1] Frequency A-weighting follows an international standard methodology of frequency de-emphasis and is typically applied to community noise measurements.

Some representative noise sources and their corresponding A-weighted noise levels are shown in **Table 4.11-1**.

TABLE 4.11-1
TYPICAL NOISE LEVELS

Noise Level (dBA)	Outdoor Activity	Indoor Activity
90+	Gas lawn mower at 3 feet, jet flyover at 1,000 feet	Rock Band
80-90	Diesel truck at 50 feet	Loud television at 3 feet
70-80	Gas lawn mower at 100 feet, noisy urban area	Garbage disposal at 3 feet, vacuum cleaner at 10 feet
60-70	Commercial area	Normal speech at 3 feet
40-60	Quiet urban daytime, traffic at 300 feet	Large business office, dishwasher next room
20-40	Quiet rural, suburban nighttime	Concert hall (background), library, bedroom at night
10-20	Remote open space	Broadcast / recording studio
0	Lowest threshold of human hearing	Lowest threshold of human hearing

SOURCE: Modified from Caltrans, 2013

Noise Exposure and Community Noise

An individual's noise exposure is a measure of the noise experienced by the individual over a period of time. A noise level is a measure of noise at a given instant in time. The noise levels presented in Table 4.11-1 represent noise measured at a given instant in time; however, noise levels rarely persist consistently over a long period of time. Rather, community noise varies continuously over time because of the contributing sound sources of the community noise environment. Community noise is primarily the product of many distant noise sources, which constitute a relatively stable background noise, with the individual contributors unidentifiable. The background noise level changes throughout a typical day, but does so gradually, corresponding with the addition and subtraction of distant noise sources such as traffic and wind. What makes community noise constantly variable throughout a day, besides the slowly changing background noise, is the addition of short duration single event noise sources (e.g., aircraft flyovers, motor vehicles, sirens), which are readily identifiable to the individual.

[1] All noise levels reported herein reflect A-weighted decibels unless otherwise stated.

These successive additions of sound to the community noise environment varies the community noise level from instant to instant requiring the measurement of noise exposure over a period of time to accurately characterize a community noise environment and evaluate cumulative noise impacts. This time-varying characteristic of environmental noise is described using statistical noise descriptors. The most frequently used noise descriptors are summarized below:

L_{eq}: The equivalent sound level is used to describe noise over a specified period of time, typically one hour, in terms of a single numerical value. The L_{eq} is the constant sound level, which would contain the same acoustic energy as the varying sound level, during the same time period (i.e., the average noise exposure level for the given time period).

L_{max}: The instantaneous maximum noise level for a specified period of time.

L_{50}: The noise level that is equaled or exceeded 50 percent of the specified time. This is the median noise level during the specified time. So an L_{50} represents the noise level exceed 30 minutes in a given hour. The numerical subscript may be changed to reflect other percentages. For example, a noise level exceeded for 5 minutes in a given hour would be the noise level exceeded 8.3 percent of the time or the $L_{8.3}$.

L_{90}: The noise level that is equaled or exceeded 90 percent of the specified time. The L_{90} is often considered the background noise level averaged over the specified time.

DNL: The Day/Night Average Sound Level is the 24-hour day and night A-weighed noise exposure level, which accounts for the greater sensitivity of most people to nighttime noise by weighting noise levels at night. Noise between 10:00 p.m. and 7:00 a.m. is weighted (penalized) by adding 10 dBA to take into account the greater annoyance from nighttime noise. (Also referred to as "Ldn.")

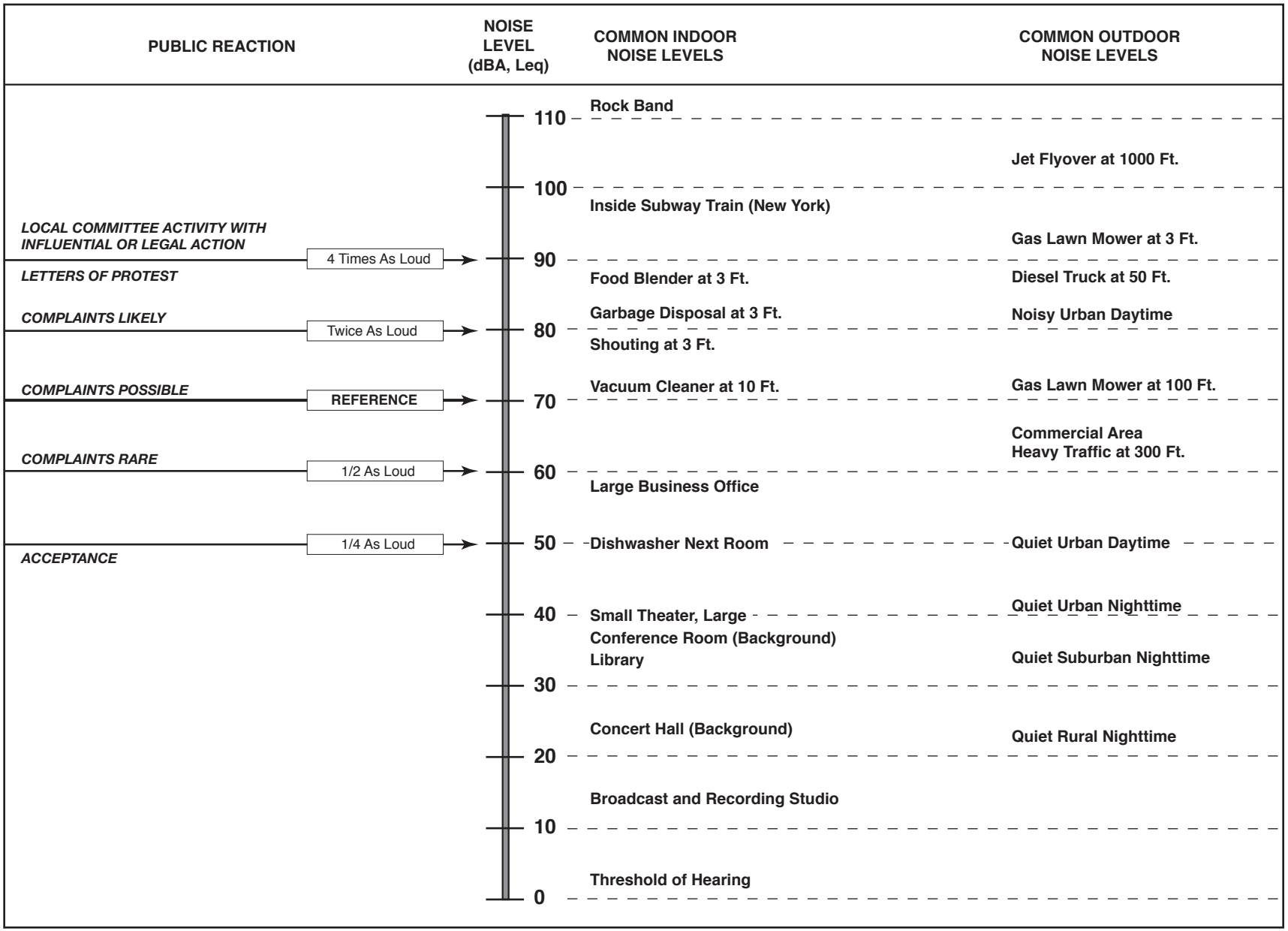
CNEL: Similar to the DNL, the Community Noise Equivalent Level (CNEL) adds a 5-dBA "penalty" for the evening hours between 7:00 p.m. and 10:00 p.m. in addition to a 10-dBA penalty between the hours of 10:00 p.m. and 7:00 a.m.

Effects of Noise on People

The effects of noise on people can be placed into three categories:

- Subjective effects of annoyance, nuisance, dissatisfaction;
- Interference with activities such as speech, sleep, learning; and
- Physiological effects such as hearing loss or sudden startling.

Environmental noise typically produces effects in the first two categories (see **Figure 4.11-1**). Workers in industrial plants generally experience noise in the last category. There is no completely satisfactory way to measure the subjective effects of noise, or the corresponding reactions of annoyance and dissatisfaction. A wide variation exists in the individual thresholds of annoyance, and different tolerances to noise tend to develop based on an individual's past experiences with noise.



SOURCE: Caltrans Transportation Laboratory Noise Manual, 1982; and modification by ESA

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Figure 4.11-1

Effects of Noise on People

Thus, an important way of predicting a human reaction to a new noise environment is the way it compares to the existing environment to which one has adapted: the so called "ambient noise" level. In general, the more a new noise exceeds the previously existing ambient noise level, the less acceptable the new noise will be judged by those hearing it. With regard to increases in A-weighted noise level, the following relationships occur:

- Under controlled conditions in an acoustics laboratory, the trained healthy human ear is able to discern changes in sound levels of 1 dBA;
- Outside these controlled conditions, the trained ear can detect changes of 2 dBA in normal environmental noise;
- It is widely accepted that the average healthy ear, however, can barely perceive changes in the noise level of 3 dBA;
- A change in level of 5 dBA is a readily perceptible increase in noise level; and
- A 10 dBA change is recognized as twice as loud as the original source (Caltrans, 2013).

These relationships occur in part because of the logarithmic nature of sound and the decibel system. The human ear perceives sound in a non-linear fashion; hence the decibel scale was developed. Because the decibel scale is based on logarithms, two noise sources do not combine in a simple additive fashion, rather logarithmically. For example, if two identical noise sources produce noise levels of 50 dBA, the combined sound level would be 53 dBA, not 100 dBA.

Noise Attenuation

Stationary point sources of noise, including stationary mobile sources such as idling vehicles, attenuate (lessen) at a rate of 6 to 7.5 dBA per doubling of distance from the source, depending on the topography of the area and environmental conditions (i.e., atmospheric conditions and noise barriers, vegetative or manufactured, etc.). Widely distributed noise, such as a large industrial facility spread over many acres or a street with moving vehicles (known as a "line" source), would typically attenuate at a lower rate, approximately 3 to 4.5 dBA each time the distance doubles from the source, which also depends on environmental conditions (Caltrans, 2009). Noise from large construction sites would exhibit characteristics of both "point" and "line" sources, and attenuation will therefore generally range between 4.5 and 7.5 dBA each time the distance doubles.

Health Effects of Noise

The consequences of exposure of people to excessive noise can include annoyance and disturbance of human activities, as well as effects on human health. The following discussion is provided so that the health implications of noise exposure are fully understood.

Exposure to high levels of noise can cause permanent hearing impairment. The levels at which noise exposure can lead to hearing loss (140 dB) or pain (120 dB) is a common method of measuring health effects or impacts of noise. The federal Safety and Health Administration (OSHA) has established an occupational noise exposure program which includes hearing conservation standards for long-term noise exposure. Employers are required to measure noise levels; provide free annual hearing exams, hearing protection, and training; and conduct

evaluations of the adequacy of the hearing protection in use where noise environments exceed 85 dBA for an eight-hour daily exposure.

The World Health Organization (WHO) is a noted source of current knowledge regarding the health effects of noise impacts because European nations have continued to study noise and its health effects, while the United States Environmental Protection Agency all but eliminated its noise investigation and control program in the 1970s. According to WHO, sleep disturbance can occur when intermittent interior noise levels reach 45 dBA, particularly if background noise is low. WHO also notes that maintaining noise levels within the recommended levels during the first part of the night is believed to be effective for the ability of people to initially fall asleep (WHO, 1999). Excessive noise during sleep periods can result in difficulty falling asleep, awakenings, and alterations in sleep stages and depth (e.g., a reduction in proportion of REM-sleep (REM = rapid eye movement)). Exposure to high levels of noise during sleep can also result in increased blood pressure, increased heart rate, increased finger pulse amplitude, vasoconstriction, changes in respiration, cardiac arrhythmia, and an increase in body movements. Secondary physiological effects of exposure to excessive noise during sleep can occur the following day, including reduced perception of quality sleep, increased fatigue, depressed mood or well-being, and decreased performance of cognitive tasks.

The City of Oakland has an interior noise level standard of 45 dBA which reflects this recommendation (see Section 4.11.2, *Regulatory Setting*). Additionally, this interior noise level is used in the development of exterior noise standards within the General Plan Noise Element Guidelines published by the Governor's Office of Planning and Research for the purposes of land use compatibility assessment.

Other potential health effects of noise identified by WHO include decreased performance for complex cognitive tasks, such as reading, attention span, problem solving, and memorization; physiological effects such as hypertension and heart disease (after many years of constant exposure, often by workers, to high noise levels); and hearing impairment (again, generally after long-term occupational exposure, although shorter-term exposure to very high noise levels, for example, exposure several times a year to concert noise at 100 dBA, can also damage hearing). Finally, noise can cause annoyance and can trigger emotional reactions like anger, depression, and anxiety. WHO reports that, during daytime hours, few people are seriously annoyed by activities with noise levels below 55 dBA.

Vehicle traffic and continuous sources of machinery and mechanical noise contribute to ambient noise levels. Short-term noise sources, such as truck backup beepers, the crashing of material being loaded or unloaded, contribute very little to 24-hour noise levels but are capable of causing sleep disturbance and annoyance. The importance of noise to receptors depends on both time and context. For example, long-term high noise levels from large traffic volumes can make conversation at a normal voice level difficult or impossible, while short-term peak noise levels, if they occur at night, can disturb sleep.

Noise Sources and Levels

Transportation sources, such as automobiles, trucks, trains, and aircraft, are the principal sources of noise in the urban environment. Along major transportation corridors, noise levels can reach 80

DNL, while along arterial streets, noise levels typically range from 65 to 70 DNL. However, noise levels on roadways, like all areas, can be affected by intervening development, topography, or landscaping. Industrial and commercial equipment and operations also contribute to the ambient noise environment in their vicinities. Primary noise sources in the Project site vicinity include locomotive and railcar activity along the Union Pacific railroad (UPRR) tracks inclusive of horn soundings at the two at-grade crossings in the vicinity of the northern Project site boundary; heavy-duty container truck traffic within the Project site and along the Embarcadero West along the north Project site boundary; the heavy metal recycling center (Schnitzer Steel) along the west Project site boundary; and heavy-duty container truck traffic on other Port lands to the west. The Project site is approximately 1,300 feet south of Interstate 880 (I-880). Observations during a site reconnaissance indicated that local truck noise is prominent and traffic along I-880 corridor is only audible during the quietest periods due to the presence of intervening structures and the distance.

To characterize the noise environment within the Project site and surrounding area, both long-term (48 hours or more) and short-term (20 minute) noise monitoring was conducted and resulting data are presented in **Appendix NOI**). Long-term noise monitoring was conducted at three locations on the Project site that were selected on the basis of their proximity to existing receptors and one location at the nearest sensitive receptor (which also borders the existing UPRR tracks), while short-term noise monitoring was conducted at multiple off-site locations near sensitive land uses and primary roadways that would be used to access the Project site. **Table 4.11-2** presents a summary of the noise data collected during the noise monitoring effort. Long-term noise monitoring locations were selected based on proximity of potential locations of residential use to different noise sources: UPRR rail tracks, Schnitzer Steel, and vessel operation within Oakland-Alameda Estuary (Estuary) and are indicated in **Figure 4.11-2**. A quantitative assessment of each long-term and short-term noise monitoring location is provided below. For short-term measurements some locations were monitored in the nighttime hours to establish a baseline relative to nighttime construction noise impacts and during evening hours to establish a baseline relative to pedestrian egress impacts along likely egress corridors.

Noise Monitoring Location LT-1: This on-site noise monitoring location is on the wharf at the south site boundary along the Estuary, and was selected for monitoring due to its potential to have the public trust designation removed and potentially be developed with other noise-sensitive land uses as part of the Project, and to characterize the noise contributions from marine vessels or other harbor activity. Noise levels at this location would also be reflective of those at the Jack London Square Public Marina which approximately the same distance from the Oakland Ferry Terminal. Observations during deployment and collection of noise monitoring equipment indicated that existing daytime noise contributions at this location were generated by existing heavy-duty container truck operations on the Project site. As discussed in Chapter 3, *Project Description*, with development of the proposed Project, the existing tenants and users of Howard Terminal are assumed to move to other locations within the region in which their uses are permitted under applicable zoning and other regulations. Noise monitoring data indicate a consistent average noise level during both daytime and nighttime hours of 58 to 59 dBA.

TABLE 4.11-2
MONITORED NOISE ENVIRONMENTS WITHIN THE PROJECT AREA

Long Term (LT) Noise Monitoring Location	Day-Night Noise level (DNL)	Noise Levels in dBA		
		24-hour L_{33}	Daytime hourly average Leq	Nighttime hourly average Leq
LT-1. South boundary of Project site along the Estuary	65	58	59	58
LT-2. West boundary of Project site adjacent to Schnitzer Steel (current site of XPO Logistics)	75	68	69	69
LT-3a. North side of Phoenix Lofts, 737 2nd Street (closest receptor; commercially zoned with residential use)	72	65	68	65
LT-3b. South side of Phoenix Lofts, 737 2nd Street (closest receptor; commercially zoned with residential use)	83	58	80	76
LT-4. North boundary of Project site adjacent to UPRR rail tracks	81	63	74	74
LT-5. Terminus of Clay Street adjacent to Port Offices	77	57	73	70
LT-6. Mitchell Avenue residences, Alameda	60	50	58	52

Short Term (ST) Noise Monitoring Location	Time	Noise Levels in dBA			Sources
		L_{eq}	L_{33}	L_{16}	
ST-1: 724 4th Street (Single Family Residence)	Daytime 1:59 – 2:19 p.m.	69	67	71	Trucks on local roadways, I-880 traffic, UPRR tracks, BART
ST-1: 724 4th Street (Single Family Residence)	Nighttime 4:31 – 4:51 a.m.	64	62	63	I-880 traffic, trucks on Brush Street, train horn
ST-2: 403 – 409 Martin Luther King Jr. Way (Single Family Residences)	Daytime 2:23 – 2:43 p.m.	77	72	77	Trucks on local roadways, I-880 traffic, UPRR tracks, BART
ST-2: 403 – 409 Martin Luther King Jr. Way (single family residences)	Evening 10:38 – 10:53 p.m.	73	68	70	Trucks on local roadways, I-880 traffic, UPRR tracks, BART
ST-3: 222 Broadway (Ellington Condominiums)	Daytime 2:53 – 3:13 p.m.	67	63	67	Vehicle traffic on I-880 and Broadway, one train pass-by event
ST-3: 222 Broadway (Ellington Condominiums)	Evening 10:00 – 10:15 p.m.	63	61	64	Vehicle traffic on I-880 and Broadway
ST-3: 222 Broadway (Ellington Condominiums)	Nighttime 4:55 – 5:15 a.m.	61	60	62	Vehicle traffic on I-880 and Broadway

TABLE 4.11-2 (CONTINUED)
MONITORED NOISE ENVIRONMENTS WITHIN THE PROJECT AREA

Short Term (ST) Noise Monitoring Location	Time	Noise Levels in dBA			Sources
		L_{eq}	L_{33}	L_{16}	
ST-4: 444 Embarcadero (Jack London Inn)	Daytime 3:17 – 3:37 p.m.	87	63	71	3 Train Pass by events with Horn, traffic on Embarcadero
ST-5: Cardinal Point Retirement Home 2431 Mariner Square Drive, Alameda	Daytime 4:00 – 4:20 p.m.	53	52	53	Backup alarms of trucks at Howard Terminal; HVAC equipment
ST-5: Cardinal Point Retirement Home 2431 Mariner Square Drive, Alameda	Nighttime 3:59 – 4:19 a.m.	47	47	48	Distant vehicle traffic on I-880, Broadway
ST-6: Z Hotel 233 Broadway (Washington Street Setback)	Evening 10:18 – 10:33 p.m.	63	59	61	Trucks on local Roadways, I-880 traffic, UPRR tracks, BART

NOTE: See Figure 4.11-2 for noise measurement locations. L_{33} represents the noise level exceeded 20 minutes (33 percent) in a given hour and is a metric relevant to standards of the City's noise ordinance discussed later in this section. L_{16} represents the noise level exceeded 10 minutes (163 percent) in a given hour.

SOURCE: Environmental Science Associates (ESA), 2019 (Appendix NOI).

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SOURCE: ESA, 2019; Google Earth, 2019

Oakland Waterfront Ballpark District Project

Figure 4.11-2
Noise Monitoring Locations

ESA

Noise Monitoring Location LT-2: This on-site noise monitoring location is at the west site boundary, along the property line with adjacent Schnitzer Steel heavy metal recycling operation, and was selected due to its potential to be developed for residential or other noise sensitive land use as part of the 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 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 within the easternmost shed of the adjacent Schnitzer Steel site. Trucking operations within the XPO logistics trucking facility site where the noise monitor was located 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 66 to 70 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.

Noise Monitoring Location LT-3: This off-site noise monitoring location is at the Phoenix Lofts at 737 2nd Street, approximately 150 feet north of, and across the UPRR tracks from, the northern Project site boundary. The four-story Phoenix Lofts which, while technically zoned as a commercial use, has units with permitted full-time occupancy and are therefore conservatively considered as the closest noise-sensitive land use to the Project site. This location is also approximately 150 feet from a Project-proposed 250-foot tower near the northern Project site boundary, and approximately 400 feet from the proposed ballpark.

The noise environment of the Phoenix Lofts varies between the south side of the building which faces the UPRR tracks and the north side of the building, along 2nd Street, which is shielded from the tracks. Noise monitoring was conducted on both the south side of the building with direct exposure to the UPRR tracks as well as the northern side of the building, which is shielded from UPRR operations

Observations during deployment and collection of noise monitoring equipment indicated that existing daytime noise contributions at this location were generated by UPRR operations, vehicle traffic on local roadways and on-going construction activity by East Bay Municipal Utility District to the west of the lofts. Noise monitoring data indicate average hourly noise levels of 76 to 81 dBA during daytime hours and 59 to 79 dBA during nighttime hours.

Noise Monitoring Location LT-4: This on-site noise monitoring location is the northern site boundary along the property line with the Embarcadero West, and was selected due to its potential to be developed for residential or other noise sensitive land use as part of the Project. Observations during deployment and collection of noise monitoring equipment indicated that existing daytime noise contributions at this location were generated by train pass-by events which included horn blasts at at-grade crossing and substantial heavy-duty truck operations along Embarcadero West, many of which were observed egressing the Project site on Martin Luther King Jr. Way. Noise monitoring data indicate a consistent elevated average noise level during both daytime and nighttime hours of 74 dBA.

Noise Monitoring Location LT-5: This off-site monitoring location is at the terminus of Clay Street on the west side of the Port of Oakland office building south of Embarcadero West. It is located approximately 650 feet east of the future ballpark. It was selected as the nearest commercial/ Public Trust land use to the Project site. Noise monitoring data indicate average hourly noise levels of 69 to 75 dBA during daytime hours and 49 to 74 dBA during nighttime hours.

Noise Monitoring Location LT-6: This location is on the island of Alameda near residences along Mitchell Avenue. It is located approximately 1,700 feet south of the future ballpark across the Estuary. It was selected as the nearest residential area on Alameda Island to the proposed ballpark. Noise monitoring data indicate average hourly noise levels of 53 to 61 dBA during weekday daytime hours and 44 to 55 dBA during weekday nighttime hours.

Noise Monitoring Location ST-1: This location is a residential use at 724 4th Street. It is located approximately 960 feet north of the future Project site. It was selected as the nearest single family residence the proposed ballpark. Noise monitoring data indicate a 20-minute average noise level of 68 dBA during weekday daytime hours and 64 dBA during weekday nighttime hours. The noise environment at this location is heavily influenced by the elevated I-880 freeway 300 feet to the north and elevated BART tracks 150 feet to the north.

Noise Monitoring Location ST-2: This location is a residential use at 409 MLK Way. It is located approximately 980 feet north of the future Project site. It was selected as the nearby single family residence the proposed ballpark and as being along a likely pedestrian access path from the 12th Street BART station. Noise monitoring data indicate a 20-minute average noise level of 77 dBA during weekday daytime hours and 73 dBA during weekday evening hours. The noise environment at this location is heavily influenced by the elevated I-880 freeway 250 feet to the north and elevated BART tracks 25 feet to the north.

Noise Monitoring Location ST-3: This location is the Ellington condominium building at 222 Broadway. It is located approximately 960 feet east of the future Project site. It was selected as the nearest residential use east of the proposed ballpark. Noise monitoring data indicate a 20-minute average noise level of 67 dBA during weekday daytime hours and 63 dBA during weekday evening hours and 61 dBA during weekday nighttime hours. The noise environment at this location is heavily influenced by the UPRR tracks 305 feet to the south. The daytime measurement included an Amtrak pass-by event on the UPRR tracks.

Noise Monitoring Location ST-4: This location is the Jack London Inn at 444 Embarcadero. It is located approximately 875 feet east of the future Project site. It was selected as a nearby hotel use east of the proposed ballpark. Noise monitoring data indicate a 20-minute average noise level of 87 dBA during weekday daytime hours. The noise environment at this location is heavily influenced by the UPRR tracks 20 feet to the south. The daytime measurement included three Amtrak pass-by event on the UPRR tracks.

Noise Monitoring Location ST-5: This location is the Cardinal Point Retirement Home at 2431 Mariner Square Drive in Alameda. It is located approximately 1,700 feet southeast of the future Project site. It was selected as the nearby residential use on Alameda Island. Noise monitoring

data indicate a 20-minute average noise level of 53 dBA during weekday daytime hours and 47 dBA during weekday nighttime hours.

Noise Monitoring Location ST-6: This location is the Z-Hotel at 233 Broadway. It is located approximately 640 feet northeast of the future Project site. It was selected as a nearby hotel use northeast of the proposed ballpark and as being along a likely pedestrian access path from the 12th Street BART station. Noise monitoring data indicate a 20-minute average noise level of 63 dBA during weekday evening hours when pedestrian egress would be highest.

Vibration Background

Vibration is an oscillatory motion through a solid medium in which the motion's amplitude can be described in terms of displacement, velocity, or acceleration. Several different methods are used to quantify vibration. The peak particle velocity (PPV) is defined as the maximum instantaneous peak of the vibration signal. The PPV is most frequently used to describe physical vibration impacts on buildings. Typically, groundborne vibration generated by human activities attenuates rapidly with distance from the source of the vibration. Sensitive receptors to vibration include people (especially residents, the elderly, and sick people), structures (especially older masonry structures), and vibration-sensitive equipment.

Another useful vibration descriptor is known as vibration decibels or VdB. VdB are generally used when evaluating human response to vibration, as opposed to structural damage (for which PPV is the more commonly used descriptor). Vibration decibels are established relative to a reference quantity, typically 1×10^{-6} inches per second (FTA, 2018).

The primary vibration source in the Project vicinity is train operations along the UPRR tracks near the northern Project boundary. FTA has published generalized ground-surface vibration curves for locomotive-powered passenger and freight trains which are presented in **Table 4.11-3**.

TABLE 4.11-3
GENERALIZED VIBRATION LEVELS (IN VDB) FROM LOCOMOTIVE POWERED PASSENGER OR FREIGHT ACTIVITY

Train Speed	Distance from Tracks				
	30 Feet	50 Feet	100 Feet	150 Feet	200 feet
10 Miles per Hour	74 VdB	71 VdB	62 VdB	60 VdB	58 VdB
20 Miles per Hour	80 VdB	77 VdB	68 VdB	66 VdB	64 VdB
30 Miles per Hour	84 VdB	81 VdB	72 VdB	70 VdB	68 VdB
50 Miles per Hour	88 VdB	85 VdB	76 VdB	74 VdB	72 VdB

SOURCE: FTA, 2018

Sensitive Receptors

Human response to noise varies considerably from one individual to another. Effects of noise at various levels can include interference with sleep, concentration, and communication; physiological and psychological stress; and hearing loss. Given these effects, some land uses are considered more sensitive to ambient noise levels than others. In general, residences, schools,

hotels, hospitals, and nursing homes are considered to be the most sensitive to noise. Commercial and industrial uses are considered the least noise-sensitive. **Table 4.11-4** presents an inventory of sensitive land uses within 0.5 miles of the Project site boundaries. While traditionally considered a recreational use, some boats moored the Jack London Square Public Marina may also serve as a "live-aboard" for some owners or occupants.

TABLE 4.11-4
SENSITIVE RECEPTORS WITHIN 0.5 MILE OF THE PROJECT SITE

Receptor / Address	Type / Public or Private	Distance from Project Site (at closest point)
Phoenix Lofts / 737 2nd Street	Private	150 feet
Single family residence 724 4th Street	Private	1,000 feet
Single family residence s / 403 – 409 MLK Way	Private	1,000 feet
Waterfront Hotel / 10 Washington Street	Private	1,100 feet
Z Hotel / 233 Broadway	Private	1,500 feet
Ellington Condominiums / 222 Broadway	Private	1,500 feet
Cardinal Point Retirement Home / 2431 Mariner Square Drive in Alameda	Private	1,800 feet
Jack London Inn / 444 Embarcadero West	Private	1,500 feet
Alameda Landing Residential Development / 400 Block of Mitchell Avenue and southwards	Private	1,800 feet
Jefferson Square Park	Public	1,800 feet
Condominiums / 423 7th Street	Public	0.5 miles
New Destiny Church / 625 8th Street	Private	0.5 miles
Jack London Square Public Marina	Public	550 feet

NOTE:

For noise analysis, sensitive receptors are residential uses, schools, daycare centers, nursing homes, churches, and hospitals and medical facilities with overnight accommodation.

SOURCE: ESA, 2019

4.11.2 Regulatory Setting

Federal, State, and local agencies regulate different aspects of environmental noise. Federal and State agencies generally set noise standards for mobile sources such as aircraft and motor vehicles, while regulation of stationary sources is left to local agencies. Local regulation of noise involves implementation of general plan policies and noise ordinance standards. Local general plans identify general principles intended to guide and influence development plans; local noise ordinances establish standards and procedures for addressing specific noise sources and activities. Noise issues relevant to the proposed Project are addressed in Title 24 of the *California Code of Regulations*, City of Oakland General Plan policies and the Oakland noise ordinance standards.

Federal

In 1972, the Noise Control Act (42 United States Code section 4901 et seq.) was passed by congress to promote limited noise environments in support of public health and welfare. It also established

the U.S. Environmental Protection Agency (U.S. EPA) Office of Noise Abatement and Control to coordinate federal noise control activities. U.S. EPA established guidelines for noise levels that would be considered safe for community exposure without the risk of adverse health or welfare effects. **Table 4.11-5**, Summary of Noise Levels Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety, presents important noise exposure levels highlighted by the guidelines.

TABLE 4.11-5
SUMMARY OF NOISE LEVELS REQUISITE TO PROTECT PUBLIC HEALTH AND WELFARE WITH AN ADEQUATE MARGIN OF SAFETY

Effect	Level	Area
Hearing loss	< 70 dBA[a] (L_{eq}, 24 hour)	All areas.
Outdoor activity interference and annoyance	< 55 dBA (L_{dn})	Outdoor residential areas and farms as well as other outdoor areas where people spend varying amounts of time and places where quiet is a basis for use.
Outdoor activity interference and annoyance	< 55 dBA (L_{eq}, 24 hour)	Outdoor areas where people spend limited amounts of time, such as school yards, playgrounds, etc.
Indoor activity interference and annoyance	< 45 dBA (L_{dn})	Indoor residential areas.
Indoor activity interference and annoyance	< 45 dBA (L_{eq}, 24 hour)	Other indoor areas with human activities, such as schools, etc.

NOTE:
a Yearly average equivalent sound levels in decibels; the exposure period that results in hearing loss at the identified level is 40 years.

SOURCE: U.S. EPA, Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety, 1974, http://nepis.epa.gov/Exe/ZyPDF.cgi/2000L3LN.PDF?Dockey=2000L3LN.PDF, accessed March 13, 2019.

U.S. EPA found that to prevent hearing loss over the lifetime of a receptor, the yearly average L_{eq} should not exceed 70 dBA, and the Ldn should not exceed 55 dBA in outdoor activity areas or 45 dBA indoors to prevent interference and annoyance (U.S. EPA, 1974). In 1982, noise control was largely passed to State and local governments.

Federal regulations establish noise limits for medium and heavy trucks (more than 4.5 tons, gross vehicle weight rating) under Title 40 of the Code of Federal Regulations, Part 205, Subpart B. The federal truck passby noise standard is 80 dBA at 50 feet from the vehicle pathway centerline, under specified test procedures. These requirements are implemented through regulatory controls on truck manufacturers. There are no comparable standards for vibration, which tend to be specific to the roadway surface, the vehicle load, and other factors.

Federal Transit Administration and Federal Railroad Administration

The mission of the Federal Railroad Administration (FRA) is to enable the safe, reliable, and efficient movement of people and goods within the Unite States. With respect to railroad noise emissions, the FRA works in concert with the Federal Transit Administration (FTA). FTA has published guidance for assessing noise and vibration impacts from rail sources (FTA, 2018). Additionally, this guidance provides methodologies for assessing the potential noise impacts from construction.

The FTA's Transit Noise and Vibration Impact Assessment is specifically developed for determining significant noise and vibration impacts for transit projects involving rail or bus facilities, and includes noise impact criteria. **Table 4.11-6** presents vibration impact criteria.

TABLE 4.11-6
FTA GROUNDBORNE VIBRATION IMPACT CRITERIA

Land Use Category	Frequent Events[a]	Occasional Events[b]	Infrequent Events[c]
Category I: Buildings where vibration would interfere with interior operations	65 VdB[d]	65 VdB[4]	65 VdB[4]
Category II: Residences and buildings where people normally sleep	72 VdB	75 VdB	80 VdB
Category III: Institutional land uses with primarily daytime use	75 VdB	78 VdB	83 VdB

NOTES:

a More than 70 vibration events of the same source per day.
b Between 30 and 70 vibration events of the same source per day.
c Less than 30 vibration events of the same source per day.
d This criterion is based on levels that are acceptable for most moderately sensitive equipment such as optical microscopes. Vibration sensitive manufacturing or research should always require detailed evaluation to define the acceptable vibration levels.

SOURCE: FTA, 2018

State

State regulations include requirements for the construction of new hotels, motels, apartment houses, and dwellings other than detached single-family dwellings that are intended to limit the extent of noise transmitted into habitable spaces. These requirements are collectively known as the California Noise Insulation Standards and are found in Title 24 of the California Code of Regulations.

The 2016 California Building Code (CBC, Title 24, Part 2 of the California Code of Regulations) requires that walls and floor/ceiling assemblies separating dwelling units from each other, or from public or service areas, have a *Sound Transmission Class* (STC) of at least 50, meaning they can reduce noise by a minimum of 50 dB.[2] The CBC (section 1207.4, Allowable Interior Noise Levels) also specifies a maximum interior noise limit of 45 dBA (L_{dn} or CNEL) in habitable rooms, and requires that common interior walls and floor/ceiling assemblies meet a minimum STC rating of 50 for airborne noise.

The State of California Office of Planning and Research has published General Plan Guidelines which include criteria for development of a required noise element within a City or County General Plan. Appendix D of the General Plan Guidelines contain the Noise Element Guidelines which direct a jurisdiction to identify and appraise noise problems in the community. The noise element is to analyze and quantify, to the extent practicable, current and projected noise levels for highways and arterial roadways, railroad and other rail transit systems, commercial and general

2 State Building Code section 1207.2.

aviation, industrial sources and other stationary noise sources. As described below, the City of Oakland has adopted a noise element as a part of its General Plan.

Local Plans, Ordinances and Policies

City of Oakland General Plan

The Oakland General Plan Noise Element contains guidelines for determining the compatibility of various land uses with different outdoor noise environments (City of Oakland, 2005). The Noise Element recognizes that some land uses are more sensitive to ambient noise levels than others, due to the amount of noise exposure (in terms of both exposure duration and insulation from noise) and the types of typical activities. The City of Oakland uses State noise guidelines for judging the compatibility between various land uses and their noise environments, which are summarized in **Table 4.11-7**.

In this context, "normally acceptable" is defined as satisfactory for the specific land use, assuming that normal conventional construction is used in buildings. "Conditionally acceptable" means that new construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features included in the design. Conventional construction, but with closed windows and fresh-air supply systems or air conditioning, will normally suffice. "Normally unacceptable" means that new construction or development should generally be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise insulation features included in the design.

The Oakland Noise Element identifies maximum interior noise levels generally considered acceptable for various common land uses (with windows closed). Relevant to the Project, 45 dB is the maximum level acceptable for residential or classroom uses. The Noise Element includes two goals for the City:

- To protect Oakland's quality of life and the physical and mental well-being of residents and others in the City by reducing the community's exposure to noise.
- To safeguard Oakland's economic welfare by mitigating noise incompatibilities among commercial, industrial and residential land uses.

The Noise Element also contains the following applicable policies and actions:

> ***Policy 1:*** Ensure the compatibility of existing and, especially, of proposed development projects not only with neighboring land uses but also with their surrounding noise environment.
>
> > *Action 1.1:* Use the noise-land use compatibility matrix in conjunction with the noise contour maps (especially for roadway traffic) to evaluate the acceptability of residential and other proposed land uses and also the need for any mitigation or abatement measures to achieve the desired degree of acceptability.

Action 1.2: Continue using the City's zoning regulations and permit processes to limit the hours of operation of noise-producing activities which create conflicts with residential uses and to attach noise-abatement requirements to such activities.

TABLE 4.11-7
LAND USE NOISE COMPATIBILITY GUIDELINES – CITY OF OAKLAND

LAND USE CATEGORY	COMMUNITY NOISE EXPOSURE (L_{DN} OR CNEL, dB)					
	55	60	65	70	75	80
Residential	NA	NA	CA	NU	CU	CU
Transient lodging – motels, hotels	NA	NA	NA	CA	NU	CU
Schools, libraries, churches, hospitals, nursing homes	NA	NA	CA	NU	NU	CU
Auditoriums, concert halls, amphitheaters	CA	CA	CA	CU	CU	CU
Sports arenas, outdoor spectator sports	CA	CA	CA	CA	CU	CU
Playgrounds, neighborhood parks	NA	NA	NA	NU	CU	CU
Golf courses, riding stables, water recreation, cemeteries	NA	NA	NA	NU	NU	CU
Office buildings, business commercial and professional	NA	NA	CA	CA	NU	NU
Industrial, manufacturing, utilities, agriculture	NA	NA	NA	CA	CA	NU

NA	NORMALLY ACCEPTABLE: Development may occur without an analysis of potential noise impacts *to the proposed development* (though it might still be necessary to analyze noise impacts that the project might have *on its surroundings*).
CA	CONDITIONALLY ACCEPTABLE: Development should be undertaken only after an analysis of noise-reduction requirements is conducted and if necessary noise-mitigating features are included.
NU	NORMALLY UNACCEPTABLE: Development should generally be discouraged; it may be undertaken only if a detailed analysis of the noise-reduction requirements is conducted, and if highly effective noise mitigation features are included.
CU	CLEARLY UNACCEPTABLE: Development should not be undertaken.

SOURCE: Reproduced Figure 1 of the City of Oakland CEQA Thresholds/Criteria of Significance Guidelines, 2016, consistent with Figure 6 from the Oakland General Plan Noise Element 2005

Policy 2: Protect the noise environment by controlling the generation of noise by both stationary and mobile noise sources.

Action 2.1: Review the various noise prohibitions and restrictions under the City's nuisance noise ordinance and revise the ordinance if necessary.

Action 2.2: As resources permit, increase enforcement of noise-related complaints and also of vehicle speed limits and of operational noise from cars, trucks, and motorcycles.

Policy 3: Reduce the community's exposure to noise by minimizing the noise levels that are received by Oakland residents and others in the city. (This policy addresses the reception of noise whereas Policy 2 addresses the generation of noise.)

Action 3.1: Continue to use the building-permit application process to enforce the California Noise Insulation Standards regulating the maximum allowable interior noise level in new multi-unit buildings.

Action 3.2: Review the City's noise performance standards and revise them as appropriate to be consistent with City Council policy.

Oakland Municipal Code

The City of Oakland also regulates noise through enforcement of its noise ordinance, which can be found in Section 8.18.020 of the Health and Safety Code, Section 17.120 of the Planning Code, and Chapter 12.56 of the Municipal Code. The City and the Port are cooperating to establish a shared regulatory framework under which the City will apply all relevant provisions of the Oakland Municipal Code.

The noise ordinance within the Health and Safety Code qualitatively addresses persistent nuisance noise which it defines as persistent maintenance or emission of any noise or sound produced by human, animal or mechanical means, between the hours of 9:00 p.m. and 7:00 a.m. next ensuing, which, by reason of its raucous or nerve-racking nature, shall disturb the peace or comfort, or be injurious to the health of any person. In addition, the Code states that failure to comply with the following requirements constitutes a nuisance:

A. All construction equipment powered by internal combustion engines shall be properly muffled and maintained.
B. Unnecessary idling of internal combustion engines is prohibited.
C. All stationery noise-generating construction equipment such as tree grinders and air compressors are to be located as far as is practical from existing residences.
D. Quiet construction equipment, particularly air compressors, are to be selected whenever possible.
E. Use of pile drivers and jack hammers shall be prohibited on Sundays and holidays, except for emergencies and as approved in advance by the Building Official.

The noise ordinance within the Planning Code regulates construction noise and only operational noise from stationary sources, as cities and counties do not have regulatory authority to establish

noise level limits over noise from mobile on-road sources (transportation noise), which does not include on-site construction. Transportation noise is regulated at the State and federal level by noise limits placed on vehicle manufacturers. **Table 4.11-8** presents maximum allowable receiving noise standards applicable to long-term exposure for residential and civic land uses, for noise from stationary noise sources (not transportation noise). Section 17.120.050 states that all activities shall be so operated that the noise level inherently and regularly generated by these activities across real property lines shall not exceed the applicable values indicated in Table 4.11-8, as modified where applicable by the adjustments indicated in footnote (a) of this table. Subsection F of Section 17.120.050 further indicates that noise measurement procedures shall be conducted at a position or positions at any point on the receiver's property.

TABLE 4.11-8
MAXIMUM ALLOWABLE RECEIVING NOISE STANDARDS FOR SPECIFIED LAND USES, DBA[a]
(FROM STATIONARY SOURCES)

Receiving Land Use	Cumulative Number of Minutes in 1-Hour Time Period[b]	Maximum Allowable Noise Level Standards (dBA)	
		Daytime 7:00 a.m. to 10:00 p.m.	Nighttime 10:00 p.m. to 7:00 a.m.
Residential, School, Child Care, Health Care, or Nursing Home, and Public Open Space	20 (L_{33}) 10 ($L_{16.7}$) 5 ($L_{8.3}$) 1 ($L_{1.7}$) 0 (L_{max})	60 65 70 75 80	45 50 55 60 65
		Anytime	
Commercial	20 (L_{33}) 10 ($L_{16.7}$) 5 ($L_{8.3}$) 1 ($L_{1.7}$) 0 (L_{max})	65 70 75 80 85	
		Anytime	
Manufacturing, Mining, and Quarrying	20 (L_{33}) 10 ($L_{16.7}$) 5 ($L_{8.3}$) 1 ($L_{1.7}$) 0 (L_{max})	70 75 80 85 90	

NOTES:

a These standards are to be further reduced by 5-dBA for simple tone noise, noise consisting primarily of speech or music, or recurring impact noise. If the ambient noise level exceeds these standards, the standard shall be adjusted to equal the ambient noise level.

b L_x represents the noise level that is exceeded X percent of a given period. L_{max} is the maximum instantaneous noise level.

SOURCE: Oakland Noise Ordinance No. 11895, 1996

Once a structure or facility is constructed, noise from a stationary source would be limited by the standards in Table 4.11-8 (for example, between 10:00 p.m. and 7:00 a.m., residential uses may only be exposed to noises up to 45 dBA for a period of cumulative 20-minutes in a 1-hour time period). The noise ordinance states that if the measured ambient noise level exceeds the applicable standard in any category, then the stated applicable noise level shall be adjusted so as to equal the ambient noise level. In other words, if existing noise is measured to be louder than the maximum allowed (i.e., the "applicable noise level standard"), the existing noise level shall be considered the maximum allowed.

Table 4.11-9 presents noise level standards from the noise ordinance that apply to temporary exposure to short- and long-term construction noise. In this context, short-term refers to construction activities lasting less than 10 days at a time while long-term refers to construction activities lasting greater than 10 days at a time. Given the Project's multi-year construction schedule, the latter noise level standards would apply for daytime construction activities. Per Section 17.120.050 (G) of the Planning Code, the limits in Table 4.11-9 apply to residential and industrial/commercial land uses. In addition, active recreational areas are considered marginally sensitive to noise, with the standards for commercial and industrial land uses applied.

TABLE 4.11-9
MAXIMUM ALLOWABLE RECEIVING NOISE STANDARDS FOR TEMPORARY CONSTRUCTION OR DEMOLITION ACTIVITIES, DBA

Operation/Receiving Land Use	Daily (Weekday) 7:00 a.m. to 7:00 p.m.	Weekends 9:00 a.m. to 8:00 p.m.
Short-Term Operation (less than 10-days)		
Residential	80	65
Commercial, Industrial	85	70
Long-Term Operation (more than 10-days)		
Residential	65	55
Commercial, Industrial	70	60

NOTES:

During the hours of 7:00 p.m. to 7:00 a.m. on weekdays and 8:00 p.m. to 9:00 a.m. on weekends and federal holidays, noise levels received by any land use from construction or demolition shall not exceed the applicable nighttime operational noise level standard (see Table 4.11-8). If the ambient noise level exceeds these standards, the standard shall be adjusted to equal the ambient noise level. Maximum allowable receiving standards are applied in this analysis as the maximum L_{eq}.

SOURCE: Oakland Noise Ordinance No. 11895, 1996

For nighttime construction activities during the hours of 7:00 p.m. to 7:00 a.m. on weekdays and 8:00 p.m. to 9:00 a.m. on weekends and federal holidays, noise level limits received by any land use from construction or demolition are not addressed by standards in Table 4.11-9 but, rather, according to the City of Oakland Noise Ordinance, these nighttime construction noise levels shall not exceed the applicable nighttime operational noise level standards in Table 4.11-8, which for residential uses would be 45-dBA (L_{33}) (see Table 4.11-8). The ordinance further states that if the ambient noise level exceeds these standards, the standard shall be adjusted to equal the ambient noise level. However, as shown in Table 4.11-2, existing L_{33} noise levels on and surrounding the Project site already exceed the applicable 45 dBA standard at the south (58 dBA), west (68 dBA), and north (63 dBA) Project site boundaries; and at the nearest sensitive receptor – Phoenix Lofts (65 dBA). Consequently, as required by the ordinance, the existing ambient level at each respective boundary would be the applicable nighttime construction standard.

Chapter 12.56 of the City's Municipal Code addresses sound amplification equipment. The Code requires a special event permit for concert events which are applied for through the City Administrators office. The office currently does not approve permits for events later than 10:00 p.m. (Espinoza, 2019). This restriction is codified in Section 12.56.030(A), which prohibits

sound amplification equipment to be used or operated out-of-doors or indoors but used or operated to reach persons out-of-doors between the hours of 10:00 p.m. and 9:30 a.m.

The Code also prohibits approval of a permit if operation of loudspeakers equipment is to be in those areas of the City that are designated, by zoning ordinance, as residential districts. The Code also prohibits approval of a permit if the equipment is to be in the business district of the City where such use or operation is so loud as to disturb the operations or meetings of businesses, a governmental entity or any public hearing conducted by such governmental entity or at a location where such use or operation would impede the flow of pedestrian or vehicular traffic to such an extent that it would create a dangerous traffic situation or would constitute a detriment to traffic safety, or if use or operation of the sound amplification equipment would interfere with another permit or event previously granted.

City of Alameda General Plan

The City of Alameda General Plan is the principal policy document for guiding future conservation and development within the City. It represents the framework on which the City of Alameda must base decisions regarding growth, public services and facilities, and protection and enhancement of the community. The General Plan polices and Alameda Municipal Code provision (discussed below) are relevant here because the Project site is on the waterfront within close proximity to the City of Alameda and could potentially have noise impacts on sensitive receptors within the City's boundaries.

The General Plan establishes comprehensive, long-term land use policies for the City of Alameda. Consistent with State law, the General Plan includes the Land Use Element; City Design Element; Transportation Element; Open Space and Conservation Element; Parks and Recreation, Shoreline Access, Schools and Cultural Facilities Element; Safety and Noise Element; Housing Element; and specific elements/amendments relating to Alameda Point and the Northern Waterfront areas of the City of Alameda.

A combined Safety and Noise element for the City of Alameda General Plan became effective on January 1, 2017. The element includes the following noise policies that would be applicable to the Project:

> ***Policy SN-50.*** Where feasible and appropriate, develop and implement noise reduction measures when undertaking improvements, extensions or design changes to Alameda streets.
>
> ***Policy SN-51.*** Maintain day and nighttime truck routes that minimize the number of residents exposed to truck noise.
>
> ***Policy SN-53.*** Require compliance with the California Building Code requirements to ensure appropriate interior noise levels in new or replacement residential construction, hotels, motels, and schools. In new dwellings subject to an airport noise easement, the maximum interior noise level is not to exceed 45 dB CNEL. If this requirement is met by inoperable or closed windows, a mechanical ventilation system meeting California Building Code requirements must be provided. Require acoustical analyses as allowed by the California Building Code.

Policy SN-54. Ensure that purchasers of property within or adjacent to the following areas are aware of existing and future potential noise conditions and the limitations of the City's ability to abate existing or future noise conditions: Oakland International Airport Influence Areas, as defined by the ALUC, commercial districts, truck routes, major arterials, Alameda United School District facilities, City recreation facilities, and business parks. Require the full disclosure of the existing and potential future noise levels within deeds and lease agreements as a condition of project approval, whenever possible.

Policy SN-55. To the extent feasible, through the development entitlement process, require local businesses to reduce noise impacts on the community by avoiding or replacing excessively noisy equipment and machinery, applying noise-reduction technology, and following operating procedures that limit the potential for conflicts.

Policy SN-56. Require noise reduction strategies in all construction projects. Require a vibration impact assessment for proposed projects in which heavy-duty construction equipment would be used (e.g. pile driving, bulldozing) within 200 feet of an existing structure or sensitive receptor. If applicable, the City shall require all feasible mitigation measures to be implemented to ensure that no damage to structures will occur and disturbance to sensitive receptors would be minimized.

Policy SN-57. In making a determination of impact under the California Environmental Quality Act (CEQA), consider the following impacts to be "significant" if the proposed project causes: an increase in the Ldn noise exposure of 4 or more dBA if the resulting noise level would exceed that described as normally acceptable for the affected land use, as indicated in **Table 4.11-10** (reproduced Figure 8-1 from Alameda General Plan), or any increase in Ldn of 6 dBA or more.

City of Alameda Municipal Code

Section 4.10 of the City of Alameda's Municipal Code establishes exterior noise standards. Specifically, exterior noise levels when measured at any receiving single or multiple family residential, school, hospital, church, public library or commercial property situated in the City of Alameda do not conform to the provisions of this subsection when they exceed the noise level standards set forth in **Table 4.11-11**, below. In the event the measured ambient noise level exceeds the applicable noise level standard in any category in Table 4.11-11, the applicable standards shall be adjusted so as to equal said ambient noise level. Each of the noise level standards specified in Table 4.11-11 are to be reduced by 5 dBA for simple tone noises, noises consisting primarily of speech or music, or for recurring impulsive noises. Construction noise is exempted from the noise standards provided it is limited to between the hours of 7:00 a.m. and 7:00 p.m. Monday through Friday and 8:00 a.m. to 5:00 p.m. on Saturdays.

TABLE 4.11-10
ACCEPTABLE NOISE LEVELS IN ALAMEDA

LAND USE CATEGORY	COMMUNITY NOISE EXPOSURE – L_{dn} or CNEL (dB)							
	50	55	60	65	70	75	80	
Residential – Low Density Single Family, Duplex, Mobile Home								
Residential – Multiple Family								
Transient Lodging – Motels, Hotels								
Schools, Libraries, Churches, Hospitals, Nursing Homes								
Auditoriums, Concert Halls, Amphitheaters								
Sports Arena, Outdoor Spectator Sports								
Playgrounds, Neighborhood Parks								
Golf Courses, Riding Stables, Water Recreation, Cemeteries								
Office Buildings, Business, Commercial, Professional								
Industrial, Manufacturing, Utilities, Agriculture								

	Normally Acceptable	Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements.
	Conditionally Acceptable	New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features are included in the design. Conventional construction, but with closed windows and fresh air supply systems or air conditioning will normally suffice.
	Normally Unacceptable	New construction or development should be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirement must be made and needed noise insulation features included in the design.
	Clearly Unacceptable	New construction or development generally should not be undertaken.

SOURCE: California Office of Planning and Research, 2003. General Plan Guidelines.

TABLE 4.11-11
CITY OF ALAMEDA EXTERIOR NOISE STANDARDS

Location	Cumulative Number of Minutes in Any One Hour Time Period	7:00 a.m. to 10:00 p.m. Standard (dBA)	10:00 p.m. to 7:00 a.m. Standard (dBA)
Single or Multiple Family Residential, School, Hospital, Church, or Public Library Properties	30	55	50
	15	60	55
	5	65	60
	1	70	65
	0	75	70
Commercial Properties	30	65	60
	15	70	65
	5	75	70
	1	80	75
	0	85	80

SOURCE: City of Alameda, 2012

4.11.3 Significance Criteria

The City of Oakland has established thresholds of significance for CEQA impacts which incorporate those in Appendix G of the CEQA Guidelines (City of Oakland, 2016). The Project would have a significant adverse impact related to noise and vibration if it would:

1. Generate noise in violation of the City of Oakland Noise Ordinance (Oakland Planning Code section 17.120.050) regarding construction noise (see Table 4.11-9), except if an acoustical analysis is performed that identifies recommended measures to reduce potential impacts;[3]
2. Generate noise in violation of the City of Alameda Noise Ordinance (Alameda Municipal Code section 4.10) regarding construction noise. This section of the Alameda Municipal Code (discussed above) is relevant here because the Project site is on the waterfront within close proximity to the City of Alameda and could potentially have noise impacts on sensitive receptors within the Alameda's boundaries;
3. Generate noise in violation of the City of Oakland nuisance standards (Oakland Municipal Code section 8.18.020) regarding persistent construction-related noise;
4. Generate noise in violation of the City of Oakland Noise Ordinance (Oakland Planning Code section 17.120.050) regarding operational noise (see Table 4.11-8);
5. Generate noise resulting in a 5 dBA permanent increase in ambient noise levels in the project vicinity above levels existing without the project; or, if under a cumulative scenario where the cumulative increase results in a 5 dBA permanent increase in ambient noise levels in the project vicinity without the project (i.e., the cumulative condition including the project

[3] The acoustical analysis must identify, at a minimum, (a) the types of construction equipment expected to be used and the noise levels typically associated with the construction equipment and (b) the surrounding land uses including any sensitive land uses (e.g., schools and childcare facilities, health care and nursing homes, public open space). If sensitive land uses are present, the acoustical analysis must recommend measures to reduce potential impacts.

compared to the existing conditions) and a 3 dBA permanent increase is attributable to the project (i.e., the cumulative condition including the project compared to the cumulative baseline condition without the project);

6. Expose persons to interior L_{dn} or CNEL greater than 45 dBA for multi-family dwellings, hotels, motels, dormitories and long-term care facilities (and may be extended by local legislative action to include single-family dwellings) per California Noise Insulation Standards (CCR Part 2, Title 24);
7. Expose the project to community noise in conflict with the land use compatibility guidelines of the Oakland General Plan (see Table 4.11-7) after incorporation of all applicable Standard Conditions of Approval;
8. Expose persons to or generate noise levels in excess of applicable standards established by a regulatory agency (e.g., occupational noise standards of the Occupational Safety and Health Administration [OSHA];)
9. During either project construction or project operation expose persons to or generate groundborne vibration that exceeds the criteria established by the Federal Transit Administration (FTA) (see Table 4.11-6);
10. Be located within an airport land use plan and would expose people residing or working in the project area to excessive noise levels; or
11. Be located within the vicinity of a private airstrip, and would expose people residing or working in the project area to excessive noise levels.

The changes to Appendix G of the State CEQA Guidelines effective in December 2018 were intended to reflect recent changes to the CEQA statutes and court decisions. Many of these recent changes and decisions are already reflected in the City's adopted significance thresholds, which have been used to determine the significance of potential impacts. With respect to noise impacts, revisions to Appendix G of the State CEQA Guidelines reflect a consolidation of what was previously a set of six questions to be considered into a set of three questions, folding one or more of the previous considerations into a single consideration.

Approach to Analysis

The methodology for analysis of noise impacts includes an assessment of both construction and operational noise impacts. To assess potential short-term construction noise impacts, sensitive receptors and their relative exposure (considering structural barriers and distance) were identified. Combined intermittent noise levels from the simultaneous operation of onsite equipment expected to be used in Project construction were estimated based on equipment noise data published by the Federal Highway Administration (FHWA) using the Roadway construction Noise Model (RCNM). Consistent with the Project Description, separate analyses are provided for construction of Phase 1 and subsequent development of the remainder of the Project site after Phase 1, referred to as Buildout. As a worst case analysis multiple pieces of equipment were assumed to operate simultaneously for each sub phase of construction, which are detailed below for each sub phase.

The study area for evaluation of noise and vibration impacts from construction encompasses the Project site and the nearest potentially affected sensitive receptors to the proposed facilities. Applying a worst case daytime noise level (pile driving at 101 dBA at 50 feet) and the most

restrictive daytime noise threshold (65 dBA, L_{eq}) and accounting for 5 dBA of shielding for intervening structures at distances beyond 1,500 feet results in a maximum potential impact distance of 1,500 feet without mitigation. Beyond this distance, all daytime construction noise impacts would be less than significant.

Construction vibration impacts are considered significant if they would either result in levels substantial enough to result in damage to nearby structures or buildings, or result in vibration levels that exceed FTA's groundborne vibration impact criteria presented in Table 4.11-6.

The study area for evaluation of operational noise and vibration impacts encompasses the Project site and receptors up to 0.5 miles away well as receptors along roadways within 0.5 miles based on incremental contribution of traffic by the proposed Project. Operational noise issues evaluated in this section include (1) noise generated by baseball and concert events at the proposed ballpark inclusive of crowd noise, public address systems and amplified music; (2) noise generated by automobile and bus traffic that would occur during typical daily conditions with the Project; (3) building operations/systems such as generators, air conditioners, etc.; and (4) compatibility of potential future uses with Oakland Land Use Compatibility Guidelines for Community Noise.

Traffic noise modeling to address the effects of the traffic generated by the Project on roadway noise (Project and cumulative, under Impact NOI-3 and Impact NOI-2.CU, respectively) was completed using the FHWA Traffic Noise Model. Traffic noise level significance is determined by comparing the increase in noise levels (traffic contribution only) to increments recognized by the City of Oakland Significance Criterion 4, above of a permanent increase in noise levels of 5 dBA or more or, for a cumulative increase that exceeds 5 dBA, a Project contribution to the cumulative scenario of 3 dBA or more.

Topics Considered and Determined to have No Impact

The following topics are considered to have no impact to the Project based on the proposed Project characteristics, its geographical location, and underlying site conditions. Therefore, these topics are not addressed further in this document for the following reasons:

Standards Established by a Regulatory Agency (Criterion 7)

The proposed Project would not result in significant impacts pursuant to criterion 7 (noise levels in excess of applicable standards established by a regulatory agency (e.g., occupational noise standards of the Occupational Safety and Health Administration [OSHA];). The proposed Project does not propose development of heavy industrial land uses that might require operation of heavy duty equipment or other substantial noise sources for which worker hearing protection standards of the Occupational Safety and Health Administration would apply. Therefore, this topic is not addressed further in this document.

Operational Vibration (Criterion 8)

Addressed in criterion 8, the proposed Project would not introduce new operational vibration sources (e.g., impact equipment, streetcar and rail operations, and blasting activities). While amplified music from live concert events can produce low frequency sound waves, speakers would be located at the ground level and would avoid resonance and vibration transfer within floors or

walls that might occur within a music hall or building. Therefore, there would be no operational vibration impacts, and operational vibration is not discussed further.

Airport-related Noise (Criteria 9 and 10)

The proposed Project would not result in significant impacts pursuant to criteria 9 and 10 (airport-related noise impact), listed above. The Project site is not located within an airport influence area of either Oakland International Airport or San Francisco International Airport (1992, 2012 and SFIA, 2015) or in the vicinity of a private airstrip; therefore, the proposed Project nor any of its variants would result in an impact related to exposure to excessive aircraft noise. Therefore, these topics are not addressed further in this document.

4.11.4 Impacts of the Project

Construction

Impact NOI-1: Construction of the proposed Project would result in substantial temporary or periodic increases in ambient noise levels in the Area in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies. (Criteria 1 and 2) (*Significant and Unavoidable with Mitigation*)

The analysis of construction noise impacts first assesses impacts from Phase 1 construction activities broken down by sub phases of construction, which are then followed by an analysis of construction activities for the remainder of the Project site (Buildout) broken down by sub phases of construction. Impacts are analyzed for both existing off-site sensitive receptors as well as for future proposed sensitive receptors that may be occupied after Phase 1 and exposed to noise from construction activities on the remainder of the Project site.

Phase 1 Construction Impact to Existing Nearby Off-site Receptors

Development and associated site improvements and infrastructure, generally in the area of the Project site east of Market Street would be developed first, as Phase 1. As described in Chapter 3, *Project Description*, Phase 1 is expected to include the proposed ballpark, up to approximately 540 residential dwelling units, 250,000 square feet of commercial (office) space, 30,000 square feet of retail/restaurant uses, and one or more hotels. Phase 1 would also include public open space and off-street parking spaces, some of which would be located on temporary surface parking lots west of the ballpark. Construction activities during Phase 1 are detailed below.

Various construction methods and practices would be employed throughout the buildout of the Project site which are described below. **Table 4.11-12** shows typical noise levels associated with various types of construction equipment including the proposed concrete crushing operation.

The following provides an analysis of Project construction impacts during the sub-phases for demolition, compaction and stabilization pile driving, and vertical construction. It should be noted that the City of Alameda Noise Ordinance exempts construction noise from its exterior noise standards if occurring between 7:00 a.m. and 7:00 p.m. on Monday through Friday and 8:00 a.m. to 5:00 p.m. on Saturdays, and therefore, daytime construction noise impacts from demolition, compaction and stabilization, pile driving and vertical construction activities to receptors within the City of Alameda would be less than significant during these periods.

However, the Project would periodically involve construction activities for site preparation and ballpark construction on Sundays.

TABLE 4.11-12
TYPICAL MAXIMUM NOISE LEVELS FROM CONSTRUCTION EQUIPMENT

Construction Equipment	Noise Level (dBA, L_{max} at 50 feet)
Backhoe	78
Excavator	81
Compactor	83
Scraper	84
Air Compressor	78
Dozer	82
Crane	81
Grader	85
Paver	77
Roller	80
Front End Loader	79
Trucks	76
Concrete Crusher	79
Drill Rig	85
Pug Mill	74
Batch Plant	83
Rapid Impact Compactor	90
Impact and Vibratory Pile Driver	101

NOTE:

These are maximum field measured values at 50 feet as reported from multiple samples. Concrete crusher processing noise level based on data from H.M. Pitt Labs, 2006. Pug Mill noise level as monitored by Rapid International, 2014. Rapid impact compaction value from Dietmar, et.al., Rapid Impact Compactor – An Innovative Dynamic Compaction Device for Soil Improvement, 2007.

SOURCE: FHWA, 2006.

Demolition Sub-phase. Initially, demolition of the existing uses and infrastructure would occur, over an approximately 4-month period, followed by remediation of any hazardous materials in a manner consistent with regulatory agency requirements. Demolition of the existing hardscape, concrete, paving, etc. currently located onsite would generate asphalt concrete and crushed aggregate base that would be reused on site. All existing underground utilities that are demolished (storm drain, sanitary sewer, electrical, etc.) would be hauled offsite.

Demolition activities at the Project site would involve operation of a variety of construction equipment, including concrete saws, excavators (some of which would be fitted with hoe-rams),

loader/backhoes and concrete crusher as well as street sweepers and trucks to transport material on-site. Noise levels at surrounding sensitive receptors from simultaneous operation of this equipment were calculated using the RCNM Model. The modeling included estimated shielding values of 5 dBA for single story receptors with intervening structures (Caltrans, 2013). **Table 4.11-13** presents the resultant noise levels at each of the four receptor locations considered. Noise impacts would be less at more distant receptors. As discussed above, daytime construction noise impacts from demolition to receptors within the City of Alameda would be less than significant, with the exception of periodic construction activities for site preparation and ballpark construction that could occur on Sundays that would not be exempt from the restrictions of City of Alameda Noise ordinance.

TABLE 4.11-13
NOISE LEVELS FROM PHASE 1 WEEKDAY DAYTIME CONSTRUCTION ACTIVITIES AT SENSITIVE RECEPTORS IN THE PROJECT AREA

Location	Noise Levels in dBA (Hourly Leq)				
	Existing Daytime Leq	Demolition	Compaction	Impact Pile Driving	Building Construction
1. Phoenix Lofts 737 2nd Street: Nearby residential receptor 150 feet from the closest pile driving location and 400 feet from generalized construction equipment locations.	76 to 81	**72**	**79**	**86**	**67**
2. 700 block of 4th Street: Residential receptor 1,000 feet from the closest pile driving location and 1,250 feet from generalized construction equipment locations.	69	57	64	**68**	52
3. Ellington Condominiums, 222 Broadway, residential receptor 1,500 feet from the closest pile driving location and 1,750 feet from generalized construction equipment locations.	67	59	**66**	**68**	54
4. Mitchell Avenue Residences, Alameda, residential receptor 1,800 feet from the closest pile driving location and 2,050 feet from generalized construction equipment locations.	58	58	65	67[a]	53

NOTES:

See Figure 4.11-1 for noise measurement locations. L_{eq} represents the hourly average sound level that takes into account equipment-specific usage factors. Bold values exceed City of Oakland standards for construction lasting more than 20 days.

a The Mitchell Avenue residence is located in the City of Alameda, which exempts daytime construction noise on Monday through Saturday from the restrictions of its noise ordinance.

SOURCE: ESA, 2019 (Appendix NOI).

As can be seen from the Table 4.11-13, the contribution of demolition noise at residential receptors would vary from 57 to 72 dBA. Noise levels at the Phoenix Lofts (the nearest sensitive receptor) would exceed the standards established in the City of Oakland Noise Ordinance (Oakland Planning Code section 17.120.050) which restricts construction of more than 10 days to

65 dBA during daytime hours at the nearest receiving property line (see Table 4.11-9). Resultant noise levels at all other Oakland receptors would be below this 65 dBA daytime standard. Therefore, mitigation measures are identified to reduce this Project Phase 1 construction noise impact to the Phoenix Lofts. It should be noted that existing daytime noise levels at the Phoenix Lofts were measured to be between 76 and 81 dBA and therefore already exceed the daytime construction noise standards. Noise levels at receptors in the City of Alameda from non-exempt demolition activity on Sundays would be 58 dBA, Leq which would exceed the City of Alameda daytime nose standard of 55 dBA, $L_{50.}$

Compaction and Stabilization Sub-phase. Soil stabilization of the Project site would involve approximately six months of compaction, and the Project sponsor proposes use of deep dynamic compaction (DDC) and Direct Power Compaction (DPC), although Rapid Impact Compaction (RIC) may be used as well. RIC is a ground improvement technique that densifies shallow, loose granular soils, using a hydraulic hammer which repeatedly strikes an impact plate. The energy is transferred to the underlying loose granular soils and rearranges the particles into a denser configuration. The impact locations are typically located on a grid pattern, the spacing of which is determined by the subsurface conditions and foundation loading and geometry. DDC involves repeatedly dropping a large weight onto the soil, while DPC is a method to compact loose ground by vibration and compaction of H piles using a vibratory pile driver.

For the analysis of compaction activities, it was conservatively assumed that DPC would involve simultaneous operation of two vibratory pile drivers and cranes. As discussed above, daytime construction noise impacts from compaction to receptors within the City of Alameda would be less than significant, with the exception of periodic construction activities for site preparation and ballpark construction that could occur on Sundays and therefore would not be exempt from the restrictions of the noise ordinance. Noise levels at receptors in the City of Alameda from non-exempt compaction activity on Sundays would be 65 dBA, Leq which would exceed the City of Alameda daytime nose standard of 55 dBA, L_{50} which would be a temporary significant impact.

As can be seen from Table 4.11-13, the contribution of compaction noise at residential receptors would vary from 64 to 79 dBA. Noise levels at two of the Oakland receptors analyzed would exceed the standards established in the City of Oakland Noise Ordinance which restricts construction of more than 10 days to 65 dBA during daytime hours at the nearest receiving property line. Therefore, mitigation measures are identified to reduce this Project Phase 1 construction noise impact. It should be noted that existing daytime noise levels at the Phoenix Lofts and Ellington Condominiums were measured to already exceed the daytime construction noise standard, which may render the resultant noise contribution from this phase less noticeable.

Pile Driving Sub-phase. Building foundations would be comprised of both drilled and driven concrete piles installed using conventional drilling and pile driving equipment. The proposed ballpark alone would have approximately 2,000 14-inch piles to support building loads. Proposed high-rise buildings would also require piles. For the analysis of pile driving activities, it was assumed that peak activity would involve simultaneous operation of three impact pile drivers and cranes, which were assumed to operate at a distance of 250 feet from each other. As discussed above, daytime construction noise impacts from pile driving to receptors within the City of Alameda would be less than significant, with the exception of periodic construction activities for

site preparation and ballpark construction that could occur on Sundays and therefore would not be exempt from the restrictions of the noise ordinance. Noise levels at receptors in the City of Alameda from non-exempt pile driving activity on Sundays would be 67 dBA, Leq which would exceed the City of Alameda daytime nose standard of 50 dBA[4], L_{50} which would be a temporary significant impact.

As can be seen from Table 4.11-13, the contribution of pile driving noise at residential receptors would vary from 67 to 86 dBA. Noise levels at the three Oakland receptors analyzed would exceed the standards established in the City of Oakland Noise Ordinance which restricts construction of more than 10 days to 65 dBA during daytime hours at the nearest receiving property line. Therefore, mitigation measures are identified to reduce this Project Phase 1 construction noise impact. It should be noted that existing daytime noise levels at the Phoenix Lofts, 4th Street Residences, and Ellington Condominiums were measured to already exceed the daytime construction noise standard, which may render the resultant noise contribution from this phase less noticeable.

Vertical Construction Sub-phase. Noise sources would be that occurring through the use of traditional construction equipment and tools such as cranes, excavators, compactors, concrete crushing and processing equipment, scrapers, graders, pavers, rollers, skid steer loaders and air compressors. As discussed above, daytime construction noise impacts from vertical construction to receptor within the City of Alameda would be less than significant, with the exception of periodic construction activities for site preparation and ballpark construction that could occur on Sundays and therefore would not be exempt from the restrictions of the noise ordinance. Noise levels at receptors in the City of Alameda from non-exempt compaction activity on Sundays would be 53 dBA, Leq which would not exceed the City of Alameda daytime nose standard of 55 dBA, L_{50} which would be a less than significant impact.

As can be seen from Table 4.11-13, the contribution of vertical construction noise at residential receptors would vary from 53 to 67 dBA. Noise levels at the Phoenix Lofts would exceed the standards established in the City of Oakland Noise Ordinance (Oakland Planning Code section 17.120.050) which restricts construction of more than 10 days to 65 dBA during daytime hours at the nearest receiving property line. Resultant noise levels at all other Oakland receptors would be below this 65 dBA daytime standard.

Transportation Improvements and Mitigation Measures. There are a number of transportation improvements and mitigation measures (see Section 4.15, *Transportation and Circulation*) that call for construction of off-site facilities that may generate construction noise. These include but are not limited to creation of a Transportation Hub, bus lanes, bike lanes, and a pedestrian and bicycle overcrossing of the railroad tracks. Construction activity associated with all off-site improvements, with the exception of the pedestrian and bicycle overpass, would require relatively minimal construction activity (when compared with other construction activities for the Project) and are in keeping with transportation improvements routinely undertaken by the City. These improvements, which often involve installing signs, striping lanes, constructing barriers, and

[4] A 5-dBA "penalty" would apply to pile driving because of its recurring, impulsive nature.

similar activities, would not add a significant construction noise levels and therefore would not generate construction noise impacts beyond what is analyzed here.

Noise levels generated by construction of the pedestrian and bicycle overpass would be commensurate with those associated with vertical construction phase described above. However, the nearest noise-sensitive receptors to the pedestrian and bicycle overpass would be located over 800 feet away and resultant construction noise impacts would therefore be less than significant.

Construction Noise with implementation of a Construction Noise Reduction Plan (CNRP) and Additional Mitigation

Significant noise impacts do not normally result when standard construction noise control measures are enforced and when the predominant noise-generating activities are of limited duration.

The Project sponsor has prepared a Draft CNRP addressing noise from construction of the ballpark and initial infrastructure which is included as **Appendix CNRP** (Charles M. Salter Associates, 2020) that would be implemented by the developer and enforced by the City and is required pursuant to Mitigation Measure NOI-1c, identified below. This Draft CNRP identifies 10 noise control measures including limitations on the hours of construction.

For impacts related to the Demolition Sub-Phase, Draft CNRP Measures 2 (Site Perimeter Barrier) and Measure 3 (Stationary Equipment Local Barriers) would provide shielding that would reduce construction noise levels for first-floor receptors. Additionally, Draft CNRP Measure 6 (Truck Traffic) would reduce noise levels associated with truck queuing for off-haul of demolition material. Notwithstanding these measures, there will likely be times when noise from demolition activities would still exceed the City's 65-dBA long-term construction noise standard when close to the nearest receptors. Therefore, daytime construction noise impacts associated with the demolition sub-phase would be significant and unavoidable.

For impacts related to the Compaction Sub-Phase, the Draft CNRP Measure 2 (Site Perimeter Barrier) and Measure 3 (Stationary Equipment Local Barriers) would provide shielding that would reduce construction noise levels for first-floor receptors. Notwithstanding these measures, there would likely be times when noise from compaction activities would still exceed the City's 65-dBA long-term construction noise standard over an extended period of time when close to the nearest receptors. Therefore, daytime construction noise impacts associated with the compaction sub-phase would be significant and unavoidable.

For impacts related to the Pile Driving Sub Phase, Draft CNRP Measures 2 (Site Perimeter Barrier) and Measure 3 (Stationary Equipment Local Barriers) would provide shielding that would reduce construction noise levels for first-floor receptors. Additionally, Draft CNRP Measure 7 (Methods) identifies alternative methods of pile installation that may be implemented to reduce noise levels generated by pile driving. These methods include drilling and cast-in-place pile installations which do not require use of an impact pile driver. However, such methods would likely substantially increase the ballpark construction schedule, which is presently estimated to be two years. Notwithstanding these measures, there will likely be times when noise from pile driving activities would still exceed the City's 65-dBA long-term construction noise standard over an extended period of time when close to the nearest receptors. Therefore, daytime

construction noise impacts associated with the pile driving sub-phase would be significant and unavoidable.

For impacts related to the Vertical Construction Sub Phase, Draft CNRP Measures 2 (Site Perimeter Barrier) and Measure 3 (Stationary Equipment Local Barriers) would provide shielding that would reduce construction noise levels for first-floor receptors. Additionally, Draft CNRP Measure 4 (Generators), and Measure 5 (Construction Equipment) would further reduce noise levels associated with off-road equipment use. Use of moveable sound barrier curtains alone, which can be located near the source in order to interrupt the line-of-sight with even an elevated receiver have been documented to provide 15 dBA of sound attenuation and (INC, 2014). These measures would likely provide the 2 dBA of reduction at the Phoenix Lofts necessary to reduce construction noise impacts associated with the Vertical Construction Sub-Phase to less than significant with mitigation. The Draft CNRP further requires measures to respond to and track noise complaints.

In addition to portable barriers, the Draft CNRP also includes the implementation of two fixed barriers on a portion of the Project site's northern and eastern perimeter during construction. **Mitigation Measure NOI-1b: Construction Noise Reduction, and Mitigation Measure NOI-1c: Project-Specific Construction Noise Measures** provide additional measures to reduce impacts from construction noise. In addition, **Mitigation Measure NOI-1e: Physical Improvements or Off-site Accommodations for Substantially Affected Receptors** is identified to temporarily relocate residents of the Phoenix Lofts when Phase 1 pile driving activities occur within 300 feet of these residences. However, while Mitigation Measure NOI-1c would reduce noise exposure of these residents, not all residents of these lofts may be able to be relocated.

While the City of Oakland's significance criterion for construction noise allows for a project to periodically generate noise in violation of the City of Oakland Noise Ordinance (Oakland Planning Code section 17.120.050) when an acoustical analysis is performed that identifies recommended measures to reduce potential impacts, given the extensive duration and intensity of activities associated with the proposed Phase 1 ballpark construction involving impact compaction methodologies and multiple pile driving activities in particular, the impact of daytime Phase 1 construction activities is conservatively identified as significant and unavoidable even with incorporation of **Mitigation Measure NOI-1a (Construction Days/Hours), Mitigation Measure NOI-1b (Construction Noise Reduction), Mitigation Measure NOI-1c (Project-Specific Construction Noise Measures), Mitigation Measure NOI-1d (Construction Noise Complaints), and Mitigation Measure NOI-1e (Physical Improvements or Off-site Accommodations for Substantially Affected Receptors)**.

Phase 1 Nighttime Construction Work

The Project sponsor proposes to conduct the vast majority of the Phase 1 construction activities during daytime hours from 7:00 a.m. to 7:00 p.m., consistent with the restrictions of measure 1 of the Draft CNRP and Mitigation Measure NOI-1a. However, there would be some activities that would require nighttime construction work. Specifically, the Project sponsor proposes to use building cranes to install the stadia precast between 6:00 p.m. and 2:00 a.m. or later; and also

proposes concrete pours at night. Phase 1 nighttime construction noise would be generated by the crane operations, and with concrete trucks and concrete pumps during the concrete pours.

Table 4.11-14 presents the resultant noise levels from Phase 1 nighttime crane operations and nighttime concrete pumping at each of the four receptor locations considered. Nighttime crane operations were also assumed to involve three cranes operating simultaneously at various distances from the receptors and with supporting equipment, including a flatbed truck and a loader. Concrete pour operations were assumed to involve three concrete boom pumps and concrete mixers operating simultaneously at various distances from the receptors.

TABLE 4.11-14
NOISE LEVELS FROM PROJECT PHASE 1 NIGHTTIME CONSTRUCTION ACTIVITIES AT SENSITIVE RECEPTORS IN THE PROJECT AREA

Location	Noise Levels in dBA (Hourly Leq)		
	Existing Nighttime L_{33}	Crane Operations	Concrete Pours
1. Phoenix Lofts, 737 2nd Street: Nearby residential receptor 650 feet from generalized construction equipment locations.	65	62	62
2. 700 block of 4th Street: Residential receptors 1,250 feet from generalized construction equipment locations.	62	49	50
3. Ellington Condominiums, 222 Broadway, residential receptor 2,850 feet from generalized construction equipment locations.	60	51	52
4. Mitchell Avenue Residences, Alameda, residential receptor 2,250 feet from generalized construction equipment locations.	47	50	50

NOTE:
See Figure 4.11-1 for noise measurement locations. L_{eq} represents the hourly average sound level that takes into account equipment-specific usage factors.

SOURCE: ESA, 2019 (Appendix NOI).

For nighttime construction activities during the hours of 7:00 p.m. to 7:00 a.m. on weekdays and 8:00 p.m. to 9:00 a.m. on weekends and federal holidays, noise level limits received at any land use from construction not addressed by standards in Table 4.11-9 but, rather, according to the City of Oakland Noise Ordinance, these nighttime construction noise levels shall not exceed the applicable nighttime operational noise level standards in Table 4.11-8, which for residential uses would be 45 dBA (L_{33}). The ordinance further states that if the ambient noise level exceeds these standards, the standard shall be adjusted to equal the ambient noise level. As shown in Table 4.11-2, existing noise levels surrounding the Project site already exceed the applicable 45 dBA standard at all receptors. Consequently, as required by the ordinance, the existing nighttime ambient level at each respective receptor would be the applicable nighttime construction standard.

As shown in Table 4.11-14, Phase 1 construction noise levels from nighttime crane operations would be below existing ambient nighttime noise levels at all receptors within the City of Oakland. However, because of the potential for prolonged activity during nighttime hours , nighttime

concrete pours and crane operations are conservatively identified as a significant noise impact for receptors within the City of Oakland.

The City of Alameda Noise Ordinance exempts construction noise from its exterior noise standards if occurring between 7:00 a.m. and 7:00 p.m. For nighttime work, the City of Alameda's exterior standard for residential uses is 50 dBA, L_{50}, which is predicted to be met but not exceeded during concrete pours. However, similar to the receptors within the City of Oakland, because of the potential for prolonged activity during nighttime hours, nighttime concrete pours and crane operations are also conservatively identified as a significant noise impact for receptors within the City of Alameda.

Buildout Construction Impacts to Existing Nearby Off-site Receptors

For purposes of this EIR, phasing of the balance of the Project site is assumed to occur immediately following completion of Phase 1 with completion (except for the turning basin option area) in four years. This estimate is conservative because it assumes that Project construction impacts would occur in an abbreviated time frame and activities would overlap. Project site preparation (grading, utilities, remediation) would occur for nearly nine months, followed by three years of vertical construction.

While the majority of demolition and compaction would occur during Phase 1, the potential would exist for some of these activities to still occur in the Buildout phase. Buildout areas are more distant from receptors than those analyzed for Phase 1 because they occur on the western portion of the Project site. Additionally, the number of piles required for Buildout development would be less than those required in Phase 1.

As discussed above, the City of Alameda Noise Ordinance exempts construction noise from its exterior noise standards if occurring between 7:00 a.m. and 7:00 p.m. and therefore daytime construction noise impacts from Buildout construction to receptors within the City of Alameda would be less than significant.

As can be seen from **Table 4.11-15**, the contribution of demolition and compaction noise at the Phoenix Lofts could occasionally exceed the standards established in the City of Oakland Noise Ordinance, which restricts construction of more than 10 days to 65 dBA during daytime hours at the nearest receiving property line, while noise levels at all other receptors would be below the standard.

Table 4.11-15 also shows that the contribution of pile driving noise at the two closest residential receptors in Oakland would exceed the standards established in the City of Oakland Noise Ordinance which restricts construction of more than 10 days to 65 dBA during daytime hours at the nearest receiving property line. It should be noted that existing daytime noise levels at the Phoenix Lofts and 4th Street residences were measured to already exceed the daytime construction noise standard, which may render the resultant noise contribution from this phase less noticeable. Notwithstanding, mitigation measures are identified to reduce this significant Project construction noise impact during pile driving. The contribution of noise from vertical building construction activities would be below the City's 65 dBA standard.

TABLE 4.11-15
DAYTIME NOISE LEVELS FROM BUILDOUT CONSTRUCTION ACTIVITIES AT SENSITIVE RECEPTORS IN THE PROJECT AREA

Location	Existing Leq	Demolition	Compaction	Noise Levels in dBA (Hourly Leq)	
				Pile Installation	Building Construction
1. Phoenix Lofts, 737 2nd Street: Nearby residential receptor 400 feet from the closest pile driving location and 650 feet from generalized construction equipment locations.	76 to 81	**66**	**75**	**78**	63
2. 700 block of 4th Street: Residential receptors 1,000 feet from the closest pile driving location and 1,250 feet from generalized construction equipment locations.	69	57	64	**66**	57
3. Ellington Condominiums, 222 Broadway, residential receptor 2,600 feet from the closest pile driving location and 2,850 feet from generalized construction equipment locations.	67	55	62	63	50
4. Mitchell Avenue Residences, Alameda, residential receptor 2,000 feet from generalized construction equipment locations.	58	58	65	65	52

NOTE:
See Figure 4.11-1 for noise measurement locations. L_{eq} represents the hourly average sound level that takes into account equipment-specific usage factors.

SOURCE: ESA, 2019 (Appendix NOI).

Buildout Construction Impacts to Proposed Phase 1 Development On-site Receptors

Once Phase 1 is completed and occupied, future residents of westerly blocks of the Phase 1 development would be subject to Buildout construction noise on the Project site for up to three years. Although the proposed Project includes some flexibility in how residential and other uses would be allocated within the proposed development, the analysis conservatively assumes that proposed residential uses could be occupied on any of the mixed-use blocks. Under this conservative scenario, proposed residential uses of Phase 1 could be as close as 50 feet away from subsequent Buildout construction activities. Noise impacts would therefore be greater than those described above for existing receptors. As can be seen from **Table 4.11-16**, the contribution of noise from all sub-phases of construction would exceed the City's 65-dBA long-term construction noise standard.

With application of all identified mitigation measures, noise levels would be reduced by up to 15 dBA for first floor receptors where shielding is provided (INC, 2014) but elevated receptors would receive little to no noise reduction benefit because line-of-sight would not be broken. Mitigation Measure NOI-b identifies alternative methods of pile installation that may be implemented to reduce noise levels generated by pile driving. Use of a drill rig, as opposed to an

impact pile driver, can result in approximately 17 dBA of resultant noise reduction, which would substantially reduce the impact at the closest Phase 1 receptor but may still result in instances when noise could be above the City's 65-dBA long-term construction noise standard. However, as stated above with respect to City of Oakland significance criteria, such occasional exceedance may be allowed if an acoustical analysis is performed that identifies recommended measures to reduce potential impacts.[5] Unlike Phase 1 construction activities for the proposed ballpark, which would be intensive due to the scale and unique structural requirements and would occur continuously over a lengthy construction period, Buildout activities for construction of mixed-uses would be akin to typical in-fill construction in urban Oakland. Therefore, with implementation of Mitigation Measure NOI-1b and Mitigation Measure NOI-1c, Buildout construction impacts to Phase 1 receptors would be less than significant with mitigation.

TABLE 4.11-16
DAYTIME NOISE LEVELS FROM BUILDOUT CONSTRUCTION ACTIVITIES AT PHASE 1 SENSITIVE RECEPTORS

Location	Existing Leq	Demolition	Compaction	Noise Levels in dBA (Hourly Leq)	
				Impact Pile Driving	Building Construction
1. Adjacent Phase 1 residential uses. Worst case residential receptor 50 feet from the closest pile driving location and generalized construction equipment locations.	N/A	**87**	**97**	**94**	80

SOURCE: ESA, 2019 (Appendix NOI).

Mitigation Measure NOI-1a: Construction Days/Hours.

The Project sponsor shall comply with the following restrictions concerning construction days and hours:

a. ***Monday-Friday***. With the exception of the proposed nighttime installation of the stadia precast and ballpark concrete pours, construction activities are limited to between 7:00 a.m. and 7:00 p.m. Monday through Friday extreme noise generating activities (those generating noise levels greater than 90 dBA) shall be limited to between 8:00 a.m. and 4:00 p.m.

b. ***Saturday***. Construction activities are limited to between 9:00 a.m. and 5:00 p.m. on Saturday. In residential zones and within 300 feet of a residential zone, construction activities are allowed from 9:00 a.m. to 5:00 p.m. only within the interior of the building with the doors and windows closed. No pier drilling or other extreme

[5] Under CEQA, lead agencies have discretion in determining the appropriate threshold of significance to determine the severity of a particular impact. "A threshold of significance is an identifiable, quantitative, qualitative, or performance level of a particular environmental effect, non-compliance with which means the effect will normally be determined to be significant by the agency and compliance with which means the effect normally will be determined to be less than significant." (CEQA Guidelines, §15064.7 subd. (a).).

noise generating activities No pier drilling or other extreme noise generating activities (activities generating greater than 90dBA) are allowed on Saturday.

c. ***Sunday and Holidays***. With the exception of construction of the proposed ballpark and site prep prior to or during the course of ballpark construction, no construction is allowed on Sunday or holidays for any of the remaining activities of Phase 1 construction or construction of Phase 2 buildings and infrastructure. Ballpark construction activities are limited to between 9:00 a.m. and 5:00 p.m. on Sunday and holidays. No pier drilling or other extreme noise generating activities (activities generating greater than 90dBA) are allowed on Sunday or holidays.

Construction activities include, but are not limited to, truck idling, moving equipment (including trucks, elevators, etc.) or materials, deliveries, and construction meetings held on-site in a non-enclosed area.

Any construction activity proposed outside of the above days and hours for special activities (such as concrete pouring which may require more continuous amounts of time) shall be evaluated on a case-by-case basis by the City, with criteria including the urgency/emergency nature of the work, the proximity of residential or other sensitive uses, and a consideration of nearby residents'/occupants' preferences. The Project sponsor shall notify property owners and occupants located within 300 feet at least 14 calendar days prior to construction activity proposed outside of the above days/hours. When submitting a request to the City to allow construction activity outside of the above days/hours, the Project sponsor shall submit information concerning the type and duration of proposed construction activity and the draft public notice for City review and approval prior to distribution of the public notice.

Mitigation Measure NOI-1b: Construction Noise Reduction.

The Project sponsor shall implement noise reduction measures to reduce noise impacts due to construction. Noise reduction measures include, but are not limited to, the following:

a. Equipment and trucks used for Project construction shall utilize the best available noise control techniques (e.g., improved mufflers, equipment redesign, use of intake silencers, ducts, engine enclosures and acoustically-attenuating shields or shrouds) wherever feasible.

b. Except as provided herein, impact tools (e.g., jack hammers, pavement breakers, and rock drills) used for Project construction shall be hydraulically or electrically powered to avoid noise associated with compressed air exhaust from pneumatically powered tools. However, where use of pneumatic tools is unavoidable, an exhaust muffler on the compressed air exhaust shall be used; this muffler can lower noise levels from the exhaust by up to about 10 dBA. External jackets on the tools themselves shall be used, if such jackets are commercially available, and this could achieve a reduction of 5 dBA. Quieter procedures shall be used, such as drills rather than impact equipment, whenever such procedures are available and consistent with construction procedures.

c. The Project sponsor shall use temporary power poles instead of generators where feasible.

d. Stationary noise sources shall be located as far from adjacent properties as possible, and they shall be muffled and enclosed within temporary sheds, incorporate insulation barriers, or use other measures as determined by the City to provide equivalent noise reduction.

e. The noisiest phases of construction shall be limited to less than 10 days at a time. Exceptions may be allowed if the City determines an extension is necessary and all available noise reduction controls are implemented.

Mitigation Measure NOI-1c: Project-Specific Construction Noise Measures.

a. Construction Noise Reduction Plan Required. Prior to any noise generating construction activities, the Project sponsor shall submit a Construction Noise Reduction Plan prepared by a qualified acoustical consultant for City review and approval that contains a set of site-specific noise attenuation measures to further reduce construction impacts, specifically impacts associated with extreme noise generating activities (activities generating greater than 90 dBA) and/or affecting sensitive receptors on or near the Project site. The Project sponsor shall implement the approved Plan during construction. Potential attenuation measures include, but are not limited to, the following:

i. Erect temporary plywood noise barriers around the construction site, particularly along on sites adjacent to residential buildings.

ii. Implement "quiet" pile driving technology (such as pre-drilling of piles, the use of more than one pile driver to shorten the total pile driving duration), where feasible, in consideration of geotechnical and structural requirements and conditions;

iii. Utilize noise control blankets on the building structure as the building is erected to reduce noise emission from the site;

iv. Specify additional feasible attenuation measures to further reduce extreme noise generating construction activities (activities generating greater than 90dBA);

v. Specify additional feasible attenuation measures to further reduce construction noise impacts on the existing Phoenix Lofts, the Ellington Condominiums, and future occupants of Phase 1 residences;

vi. Evaluate the feasibility of noise control at the receivers by temporarily improving the noise reduction capability of adjacent buildings by the use of sound blankets for example and implement such measure if such measures are feasible and would noticeably reduce noise impacts; and

vii. Monitor the effectiveness of noise attenuation measures by taking noise measurements.

b. ***Public Notification Required***. The Project sponsor shall notify property owners and occupants located within 300 feet of the construction activities at least 14 calendar days prior to commencing extreme noise generating activities. Prior to providing the notice, the Project sponsor shall submit to the City for review and approval the proposed type and duration of extreme noise generating activities and the proposed public notice. The public notice shall provide the estimated start and

end dates of the extreme noise generating activities and describe noise attenuation measures to be implemented.

Mitigation Measure NOI-1d: Construction Noise Complaints.

The Project sponsor shall submit to the City for review and approval a set of procedures for responding to and tracking complaints received pertaining to construction noise, and shall implement the procedures during construction. At a minimum, the procedures shall include:

a. Designation of an on-site construction complaint and enforcement manager for the Project;

b. A large on-site sign near the public right-of-way containing permitted construction days/hours, complaint procedures, and phone numbers for the Project complaint manager and City Code Enforcement unit;

c. Protocols for receiving, responding to, and tracking received complaints; and

d. Maintenance of a complaint log that records received complaints and how complaints were addressed, which shall be submitted to the City for review upon the City's request.

Mitigation Measure NOI-1e: Physical Improvements or Off-site Accommodations for Substantially Affected Receptors.

The Project sponsor shall provide physical improvements or temporary accommodations for residents of the Phoenix Lofts and new Phase 1 receptors during impact or vibratory pile driving activities when it occurs within 300 feet with direct line of sight for the duration of the pile driving activity within the distances specified.

- Physical improvements may consist of installation of storm windows in specific out-facing residences and/or temporary installation of acoustical blankets on the outside of the structure facing the pile driving activities.
- The accommodation option may be provided for the duration of pile driving activities. A temporary relocation Plan shall be developed by the Project sponsor and submitted to the City Department of Planning & Building for review that specifies the duration of the accommodation and the type of accommodation (e.g., hotel or other). Once finalized, the affected residents shall be contacted six months prior to construction and provided with a description and the predicted severity and duration of construction-related noise exposure and provided the opportunity for temporary relocations as developed within the Temporary Relocation Plan.

Significance after Mitigation: Significant and Unavoidable

Potential Health Effects of Significant and Unavoidable Construction Noise Impacts

As discussed above, daytime construction noise levels from simultaneous operation of multiple (3) pile drivers at high rises in Phase 1 could result in noise levels of up to 85 dBA, Leq at the nearby Phoenix Lofts over several weeks of pile driving activity. Because impact pile driving would be restricted by Mitigation Measure NOI-1a to only occur during daytime hours, health effects associated with the potential for nighttime awakenings would be avoided.

Short-term noise levels constituting the threshold of pain and hearing damage are 120 dB and 140 dB, respectively.[6] Table 4.11-13 shows average daytime construction noise levels and Table 4.11-14 shows the maximum nighttime construction noise levels at each of the studied receptors. As shown, average daytime and maximum nighttime construction noise levels would not reach the point at which pain or hearing damage would occur. Therefore, Project construction would not result in adverse health effects related to pain and hearing loss.

Measures potentially implemented under the CNRP, such as drilled and cast-in-place piles, would also have the potential to reduce noise, depending on feasibility. As discussed in the Setting, noise monitoring indicates that receptors at the Phoenix Lofts are currently exposed to daytime exterior noise levels of 68 to 80 dBA on the north and south sides of the building, respectively and are routinely exposed to horn blasts of UPRR locomotives in excess of 100 dBA. Mitigation Measure NOI-1e would provide physical improvements or temporary relocation for occupants of the Phoenix Lofts during Phase 1 construction which would address noise exposure impacts along with other measures of the CNRP and Mitigation Measures NOI-1a through NOI-1d.

Beyond the Phoenix Lofts, the next closest existing receptor would be existing single-family homes on the north side of 4th Street between Brush Street and Castro Street, approximately 950 feet from Project site where during Phase 1 construction, noise levels of up to 70 dBA, Leq could be expected, accounting for the presence of intervening structures. This noise level would be at or below the existing monitored noise level at these receptors and would not contribute to hearing loss and would be restricted by measures of the CNRP to only occur during daytime hours, such that health effects associated with the potential for nighttime awakenings would be avoided.

Impact NOI-2: Construction of the proposed Project would expose persons to or generate groundborne vibration that exceeds the criteria established by the Federal Transit Administration (FTA). (Criterion 8) (*Significant and Unavoidable with Mitigation*)

Groundborne vibration from construction activities that involve impact activities, primarily compaction and pile driving, could produce detectable vibration at nearby sensitive buildings and sensitive receptors unless proper precaution is followed.

There are no adopted State or local policies or standards for groundborne vibration, but the City's significance criteria with respect to vibration impacts recognize FTA criteria for sensitive land uses presented in Table 4.11-6. Additionally, Mitigation Measure NOI-1a restricts impact pile driving and/or other extreme noise generating activities greater than 90 dBA to between 8:00 a.m. and 4:00 p.m.

Typical vibration levels associated with the operation of various types of construction equipment at distances of 25 feet (reference), 150 feet, 300 feet, and 450 feet away from the vibration source are listed in **Table 4.11-17**. These distances generally correspond to the closest setback distances between construction activities and existing adjacent structures, as well as future onsite Project structures and planned structures on the Project site. In addition to the equipment cited in Table

[6] Kinsler, Lawrence E., Frey, A.R., Coppens, A.B., and Sanders, J.V., 1982. *Fundamentals of Acoustics*, Third Edition.

4.11-17, use of various compaction methods may be employed including RIP, DPC and DDC. Specific compaction methods to be used have yet to be confirmed. Studies of vibration induced by RIPC indicates that compliance with a safe level of vibration with respect to building damage (94 VdB) can be achieved provided that the activity occur no closer than 10 meters (33 feet) from a structure (Lauzon, 2011). Dark-shaded areas indicate distances where vibration levels would exceed the criterion for building damage while the lighter shaded indicate the distance at which the criterion sleep interference criterion would be exceeded if such activity were to occur during nighttime hours.

TABLE 4.11-17
VIBRATION LEVELS FOR CONSTRUCTION ACTIVITY

Equipment	Estimated VdB			
	At 25 Feet (reference)	At 150 Feet	At 300 Feet	At 750 Feet
Jack Hammer	79	56	47	38
Large Bulldozer	**87**	64	55	46
Loaded Trucks	86	63	54	45
Impact Pile Driver	104	81	72	63
Vibratory Pile Driver	104	81	72	63
Caisson Drilling	87	64	55	46
Direct Power Compaction (DPC) – Vibro-compaction	102	79	72	61
Deep Dynamic Compaction (DDC)	119	96	87	78
Rapid Impact Compaction	97	74	65	53

NOTE:

Dark grey shading indicates distances where building damage criterion would be exceeded. Light grey shading indicates distances where sleep interference criterion would be exceeded if such activity were to occur during nighttime hours.

SOURCE: Federal Transit Administration, *Transit Noise and Vibration Impact Assessment*, 2018 and ENGEO, 2011, Lauzon, 2011.

Exposure of Persons to Vibration

Residential receptors nearest the construction site would include Phoenix Lofts at 737 2nd Street, located 150 feet north of the Project site, while all other residential receptors would be 1,000 feet away or more from the Project site. The Phoenix Lofts are also located approximately 30 feet from the UPRR tracks and, as indicated in Table 4.11-2, are currently exposed to vibration levels of approximately 74 to 88 VdB from frequent locomotive operations.

As shown in Table 4.11-17, vibration levels of up to 96 VdB from DDC, 81 VdB from pile driving, 74 VdB from RIC, and 79 VdB from DPC would be expected at a distance of 150 feet. This would exceed the FTA exposure levels for Category II receptor (residences or places where people normally sleep) of 72 VdB for frequent events as shown in Table 4.11-6. However, pile driving, DPC, RIC and DDC would be restricted by the CNRP to daytime hours. Daytime exposure FTA exposure levels for a Category III land use (no sleeping) is 75 VdB for frequent events and would also be exceeded when DDC occurs within 750 feet. Mitigation Measure NOI-1e (Physical Improvements or Off-site Accommodations for Substantially Affected Receptors), identified

above in Impact NOI-1 would relocate these receptors, as feasible and/or desired.[7] While this mitigation could reduce vibration exposure of these residents, not all residents may be able to be relocated and this impact is considered to be significant and unavoidable.

> **Mitigation Measure NOI-1e: Physical Improvements or Off-site Accommodations for Substantially Affected Receptors**. (See Impact NOI-1)
>
> **Significance after Mitigation:** Significant and Unavoidable for human exposure impacts.

Structural Damage Impacts from Construction-Related Vibration

Depending on the type of vibration (transient versus continuous), groundborne vibration generated by Project-related compaction, pile driving and construction activities above 0.2 and 0.5 in/sec PPV could cause cosmetic damage to historic or new nearby structures, respectively, including some older and historic buildings. Historic resources located on or adjacent to the Project site are identified on Section 4.4, *Cultural and Tribal Cultural Resources*.

While vibration attenuation with distance can vary depending on subsoils, typical attenuation rates indicate that vibration generated by impact pile drivers or DPC could result in cosmetic damage to adjacent structures if those construction activities occur within approximately 75 feet of a historic structure (0.2 PPV) or 35 feet of a modern structure (0.5 PPV). Attenuation rates associated with DDC indicate that vibration generated by impact pile drivers could result in cosmetic damage to adjacent structures if that construction activity occurs within approximately 200 feet of a historic structure or 100 feet of a modern structure. Potential impacts to historic buildings during construction are addressed in Section 4.4, *Cultural and Tribal Cultural Resources*, through implementation of **Mitigation Measure CUL-2 (Vibration Analysis for Historic Structures)**. Because the nearest modern structures would be 150 feet or more from compaction and pile driving activities, there would be sufficient distance between modern, seismically designed structures for vibration levels to be attenuated below 0.5 inches per second PPV and, thus, potential structural impacts to modern buildings from pile driving, DPC, RIC and DDC would be less than significant.

> **Mitigation Measure CUL-2: Vibration Analysis for Historic Structures**. (See Section 4.4, *Cultural and Tribal Cultural Resources*)
>
> **Significance after Mitigation:** Less than Significant.

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[7] Feasibility of this measure would depend on the ability of an occupant to relocate their live-work operations over the durations of the compaction (DDC) and pile driving stages of construction. Additionally, while relocation may be feasible, it may not be a desired option for the occupant.

Operational Impacts

Impact NOI-3: Operation of the proposed Project would result in generation of noise resulting in a 5-dBA permanent increase in ambient noise levels in the Project vicinity above levels existing without the Project, or generate noise in violation of the City of Oakland Noise Ordinance (Oakland Planning Code section 17.120.050) regarding operational noise. (Criteria 3 and 4) (*Significant and Unavoidable with Mitigation)*

Operational noise from the proposed Project would result from multiple sources, each of which is evaluated individually. Individually considered noise sources include:

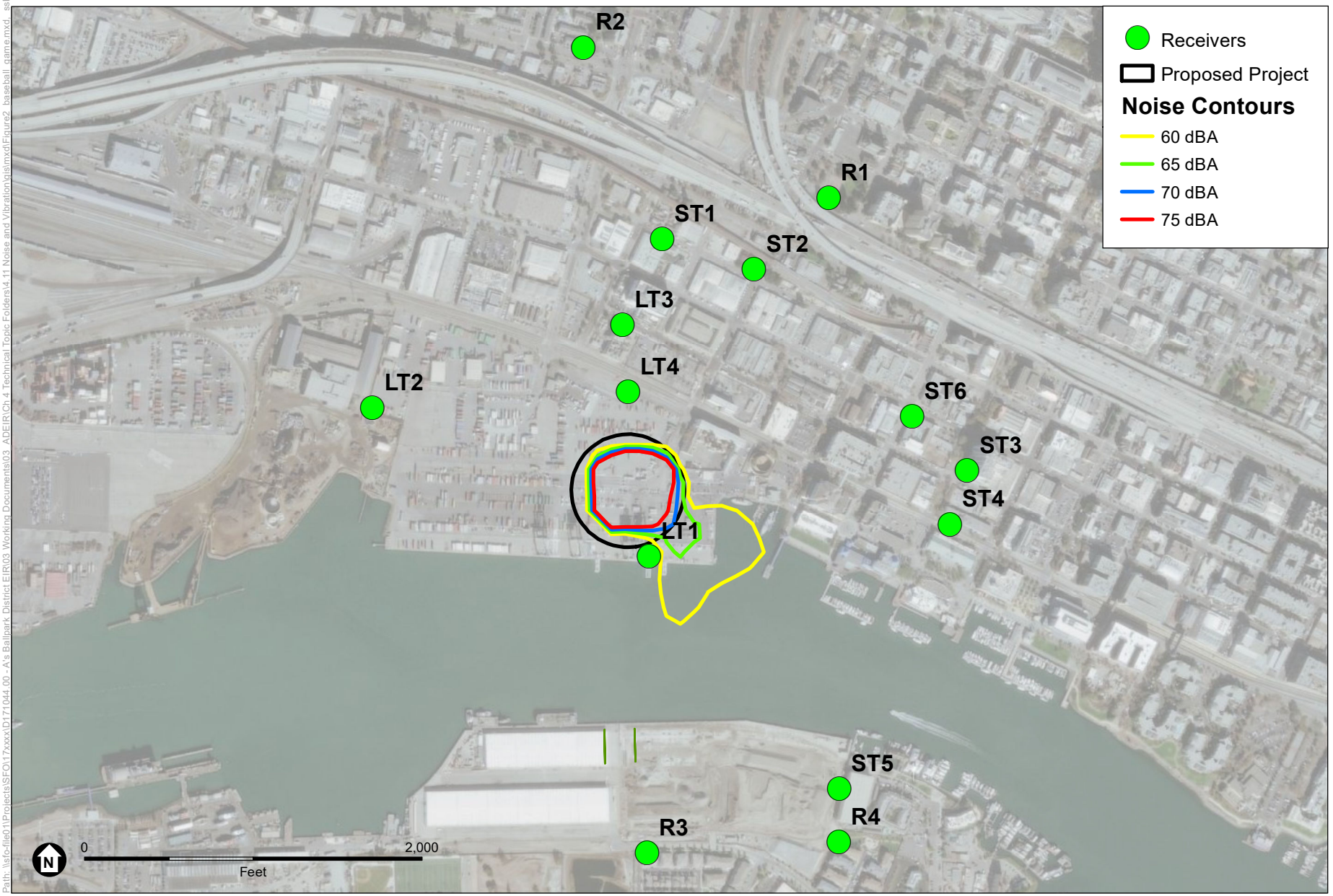
1. Crowd, loudspeaker and amplified music from baseball and concert events at the proposed ballpark;
2. Increased traffic noise along roadways from the proposed ballpark and mixed-use development; and
3. Stationary source noise from mechanical equipment, including emergency generators, and loading docks constructed as part of the proposed ballpark and mixed-use development.

A's Baseball Game Noise

The potential for noise impacts associated with A's baseball games was assessed using the CadnaA noise propagation software. The CadnaA model accounts for local topographical conditions, including the attenuation provided by the bowl of the proposed ballpark and intervening structures and also considers meteorological conditions such as temperature, humidity and wind speed and direction. Noise sources due to baseball games were assumed to be primarily crowd and PA systems. Reference noise data was collected from two locations at the bottom of the 3rd deck at an A's baseball game at the Oakland Coliseum in March 31, 2019 which had an attendance of 23,265. The CadnaA model was calibrated using the collected data at the Oakland Coliseum[8] and then scaled to reflect the proposed maximum capacity of baseball events. Noise data collected at the Oakland Coliseum was used for reference purposes. This data was then used as source data within the CadnaA model to propagate crowd noise within a GIS representation of the proposed ballpark. Noise contours were then developed to demonstrate resultant noise levels from the proposed ballpark within the surrounding communities of Oakland and Alameda. A Technical Noise Memorandum detailing the modeling effort assumptions, methodologies and results in included in **Appendix NOI.**

Figure 4.11-3 presents the noise contours estimated for a capacity baseball event at the proposed ballpark while **Table 4.11-18** presents the specific noise levels at existing receptors in the Project area and compares them to the applicable standards of the noise ordinance (nighttime standards would apply for events occurring after 10:00 p.m.). Noise levels would be somewhat reduced for lower capacity ball games. Increases over daytime periods would be less as ambient noise levels would be higher during daytime periods.

[8] Coliseum crowd noise was validated and scaled within the CadnaA model and refined to establish the contribution of a single attendee. This source data is then scaled to reflect the assigned seated crowd capacity within the architecture of the proposed Ballpark.



SOURCE: ESA, 2020; Oakland Athletics, 2020; City of Oakland, 2019

Oakland Waterfront Ballpark District Project

Figure 4.11-3
Noise Contour Map
Baseball Game

ESA

TABLE 4.11-18
MODELED BALLPARK NOISE LEVELS WITH A BASEBALL EVENT

Receptor Location	Existing L_{33}[a]	Baseball Event	Exceed Noise Ordinance Standard?[b,c]
LT-3: North side of Phoenix Lofts, 737 2nd Street (closest residential receptor but commercially zoned)	65	41.0	No
ST-1: 724 4th Street (Single Family Residence)	67	36.2	No
ST-2: 403 – 409 Martin Luther King Jr. Way (Single Family Residences)	68	37.5	No
ST-3: 222 Broadway (Ellington Condominiums)	61	34.6	No
ST-4: 444 Embarcadero (Jack London Inn)	63	39.5	No
ST-5: Cardinal Point Retirement Home 2431 Mariner Square Drive, Alameda [2]	52	49.9	No
ST-6: Z Hotel 233 Broadway (Washington Street Setback)	59	34.8	No

NOTES:

a At the Alameda receptor location this value is Leq.
b Noise ordinance standard in Oakland is 60 dBA, L_{33} residential and 65 dBA, L_{33} Commercial unless existing level already exceeds which results in the existing ambient level becoming the standard.
c Noise ordinance standard in Alameda is 55 dBA, L_{50} residential and 65 dBA, L_{50} Commercial unless existing level already exceeds which results in the existing ambient level becoming the standard.

SOURCE: ESA, 2019 (Appendix NOI)

Resultant noise levels at each receptor were assessed by comparing predicted noise levels to maximum allowable receiving noise standards for residential uses and commercial uses (Phoenix Lofts and hotels) established by Section 17.120.050 of the City of Oakland Municipal Code and Section 4.10 of the City of Alameda's municipal code, as appropriate. While the ballpark would be a permanent facility, noise from ballpark events would not be constant over each day and is therefore considered to be a temporary noise increase. As shown in Table 4.11-18, noise levels from ballgame events would not exceed either the City of Oakland or the City of Alameda noise ordinances during daytime and nighttime hours. Consequently, resultant noise from ballgame events of the proposed ballpark at nearby receptors would be within the noise levels limits of the local noise ordinances and result in a less than significant impact.

The above analysis applies the daytime exterior noise standard for both the City of Oakland and the City of Alameda. The potential exists for longer games and extra-inning games to extend beyond the 10:00 p.m. hour. The nighttime (post 10:00 p.m.) exterior standards are 45 dBA, L_{33} in Oakland and 50 dBA, L_{50} in Alameda. In both the cities of Oakland and Alameda, the ordinance states that if the ambient noise level exceeds these standards (which it does for all receptors), the standard shall be adjusted to equal the ambient noise level. A comparison of the first two quantitative columns in Table 4.11-18 shows that the predicted baseball event noise level would not exceed the existing 24-hour L_{33} average noise level at any receptor location in Oakland. Noise levels at the receptor in Alameda would be less than the City of Alameda standard of 50 dBA. Therefore, nighttime noise from baseball events at the proposed ballpark would be a less than significant impact.

Concert Event Noise

The Project sponsor proposes up to 9 concert events per year at the proposed ballpark. As noise from concert events would not be constant over each day and would only occur a few days per year, they are therefore considered to be a temporary noise increase. The potential for noise impacts associated with concert events at the proposed ballpark was also assessed using the CadnaA noise propagation software, using similar techniques as those described above for baseball games. The proposed ballpark capacity is 35,000 for a baseball game as well as for a music concert. The noise source location generated by the music event crowd was therefore assumed to be the similar to that for a baseball game. Music events within the ballpark would take place on a stage at the center field area. Noise source levels from speakers were assumed to be 95dBA at 100 feet, which was derived from the Environmental Noise Assessment report for the Levi's Stadium Project in Santa Clara. A Technical Noise Memorandum detailing the modeling effort assumptions, methodologies and results are included in Appendix NOI.

Figure 4.11-4 presents the noise contours estimated for a concert event at the proposed ballpark while **Table 4.11-19** presents the specific noise levels at existing receptors in the Project area and compares them to monitored existing noise level at each receptor during the peak evening period of the event (9:00 p.m. to 11:00 p.m.).

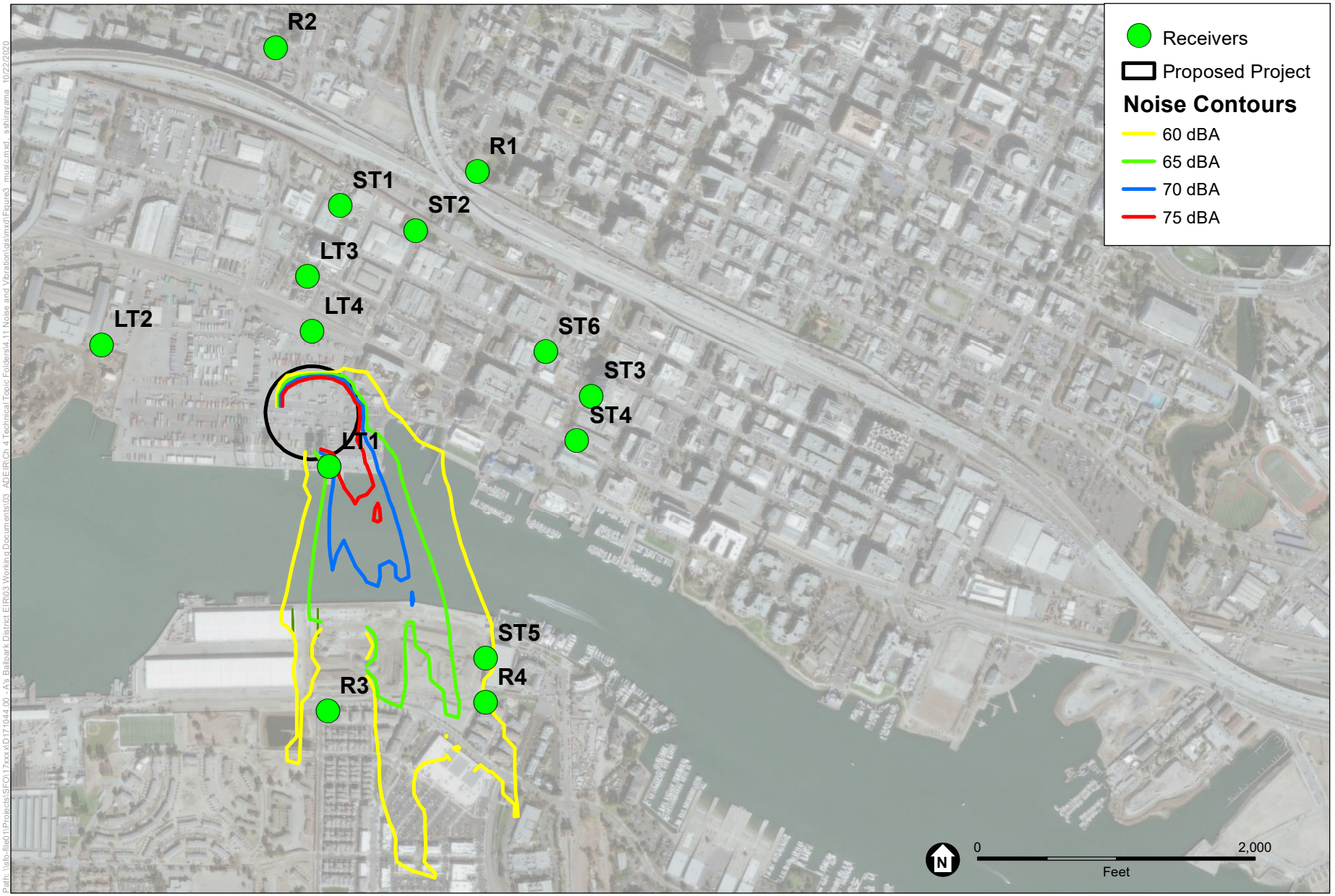
TABLE 4.11-19
MODELED BALLPARK NOISE LEVELS WITH A CONCERT EVENT

Receptor Location	Existing L_{33} [a]	Concert Event	Exceed Noise Ordinance Standard?[b,c]
LT-3. North side of Phoenix Lofts, 737 2nd Street (closest residential receptor but commercially zoned)	65	49.4	No
ST-1: 724 4th Street (Single Family Residence)	67	45.2	No
ST-2: 403 – 409 Martin Luther King Jr. Way (Single Family Residences)	68	45.8	No
ST-3: 222 Broadway (Ellington Condominiums)	61	43.4	No
ST-4: 444 Embarcadero (Jack London Inn)	63	44.4	No
ST-5: Cardinal Point Retirement Home 2431 Mariner Square Drive, Alameda [2]	52	**61.8**	**Yes**
ST-6: Z Hotel 233 Broadway (Washington Street Setback)	59	44.8	No

NOTES:

a At the Alameda receptor location this value is Leq.
b Noise ordinance standard in Oakland is 60 dBA, L_{33} residential and 65 dBA, L_{33} Commercial unless existing level already exceeds which results in the existing ambient level becoming the standard.
c Noise ordinance standard in Alameda is 55 dBA, L_{50} residential and 65 dBA, L_{50} Commercial unless existing level already exceeds which results in the existing ambient level becoming the standard.

SOURCE: ESA, 2019 (Appendix NOI)



SOURCE: ESA, 2020; Oakland Athletics, 2020; City of Oakland, 2019

Oakland Waterfront Ballpark District Project

Figure 4.11-4
Noise Contour Map
Music Event

ESA

Because noise from concert events would be a temporary noise source, resultant noise levels at each receptor from a concert at the proposed ballpark were assessed by comparing predicted noise levels to maximum allowable receiving noise standards for residential uses and commercial uses (Phoenix Lofts and hotels) established by Section 17.120.050 of the City of Oakland Municipal Code and Section 4.10 of the City of Alameda's Municipal Code, as appropriate. In both Oakland and Alameda, the ordinances state that if the ambient noise level exceeds these standards (which is does for all receptors), the standard shall be adjusted to equal the ambient noise level.

As shown in Table 4.11-19, noise levels from a concert event at the proposed ballpark are not predicted to exceed the City of Oakland noise standards but would exceed the City of Alameda noise ordinance standards at receptor ST-5, which would not benefit from the presence of intervening structures. Consequently, noise from concert events at the proposed ballpark would be a significant impact requiring mitigation.

Future occupants of the residential units of the proposed Project would also be exposed to concert noise levels but as shown in Figure 4.11-4, the noise levels at these on-site receptor locations would not be expected to be greater than the existing noise environment that is characterized by substantial rail noise. Additionally, potential effects of a project on itself are legally not required to be analyzed or mitigated under CEQA.

Section 12.56.030(A) of Oakland's Municipal Code prohibits the issuing of a permit for sound amplification equipment for operations between the hours of 10:00 p.m. and 9:30 a.m. Because the Project could potentially result in outdoor concert events after 10:00 p.m., the proposed Project would generate outdoor loudspeaker noise in violation of Section 12.56.030, which would also be a significant noise impact.

Mitigation Measure NOI-2a: Sound Control Plan for Concert Events.

The Project sponsor shall prepare and implement a Sound Control Plan for Concert Events to be implemented at all concert events at the proposed ballpark to reduce the severity of potential noise impacts from amplified music. This Sound Control Plan shall be submitted to the City's Administrators office when applying for the special event permit required pursuant to Chapter 12.56 of the City's Municipal Code. The Plan shall be vetted by the City Administrator's Office and shall contain the following elements:

- **Sound Control Agreement**: Each concert event will require a permit from the City Administrators Office pursuant to Section 12.56 of the City's Municipal Code. Any operator applying for a concert event at the ballpark shall enter into a Sound Control Agreement with the City as a part of this permit application. This Agreement shall establish operational restrictions on the operator both in terms of operational hours and quantitative sound level limits.

- **Operational Hours**: The Sound Control Agreement would restrict the event operator to prescribed hours and days for all amplified sound.

- **Operational Setup**: Noise impacts are predicted to occur at receptor locations south of the proposed ballpark. Consequently, speakers and stages shall be oriented so as to avoid directing amplified sound toward the more impacted southerly locations. The

directional limitation shall be enforced for all auxiliary stage set-ups as well as the main stage, with the preferred direction being speakers facing inward.

- **Sound Level Limits**: For concert events the maximum allowable sound amplification shall be established at approximately 100 feet from the stage or at an alternative location otherwise approved by the City.

- **Real-time Monitoring**: Sound monitoring during events would represent the most effective method of not only ascertaining whether the operator is in compliance with the Sound Control Agreement, but also establishing a mechanism by which an operator may reduce sound levels in excess of the standard while the event is occurring.

  Sound monitoring shall be performed either by City staff, the event operator, or by a contracted technician. This monitoring shall be conducted using a 10-minute L_{eq} average to assess compliance with the Sound Control Agreement. Sound levels shall be monitored at pre-established off-site receptor locations to be included in the Plan or at the sound board, if correlation to remote receptors can be established. If monitored sound levels are in excess of the standard in the Sound Control Agreement, the sound monitoring technician would contact the Sound Control Liaison (see below) by the manner agreed upon in the Sound Control Agreement. The Sound Control Liaison would then have the operator reduce noise levels. After this period, the technician would collect subsequent measurements to assess compliance throughout the balance of the concert event. Repeated occurrences of not meeting the response time would lead to future permit denials for the given operator.

- **Sound Control Liaison**: As part of the Sound Control Agreement, the operator would designate a Sound Control Liaison to respond to notification of sound levels in excess of those established by the Sound Control Agreement. The Sound Control Liaison would be notified by the sound monitoring technician by cell phone or text. Once notified, the Sound Control Liaison would respond to the notification and reduce sound levels to acceptable levels.

Significance after Mitigation: Significant and Unavoidable for up to 9 concert events annually. , Given the potential for concert events to extend beyond the 10:00 p.m. hour currently allowed by Section 12.56.030 of Oakland's Municipal Code, the impact would be a significant impact. While the Project sponsor could seek to revise this section of the City Code to allow for an extension of permitted hours of operation of sound amplification equipment for events within the proposed Waterfront Planned Development Zoning District, given that this modification cannot be assured at this time the impact is conservatively identified as significant and unavoidable with mitigation. While the three dimensional CadnaA modeling accounts for topographical conditions and also considers meteorological conditions such as temperature, humidity, and wind speed and direction, some meteorological conditions such as cloud cover and inversions may also affect resultant noise levels at receptors within the City of Oakland, further supporting a conservative finding of a significant and unavoidable operational noise impact from concert events within the City of Oakland. Additionally, noise levels are predicted to exceed the standards for the City of Alameda during concert events.

Fireworks Displays

There could be occasional fireworks displays at the proposed ballpark. These fireworks display events would range in duration depending on the nature of the event, with more notable fireworks

displays ranging between approximately 30 and 45 minutes in duration. Fireworks currently routinely occur along San Francisco Bay (including, but not limited to, at Oracle Park in San Francisco, and at the Oakland Coliseum), such as during the Fourth of July and radio station events. Sound monitoring conducted between 1993 and 2001 reported firework displays generating peak sound levels of 82 dBA and average sound levels of 70 to 78 dBA at a 0.5-mile distance (NOAA, 2011). Sensitive (human) receptors in the Project area include occupants of residences and transient lodging. While peak firework noise may occasionally exceed the instantaneous performance standard for residential uses identified in Table 4.11-8 which are generally applicable to stationary noise sources, given the brief duration and limited number of firework events that would occur at the ballpark, noise from firework displays is expected to result in a less than significant human exposure impact, with noise levels of 70 to 78 dBA expected during 45-minute events. The magnitude of this noise is similar to roadside noise levels along arterial roadways. Further, the City of Oakland Municipal Code and Section 8.06.030(B) allows for the City Administrator to issue permits for professional displays of fireworks and to promulgate a separate set of regulations governing the issuance of such permits for large public fireworks displays. Potential adverse noise impacts on wildlife from fireworks are addressed in Section 4.3, *Biological Resources*.

Mitigation: None Required.

Roadway Traffic Noise Increases

The proposed Project would result in increased traffic volumes along roadways used to access the proposed ballpark and mixed-use development.

Traffic noise level significance is determined by comparing the increase in noise levels (traffic contribution only) to increments recognized by the City of Oakland (City of Oakland, 2016) and Caltrans (Caltrans, 2013) as representing a readily perceptible increase in noise levels.

Increased vehicular traffic associated with the proposed Project would increase noise levels along existing roadways. Increases in noise from traffic on existing roadways were assessed by modeling existing and future roadway noise levels and comparing the resulting increase to standards adopted by the City of Oakland as thresholds of significance.

Traffic noise was developed from the transportation analysis, and assessed in this section for the following scenarios:

1. Existing traffic conditions (year 2018) during the weekday p.m. peak commute hour (4:45 to 5:45 p.m.). The weekday p.m. peak hour was used to represent the maximum period of traffic generation and associated noise generated by the Project;
2. Existing plus proposed full buildout of Project mixed uses only during the weekday p.m. peak commute hour (this does not include ballgame or event traffic, so is representative of a non-game/event day);
3. Existing plus proposed full buildout of Project mixed uses during the weekday p.m. peak commute hour plus peak pre-ballgame-related traffic [conservatively adds the peak hour of pre-ballgame-related traffic (6:00 to 7:00 p.m.), and assumes ballpark attendance of 35,000]; and

4. Nighttime Scenario (10:00 to 11:00 p.m.): Existing plus proposed full buildout of Project mixed uses plus post-ballgame-related traffic (existing and proposed mixed use traffic conservatively estimated at one-third that of weekday p.m. peak commute traffic based on professional judgment of the transportation consultants).

Traffic noise levels were determined for this analysis using the FHWA Traffic Noise Prediction Model based on baseline and future traffic projections developed as part of the transportation analysis (see Section 4.15, *Transportation and Circulation*). All traffic volumes used in this roadway noise analysis were provided by Fehr & Peers Transportation Consultants, and reflect a 20 percent trip reduction associated with implementation of the Transportation Demand Management Plan as required under **Mitigation Measure TRANS–1a** and Transportation Management Plan required by **Mitigation Measure TRANS-1b**[9]. Modeled weekday noise level estimates for the most highly impacted 35 roadway segments near the Project site are presented in **Table 4.11-20** for full buildout of the Project mixed uses during the weekday p.m. peak commute hour (excludes ballgame); in **Table 4.11-21** for the full buildout of Project mixed uses plus pre-ballgame traffic; and in **Table 4.11-22** for Nighttime Scenario: full buildout of the Project mixed uses plus post-ballgame traffic.

As shown in Table 4.11-20, weekday traffic noise level increases under the full buildout of Project mixed uses scenario (excludes ballgame) would be less than significant (less than 5 dBA increase) for receptors along all roadways analyzed.

As shown in Table 4.11-21, weekday traffic noise level increases for full buildout of Project mixed uses plus pre-game related traffic would be less than significant (less than 5 dBA increase) for receptors along all roadways analyzed, except for Martin Luther King Jr. Way between 8th Street and 11th Street., where noise levels would increase by 5 dBA. This roadway is impacted because it provides the most direct access to and from freeway ramps. Although receptors on Martin Luther King Jr. Way are near to the elevated I-880 freeway and BART tracks, the predicted increase at this roadway is based on existing monitored noise levels and so takes into account the existing contributions of these sources. While this impact would occur only for a few hours per event, given that there would be up to 41 weekday evening regular season A's baseball games as well as up to 9 concert events per year, annually, this impact is considered a significant permanent increase in noise levels.

As shown in Table 4.11-22, nighttime (10:00 to 11:00 p.m.) weekday traffic noise level increases for full buildout of the Project mixed-uses plus post-ballgame would result in the same impacted roadway (Martin Luther King Jr. Way between 8th Street and 11th Street) as described above for the peak pre-game traffic hour.

[9] An analysis of traffic noise impacts without the implementation of the Transportation Demand Management Plan as required under Mitigation Measure TRANS-1a and Transportation Management Plan required by Mitigation Measure TRANS-1b is provided in Appendix NOI.

TABLE 4.11-20
MODELED TRAFFIC NOISE LEVELS WITH WEEKDAY P.M. FULL BUILDOUT OF PROJECT MIXED USES (EXCLUDES BALLGAME/EVENT)

Roadway Segment	Existing	Existing plus Full Buildout of Project Mixed Uses	dBA Difference	Significant Increase?
Weekday PM Peak Hour Noise Levels (4:45 PM – 5:45 PM)				
Brush Street from 3rd Street to 5th Street	59.6	61.0	0.4	No
Brush Street from 7th Street to 11th Street	67.1	68.2	1.1	No
Brush Street from 12th Street to 14th Street	62.9	63.9	1.0	No
Castro Street from 3rd Street to 5th Street	58.9	60.4	1.5	No
Castro Street from 7th Street to 8th Street	65.6	66.3	0.7	No
Castro Street from 8th Street to 11th Street	67.5	68.0	0.5	No
Castro Street from 12th Street to 14th Street	61.2	61.8	0.6	No
MLK Way from 3rd Street to 5th Street[a]	77.2	77.4	0.2	No
MLK Way from 6th Street to 7th Street[a]	68.6	69.4	0.8	No
MLK Way from 8th Street to 11th Street[a]	63.1	65.2	2.1	No
Clay Street from 7th Street to 8th Street	57.0	57.0	0.1	No
Washington Street from Embarcadero to 3rd Street	57.4	57.6	0.1	No
Washington Street from 7th Street to 8th Street	58.2	58.2	0.0	No
Broadway from Embarcadero to 3rd Street	60.6	60.6	0.0	No
Broadway from 6th Street to 7th Street	65.9	65.9	0.0	No
Broadway from 8th Street to 11th Street	65.5	65.5	0.0	No
Franklin Street from 12th Street to 14th Street	60.3	60.3	0.0	No
Harrison Street from 6th Street to 7th Street	63.2	63.6	0.4	No
Harrison Street from 7th Street to 8th Street	65.0	65.3	0.3	No
Embarcadero from Market Street to Martin Luther King Jr. Way	55.7	Closed	N/A	No
Embarcadero from Washington Street to Broadway	59.6	59.6	0.0	No
3rd Street from Brush Street to Castro Street	63.4	63.7	0.3	No
3rd Street from Washington Street to Broadway	62.1	62.6	0.5	No
3rd Street from Broadway to Franklin Street	61.6	61.7	0.1	No
5rd Street from Brush Street to Castro Street	65.9	66.5	0.6	No
5rd Street from Castro Street to Martin Luther King Jr. Way	65.6	66.2	0.6	No
7rd Street from Castro Street to Martin Luther King Jr. Way	66.3	66.5	0.2	No
7rd Street from Martin Luther King Jr. Way to Jefferson Street	66.7	66.9	0.2	No
7rd Street from Clay Street to Washington Street	67.1	67.3	0.2	No
7rd Street from Broadway to Franklin Street	67.9	68.0	0.1	No
8th Street from Webster Street to Harrison Street	63.7	64.1	0.4	No
11th Street from Castro Street to Martin Luther King Jr. Way	63.1	63.4	0.3	No
12th Street from Castro Street to Martin Luther King Jr. Way	64.0	64.5	0.5	No
Market Street from Embarcadero to 3rd Street[a]	68.5	70.9	2.4	No
Market Street from 3rd Street to 7th Street[a]	84.8	84.9	0.1	No

a Due to the presence of other existing noise sources near this location (UPRR or I-880), the existing noise level at this location is based on measurement data and the existing plus Project value is the logarithmic sum of the existing measurement data and the predicted traffic contribution.

SOURCE: Fehr & Peers, 2019 (Appendix TRA), ESA, 2019 (Appendix NOI).

TABLE 4.11-21
MODELED TRAFFIC NOISE LEVELS WITH WEEKDAY P.M. FULL BUILDOUT OF PROJECT MIXED USES PLUS PRE-BALLGAME TRAFFIC

Roadway Segment	Existing	Existing plus Full Buildout of Project Mixed Uses plus Pre-Ballgame Traffic	dBA Difference	Significant Increase?
Weekday PM Peak Hour Noise Levels				
Brush Street from 3rd Street to 5th Street	59.6	61.0	1.4	No
Brush Street from 7th Street to 11th Street	67.1	69.5	2.4	No
Brush Street from 12th Street to 14th Street	62.9	66.0	3.1	No
Castro Street from 3rd Street to 5th Street	58.9	60.4	1.5	No
Castro Street from 7th Street to 8th Street	65.6	67.0	1.4	No
Castro Street from 8th Street to 11th Street	67.5	68.4	0.9	No
Castro Street from 12th Street to 14th Street	61.2	62.8	1.6	No
MLK Way from 3rd Street to 5th Street[a]	77.2	77.6	0.6	No
MLK Way from 6th Street to 7th Street[a]	68.6	70.2	1.6	No
MLK Way from 8th Street to 11th Street[a]	63.1	67.1	**5.0**	**Yes**
Clay Street from 7th Street to 8th Street	57.0	59.1	2.1	No
Washington Street from Embarcadero to 3rd Street	57.4	61.8	4.4	No
Washington Street from 7th Street to 8th Street	58.2	60.3	2.1	No
Broadway from Embarcadero to 3rd Street	60.6	60.7	0.1	No
Broadway from 6th Street to 7th Street	65.9	66.9	1.0	No
Broadway from 8th Street to 11th Street	65.5	67.1	1.6	No
Franklin Street from 12th Street to 14th Street	60.3	60.9	0.6	No
Harrison Street from 6th Street to 7th Street	63.2	65.0	1.8	No
Harrison Street from 7th Street to 8th Street	65.0	66.3	1.3	No
Embarcadero from Market Street to MLK Way	55.7	Closed	N/A	No
Embarcadero from Washington Street to Broadway	59.6	59.6	0.0	No
3rd Street from Brush Street to Castro Street	63.4	63.7	0.3	No
3rd Street from Washington Street to Broadway	62.1	63.4	1.3	No
3rd Street from Broadway to Franklin Street	61.6	63.4	1.8	No
5rd Street from Brush Street to Castro Street	65.9	67.9	2.0	No
5rd Street from Castro Street to MLK Way	65.6	67.3	1.7	No
7rd Street from Castro Street to MLK Way	66.3	67.5	1.2	No
7rd Street from MLK Way to Jefferson Street	66.7	68.0	1.3	No
7rd Street from Clay Street to Washington Street	67.1	68.1	1.0	No
7rd Street from Broadway to Franklin Street	67.9	68.1	0.2	No
8th Street from Webster Street to Harrison Street	63.7	66.1	2.4	No
11th Street from Castro Street to MLK Way	63.1	65.3	2.2	No
12th Street from Castro Street to MLK Way	64.0	64.5	0.5	No
Market Street from Embarcadero to 3rd Street[a]	68.5	71.7	3.2	No
Market Street from 3rd Street to 7th Street[a]	84.8	84.9	0.1	No

a Due to the presence of other existing noise sources near this location (UPRR or I-880), the existing noise level at this location is based on measurement data and the existing plus Project value is the logarithmic sum of the existing measurement data and the predicted traffic contribution.

SOURCE: Fehr & Peers, 2019, ESA, 2019 (Appendix TRA).

TABLE 4.11-22
MODELED TRAFFIC NOISE LEVELS WITH NIGHTTIME SCENARIO (10:00 TO 11:00 P.M.): FULL BUILDOUT OF PROJECT MIXED USES PLUS POST-BALLGAME TRAFFIC

Roadway Segment	Existing	Existing plus Full Buildout of Mixed Uses plus Post-Ballgame Traffic	dBA Difference	Significant Increase?
Weekday Nighttime Hour (10:00 PM – 11:00 PM)				
Brush Street from 3rd Street to 5th Street	54.8	56.2	1.4	No
Brush Street from 7th Street to 11th Street	62.3	63.3	1.0	No
Brush Street from 12th Street to 14th Street	58.1	59.1	1.0	No
Castro Street from 3rd Street to 5th Street	54.1	55.6	1.4	No
Castro Street from 7th Street to 8th Street[a]	67.7	70.2	2.5	No
Castro Street from 8th Street to 11th Street[a]	67.7	70.8	3.1	No
Castro Street from 12th Street to 14th Street[a]	67.7	69.1	1.4	No
MLK Way from 3rd Street to 5th Street[a]	72.7	73.5	0.8	No
MLK Way from 6th Street to 7th Street[a]	65.9	68.7	2.8	No
MLK Way from 8th Street to 11th Street[a]	58.8	65.5	**6.7**	**Yes**
Clay Street from 7th Street to 8th Street	52.2	55.6	3.4	No
Washington Street from Embarcadero to 3rd Street[a]	62.6	65.1	2.5	No
Washington Street from 7th Street to 8th Street	53.4	53.4	0.0	No
Broadway from Embarcadero to 3rd Street	55.7	58.9	3.2	No
Broadway from 6th Street to 7th Street	61.1	64.4	3.3	No
Broadway from 8th Street to 11th Street	60.7	65.5	4.8	No
Franklin Street from 12th Street to 14th Street	55.4	55.5	0.1	No
Harrison Street from 6th Street to 7th Street	58.4	58.8	0.4	No
Harrison Street from 7th Street to 8th Street	60.2	61.1	0.9	No
Embarcadero from Market Street to MLK Way	50.8	Closed	N/A	No
Embarcadero from Washington Street to Broadway	54.8	54.8	0.0	No
3rd Street from Brush Street to Castro Street	58.5	58.9	0.4	No
3rd Street from Washington Street to Broadway	57.3	59.2	1.9	No
3rd Street from Broadway to Franklin Street	56.8	60.8	4.0	No
5rd Street from Brush Street to Castro Street[a]	63.8	68.2	4.4	No
5rd Street from Castro Street to MLK Way	60.8	65.1	4.3	No
7rd Street from Castro Street to MLK Way	61.5	63.0	1.5	No
7rd Street from MLK Way to Jefferson Street	61.9	64.2	2.3	No
7rd Street from Clay Street to Washington Street	62.3	64.1	1.8	No
7rd Street from Broadway to Franklin Street	63.1	64.6	1.5	No
8th Street from Webster Street to Harrison Street	58.9	60.8	1.9	No
11th Street from Castro Street to MLK Way	58.3	58.8	0.5	No
12th Street from Castro Street to MLK Way	59.2	63.5	4.3	No
Market Street from Embarcadero to 3rd Street[a]	66.8	71.1	4.3	No
Market Street from 3rd Street to 7th Street[a]	78.5	79.0	1.5	No

a Due to the presence of other existing noise sources near this location (UPRR, _I-980, or I-880), the existing noise level at this location is based on measurement data and the existing plus Project value is the logarithmic sum of the existing measurement data and the predicted traffic contribution.

SOURCE: Fehr & Peers, 2019 (Appendix TRA), ESA, 2019 (Appendix NOI).

While physical noise mitigation (i.e., installation of noise barriers), could potentially result in a meaningful reduction, it would restrict driveway access to landowners along a given roadway who need driveway access. Another mitigation considered would be re-routing traffic away from the affected roadway. Re-routing Project traffic, however, would likely only transfer the noise impact from one roadway to another and would result in less efficient ingress and egress to the Project site. Alternative methods of ingress and egress (i.e., gondola) are explored in the Project variant analysis in Chapter 5. Consequently, operational noise impacts during events with implementation of the Transportation Demand Management Plan required under Mitigation Measure TRANS-1a and Transportation Management Plan required by Mitigation Measure TRANS-1b would be *significant and unavoidable*, with no feasible mitigation that would reduce roadside noise levels even with implementation of transportation mitigation measures identified in Section 4.15, *Transportation and Circulation.*

> **Mitigation Measure TRANS-1a: Transportation and Parking Demand Management (TDM) Plan.** (See Section 4.15, *Transportation and Circulation*)
>
> **Mitigation Measure TRANS-1b: Transportation Management Plan.** (See Section 4.15, *Transportation and Circulation*)
>
> **Significance after Mitigation:** Significant and Unavoidable for traffic noise.

Transportation Improvements and Mitigation Measures. As discussed in Impact NOI-1, there are a number of transportation improvements and mitigation measures that involve new off-site facilities, such as the creation of a Transportation Hub, bus lanes, protected bike lanes, and a pedestrian and bicycle overcrossing of the railroad tracks. Noise generated from the multi-modal use of these improvements or facilities are in keeping with similar facilities routinely implemented by the City. All off-site improvements would be within public rights of way and would not result in changes in roadway capacity for motor vehicles or traffic volumes. Consequently, these transportation improvements would not change operational noise impacts beyond what is analyzed here. Certain facilities would enhance pedestrian use and noise associated with users of the proposed ballpark, which is addressed as follows.

Crowd Noise Outside of the Proposed Ballpark

Operational noise from non-transportation sources such as egress of patrons from events, or sound amplification equipment in common areas are assessed based on noise increases of 5 dBA over existing ambient levels and any applicable restrictions of the City's noise ordinance. As noted above, an increase in noise below 5 dBA is not readily perceptible. Although these operational noise increases would be of limited duration, they would be expected to occur throughout the life of the Project and are therefore considered permanent changes in noise conditions.

Noise generated by event patrons and retail customers could result in increased noise along surrounding streets, particularly during the evening and nighttime hours (depending on the event timing) and at the end of scheduled games/events when large numbers of people would be departing the proposed ballpark and walking on local streets to access their transit connections or access their vehicles at local parking locations.

The transportation analysis predicts the following primary pedestrian routes[10] and volume after events at the proposed ballpark:

- Washington Street north to 12th Street/City Center BART station (up to 1,780 persons);
- Broadway north to 12th Street/City Center BART station and ancillary parking area (up to 4,320 persons);
- Martin Luther King Jr. Way north to 12th Street/City Center BART station and ancillary parking area (up to 4,320 persons);
- 7th Street west (from Martin Luther King Jr. Way) to West Oakland BART station (up to 1,820 persons); and
- Water Street east to Jack London Square area parking (up to 4,960 persons)

Of these five primary routes, there are no noise-sensitive receptors along Water Street route, except for the Waterfront Hotel on Water Street, which also fronts on Washington Street. The other four primary pedestrian routes have combinations of residential tower buildings, hotels and older single family homes. **Mitigation Measure NOI-2b (Egress Notification)** is identified to encourage event-goers to use Market Street or other routes without sensitive receptors as a preferred egress routes. However, there is no means to require event-goers to use those routes, so the crowd noise impacts would remain significant and unavoidable.

To estimate noise levels from departing crowds after an event, noise monitoring of crowd egress after a San Francisco Giants baseball game at AT&T Park[11] conducted in 2015 was used. This short-term noise monitoring was located across King Street at a setback of approximately 120 feet from the ballpark. It should be noted that this measured data included a portion of restricted vehicle traffic along the street adjacent to the ballpark (King Street) which may overestimate the magnitude of the pedestrian contribution. Monitored noise levels during the 30-minute egress period when the game ended averaged 73 dBA, Leq. This noise level was collected across the street from two of the four primary egress points of the ballpark and therefore represents the noise generated by egress of 20,000 attendees or more. This reference noise level was scaled as a line source to estimate the noise level generated by crowds of smaller size predicted along the primary pedestrian routes. for the proposed Project Table 4.11-23 presents a conservative estimate of noise levels that may be generated along each of the three primary pedestrian routes where noise-sensitive land uses are present.

As can be seen in the data in **Table 4.11-23,** noise from crowd egressing the proposed ballpark could increase noise levels along one of the three primary pathways by 5 dBA or more for approximately 30 minutes following approximately 56 evening events per year, including concert events.

[10] This distribution was developed by the Transportation consultant based upon project specific mode splits and through corridors to off-site transit and parking. TNC's the ferry and AC Transit are not considered part of these pedestrian routes. Travel characteristics were taken from the existing A's fans at the coliseum. Adjustments were made based on the change in location and based on location of the three BART stations, AC Transit bus lines, and availability of parking.

[11] Now named Oracle Park.

Additionally, the Project proposes a Transportation Hub on 2nd Street between Martin Luther King Jr. Way and Clay Street. Operation of this Hub could result in noise generated by idling shuttles and transit buses, and queuing of crowds. The western extent of this proposed Hub would be approximately 600 feet from the Phoenix lofts while the eastern extent would be approximately 800 feet from the Ellington Condominiums. The FTA identifies an unobstructed screening distance for a transit center of 225 feet, beyond which a noise impact assessment in not required (FTA, 2018). Therefore, at a distance of 500 feet or greater, crowd noise and bus idling would be expected to be attenuated to a less than significant level.

Mitigation Measure NOI-2b: Egress Notifications.

The Project sponsor shall disseminate information to event-goers identifying alternative egress routes without sensitive receptors and asking patrons for quiet post-event egress.

Significance after Mitigation: Significant and Unavoidable for crowd noise. This measure would require the Project sponsor to disseminate information to event-goers identifying alternative egress routes. However, the effectiveness of this notification cannot be assured. Therefore, even with Mitigation Measure NOI-2b, the impact would be significant and unavoidable.

TABLE 4.11-23
ESTIMATED CROWD NOISE ALONG PRIMARY PEDESTRIAN ROUTES

Route Location	Existing Evening Noise Level dBA, Leq	Predicted Crowd Contribution dBA, Leq	Predicted Noise level with Crowd dBA, Leq	Noise Increase with Crowd Egress
Washington Street north to 12th Street/City Center BART station	63	63	66	+3 dBA
Broadway north to 12th Street/City Center BART station and ancillary parking area	63	67	69	+6 dBA
MLK Way north to 12th Street/City Center BART station and ancillary parking area	73	67	74	+1 dBA
7th Street west to West Oakland BART station	62	64	66	+2 dBA

SOURCE: ESA, 2019 (Appendix NOI).

Stationary Noise Impacts on Existing Offsite and Future Onsite Receptors

Operation of the proposed Project would increase ambient noise levels in the immediate vicinity primarily through the onsite use of stationary equipment, such as HVAC systems and by emergency generators that would be required by building code for emergency egress of high rise buildings. Operation of HVAC equipment (and any other stationary equipment) would be subject to the City of Oakland Noise Ordinance for maximum allowable receiving noise standards presented in Table 4.11-8.

Operation of proposed generators during a power failure or other emergency would be exempt from the restrictions of the City's noise ordinance. Maintenance operation of emergency standby

diesel generators would occur for approximately four hours per month (50 hours annually) for testing and such a short noise event would not substantially alter ambient noise levels.

Mitigation Measure NOI-2c (Operational Noise from Stationary Equipment) is identified to require that the mechanical equipment would be standardized and that noise generating equipment would not exceed the City's established thresholds presented in Table 4.11-8. Noise from mechanical equipment would be a less than significant impact with mitigation with respect to permanent increase in noise.

> **Mitigation Measure NOI-2c: Operational Noise from Stationary Equipment.**
>
> Noise levels from stationary equipment (e.g., HVAC systems) on the Project site after completion of the Project (i.e., during Project operation) shall comply with the noise standards in chapter 17.120 of the Oakland Planning Code and chapter 8.18 of the Oakland Municipal Code. If noise levels caused by stationary equipment exceed these standards, the activity causing the noise shall be abated until appropriate noise reduction measures have been installed and compliance verified by the City. Methods of achieving this standard include low-noise-emitting HVAC equipment, locating HVAC and other mechanical equipment with a rooftop mechanical penthouse, and use of shields and parapets to reduce noise levels to adjacent land uses. For Generators, industrial grade silencers can reduce exhaust noise by 12 to 18 dB and residential grade silencers by 18 to 25 dBA. (ASHRAE TC, 2006).
>
> **Significance after Mitigation:** Less than Significant for stationary source noise.

Impact NOI-4: The proposed Project could propose land uses in conflict with the land use compatibility guidelines of the Oakland General Plans. (Criterion 5 and 6) (*Less than Significant with Mitigation*)

The development of the proposed Project could expose future occupants of the Project to existing sources of noise. However, CEQA does not require that potential effects of the environment on the Project be analyzed or mitigated, except where the Project impacts exacerbate the existing conditions. As discussed above, Project impacts will exacerbate some existing noise conditions. Thus, an analysis of existing noise effects on the Project is included in order to analyze these impacts and to provide information to the public and decision-makers.

The City of Oakland uses Land Use Compatibility Guidelines to determine noise-affected uses (see Table 4.11-7 above). For commercial uses, noise environments of 65 DNL or less represent the normally acceptable noise exposure, between 65 DNL and 75 DNL are considered conditionally acceptable, and noisier than 75 DNL are considered normally unacceptable. For family residential uses, noise environments of 60 DNL or less represent the normally acceptable noise exposure, between 60 DNL and 70 DNL are considered conditionally acceptable, and between 70 DNL and 75 DNL are considered normally unacceptable. For neighborhood parks, noise environments of 65 DNL or less represent the normally acceptable noise exposure, between 65 DNL and 75 DNL are considered normally unacceptable, and noisier than 75 DNL are considered clearly unacceptable.

"Normally unacceptable" means that development of such uses should generally be discouraged but may be undertaken if a detailed analysis of the noise-reduction requirements is conducted and if highly effective noise mitigation features are included. Conditionally acceptable means that new construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features are included in the design.

Noise measurements were conducted at four representative locations of proposed residential land uses and are presented in Table 4.11-2.

Exposure of Parks to Noise

The proposed Waterfront Park would extend along the Estuary from Water Street at Jack London Square on the east to the west edge of the wharf and property line of the Project site. Noise monitoring location LT-1 along the Estuary in the location of the proposed Waterfront Park and the west most property line of the Project site monitored noise levels at 65 DNL, which would be at the top end of normally acceptable noise exposure for park uses (pursuant to the General Plan land use noise compatibility guidelines, see Table 4.11-7). It should be noted that the predominant noise source observed at this location was existing container truck operations within the Project site. As discussed in Chapter 3, *Project Description*, with development of the proposed Project, the existing tenants and users of Howard Terminal are assumed to move to other locations within the region in which their uses are permitted under applicable zoning and other regulations. Therefore, under the Project, the noise exposure of proposed Waterfront Park area would be compatible with the land use noise environment guidelines.

Exposure of Retail and Residential Uses to Noise

Because the Project proposes a mixture of retail and residential uses without specified designations for any given block, this analysis conservatively considers that any block could be developed with residential use, which is the more restrictive of these potential uses with regard to noise exposure. Three long-term measurements were taken on the Project site to capture the locations closest to the predominant on- and off-site noise sources. Noise monitoring location LT-1 was selected to reflect maximum exposure to potential noise contributions from marine vessels or other harbor activity on the Estuary. Noise monitoring location LT-2 was selected to reflect maximum exposure from operations of Schnitzer Steel metal recycling facility adjacent to the west property line of blocks 17 through 21. Noise monitoring location LT-4 was selected to reflect maximum exposure to potential noise contributions from UPRR activity including freight and Amtrak pass-by event and horn blasts at at-grade crossings.

At noise monitoring location LT-1, along the Estuary, recorded noise levels were 65 DNL, which would be within the "conditionally acceptable noise exposure category for residential uses. **Mitigation Measure NOI-3 (Noise Reduction Plan for Exposure to Community Noise)** requires the Project sponsor to submit a Noise Reduction Plan prepared by a qualified acoustical engineer for City review and approval that identifies specific noise reduction measures (e.g., sound-rated window, wall, and door assemblies) to achieve an acceptable interior noise level of 45DNL within the interior space of residential buildings. It should be noted that the predominant noise source observed at this location was existing container truck operations within the Project site. As discussed in Chapter 3, *Project Description*, with

development of the proposed Project, the existing tenants and users of Howard Terminal are assumed to move to other locations within the region in which their uses are permitted under applicable zoning and other regulations. Therefore, with Mitigation Measure NOI-3, the noise exposure of proposed residential location near the Estuary would be compatible with the land use noise environment guidelines.

At noise monitoring location LT-2, adjacent to operations of Schnitzer Steel metal recycling facility at the west Project property line, recorded noise levels were 75 DNL which would be at the top end of the "normally unacceptable" noise exposure category for residential uses. The General Plan indicates that residential development should only proceed in such an area provided that a detailed analysis of the noise reduction requirements be made and needed noise insulation features included in the design. Because Mitigation Measure NOI-3 would ensure acceptable interior noise levels within the interior space of residential buildings, the noise exposure of proposed residential uses on Blocks 17 through 21, along the western property line with Schnitzer Steel could be compatible with the land use noise environment guidelines.

At long -term monitoring location LT-4, adjacent to operations of the UPRR tracks recorded noise levels were 72 DNL which would be within the "normally unacceptable" noise exposure category for residential uses. The General Plan indicates that residential development should only proceed in such as area provided that a detailed analysis of the noise reduction requirements be made and needed noise insulation features included in the design. Because Mitigation Measure NOI-3 would ensure acceptable interior noise levels within the interior space of residential buildings, the noise exposure of proposed residential uses on Blocks 17 through 21, along the northern property line with the UPRR tracks could be compatible with the land use noise environment guidelines.

For interior noise levels, noise analysis and noise reduction measure implementation would be achieved by adherence to Mitigation Measure NOI-3 to achieve an acceptable residential interior noise level of 45 DNL in accordance with the land use compatibility guidelines of the Noise Element of the Oakland General Plan.

While exterior areas at future residences such as yards, patios and balconies could still be exposed to relatively high noise levels that would be unabated by implementation of Mitigations Measure NOI-3, the City has not established standards for noise exposure in private outdoor areas.

Summary

The Project proposes retail, commercial retail and parks/open space uses, all of which would be developed in areas where required SCA's could ensure they would be consistent with the General Plan's noise compatibility guidelines. The implementation of Mitigation Measure NOI-3 will ensure any effects are less than significant, for residential (interior) and commercial uses. The impact is less than significant with mitigation.

Mitigation Measure NOI-3: Noise Reduction Plan for Exposure to Community Noise.

Prior to approval of construction-related permit, once specific land use designations and building design plans are available, the Project sponsor shall submit a Noise Reduction Plan prepared by a qualified acoustical engineer for City review and approval that contains noise reduction measures (e.g., sound-rated window, wall, and door assemblies) to achieve an acceptable interior noise level in accordance with the land use compatibility guidelines of the Noise Element of the Oakland General Plan. Exterior to interior noise reductions of 36 dBA have been demonstrated in modern urban residential uses (ESA, 2019), while attenuation of up to 45 dBA have been achieved at airport hotels. The Project sponsor shall implement the approved Plan during construction. Interior noise levels shall not exceed the following:

a. 45 dBA, DNL: Residential activities, civic activities, hotels

b. 50 dBA, DNL: Administrative offices; group assembly activities

c. 55 dBA, DNL: Commercial activities

d. 65 dBA, DNL: Industrial activities

Significance after Mitigation: Less than Significant

Impact NOI-5: Operation of the proposed Project would not expose persons to groundborne vibration that exceeds the criteria established by the Federal Transit Administration (FTA) or propose land uses in conflict with the land use compatibility guidelines of the Oakland General Plans. (Criterion 5 and 6) (*Less than Significant, but not a CEQA Consideration*)

The development of the Project could expose future occupants of the Project to perceptible groundborne vibration when trains on the UPRR tracks during the operation of the Project. However, CEQA does not require that potential effects of the environment on the Project be analyzed or mitigated. Nevertheless, an analysis of vibration related effects associated with existing train operations on the UPRR tracks on the Project is included to provide information to the public and decision-makers. Measures to reduce non-CEQA impacts are designated as "Improvement Measures" and not as mitigation measures to be implemented pursuant to CEQA.

Because the Project site is bounded by the UPRR rail tracks that service both Amtrak commuter trains and freight train activity, Project site development would result in the exposure of people to vibrations from rail operations. Currently, AMTRAK operates 38 passenger trains every weekday on this track, while approximately six freight trains travel past the site every day.

FTA acknowledges that steel wheeled/steel rail vehicles can generate vibration impacts. FTA identifies screening buffer distances in its document, *Transit Noise and Vibration Impact Assessment*. Specifically, for commuter rail lines, buffer distances of 50 to 100 feet from the right-of-way are recommended for residences or any land uses where people sleep, such as hotels and hospitals to avoid vibration impacts. Therefore, given that the Project proposes to develop land uses that could include residences within 100 feet of the UPRR tracks, non-CEQA vibration exposure impacts could be significant. **Improvement Measure NOI-4** is identified, which

establishes a vibration performance standard for residential developments exposed to vibration levels in excess of 75 VdB from operations of the UPRR tracks, and requires that detailed Project-level vibration analyses be prepared to ensure that the that standard will be met.

Improvement Measure NOI-4. Vibration Reduction Plan.

All residential development with a vibration exposure exceeding 75 VdB from operations on the UPRR tracks shall be designed to reduce vibration from UPRR operations to 75 VdB or less for residential uses. Prior to issuance of any building permit for structures intended for human occupancy within 100 feet of the mainline track, a detailed vibration design study shall be completed by a qualified engineer to confirm the ground vibration levels and frequency along the UPRR tracks and to determine appropriate design to limit interior vibration levels to 75 VdB for residences, if necessary. Implementation of the recommended measures of the acoustical study into Project design elements shall be verified by the Oakland Building Department as part of the plan-check process.

Specific measures to achieve the performance standards set forth above may include one or a combination of the following methods:

- Use of vibration isolation techniques such as supporting the new building foundations on elastomer pads similar to bridge bearing pads;
- Installation of vibration wave barriers. Wave barriers would consist of control trenches or sheet piles, which are analogous to controlling noise with sound barrier. The applicability of this technique depends on the characteristics of the vibration waves.

Mitigation: None required for this non-CEQA impact.

Maritime Reservation Scenario

The Maritime Reservation Scenario involves an alternative site plan for the Project that was analyzed alongside the Project. The Maritime Reservation Scenario includes the same development program as the proposed Project, but would distribute that development program within a different Project site boundary that removes a portion of the southwest corner of the site.

At any point within the next 10 years, the Port of Oakland may choose to exercise its option and take back a portion of the site from the A's in order to accommodate possible expansion of the existing turning basin used to turn large vessels within Oakland's Inner Harbor. As a result, the Project site plan would be modified, and the proposed development would be denser, fitting the same development program (i.e., the ballpark and mix of other uses proposed) onto the smaller site. Changes to the Project site plan that would occur with the Maritime Reservation Scenario would occur within the area of the Project site that would be developed after Phase 1. The Maritime Reservation Scenario would distribute the Project's development program differently within the altered site configuration.

The Port of Oakland has not designed or permitted an expanded turning basin and the impacts of the expansion, if it were proposed, are not considered in this EIR. If the Port were to exercise its

option and take back a portion of the Project site from the Project sponsor, the Port would analyze the potential impacts of expanding the turning basin at that time.

This EIR presents the noise impacts of the Maritime Reservation Scenario that are different from those identified for the Project.

Construction Noise and Vibration Impacts

Since all of the square footage of the Project is being preserved (in a smaller footprint) in the Maritime Reservation Scenario, the only meaningful difference from the Proposed Project would be that a smaller footprint of construction would occur during Buildout construction. While vertical construction may be denser in the rest of the Project, the same off-road equipment would be involved and the noise impacts at the northern Project boundary would be reduced. Given that there are no existing sensitive receptors along the northern Project boundary, and potential reduction in Buildout construction noise would primarily be realized by proposed on-site receptors occupied as part of Phase 1 development. As such, this impact would be marginally less than the Project but still significant and unavoidable with mitigation.

Operational Noise Impacts

Since all of the square footage of the Project is being preserved in the Maritime Reservation Scenario, the land uses, activities, attendance and population data are the same as the Project. Additionally, mobile trips associated with hauling, vendor deliveries, and workers would also remain the same. Therefore, operational noise sources are expected to be very similar to the Project operational noise sources, since the overall population and activities would be identical. Therefore, the only changes to operational emissions are assumed to be changes to the number and size of the on-site mechanical equipment such HVAC and emergency generators, since there would be fewer non-ballpark buildings than the Project, with more square footage in each; therefore, fewer HVAC and generators are required but may need to have higher capacities. Regardless, Mitigation Measure NOI-2c (Operational Noise) would still apply to stationary sources and the impact of operational noise inclusive of baseball events, concert events and Project traffic would be significant and unavoidable.

4.11.5 Cumulative Impacts

Impact NOI-1.CU: Construction activities of the proposed Project combined with cumulative construction noise in the Project area would cause a substantial temporary or periodic increase in ambient noise levels in the Project vicinity during construction. (*Significant and Unavoidable*)

Geographic Context

The geographic scope of analysis for cumulative noise and vibration construction impacts encompasses sensitive receptors within approximately 1,000 feet of the Project site.[12] Beyond 1,000 feet, the contributions of noise from other projects would be greatly attenuated through both distance and intervening structures and their contribution would be expected to be minimal. **Appendix DEV** presents the list of reasonably foreseeable future projects in the vicinity that could contribute to cumulative construction noise.

Cumulative Impact Analysis

All but two of the listed cumulative projects are sufficiently distant to not meaningfully contribute to construction noise impacts.

Of the two cumulative projects within 1,000 feet of the Project site, one is a planned but not yet permitted 8-story, 135-unit residential tower at 466 Water Street, approximately 500 feet east of the Clay Street boundary of the Project site. The other proximate cumulative project is a planned but not yet permitted 7-story, 48-unit residential tower at 201 Broadway, approximately 750 feet east of the Clay Street boundary of the Project site.

Separate CEQA review of the planned residential tower at 466 Water Street found that construction noise impacts would be less than significant with the implementation of mitigation measures including subsequently adopted construction-noise-related mitigation measures adopted by the City (ESA, 2014). There is currently no CEQA-related noise analysis conducted for the cumulative project at 201 Broadway.

Both the 466 Water Street and 201 Broadway cumulative projects could entail pile driving and could be under construction at the same time as the proposed Project. Therefore, the potential exists for construction of these projects to cumulatively contribute to the significant and unavoidable construction noise impacts identified for the proposed Project.

The receptors most impacted by construction noise of the proposed Project (the Phoenix Lofts) are located over 2,000 feet from the closest of these two cumulative projects, which is sufficiently distant so as not to pose additional cumulatively considerable noise contribution to construction noise. Similarly, as indicated in Table 4.11-13, maximum construction noise levels from the proposed Project at the receptor at 222 Broadway (across the street from the cumulative project at 201 Broadway) would be 68 dBA, which is one dBA above the existing daytime noise levels

[12] This screening threshold distance was developed based on stationary source noise attenuation equations (Caltrans, 2013) and the combined noise level generated by typical construction phases for a given project (assuming multiple pieces of equipment) at a distance of 50 feet. Using the attenuation equations, the maximum noise level of 89 A-weighted decibels (dBA) for both excavation and finishing would diminish to below 65 dBA at 1,000 feet. A receptor experiencing noise levels of 89 dBA from two adjacent construction sites would experience a cumulative noise level of 91 dBA (the acoustical sum of 89 dBA plus 89 dBA), which would still be below 65 dBA at 1,000 feet which, hence, is used as the geographic scope.

monitored at this receptor, and hence would not contribute considerably to a cumulative construction noise impact that may result from the other projects. Notwithstanding the marginal impact of these cumulative construction projects, given the fact that the Project level analysis is significant and unavoidable, there would also be a potential for significant cumulative construction noise impact if impact pile driving were to occur concurrently. While nighttime noise impacts of the Project would be less-than significant, it is also possible, though unlikely, that a cumulative project could have a simultaneous nighttime construction noise contribution that could result in a significant cumulative impact. if the cumulative noise levels exceed the City's construction noise standards. Therefore, cumulative construction noise impacts during nighttime hours is also conservatively identified as significant and unavoidable, even with implementation of Mitigation Measures NOI-1a through NOI-1e.

Mitigation Measure NOI-1a: Construction Days/Hours. (See Impact NOI-1)

Mitigation Measure NOI-1b: Construction Noise Reduction. (See Impact NOI-1)

Mitigation Measure NOI-1c: Project-Specific Construction Noise Measures. (See Impact NOI-1)

Mitigation Measure NOI-1d: Construction Noise Complaints. (See Impact NOI-1)

Mitigation Measure NOI-1e: Structural Improvements or Off-site Accommodations for Substantially Affected Receptors. (See Impact NOI-1)

Significance after Mitigation: Significant and Unavoidable.

Impact NOI-2.CU: Operation of the proposed Project when considered with other cumulative development would cause a substantial permanent increase in ambient noise levels in the Project vicinity. (Significant and Unavoidable)

Geographic Context

Operational noise impacts of the proposed Project would primarily result from increased traffic on the local roadway network. There are no cumulative projects that would be expected to produce outdoor noise from sources that would not be subject to the noise ordinance and, as noted above, the nearest cumulative projects would be 500 feet or more from the proposed Project site which would be sufficient to attenuate noise from HVAC equipment or similar stationary sources. Consequently, the operational cumulative analysis focuses on the contributions to roadway traffic noise generated by the proposed Project as well as cumulative projects including the Downtown Oakland Specific Plan.

Cumulative Impact Analysis

Cumulative (year 2040) plus Project traffic data were used to estimate the cumulative operational noise increases. Because traffic impacts would primarily occur before and after events the cumulative impact analysis considers traffic impacts separately from operational impacts.

Cumulative traffic noise level significance is determined by a two-step process. First, a comparison is made of the increase in noise levels between cumulative conditions with the

Project and existing baseline conditions to an incremental 5 dBA threshold established by the City of Oakland. If the roadside noise levels would exceed this incremental threshold, a cumulative noise impact would be identified.

The second step of the cumulative roadside noise analysis (if a cumulative noise impact is predicted) is to evaluate if the contribution of the Project to roadside noise levels is cumulatively considerable. This second step (if necessary) involves assessing whether the Project contribution to roadside noise levels (i.e., the difference between cumulative conditions and cumulative plus Project conditions) would exceed the 3 dBA incremental contribution threshold established by the City of Oakland.

The roadway segments analyzed and the results of the noise increases resulting from modeling are shown in **Table 4.11-24** [for 2040 Cumulative plus weekday p.m.[13] full buildout of Project mixed uses (excludes ballgame)], **Table 4.11-25** (for the 2040 Cumulative plus weekday p.m. full buildout of Project mixed uses plus pre-ballgame traffic) and **Table 4.11-26** (for the 2040 Nighttime Cumulative scenario (10:00 to 11:00 p.m.): full buildout of Project mixed uses plus post-ballgame traffic).

As shown in Table 4.11-24, none of the 35 roadway segments analyzed under 2040 Cumulative plus weekday p.m. full buildout of Project mixed uses conditions would experience an increase in traffic noise levels over baseline conditions that would exceed 5 dBA and represent significant cumulative noise impacts.

As shown in Table 4.11-25, one of the 35 roadway segments analyzed under 2040 Cumulative plus weekday p.m. full buildout of Project mixed uses plus pre-ballgame traffic conditions would experience an increase in traffic noise levels over baseline conditions that would exceed 5 dBA and represent significant cumulative noise impacts. This impacted roadway segment is predicted to occur on Martin Luther King Jr. Way from 8th Street to 11th Street. However, the Project's contribution to this these roadway segments would be less than 3-dBA and, hence, would not constitute a cumulatively considerable contribution.

As shown in Table 4.11-26, two of the 35 roadway segments analyzed under 2040 Nighttime Cumulative scenario (10:00 to 11:00 p.m.): full buildout of Project mixed uses plus post-ballgame traffic conditions would experience an increase in traffic noise levels over baseline conditions that would exceed 5 dBA and represent significant cumulative noise impacts. These impacted roadway segments are predicted to occur on Martin Luther King Jr. Way MLK Way from 8th Street to 11th Street and Broadway from 8th Street to 11th Street. The Project's contribution to both of these roadway segments would be 3 dBA or greater and, hence, be cumulatively considerable.

[13] The peak hour was used to represent the maximum period of traffic generation and associated noise generated by the project.

TABLE 4.11-24
MODELED TRAFFIC NOISE LEVELS YEAR 2040 WITH WEEKDAY P.M. FULL BUILDOUT OF PROJECT MIXED USES (EXCLUDES BALLGAME)

Roadway Segment	Existing	2040 plus Full Buildout of Project Mixed Uses	dBA Difference 2040 plus Full Buildout of Project Mixed Uses from Existing	Significant Cumulative Increase ?	2040 No Project	dBA Difference 2040 plus Full Buildout of Project Mixed Uses from 2040 No Project	Cumulatively Considerable Project Increase?
Weekday PM Peak Hour Noise Levels (4:45 p.m. – 5:45 p.m.)							
Brush Street from 3rd Street to 5th Street	59.6	63.0	3.4	No	61.9	1.1	N/A
Brush Street from 7th Street to 11th Street	67.1	70.4	3.3	No	69.79	0.7	N/A
Brush Street from 12th Street to 14th Street	62.9	66.2	3.3	No	65.4	0.8	N/A
Castro Street from 3rd Street to 5th Street	58.9	61.9	3.0	No	61.4	0.5	N/A
Castro Street from 7th Street to 8th Street	65.6	68.4	2.8	No	68.2	0.2	N/A
Castro Street from 8th Street to 11th Street	67.5	70.2	**2.7**	No	70.1	0.1	N/A
Castro Street from 12th Street to 14th Street	61.2	63.9	2.7	No	63.8	0.1	N/A
MLK Way from 3rd Street to 5th Street[a]	77.2	77.4	0.2	No	77.3	0.1	N/A
MLK Way from 6th Street to 7th Street[a]	68.6	69.7	1.1	No	69.3	0.4	N/A
MLK Way from 8th Street to 11th Street[a]	63.1	66.2	3.1	No	65.5	0.7	N/A
Clay Street from 7th Street to 8th Street	57.0	59.8	2.8	No	59.8	0.0	N/A
Washington Street from Embarcadero to 3rd Street	57.4	60.1	2.7	No	60.1	0.0	N/A
Washington Street from 7th Street to 8th Street	58.2	60.7	2.5	No	60.7	0.0	N/A
Broadway from Embarcadero to 3rd Street	60.6	63.2	2.6	No	63.2	0.0	N/A
Broadway from 6th Street to 7th Street	65.9	68.5	2.6	No	68.5	0.0	N/A
Broadway from 8th Street to 11th Street	65.5	68.0	2.5	No	68.0	0.0	N/A
Franklin Street from 12th Street to 14th Street	60.3	62.9	2.6	No	62.9	0.0	N/A
Harrison Street from 6th Street to 7th Street	63.2	66.1	2.9	No	65.8	0.3	N/A
Harrison Street from 7th Street to 8th Street	65.0	67.8	2.8	No	67.6	0.2	N/A
Embarcadero from Market Street to MLK Way	55.4	52.6	-2.8	No	55.6	-3.0	N/A
Embarcadero from Washington Street to Broadway	60.5	59.6	-0.9	No	59.6	0.0	N/A
3rd Street from Brush Street to Castro Street	63.4	66.0	2.6	No	65.9	0.1	N/A
3rd Street from Washington Street to Broadway	62.1	64.9	2.8	No	64.7	0.2	N/A
3rd Street from Broadway to Franklin Street	61.6	64.3	2.7	No	64.2	0.1	N/A

TABLE 4.11-24 (CONTINUED)
MODELED TRAFFIC NOISE LEVELS YEAR 2040 WITH WEEKDAY P.M. FULL BUILDOUT OF PROJECT MIXED USES (EXCLUDES BALLGAME)

Roadway Segment	Existing	2040 plus Full Buildout of Project Mixed Uses	dBA Difference 2040 plus Full Buildout of Project Mixed Uses from Existing	Significant Cumulative Increase ?	2040 No Project	dBA Difference 2040 plus Full Buildout of Project Mixed Uses from 2040 No Project	Cumulatively Considerable Project Increase?
5rd Street from Brush Street to Castro Street	65.9	68.7	2.8	No	68.5	0.2	N/A
5rd Street from Castro Street to MLK Way	65.6	68.5	2.9	No	68.2	0.3	N/A
7rd Street from Castro Street to MLK Way	66.3	68.9	2.6	No	68.9	0.0	N/A
7rd Street from MLK Way to Jefferson Street	66.7	69.3	2.6	No	69.3	0.0	N/A
7rd Street from Clay Street to Washington Street	67.1	69.8	2.7	No	69.7	0.1	N/A
7rd Street from Broadway to Franklin Street	67.9	70.5	2.6	No	70.5	0.0	N/A
8th Street from Webster Street to Harrison Street	63.7	66.5	2.8	No	66.3	0.2	N/A
11th Street from Castro Street to MLK Way	63.1	65.7	2.6	No	65.7	0.09	N/A
12th Street from Castro Street to MLK Way	64.0	66.8	2.8	No	66.6	0.2	N/A
Market Street from Embarcadero to 3rd Street[a]	68.5	70.7	2.2	No	68.9	1.8	N/A
Market Street from 3rd Street to 7th Street[a]	84.8	84.9	0.1	No	84.8	0.1	N/A

NOTE:
a Due to the presence of other existing noise sources near this location (UPRR or I-880), the existing noise level at this location is based on measurement data and the existing plus Project value is the logarithmic sum of the existing measurement data and the predicted traffic contribution.

TABLE 4.11-25
MODELED TRAFFIC NOISE LEVELS YEAR 2040 WITH WEEKDAY P.M. FULL BUILDOUT OF PROJECT MIXED USES PLUS PRE-BALLGAME TRAFFIC

Roadway Segment	Existing	2040 plus Full Buildout of Project Mixed Uses plus Pre-Ballgame Traffic	dBA Difference 2040 plus Full Buildout of Project Mixed Uses plus Pre-Ballgame Traffic from Existing	Significant Cumulative Increase ?	2040 No Project	dBA Difference 2040 plus Full Buildout of Project Mixed Uses plus Pre-Ballgame Traffic from 2040 No Project	Cumulatively Considerable Project Increase?
Weekday PM Peak Hour Noise Levels							
Brush Street from 3rd Street to 5th Street	59.6	63.0	3.8	No	61.9	1.1	N/A
Brush Street from 7th Street to 11th Street	67.1	71.2	4.1	No	69.79	1.5	N/A
Brush Street from 12th Street to 14th Street	62.9	67.6	**4.7**	No	65.4	2.2	N/A
Castro Street from 3rd Street to 5th Street	58.9	61.9	3.0	No	61.4	0.5	N/A
Castro Street from 7th Street to 8th Street	65.6	68.8	3.2	No	68.2	0.6	N/A
Castro Street from 8th Street to 11th Street	67.5	70.5	3.0	No	70.1	0.4	N/A
Castro Street from 12th Street to 14th Street	61.2	64.6	2.4	No	63.8	0.8	N/A
MLK Way from 3rd Street to 5th Street[a]	77.2	77.6	0.4	No	77.3	0.3	N/A
MLK Way from 6th Street to 7th Street[a]	68.6	70.9	2.3	No	69.3	1.6	N/A
MLK Way from 8th Street to 11th Street[a]	63.1	68.3	**5.2**	**Yes**	65.5	2.8	No
Clay Street from 7th Street to 8th Street	57.0	61.0	4.0	No	59.8	1.2	N/A
Washington Street from Embarcadero to 3rd Street[a]	62.6	65.8	3.2	No	64.5	1.3	N/A
Washington Street from 7th Street to 8th Street	58.2	62.0	3.8	No	60.7	1.3	N/A
Broadway from Embarcadero to 3rd Street	60.6	63.3	2.7	No	63.2	0.1	N/A
Broadway from 6th Street to 7th Street	65.9	69.1	3.2	No	68.5	0.6	N/A
Broadway from 8th Street to 11th Street	65.5	69.0	3.5	No	68.0	1.0	N/A
Franklin Street from 12th Street to 14th Street	60.3	63.2	2.9	No	62.9	0.3	N/A
Harrison Street from 6th Street to 7th Street	63.2	67.0	3.8	No	65.8	2.2	N/A
Harrison Street from 7th Street to 8th Street	65.0	68.4	3.4	No	67.6	0.8	N/A
Embarcadero from Market Street to MLK Way	55.7	52.6	-3.1	No	55.6	-3.0	No
Embarcadero from Washington Street to Broadway	59.6	59.6	0.0	No	59.6	0.0	N/A
3rd Street from Brush Street to Castro Street	63.4	66.0	2.6	No	65.9	0.1	N/A
3rd Street from Washington Street to Broadway	62.1	65.4	3.3	No	64.7	0.7	N/A

TABLE 4.11-25 (CONTINUED)
MODELED TRAFFIC NOISE LEVELS YEAR 2040 WITH WEEKDAY P.M. FULL BUILDOUT OF PROJECT MIXED USES PLUS PRE-BALLGAME TRAFFIC

Roadway Segment	Existing	2040 plus Full Buildout of Project Mixed Uses plus Pre-Ballgame Traffic	dBA Difference 2040 plus Full Buildout of Project Mixed Uses plus Pre-Ballgame Traffic from Existing	Significant Cumulative Increase ?	2040 No Project	dBA Difference 2040 plus Full Buildout of Project Mixed Uses plus Pre-Ballgame Traffic from 2040 No Project	Cumulatively Considerable Project Increase?
3rd Street from Broadway to Franklin Street	61.6	65.3	3.7	No	64.2	1.1	N/A
5rd Street from Brush Street to Castro Street	65.9	69.7	3.8	No	68.5	1.2	N/A
5rd Street from Castro Street to MLK Way	65.6	69.2	3.6	No	68.2	1.0	N/A
7rd Street from Castro Street to MLK Way	66.3	69.6	3.3	No	68.9	0.7	N/A
7rd Street from MLK Way to Jefferson Street	66.7	70.0	3.3	No	69.3	0.7	N/A
7rd Street from Clay Street to Washington Street	67.1	70.2	3.1	No	69.7	0.5	N/A
7rd Street from Broadway to Franklin Street	67.9	70.6	2.8	No	70.5	0.1	N/A
8th Street from Webster Street to Harrison Street	63.7	67.8	4.1	No	66.3	1.5	N/A
11th Street from Castro Street to MLK Way	63.1	66.9	3.7	No	65.7	1.2	N/A
12th Street from Castro Street to MLK Way	64.0	66.8	2.8	No	66.6	0.2	N/A
Market Street from Embarcadero to 3rd Street[a]	68.5	72.2	3.7	No	68.9	3.3	N/A
Market Street from 3rd Street to 7th Street[a]	84.8	85.0	0.2	No	84.8	0.2	N/A

NOTE:
a Due to the presence of other existing noise sources near this location (UPRR or I-880), the existing noise level at this location is based on measurement data and the existing plus Project value is the logarithmic sum of the existing measurement data and the predicted traffic contribution.

TABLE 4.11-26
MODELED TRAFFIC NOISE LEVELS YEAR 2040 WITH NIGHTTIME SCENARIO (10:00 TO 11:00 P.M.): FULL BUILDOUT OF PROJECT MIXED USES PLUS POST-BALLGAME TRAFFIC

Roadway Segment	Existing	2040 plus Full Buildout of Mixed Uses plus Post-Ballgame Traffic	dBA Difference 2040 plus Full Buildout of Mixed Uses plus Post-Ballgame Traffic from Existing	Significant Cumulative Increase ?	2040 No Project	dBA Difference 2040 plus Full Buildout of Mixed Uses plus Post-Ballgame Traffic2040 No Project	Cumulatively Considerable Project Increase?
Weekday Nighttime Hour Noise Levels (10:00 p.m. – 11:00 p.m.)							
Brush Street from 3rd Street to 5th Street	54.8	58.2	3.4	No	57.1	1.1	N/A
Brush Street from 7th Street to 11th Street	62.3	65.6	3.3	No	64.9	0.7	N/A
Brush Street from 12th Street to 14th Street	58.1	61.3	3.2	No	60.6	0.7	N/A
Castro Street from 3rd Street to 5th Street	54.1	57.1	3.0	No	56.6	0.5	N/A
Castro Street from 7th Street to 8th Street[a]	67.7	70.6	2.9	No	69.0	1.6	N/A
Castro Street from 8th Street to 11th Street[a]	67.7	71.3	3.6	No	69.7	1.6	N/A
Castro Street from 12th Street to 14th Street[a]	67.7	69.3	1.6	No	68.2	1.1	N/A
MLK Way from 3rd Street to 5th Street[a]	72.7	73.5	0.7	No	72.8	0.7	N/A
MLK Way from 6th Street to 7th Street[a]	65.9	68.8	2.9	No	66.4	2.6	N/A
MLK Way from 8th Street to 11th Street[a]	58.8	66.4	**7.6**	**Yes**	61.0	**5.4**	**Yes**
Clay Street from 7th Street to 8th Street	52.2	57.0	4.8	No	55.0	2.0	N/A
Washington Street from Embarcadero to 3rd Street[a]	62.6	65.3	2.7	No	63.3	2.0	N/A
Washington Street from 7th Street to 8th Street	53.4	55.9	2.5	No	55.9	0.0	N/A
Broadway from Embarcadero to 3rd Street	55.7	60.4	4.7	No	58.4	2.0	N/A
Broadway from 6th Street to 7th Street	61.1	65.8	4.7	No	63.6	2.2	N/A
Broadway from 8th Street to 11th Street	60.7	66.5	**5.8**	**Yes**	63.2	**3.3**	**Yes**
Franklin Street from 12th Street to 14th Street	55.4	58.0	2.6	No	58.0	0.0	N/A
Harrison Street from 6th Street to 7th Street	58.4	61.3	2.9	No	61.0	0.3	N/A
Harrison Street from 7th Street to 8th Street	60.2	63.3	3.1	No	62.8	0.5	N/A
Embarcadero from Market Street to MLK Way	50.8	47.8	-3.0	No	50.8	-3.0	N/A
Embarcadero from Washington Street to Broadway	54.8	54.8	0.0	No	54.8	0.0	N/A
3rd Street from Brush Street to Castro Street	58.5	61.2	2.7	No	61.1	0.1	N/A
3rd Street from Washington Street to Broadway	57.3	61.0	3.7	No	59.9	1.1	N/A
3rd Street from Broadway to Franklin Street	56.8	62.1	**5.3**	**Yes**	59.4	2.7	No

TABLE 4.11-26 (CONTINUED)
MODELED TRAFFIC NOISE LEVELS YEAR 2040 WITH NIGHTTIME SCENARIO (10:00 TO 11:00 P.M.): FULL BUILDOUT OF PROJECT MIXED USES PLUS POST-BALLGAME TRAFFIC

Roadway Segment	Existing	2040 plus Full Buildout of Mixed Uses plus Post-Ballgame Traffic	dBA Difference 2040 plus Full Buildout of Mixed Uses plus Post-Ballgame Traffic from Existing	Significant Cumulative Increase ?	2040 No Project	dBA Difference 2040 plus Full Buildout of Mixed Uses plus Post-Ballgame Traffic2040 No Project	Cumulatively Considerable Project Increase?
5rd Street from Brush Street to Castro Street[a]	63.8	68.8	**5.0**	**Yes**	66.8	2.0	No
5rd Street from Castro Street to MLK Way	60.8	66.2	**5.4**	**Yes**	63.4	2.8	No
7rd Street from Castro Street to MLK Way	61.5	65.0	3.5	No	64.0	1.0	N/A
7rd Street from MLK Way to Jefferson Street	61.9	65.8	3.9	No	64.5	1.3	N/A
7rd Street from Clay Street to Washington Street	62.3	66.0	3.7	No	64.9	1.1	N/A
7rd Street from Broadway to Franklin Street	63.1	66.6	3.5	No	65.7	0.9	N/A
8th Street from Webster Street to Harrison Street	58.9	62.6	3.7	No	61.5	0.5	N/A
11th Street from Castro Street to MLK Way	58.3	61.0	2.7	No	60.9	0.1	N/A
12th Street from Castro Street to MLK Way	59.2	64.6	**5.4**	**Yes**	61.8	2.8	No
Market Street from Embarcadero to 3rd Street[a]	66.8	71.0	4.2	No	67.0	4.0	N/A
Market Street from 3rd Street to 7th Street[a]	78.5	79.0	0.5	No	78.5	0.5	N/A

NOTE
a Due to the presence of other existing noise sources near this location (UPRR or I-880), the existing noise level at this location is based on measurement data and the existing plus Project value is the logarithmic sum of the existing measurement data and the predicted traffic contribution.

Consequently, the proposed Project would contribute considerably to predicated cumulative roadside noise impacts at residential receptors adjacent to Martin Luther King Jr. Way and Broadway. While these impacts would occur only for a few hours per event, given that there would be up to 41 weekday evening regular season baseball games as well as up to 9 concert events per year, this impact is considered a *significant* cumulative operational noise impact.

Although noise mitigation (i.e., installation of noise barriers), could potentially reduce these event-driven noise impacts, physical barriers would likely have secondary effects on aesthetics and would not effectively shield elevated receptors. Additionally, a barrier would need to be continuous to provide meaningful reduction (FTA, 2018), which is not physically feasible because landowners along these roadways need driveway access. Another mitigation considered would be re-routing traffic away from these affected roadways. Re-routing Project traffic would result in the transfer of noise impacts from one roadway to another and would likely result in secondary traffic impacts. Further, the volumes along impacted roadways would need to be reduced by half of the projected volumes for noise levels to be reduced to a less than significant level, which would not reduce impacts. Alternative methods of ingress and egress (i.e., gondola) are explored in Project variant analysis. Consequently, cumulative operational traffic noise impacts during events with implementation of the Transportation and Parking Demand Management Plan required under Mitigation Measure TRANS-1a and Transportation Management Plan required by Mitigation Measure TRANS-1b would be *significant and unavoidable*, with no feasible mitigation that would reduce roadside noise levels even with implementation of transportation mitigation measures identified in Section 4.15, *Transportation and Circulation.*

> **Mitigation Measure TRANS-1a: Transportation and Parking Demand Management (TDM) Plan.** (See Section 4.15, *Transportation and Circulation*)
>
> **Mitigation Measure TRANS-1b: Transportation Management Plan.** (See Section 4.15, *Transportation and Circulation*)
>
> **Significance after Mitigation:** Significant and Unavoidable.

Maritime Reservation Scenario – Cumulative

As discussed above, construction and operational noise and vibration associated with the Maritime Reservation Scenario would be very similar to the Project, though slightly different because of the reduced footprint of the Buildout development area. As such, noise and vibration impacts for the Maritime Reservation Scenario would be the same as those discussed above for the Project and the same mitigation measures would be required. As with the Project, the Maritime Reservation Scenario's construction noise impacts would be cumulatively considerable, and this cumulative impact would be significant and unavoidable with mitigation.

Since all of the square footage of the Project is being preserved in the Maritime Reservation Scenario, the land uses, activities, attendance and population data are the same as the Project. Additionally, mobile trips associated with hauling, vendor deliveries, and workers would also remain the same. Therefore, operational noise sources are expected to be very similar to the

Project operational noise sources, since the overall population and activities would be identical. Consequently, the only changes to operational emissions are assumed to be changes to the number and size of the on-site mechanical equipment such HVAC and emergency generators, since there would be fewer non-ballpark buildings than the Project, with more square footage in each; therefore, fewer HVAC and generators are required but may need to have higher capacities. Regardless, Mitigation Measure NOI-2c (Operational Noise) would still apply to stationary sources and the impact of operational noise inclusive of baseball events, concert events and Project traffic would be cumulatively considerable and would therefore contribute considerably to a cumulative operational noise impact that is significant and unavoidable.

4.11.6 References – Noise and Vibration

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