



4.12 NOISE

<i>Would the project:</i>	Potentially Significant Impact	Less Than Significant Impact With Mitigation Incorporated	Less Than Significant Impact	No Impact
a. Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?		✓		
b. Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?			✓	
c. A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?			✓	
d. A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?		✓		
e. For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?				✓
f. For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?				✓

Sound is mechanical energy transmitted by pressure waves in a compressible medium such as air, and is characterized by both its amplitude and frequency (or pitch). The human ear does not hear all frequencies equally. In particular, the ear deemphasizes low and very high frequencies. To better approximate the sensitivity of human hearing, the A-weighted decibel scale (dBA) has been developed. On this scale, the human range of hearing extends from approximately 3 dBA to around 140 dBA.

Noise is generally defined as unwanted or excessive sound, which can vary in intensity by over one million times within the range of human hearing; therefore, a logarithmic scale, known as the decibel scale (dB), is used to quantify sound intensity. Noise can be generated by a number of sources, including mobile sources such as automobiles, trucks, and airplanes, and stationary sources such as construction sites, machinery, and industrial operations. Noise generated by mobile sources typically attenuates (is reduced) at a rate between 3 dBA and 4.5 dBA per doubling of distance. The rate depends on the ground surface and the number or type of objects between the noise source and the receiver. Hard and flat surfaces, such as concrete or asphalt, have an attenuation rate of 3 dBA per doubling of distance. Soft surfaces, such as uneven or vegetated terrain, have an attenuation rate of about 4.5 dBA per doubling of distance. Noise generated by stationary sources typically attenuates at a rate between 6 dBA and about 7.5 dBA per doubling of distance.

There are a number of metrics used to characterize community noise exposure, which fluctuate constantly over time. One such metric, the equivalent sound level (L_{eq}), represents a constant sound that, over the specified period, has the same sound energy as the time-varying sound. Noise exposure over a longer period of time is often evaluated based on the Day-Night Sound Level (L_{dn}). This is a measure of 24-hour noise levels that incorporates a 10-dBA penalty for sounds occurring between 10:00 PM and 7:00 AM. The penalty is intended to reflect the increased human sensitivity to noises occurring during nighttime hours, particularly at times when people are sleeping and there are lower ambient noise conditions. Typical L_{dn} noise levels for light and medium density residential areas range from 55 dBA to 65 dBA.



Two of the primary factors that reduce levels of environmental sounds are increasing the distance between the sound source to the receiver and having intervening obstacles such as walls, buildings, or terrain features between the sound source and the receiver. Factors that act to increase the loudness of environmental sounds include moving the sound source closer to the receiver, sound enhancements caused by reflections, and focusing caused by various meteorological conditions.

REGULATORY SETTING

State of California

The State Office of Planning and Research *Noise Element Guidelines* include recommended exterior and interior noise level standards for local jurisdictions to identify and prevent the creation of incompatible land uses due to noise. The *Noise Element Guidelines* contain a land use compatibility table that describes the compatibility of various land uses with a range of environmental noise levels in terms of the Community Noise Equivalent Level (CNEL). A noise environment of 50 CNEL to 60 CNEL is considered to be of “normally acceptable” for residential uses. The Office of Planning and Research recommendations also note that, under certain conditions, more restrictive standards than the maximum levels cited may be appropriate.

City of Long Beach

Municipal Code

Chapter 8.80, *Noise*, of the *LBMC* sets forth all noise regulations controlling unnecessary, excessive, and annoying noise and vibration in the City. As outlined in Section 8.80.150 of the *LBMC*, maximum exterior noise levels are based on land use districts. According to the *Noise District Map* of the *LBMC*, the project site and surrounding uses are located within Receiving Land Use District One and Receiving Land Use District Four. District One is defined as “predominantly residential uses with other land use types also present” and District Four is defined as “predominantly industrial uses with other land use types also present.” Table 4.12-1, *Long Beach Noise Limits*, summarizes the exterior and interior noise limits for both District One and District Four.

**Table 4.12-1
Long Beach Noise Limits**

Land Use District	Exterior		Interior	
	Exterior Noise Level (Leq) 7 AM to 10 PM	Exterior Noise Level (Leq) 10 PM to 7 AM	Interior Noise Level (Leq) 7 AM to 10 PM	Interior Noise Level (Leq) 10 PM to 7 AM
District One	50	45	45	35
District Four	70	70	--	--
Notes: 1. District Four limits are intended primarily for use at their boundaries rather than for noise control within the district. 2. No person shall operate or cause to be operated any source of sound at any location within the incorporated limits of the City or allow the creation of any noise on property owned, leased, occupied, or otherwise controlled by such person, which causes the noise level when measures from any other property to exceed: <ul style="list-style-type: none"> – The noise standard for that land use district as specified in <u>Table 4.12-1</u> for a cumulative period of more than five (5) minutes in any hour; or – The noise standard plus five decibels (5 dB) for a cumulative period of more than one (1) minute in any hour; or – The noise standard plus ten decibels (10 dB) or the maximum measured ambient, for any period of time. 				
Source: City of Long Beach Municipal Code (LBMC), Section 8.80.160 and Section 8.80.170, 1977.				



Section 8.80.202, *Construction Activity – Noise Regulations*, of the LBMC specifies the following construction-related noise standards:

The following regulations shall apply only to construction activities where a building or other related permit is required or was issued by the Building Official and shall not apply to any construction activities within the Long Beach harbor district as established pursuant to Section 201 of the City Charter.

- A. *Weekdays and federal holidays. No person shall operate or permit the operation of any tools or equipment used for construction, alteration, repair, remodeling, drilling, demolition or any other related building activity which produce loud or unusual noise which annoys or disturbs a reasonable person of normal sensitivity between the hours of 7:00 PM and 7:00 AM the following day on weekdays, except for emergency work authorized by the Building Official. For purposes of this Section, a federal holiday shall be considered a weekday.*
- B. *Saturdays. No person shall operate or permit the operation of any tools or equipment used for construction, alteration, repair, remodeling, drilling, demolition or any other related building activity which produce loud or unusual noise which annoys or disturbs a reasonable person of normal sensitivity between the hours of 7:00 PM on Friday and 9:00 AM on Saturday and after 6:00 PM on Saturday, except for emergency work authorized by the Building Official.*
- C. *Sundays. No person shall operate or permit the operation of any tools or equipment used for construction, alteration, repair, remodeling, drilling, demolition or any other related building activity at any time on Sunday, except for emergency work authorized by the Building Official or except for work authorized by permit issued by the Noise Control Officer.*
- D. *Owner's/employee's responsibility. It is unlawful for the landowner, construction company owner, contractor, subcontractor or employer of persons working, laboring, building, or assisting in construction to permit construction activities in violation of provisions in this Section.*
- E. *Sunday work permits. Any person who wants to do construction work on a Sunday must apply for a work permit from the Noise Control Officer. The Noise Control Officer may issue a Sunday work permit if there is good cause shown; and in issuing such a permit, consideration will be given to the nature of the work and its proximity to residential areas. The permit may allow work on Sundays, only between 9:00 AM and 6:00 PM, and it shall designate the specific dates when it is allowed.*

EXISTING STATIONARY SOURCES

The project area is urbanized and generally built-out. Surrounding uses in proximity to the project site consist of residential, industrial, recreational, commercial, transportation, open space, water land, and institutional uses. The primary sources of stationary noise in the project vicinity are urban-related activities (i.e., mechanical equipment associated with existing industrial uses). The noise associated with these sources may represent a single-event noise occurrence, short-term or long-term/continuous noise.

EXISTING MOBILE SOURCES

The majority of the existing noise from mobile sources in the project area is generated from vehicle sources along the adjacent roadways.

- a) ***Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?***



Less Than Significant Impact With Mitigation Incorporated. It is difficult to specify noise levels that are generally acceptable to everyone; noise that is considered a nuisance to one person may be unnoticed by another. Standards may be based on documented complaints in response to documented noise levels, or based on studies of the ability of people to sleep, talk, or work under various noise conditions. However, all such studies recognize that individual responses vary considerably. Standards usually address the needs of the majority of the general population.

As stated above, the LBMC includes some regulations controlling unnecessary, excessive, and annoying noise within the City. As outlined in the LBMC, maximum noise levels are based on land use districts.

Short-Term Noise Impacts

Construction activities generally are temporary and have a short duration, resulting in periodic increases in the ambient noise environment. Construction activities involving the installation of the treatment and conveyance facilities would be completed over the course of approximately four years (from 2018 through 2021). Construction of the conveyance facilities would occur incrementally and would not occur in one location for the entire construction period. Construction activities would include demolition, excavation/trenching, building construction, equipping, and paving. Ground-borne noise and other types of construction-related noise impacts typically occur during the initial demolition and earthwork phases. These phases of construction have the potential to create the highest levels of noise. Typical noise levels generated by construction equipment are shown in Table 4.12-2, Maximum Noise Levels Generated by Construction Equipment. It should be noted that the noise levels identified in Table 4.12-2 are maximum sound levels (L_{max}), which are the highest individual sound occurring at an individual time period. Operating cycles for these types of construction equipment may involve one or two minutes of full power operation followed by three to four minutes at lower power settings. Other primary sources of acoustical disturbance would be due to random incidents, which would last less than one minute (such as dropping large pieces of equipment or the hydraulic movement of machinery lifts).

**Table 4.12-2
Maximum Noise Levels Generated by Construction Equipment**

Type of Equipment	Acoustical Use Factor ¹	L_{max} at 50 Feet (dBA)
Concrete Saw	20	90
Crane	16	81
Augur Drill Rig	20	85
Concrete Mixer Truck	40	79
Backhoe	40	78
Dozer	40	82
Excavator	40	81
Forklift	40	78
Paver	50	77
Roller	20	80
Tractor	40	84
Water Truck	40	80
Grader	40	85
General Industrial Equipment	50	85
Note: 1. Acoustical Use Factor (percent): Estimates the fraction of time each piece of construction equipment is operating at full power (i.e., its loudest condition) during a construction operation.		
Source: Federal Highway Administration, <i>Roadway Construction Noise Model (FHWA-HEP-05-054)</i> , January 2006.		



Sensitive uses surrounding the project site include residential and institutional uses. Residential uses adjoin Segments 1-7, 9, and 10 and are located approximately 280 feet east of the proposed MUST facility. Jordan High School, located at 6500 Atlantic Avenue, adjoins Segments 2. Los Cerritos Elementary School, located at 515 West San Antonio Drive, adjoins Segment 5. Lafayette Elementary School, located at 2445 Chestnut Avenue, is approximately 330 feet east of Segment 6. Edison Elementary School, located at 625 Maine Avenue, is located approximately 245 feet east of the proposed MUST facility. These sensitive uses may be exposed to elevated noise levels during project construction.

Construction noise would be acoustically dispersed throughout the project site and not concentrated in one area near adjacent sensitive uses. Pursuant to the *LBMC*, all construction activities may only occur between the hours of 7:00 AM and 7:00 PM, Monday through Friday, and between the hours of 9:00 AM and 6:00 PM on Saturday. Construction activities are prohibited on Sundays and Federal holidays. Additionally, implementation of Mitigation Measure NOI-1 would further minimize impacts from construction noise as it requires the use of best management practices. Mitigation Measure NOI-1 requires construction equipment to be equipped with properly operating and maintained mufflers and other state required noise attenuation devices. Thus, a less than significant noise impact would result from construction activities.

Long-Term Off-Site Mobile Noise Impacts

The only long-term mobile noise associated with the proposed project would be generated through operation of the MUST facility. The proposed project would not substantially increase off-site mobile noise, since it only requires two shifts of three operators Monday through Friday, two shifts of two operators Saturday and Sunday, and the facility would be open to the public on a limited basis for educational tours. Therefore, project-related traffic would not substantially increase with implementation of the project. Although the project may result in a nominal number of trips associated with new employees and limited educational opportunities, the impact of these trips would be negligible. Thus, impacts in this regard would be less than significant.

Long-Term Stationary Noise Impacts

Upon project completion, noise in the project area would not significantly increase. The project involves construction of the MUST facility and associated conveyance facilities within an urbanized, built-out area. The proposed project would include 14 sump pumps associated with the conveyance facilities (i.e, diversion structures), in addition to treatment facility equipment/pumps, and heating, ventilation, and air conditioning (HVAC) equipment associated with the MUST facility, which would generate stationary source noise.

The sump pumps associated with the diversion structures would be constructed below ground surface within a vault. Since these pumps would be below grade, enclosed, electrically-powered, and of limited capacity (10 horsepower each), it is not anticipated that these pumps would have the capacity to exceed City noise standards and adversely affect adjacent uses.

The MUST facility would include treatment facility machinery, pumps and HVAC equipment. These facilities would be located at least 280 feet away from the closest sensitive receptor, which include residential uses. Typical water conveyance pumps generate approximately 90 dB at one meter (3.28 feet). Based on distance attenuation alone, pump levels would be approximately 72 dB at 25 feet and approximately 51 dBA at 280 feet, which is below the City's 70 dBA noise limit for District Four. Additionally, all pump and treatment equipment would be housed within enclosed structures or housed underground, which would further reduce noise levels by 24 to 39 dBA depending on the structure/enclosure type. Thus, under the worst-case scenario, pump and treatment equipment at the MUST Facility is anticipated to be less than 28 dBA at the nearest sensitive receptor, which is below the City's 50 dBA noise limit for District One.



Mechanical equipment noise, including HVAC, is typically 55 dBA at 50 feet from the source. As noted above, the nearest residential uses are located approximately 280 feet east of the proposed MUST facility. At this distance and height, potential noise from the HVAC unit would be approximately 40 dBA, which is below the City's 50 dBA noise limit for District One and 70 dBA noise limit for District Four. Therefore, noise generated by project operation is not anticipated to adversely affect adjacent land uses. Impacts during long-term operations would be less than significant.

Mitigation Measures:

NOI-1 Prior to Grading Permit issuance, the City of Long Beach City Engineer shall ensure that the project complies with the following:

- Construction contracts specify that all construction equipment, fixed or mobile, shall be equipped with properly operating and maintained mufflers and other state required noise attenuation devices.
- Property owners and occupants located within 100 feet of the project boundary shall be sent a notice, at least 15 days prior to commencement of construction of each phase, regarding the construction schedule of the proposed project. A sign, legible at a distance of 50 feet shall also be posted at the project construction site. All notices and signs shall be reviewed and approved by the City of Long Beach Development Services Department, prior to mailing or posting and shall indicate the dates and duration of construction activities, as well as provide a contact name and a telephone number where residents can inquire about the construction process and register complaints.
- Prior to issuance of any Grading or Building Permit, the contractor shall provide evidence that a construction staff member will be designated as a Noise Disturbance Coordinator and will be present on-site during construction activities. The Noise Disturbance Coordinator shall be responsible for responding to any local complaints about construction noise. When a complaint is received, the Noise Disturbance Coordinator shall notify the City within 24-hours of the complaint and determine the cause of the noise complaint (e.g., starting too early, bad muffler, etc.) and shall implement reasonable measures to resolve the complaint, as deemed acceptable by the City of Long Beach City Engineer. All notices that are sent to residential units immediately surrounding the construction site and all signs posted at the construction site shall include the contact name and the telephone number for the Noise Disturbance Coordinator.
- Prior to issuance of any Grading or Building Permit, the project applicant shall demonstrate to the satisfaction of the City of Long Beach City Engineer that construction noise reduction methods shall be used where feasible. These reduction methods include shutting off idling equipment, installing temporary acoustic barriers around stationary construction noise sources, maximizing the distance between construction equipment staging areas and occupied residential areas, and electric air compressors and similar power tools.
- During construction, stationary construction equipment shall be placed such that emitted noise is directed away from sensitive noise receivers.

b) *Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?*

Less Than Significant Impact. Project construction can generate varying degrees of ground-borne vibration, depending on the construction procedure and the construction equipment used. Operation of construction equipment



generates vibrations that spread through the ground and diminish in amplitude with distance from the source. The effect on buildings located in the vicinity of the construction site often varies depending on soil type, ground strata, and construction characteristics of the receiver building(s). The results from vibration can range from no perceptible effects at the lowest vibration levels, to low rumbling sounds and perceptible vibration at moderate levels, to slight damage at the highest levels. Ground-borne vibrations from construction activities rarely reach levels that damage structures.

The Federal Transit Administration (FTA) has published standard vibration velocities for construction equipment operations. In general, the FTA architectural damage criterion for continuous vibrations (i.e., 0.20 inch/second) appears to be conservative. The types of construction vibration impact include human annoyance and building damage. Human annoyance occurs when construction vibration rises significantly above the threshold of human perception for extended periods of time. Building damage can be cosmetic or structural. Ordinary buildings that are not particularly fragile would not experience any cosmetic damage (e.g., plaster cracks) at distances beyond 30 feet. This distance can vary substantially depending on the soil composition and underground geological layer between vibration source and receiver. In addition, not all buildings respond similarly to vibration generated by construction equipment. Typical vibration produced by construction equipment is illustrated in [Table 4.12-3, *Typical Vibration Levels for Construction Equipment*](#).

**Table 4.12-3
Typical Vibration Levels for Construction Equipment**

Equipment	Approximate peak particle velocity at 15 feet (inches/second)	Approximate peak particle velocity at 25 feet (inches/second)	Approximate peak particle velocity at 280 feet (inches/second)
Large bulldozer	0.192	0.089	0.002
Loaded trucks	0.164	0.076	0.002
Small bulldozer	0.007	0.003	0.000
Jackhammer	0.075	0.035	0.001
Pile Driver - Impact (associated with construction of the MUST facility only)	3.266	1.518	0.041
Pile Driver – Sonic (associated with construction of the MUST facility only)	1.579	0.734	0.020

Notes:

1. Federal Transit Administration, *Transit Noise and Vibration Impact Assessment Guidelines*, May 2006. Table 12-2.
2. Calculated using the following formula:

$$PPV_{equip} = PPV_{ref} \times (25/D)^{1.5}$$
 where: PPV (equip) = the peak particle velocity in in/sec of the equipment adjusted for the distance
 PPV (ref) = the reference vibration level in in/sec from Table 12-2 of the FTA *Transit Noise and Vibration Impact Assessment Guidelines*
 D = the distance from the equipment to the receiver

The nearest structures to the project site are the residential uses adjoining Segments 1-7, 9, and 10. Pile driving would only be required during construction of the MUST facility, which is approximately 280 feet west of the nearest residential uses. Groundborne vibration decreases rapidly with distance. As indicated in [Table 4.12-3](#), based on the FTA data, vibration velocities from typical heavy construction equipment operation that would be used during project construction range from 0.003 to 0.089 inch-per-second peak particle velocity (PPV) at 25 feet from the source of activity (this range does not include pile driving as this is only associated with construction of the MUST facility). With regard to the proposed project, groundborne vibration would be generated primarily during grading activities on-site and by off-site haul-truck travel. Although the adjacent residential uses are located approximately 15 feet of the



project site, the proposed construction activities would not be capable of exceeding the 0.2 inch-per-second PPV significance threshold for vibration, as construction activities would be limited and would not be concentrated within 15 feet of the adjoining structures for an extended period of time. As stated, pile driving would only be associated with construction of the MUST facility. At a distance of 280 feet, pile driving would not be capable of exceeding the 0.2 inch-per-second PPV significance threshold for vibration. Therefore, vibration impacts would be less than significant.

Mitigation Measures: No mitigation is required.

- c) ***A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?***

Less Than Significant Impact. Refer to Response 4.12(a) above.

Mitigation Measures: No mitigation is required.

- d) ***Result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above the levels existing without the project?***

Less Than Significant Impact With Mitigation Incorporated. Refer to Response 4.12(a) above.

Mitigation Measures: Refer to Mitigation Measure NOI-1.

- e) ***For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?***

No Impact. The MUST facility site is not located within an airport land use plan or within two miles of a public airport or public use airport. The nearest airport to the project site is the Long Beach Airport, located approximately 3.3 miles to the northeast of the proposed MUST facility at 4100 Donald Douglas Drive. In addition, the project site is located outside of the Long Beach Airport Influence Area.¹ Therefore, no impacts would occur in this regard.

Mitigation Measures: No mitigation is required.

- f) ***For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?***

No Impact. There are no private airstrips located within the project area or in the vicinity. Thus, no impacts would occur in this regard.

Mitigation Measures: No mitigation is required.

¹ Los Angeles County Airport Land Use Commission, *Long Beach Airport, Airport Influence Area Map*, May 13, 2003.