# 5.6 NOISE

This section of the Draft Environmental Impact Report (DEIR) evaluates the potential for implementation of the Wedgeworth K-8 School and Residential Development Project to result in noise impacts in the project area. This section discusses the fundamentals of sound; examines federal, state, and local noise guidelines, policies, and standards; reviews noise levels at existing receptor locations; evaluates potential noise and vibration impacts associated with the proposed project; and provides mitigation to reduce noise impacts at sensitive receptor locations. The analysis in this section is based in part on the noise modeling data in Appendix I of this DEIR.

## 5.6.1 Environmental Setting

### 5.6.1.1 NOISE AND VIBRATION FUNDAMENTALS

Noise is defined as unwanted sound and is known to have several adverse effects on people, including hearing loss, speech and sleep interference, physiological responses, and annoyance. Although sound can be easily measured, the perception of noise and the physical response to sound complicate the analysis of its impact on people. People judge the relative magnitude of sound sensation in subjective terms such as "noisiness" or "loudness." Based on these known adverse effects of noise, the federal government, the State of California, and many local governments have established criteria to protect public health and safety and to prevent disruption of certain human activities.

The following are brief definitions of terminology used in this chapter:

- **Sound.** A disturbance created by a vibrating object, which, when transmitted by pressure waves through a medium such as air, is capable of being detected by a receiving mechanism, such as the human ear or a microphone.
- **Noise.** Sound that is loud, unpleasant, unexpected, or otherwise undesirable.
- **Decibel (dB).** A unitless measure of sound on a logarithmic scale.
- **A-Weighted Decibel (dBA).** An overall frequency-weighted sound level in decibels that approximates the frequency response of the human ear.
- **Equivalent Continuous Noise Level ($L_{eq}$); also called the Energy-Equivalent Noise Level.** The value of an equivalent, steady sound level which, in a stated time period (often over an hour) and at a stated location, has the same A-weighted sound energy as the time-varying sound. Thus, the $L_{eq}$ metric is a single numerical value that represents the equivalent amount of variable sound energy received by a receptor over the specified duration.
- **Statistical Sound Level ($L_n$).** The sound level that is exceeded "n" percent of time during a given sample period. For example, the $L_{50}$ level is the statistical indicator of the time-varying noise signal that is exceeded 50 percent of the time (during each sampling period); that is, half of the sampling time, the changing noise levels are above this value and half of the time they are below it. This is called the "median sound level."

The $L_{10}$ level, likewise, is the value that is exceeded 10 percent of the time (i.e., near the maximum) and this is often known as the "intrusive sound level." The $L_{90}$ is the sound level exceeded 90 percent of the time and is often considered the "effective background level" or "residual noise level."

- **Day-Night Sound Level ($L_{dn}$ or DNL).** The energy-average of the A-weighted sound levels occurring during a 24-hour period, with 10 dB added to the sound levels occurring during the period from 10:00 PM to 7:00 AM.

- **Community Noise Equivalent Level (CNEL).** The energy average of the A-weighted sound levels occurring during a 24-hour period, with 5 dB added from 7:00 pm to 10:00 pm and 10 dB from 10:00 pm to 7:00 am. For general community/environmental noise, CNEL and $L_{dn}$ values rarely differ by more than 1 dB (with the CNEL being only slightly more restrictive, that is, higher than the $L_{dn}$ value). As a matter of practice, $L_{dn}$ and CNEL values are interchangeable and are treated as equivalent in this assessment.

- **Sensitive Receptor.** Noise- and vibration-sensitive receptors include land uses where quiet environments are necessary for enjoyment and public health and safety. Residences, schools, motels and hotels, libraries, religious institutions, hospitals, and nursing homes are examples.

- **Peak Particle Velocity (PPV)**. The peak rate of speed at which soil particles move (e.g., inches per second) due to ground vibration.

- **Vibration Decibel (VdB).** A unitless measure of vibration, expressed on a logarithmic scale and with respect to a defined reference vibration velocity. In the U.S., the standard reference velocity is 1 micro-inch per second ($1x10^{-6}$ in/sec).

## Sound Fundamentals

Sound is a pressure wave transmitted through the air. It is described in terms of loudness or amplitude (measured in decibels), frequency or pitch (measured in Hertz [Hz] or cycles per second), and duration (measured in seconds or minutes). The standard unit of measurement of the loudness of sound is the decibel (dB). Changes of 1 to 3 dBA are detectable under quiet, controlled conditions and changes of less than 1 dBA are usually indiscernible. A 3 dB change in noise levels is considered the minimum change that is detectable with human hearing in outside environments. A change of 5 dBA is readily discernable to most people in an exterior environment whereas a 10 dBA change is perceived as a doubling (or halving) of the sound.

The human ear is not equally sensitive to all frequencies. Sound waves below 16 Hz are not heard at all and are "felt" more as a vibration. Similarly, while people with extremely sensitive hearing can hear sounds as high as 20,000 Hz, most people cannot hear above 15,000 Hz. In all cases, hearing acuity falls off rapidly above about 10,000 Hz and below about 200 Hz. Since the human ear is not equally sensitive to sound at all frequencies, a special frequency dependent rating scale is usually used to relate noise to human sensitivity. The A-weighted decibel scale (dBA) performs this compensation by discriminating against frequencies in a manner approximating the sensitivity of the human ear.

Noise is defined as unwanted sound, and is known to have several adverse effects on people, including hearing loss, speech and sleep interference, physiological responses, and annoyance. Based on these known adverse effects of noise, the federal government, the State of California, and many local governments have established criteria to protect public health and safety and to prevent disruption of certain human activities.

## Sound Measurement

Sound intensity is measured through the A-weighted measure to correct for the relative frequency response of the human ear. That is, an A-weighted noise level de-emphasizes low and very high frequencies of sound similar to the human ear's de-emphasis of these frequencies.

Unlike linear units such as inches or pounds, decibels are measured on a logarithmic scale, representing points on a sharply rising curve. On a logarithmic scale, an increase of 10 dBA is 10 times more intense than 1 dBA, while 20 dBA is 100 times more intense, and 30 dBA is 1,000 times more intense. A sound as soft as human breathing is about 10 times greater than 0 dBA. The decibel system of measuring sound gives a rough connection between the physical intensity of sound and its perceived loudness to the human ear. Ambient sounds generally range from 30 dBA (very quiet) to 100 dBA (very loud).

Sound levels are generated from a source and their decibel level decreases as the distance from that source increases. Sound dissipates exponentially with distance from the noise source. This phenomenon is known as "spreading loss." For a single point source, sound levels decrease by approximately 6 dBA for each doubling of distance from the source. This drop-off rate is appropriate for noise generated by on-site operations from stationary equipment or activity at a project site. If noise is produced by a line source, such as highway traffic, the sound decreases by 3 dBA for each doubling of distance in a hard site environment. Line source noise in a relatively flat environment with absorptive vegetation decreases by 4.5 dBA for each doubling of distance.

Time variation in noise exposure is typically expressed in terms of a steady-state energy level equal to the energy content of the time varying period (called $L_{eq}$), or alternately, as a statistical description of the sound level that is exceeded over some fraction of a given observation period. For example, the $L_{50}$ noise level represents the noise level that is exceeded 50 percent of the time. Half the time the noise level exceeds this level and half the time the noise level is less than this level. This level is also representative of the level that is exceeded 30 minutes in an hour. Similarly, the $L_2$, $L_8$ and $L_{25}$ values represent the noise levels that are exceeded 2, 8, and 25 percent of the time or 1, 5, and 15 minutes per hour. These "L" values are typically used to demonstrate compliance for stationary noise sources with a city's noise ordinance, as discussed below. Other values typically noted during a noise survey are the $L_{min}$ and $L_{max}$. These values represent the minimum and maximum root-mean-square noise levels obtained over the measurement period.

Because community receptors are more sensitive to unwanted noise intrusion during the evening and at night, an artificial dB increment be added to quiet time noise levels in a 24-hour noise descriptor called the Community Noise Equivalent Level (CNEL) or Day-Night Noise Level ($L_{dn}$). The CNEL descriptor requires that an artificial increment of 5 dBA be added to the actual noise level for the hours from 7:00 P.M. to 10:00 P.M. and 10 dBA for the hours from 10:00 P.M. to 7:00 A.M. The $L_{dn}$ descriptor uses the same methodology except that there is no artificial increment added to the hours between 7:00 P.M. and 10:00 P.M. Both descriptors give roughly the same 24-hour level with the CNEL being only slightly more restrictive (i.e., higher).

## Psychological and Physiological Effects of Noise

Physical damage to human hearing begins at prolonged exposure to noise levels higher than 85 dBA. Exposure to high noise levels affects our entire system, with prolonged noise exposure in excess of 75 dBA increasing body tensions, and thereby affecting blood pressure, functions of the heart and the nervous system. In comparison, extended periods of noise exposure above 90 dBA could result in permanent hearing damage. When the noise level reaches 120 dBA, a tickling sensation occurs in the human ear even with short-term exposure. This level of noise is called the threshold of feeling. As the sound reaches 140 dBA, the tickling sensation is replaced by the feeling of pain in the ear. This is called the threshold of pain. A sound level of 190 dBA will rupture the eardrum and permanently damage the inner ear.

## Vibration Fundamentals

Vibration is an oscillatory motion through a solid medium, such as the ground or a building. Vibration is normally associated with activities stemming from operations of railroads or vibration-intensive stationary sources, but can also be associated with construction equipment such as jackhammers, pile drivers, and hydraulic hammers.

### *Amplitude*

Vibration amplitudes are usually described in terms of either the peak particle velocity (PPV) or the root mean square (RMS) velocity. PPV is the maximum instantaneous peak of the vibration signal, and RMS is the square root of the average of the squared amplitude of the signal. PPV is more appropriate for evaluating potential building damage and RMS (typically expressed in VdB) for potential annoyance. The units for PPV are normally inches per second (in/sec). Typically, groundborne vibration generated by human activities attenuates rapidly with distance from the source of the vibration.

The way in which vibration is transmitted through the earth is called propagation. As vibration waves propagate from a source, the energy is spread over an ever-increasing area such that the energy level striking a given point is reduced with the distance from the energy source. This geometric spreading loss is inversely proportional to the square of the distance. The amount of attenuation provided by material damping varies with soil type and condition as well as the frequency of the wave.

As with airborne sound, annoyance with vibrational energy is a subjective measure, depending on the level of activity and the sensitivity of the individual. To sensitive individuals, vibrations approaching the threshold of perception can be annoying. Persons accustomed to elevated ambient vibration levels, such as in an urban environment, may tolerate higher vibration levels. Table 5.6-1, *Human Reaction to Typical Vibration Levels*, displays the human response and the effects on buildings resulting from continuous vibration (in terms of various levels of PPV).

**Table 5.6-1 Human Reaction to Typical Vibration Levels**

| Vibration Level Peak Particle Velocity | Human Reaction | Effect on Buildings |
|---|---|---|
| 0.006–0.019 in/sec | Threshold of perception, possibility of intrusion | Vibrations unlikely to cause damage of any type |
| 0.08 in/sec | Vibrations readily perceptible | Recommended upper level of vibration to which ruins and ancient monuments should be subjected |
| 0.10 in/sec | Level at which continuous vibration begins to annoy people | Virtually no risk of "architectural" (i.e., not structural) damage to normal buildings |
| 0.20 in/sec | Vibrations annoying to people in buildings | Threshold at which there is a risk to "architectural" damage to normal dwelling – houses with plastered walls and ceilings |
| 0.4–0.6 in/sec | Vibrations considered unpleasant by people subjected to continuous vibrations and unacceptable to some people walking on bridges | Vibrations at a greater level than normally expected from traffic, but would cause "architectural" damage and possibly minor structural damage |

Source: Caltrans 2013.

### 5.6.1.2 REGULATORY FRAMEWORK

To limit population exposure to physically and/or psychologically damaging as well as intrusive noise levels, the federal government, the State of California, various county governments, and most municipalities in the state have established standards and ordinances to control noise.

## Federal

### *US Department of Housing and Urban Development*

The US Department of Housing and Urban Development (HUD) has set a goal of 65 dBA $L_{dn}$ as a desirable maximum exterior standard for residential units developed under HUD funding. (This level is also generally accepted within the State of California.) While HUD does not specify acceptable interior noise levels, standard construction of residential dwellings constructed under Title 24 standards typically provides in excess of 20 dBA of attenuation with the windows closed. Based on this premise, the interior $L_{dn}$ should not exceed 45 dBA.

## State

### *California Building Code*

The California Building Code (CBC), Title 24, Part 2, Volume 1, Chapter 12, Section 1207.11.2, Allowable Interior Noise Levels, requires that interior noise levels attributable to exterior sources shall not exceed 45 dB in any habitable room. The noise metric is evaluated as either the day-night average sound level ($L_{dn}$) or the CNEL, consistent with the noise element of the local general plan.

Residential structures within the noise contours identified above require an acoustical analysis showing that the structure has been designed to limit intruding noise in the prescribed allowable levels. To comply with these regulations, applicants new the residential projects are required to submit an acoustical report in areas where noise and land use compatibility is a concern. The report is required to analyze exterior noise sources affecting the proposed dwelling site, predicted noise spectra at the exterior of the proposed dwelling structure

considering present and future land usage, basis for the prediction (measured or obtained from published data), noise attenuation measures to be applied, and an analysis of the noise insulation effectiveness of the proposed construction showing that the prescribed interior noise level requirements are met. If interior allowable noise levels are met by requiring that windows be inoperable or closed, the design for the structure must also specify the means that will be employed to provide ventilation and cooling, if necessary, to provide a habitable interior environment.

### *CALGreen*

The California Green Building Standards Code (CALGreen) has requirements for insulation that affect exterior-interior noise transmission for nonresidential structures. Pursuant to CALGreen Section 5.507.4.1, Exterior Noise Transmission, an architectural acoustics study may be required when a project site is within a 65 dBA CNEL or $L_{dn}$ noise contour of an airport, freeway or expressway, railroad, industrial source or fixed-guideway source. Where noise contours are not readily available, if buildings are exposed to a noise level of 65 dBA $L_{eq}$ during any hour of operation, specific wall and ceiling assembly and sound-rated windows may be necessary to reduce interior noise to acceptable levels.

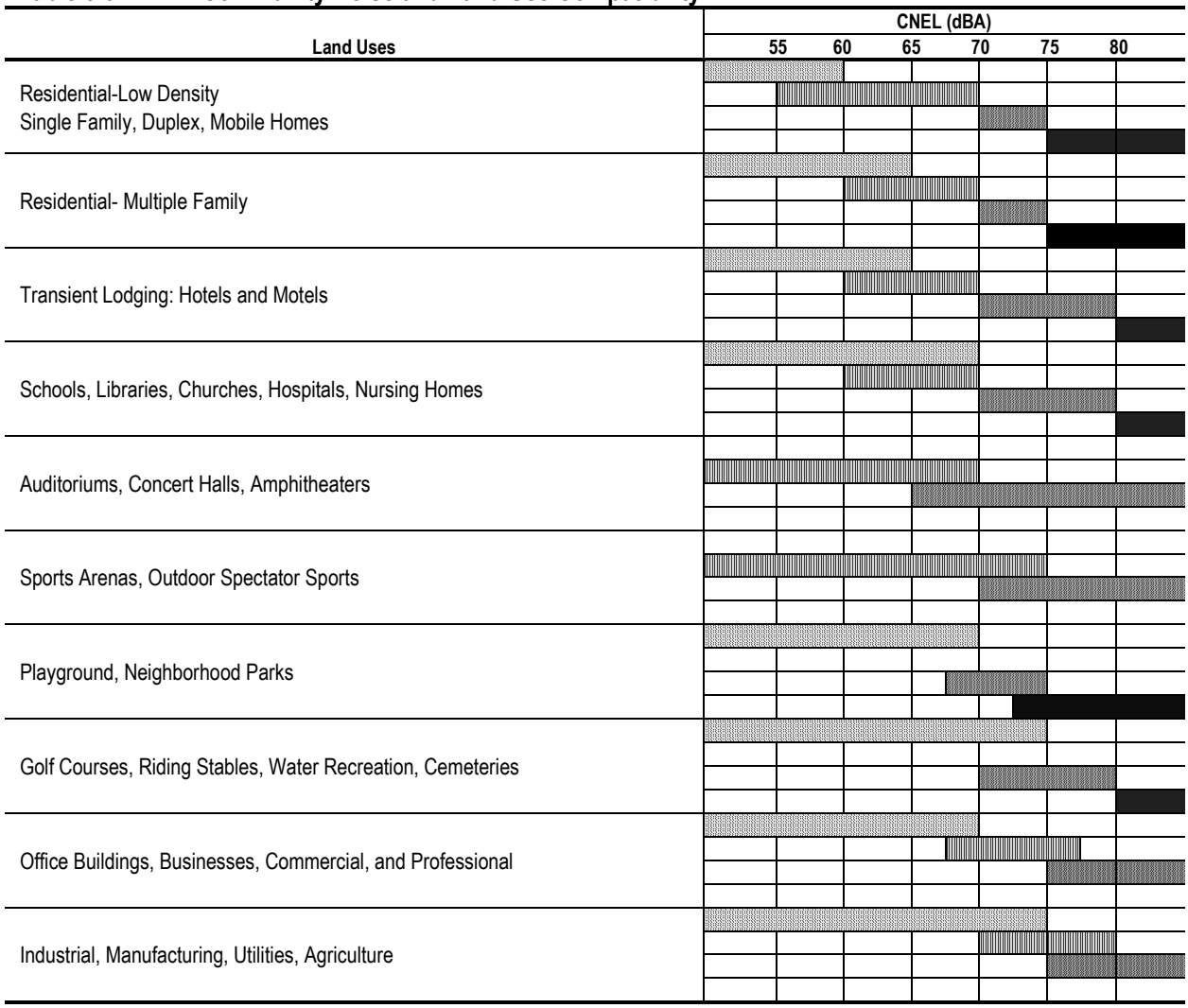
### *Title 5 California Department of Education*

Under Title 5, the California Department of Education (CDE) regulations require public school districts to consider noise in the site selection process. As recommended by CDE guidance, if a school district is considering a potential school site near a freeway or other source of noise, it should hire an acoustical engineer to determine the level of sound that the site is exposed to and to assist in designing the school should that site be chosen.

### *California State Land Use Compatibility Guidelines for Noise*

The State Noise Compatibility Guidelines presented in Table 5.6-2, *Community Noise and Land Use Compatibility*. are derived from the State General Plan Guidelines and are designed to ensure that proposed land uses are compatible with the predicted future noise environment. At different exterior noise levels, individual land uses are identified as "clearly acceptable," "normally acceptable," "normally unacceptable," or "clearly unacceptable." A "conditionally acceptable" designation implies new construction or development should be undertaken only after a detailed analysis of the noise reduction requirements for each land use is made and needed noise insulation features are incorporated in the design. By comparison, a "normally acceptable" designation indicates that standard construction can occur with no special noise reduction requirements.

**Table 5.6-2 Community Noise and Land Use Compatibility**




| | | | |
|---|---|---|---|
| | **Normally Acceptable:** With no special noise reduction requirements assuming standard construction. | | **Normally Unacceptable:** New construction is discouraged. If new construction does not proceed, a detailed analysis of the noise reduction requirements must be made and needed noise insulation features included in the design. |
| | **Conditionally Acceptable:** New construction or development should be undertaken only after a detailed analysis of the noise reduction requirement is made and needed noise insulation features included in the design. | | **Clearly Unacceptable:** New construction or development should generally not be undertaken. |

Source: California Governor's Office of Planning and Research, State of California General Plan Guidelines Appendix D: Guidelines for the Preparation and Content of Noise Elements of the General Plan.

## Local Regulations

### *County of Los Angeles*

The County of Los Angeles encourages the reduction of noise impacts on noise sensitive uses through goals and policies. The following goals and policies from the General Plan are applicable to the Project:

**Goal N1:** The reduction of excessive noise impacts.

***Policies:***

N 1.2 Reduce exposure to noise impacts by promoting land use compatibility

N 1.3 Minimize impacts to noise-sensitive land uses by ensuring adequate site design, acoustical construction, and use of barriers, berms, or additional engineering controls through Best Available Technologies (BAT).

N1.5 Ensure compliance with the jurisdictions of State Noise Insulation Standards (Title 24, California Code of Regulations and Chapter 35 of the Uniform Building Code), such as noise insulation of new multifamily dwellings constructed within the 60 dB (CNEL or $L_{dn}$) noise exposure contours

N1.10 Orient residential units away from major noise sources (in conjunction with applicable building codes).

### *Los Angeles Municipal Code*

The County's noise ordinance is designed to protect people from objectionable non-transportation noise sources. The noise standards in Table 5.6-3, *County of Los Angeles Exterior Noise Standards*, apply to all properties within a designated noise zone unless otherwise indicated.

**Table 5.6-3 County of Los Angeles Exterior Noise Standards**

| Zone | Time Period | Exterior Noise Level, dBA[1,2] | | | | |
|---|---|---|---|---|---|---|
| | | $L_{50}$ | $L_{25}$ | $L_8$ | $L_2$ | $L_{max}$ |
| Noise-sensitive area | Anytime | 45 | 50 | 55 | 60 | 65 |
| Residential properties | 10 PM – 7 AM | 45 | 50 | 55 | 60 | 65 |
| | 7 AM – 10 PM | 50 | 55 | 60 | 65 | 70 |
| Commercial properties | 10 PM – 7 AM | 55 | 60 | 65 | 70 | 75 |
| | 7 AM - 10 PM | 60 | 65 | 70 | 75 | 80 |
| Industrial properties | Anytime | 70 | 75 | 80 | 85 | 90 |

Source: County of Los Angeles Municipal Code, Section 12.08.390.

1 According to Section 12.08.390, if the ambient noise levels exceed the exterior noise standards above, then the ambient noise level becomes the noise standard. Per Section 12.08.410, if the source of noise emits a pure tone or impulsive noise, the exterior noise levels limits shall be reduced by five decibels.

2 If the measurement location is on a boundary property between two different zones, the noise limit shall be the arithmetic mean of the maximum permissible noise level limits of the subject zones; except as provided for above, when an intruding noise source originates on an industrial property and is impacting another noise zone, the applicable exterior noise level shall be the daytime exterior noise level for the subject receptor property.

### *Construction Noise Standards*

The County prohibits the operation of any tools or equipment used in construction, drilling, repair, alteration, or demolition work between the hours of 7:00 PM and 7:00 AM on weekdays or at any time on Sundays or holidays except for emergency work of public service utilities or by variance.

Noise levels for long-term operations (10 days or more) from "stationary" construction equipment are summarized in Table 5.6-4, *County of Los Angeles Stationary Construction Equipment Noise Limits*.

**Table 5.6-4 County of Los Angeles Stationary Construction Equipment Noise Limits**

| Time Period | Single-Family Residential | Multifamily Residential | Semi-residential/ Commercial |
|---|---|---|---|
| Daily, except Sundays and legal holidays, 7 AM to 8 PM | 60 dBA | 65 dBA | 70 dBA |
| Daily, 8 PM to 7 AM and all-day Sunday and legal holidays | 50 dBA | 55 dBA | 60 dBA |

Source: County of Los Angeles Municipal Code, Section 12.08.440. For repetitively scheduled and relatively long-term operations of 10 days or more.

Note: All mobile and stationary internal-combustion-powered equipment or machinery shall be equipped with suitable exhaust and air intake silences in proper working order.

As stated in the project description, above, construction is scheduled to be developed in two phases. Phase 1 is anticipated to occur in two stages beginning in March 2020 and ending in July 2021 and phase 2 would depend on the sale of the surplus site and would be developed by a private developer upon approval of necessary permits by the County of Los Angeles. For the purpose of the EIR, it was assumed that Phase 2 would be completed by 2026.

### *Refrigeration Equipment*

The County of Los Angeles has set noise limits for refrigeration equipment, such as HVAC mechanical systems, to 55 dBA at neighboring property lines and 50 dBA at the center of neighboring patios. These noise limits apply to system units installed after January 1, 1980.

### *County Vibration Standards*

The County of Los Angeles Code, Section 12.08.560, prohibits the operation of any device that creates motion velocity of 0.01 inches/second (in/sec) or greater at or beyond the property boundary of the source if on private property, or at 150 feet from the source if on a public space or public right-of-way. This criterion is equivalent to 80 VdB (root-mean-square vibration decibel level).

### *Exempt Activities*

Section 12.08.570 of the Municipal Code exempts noise from activities conducted on public and private playgrounds or school grounds.

## 5.6.1.3 EXISTING NOISE ENVIRONMENT

The project site is in a predominantly residential area with a noise environment influenced primarily by roadway noise from the Pomona Freeway (SR-60) and local traffic. Secondary noise sources from residential uses (e.g.,

property maintenance) and activity at the existing Wedgeworth Elementary School also contribute to the total noise environment in the project vicinity. The Los Angeles County General Plan noise contour map shows the project vicinity to be within the 60 dBA CNEL contour or higher. The noise contour map, however, does not exhibit noise contours for freeways. Since SR-60 is less than 1,000 feet from proposed school buildings, existing CNEL levels would likely be higher than 65 dBA CNEL. Therefore, during the design-level review stage of the project, the school portion would be required to comply with CALGreen requirements for exterior-to-interior noise transmission for nonresidential structures. The residential portion of the project would be required to comply with the Title 24 requirements for exterior-to-interior noise transmission for residential structures.

### Sensitive Receptors

Certain land uses, such as residences, schools, and hospitals, are particularly sensitive to noise and vibration. Sensitive receptors include residences, senior housing, schools, places of worship, and recreational areas. These uses are regarded as sensitive because they are where citizens most frequently engage in activities which are likely to be disturbed by noise, such as reading, studying, sleeping, resting, working from home, or otherwise engaging in quiet or passive recreation. Commercial and industrial uses are not particularly sensitive to noise or vibration.

Off-site sensitive receptors are the surrounding residential uses to the east, south, and west. For school projects that conduct construction activity while school is in session, students are also considered sensitive receptors.

## 5.6.2 Plans, Programs, and Policies

### 5.6.2.1 PROJECT DESIGN FEATURES

PDF NOI-1 Project related construction activity will be limited to the hours of 7:00 AM to 7:00 PM weekdays. Construction is prohibited on Sundays or any holiday.

PDF NOI-2 The project will comply with the County of Los Angeles' stationary construction equipment noise limits as summarized above in Table 5.6-4.

PDF NOI-3 Refrigeration equipment installed after January 1, 1980, will be limited to 55 dBA at neighboring property lines and to 50 dBA at the center of neighboring patios.

PDF NOI-4 The project will comply with the County of Los Angeles vibration standards and not exceed 80 VdB at the property boundary of a sensitive receptor or beyond.

### 5.6.2.2 REGULATORY REQUIREMENTS

RR NOI-1 The residential development will comply with the California Building Code (CBC), Title 24, Part 2, Volume 1, Chapter 12, Interior Environment, Section 1207.11.2, Allowable Interior Noise Levels for multifamily residential uses.

RR NOI-2 The Hacienda La Puente Unified School District will comply with the California Green Building Standards (CALGreen) Section 5.507.4.1, Exterior Noise Transmission, for nonresidential uses.

## 5.6.3 Thresholds of Significance

According to Appendix G of the CEQA Guidelines, a project would normally have a significant effect on the environment if the project would result in:

N-1 Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies.

N-2 Generation of excessive groundborne vibration or groundborne noise levels.

N-3 For a project located within the vicinity of a private airstrip or 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, if the project would expose people residing or working in the project area to excessive noise levels.

The Initial Study, included as Appendix A, substantiates that impacts associated with the following thresholds would be less than significant:

- Threshold N-3

This impact will not be addressed in the following analysis.

### 5.6.3.1 CONSTRUCTION NOISE THRESHOLDS

The county of Los Angeles has construction noise limitations based on residential density as discussed above in Section 5.6.1.2, *Regulatory Framework* (Table 5.6-4). For the purposes of this analysis, the threshold of 60 dBA daytime and 50 dBA nighttime at residences is used.

### 5.6.3.2 TRANSPORTATION NOISE THRESHOLDS

A project will normally have a significant effect on the environment related to noise if it will substantially increase the ambient noise levels for adjoining areas. Most people can detect changes in sound levels of approximately 3 dBA under normal, quiet conditions, and changes of 1 to 3 dBA are perceptible under quiet, controlled conditions. Changes of less than 1 dBA are usually inaudible. A change of 5 dBA is readily audible to most people in an exterior environment. Based on this, traffic noise impacts are considered significant if sensitive receptor locations experience 3 dBA or more noise increases with implementation of the project.

### 5.6.3.3 STATIONARY NOISE THRESHOLDS

As discussed above in Section 5.6.1.2, *Regulatory Framework*, the County's noise ordinance establishes noise level standards at receiving residential, commercial, and industrial properties (see Table 5.6-3). Noise levels in excess

of these standards at residential areas are considered a noise nuisance. The exterior noise level standards for residential properties would apply to the proposed project.

### *Refrigeration Equipment*

The County of Los Angeles has set noise limits for refrigeration equipment, such as HVAC mechanical systems, to 55 dBA at neighboring property lines and 50 dBA at the center of neighboring patios. These noise limits apply to system units installed after January 1, 1980.

## 5.6.3.4 VIBRATION THRESHOLDS

### *Vibration Annoyance*

The County of Los Angeles Code, Section 12.08.560, prohibits the operation of any device that creates motion velocity of 0.01 inches/second (in/sec) or greater at or beyond the property boundary of the source if on private property, or at 150 feet from the source if on a public space or public right-of-way. This criterion is equivalent to 80 VdB (root-mean-square vibration decibel level).

### *Architectural Damage*

The County of Los Angeles does not have specific limits or thresholds for vibration induced architectural damage related to construction activities. The Federal Transit Administration (FTA) provides criteria for acceptable levels of ground-borne vibration for various types of buildings therefore, FTA criteria were used for this analysis.

Structures amplify groundborne vibration and wood-frame buildings, such as typical residential structures, are more affected by ground vibration than heavier buildings. The level at which groundborne vibration is strong enough to cause architectural damage has not been determined conclusively. The most conservative estimates are reflected in the FTA standards, shown in Table 5.6-5, *Groundborne Vibration Criteria: Architectural Damage*.

**Table 5.6-5 Groundborne Vibration Criteria: Architectural Damage**

| Building Category | | PPV (in/sec) |
|---|---|---|
| I. | Reinforced concrete, steel, or timber (no plaster) | 0.5 |
| II. | Engineered concrete and masonry (no plaster) | 0.3 |
| III. | Non-engineered timber and masonry buildings | 0.2 |
| IV. | Buildings extremely susceptible to vibration damage | 0.12 |

Source: FTA 2018.
PPV = peak particle velocity

## 5.6.4 Environmental Impacts

### 5.6.4.1 METHODOLOGY

This noise evaluation was prepared in accordance with the requirements of CEQA to determine if the Proposed Project would result in significant construction and operational impacts at nearby sensitive receptors. Construction noise modeling was conducting using the Federal Highway Administration (FHWA) Roadway Construction Noise Model (RCNM). Traffic noise increases was estimated using PM peak hour segment volumes provided by PlaceWorks (see Appendix I) and the following logarithmic formula: 10*LOG(future traffic volume/existing traffic volume).

### 5.6.4.2 IMPACT ANALYSIS

**Impact 5.6-1: Construction activities would result in a substantial temporary noise increase in ambient noise levels in the vicinity of the project site in excess of local standards. [Threshold N-1 (part)]**

Two types of short-term noise impacts could occur during construction: (1) mobile-source noise from transport of workers, material deliveries, and debris and soil haul and (2) stationary-source noise from use of construction equipment. Existing uses surrounding the project site would be exposed to construction noise.

#### Construction Vehicles

The transport of workers and materials to and from the construction site would incrementally increase noise levels along local residential roadways including, but not limited to, Wedgeworth Drive and Eagle Park Road. Individual construction vehicle pass-bys and haul trucks may create momentary noise levels of up to 85 dBA ($L_{max}$) at 50 feet from the vehicle, but these occurrences would generally temporary and short lived.[1] Construction generates temporary trips from workers and vendors. Project construction is anticipated to have two development phases with multiple construction activity phases. Construction-related trips will vary and depend the construction activity phase.

##### *Phase 1*

The building construction phase during development Phase 1 is anticipated to generate 236 daily trips (worker and vendor combined) during overlapping phases. Existing average daily trips in the project vicinity range from 3,250 to 4,470 trips.[2] The addition of worker and vendor trips would result in a less than 1 dBA CNEL increase. Therefore, noise impacts from construction-related truck traffic would be less than significant and no mitigation measures would be required.

##### *Phase 2*

The building (of residential housing) construction phase during development Phase 2 is anticipated to generate 282 daily trips (worker and vendor combined) during overlapping phases. Existing PM peak hour volumes in

[1] Approximately 5 haul trips per hour during a 35 work-day grading phase.
[2] Average daily trips calculated using a multiplier of 10 and applied to PM peak hour trips.

the project vicinity range from 3,250 to 4,470 trips.[3] The addition of worker and vendor trips would result in a less than 1 dBA CNEL increase. Therefore, noise impacts from construction-related truck traffic would be less than significant and no mitigation measures would be required.

### Construction Equipment

Noise generated during construction is based on the type of equipment used, the location of the equipment relative to sensitive receptors, and the timing and duration of the noise-generating activities. Each phase of construction involves the use of different construction equipment and therefore each phase has its own distinct noise characteristics. Noise levels from construction activities are dominated by the loudest piece of construction equipment. The dominant noise source is typically the engine, although work piece noise (such as dropping of materials) can also be noticeable.

The noise produced at each phase is determined by combining the $L_{eq}$ contributions from each piece of equipment used at a given time. Construction activities associated with the Proposed Project would not require blasting or pile driving. In the construction of residential and mixed-use projects, demolition and grading typically generate the highest noise levels because they require the largest equipment. Construction noise quite often exhibits a high degree of variability because factors such as noise attenuation due to distance, the number and type of equipment, and the load and power requirements to accomplish tasks at each construction phase result in different noise levels at a given sensitive receptor. Heavy equipment, such as a dozer or a loader, can have maximum, short-duration noise levels in excess of 80 dBA at 50 feet. Since noise from construction equipment is intermittent and diminishes at a rate of 6 dB per doubling distance,[4] the average noise levels at noise-sensitive receptors would be lower, because mobile construction equipment would move around the site with different loads and power requirements. Noise levels from project-related construction activities were calculated from the simultaneous use of all applicable construction equipment at spatially averaged distances (i.e., from the acoustical center of the general construction site) to the property line of the nearest receptors. Although construction may occur across the entire phase area, the area around the center of construction activities best represents the potential average construction-related noise levels at the various sensitive receptors.

To calculate construction noise as it affects sensitive receptors, the FHWA RCNM noise model was used. The RCNM includes reference noise levels for numerous equipment pieces. Since the RCNM calculations do not account for shielding due to intervening buildings and structures, ground effects, or air absorption, the results of these calculations are conservative (that is, they represent a "worst case" scenario).

Phase 1 consists of the new school construction, and Phase 2 would include the demolition of the old Wedgeworth Elementary School buildings and construction of the proposed 160 residential units. Phase 2 would occur after the construction of school. The construction noise analysis is broken down by phase and uses the distance to the nearest on-site or off-site receptors.

[3] Average daily trips calculated using a multiplier of 10 and applied to PM peak hour trips.
[4] The sound attenuation rate of 6 dB is generally conservative. Attenuation provided by existing buildings and structures around the project site are not taken into account.

Using methodologies and inputs employed in the air quality assessment (CalEEMod defaults), the expected construction equipment mix was estimated and categorized by construction activity and phasing. The associated, aggregate sound levels—grouped by construction phase and activity—are summarized below.

## Phase 1

### *Off-Site Residential*

As shown in Table 5.6-6, *Phase 1 Project-Related Construction Noise Levels*, the loudest activity phase would be paving. Construction noise levels at the nearest residences could exceed the County's stationary construction equipment noise limit of 60 dBA. This would result in a potentially significant impact. Mitigation Measure N-1 would reduce this impact to a level of less than significant.

**Table 5.6-6 Phase 1 Project-Related Construction Noise Levels**

| | Sound Level at Various Distances from Construction Activities, dBA $L_{eq}$ | |
|---|---|---|
| | Nearest off-site receptors | Nearest on-site receptors |
| Construction Activity Phase | Residences to the west and south 400 ft. | School Buildings to east 180 ft. |
| Site Preparation | 68 | 75 |
| Grading | 68 | 75 |
| Utility Trenching | 64 | 71 |
| Building Construction | 66 | 73 |
| Paving | 69 | 75 |
| Architectural Coating | 56 | 66 |
| Demolition | 68 | 75 |
| Finishing and Landscaping | 62 | 69 |

Calculations performed with the FHWA's RCNM software are included in Appendix I. Distance measurements were taken from the acoustical center of the Phase 1 construction site.

### *On-Site School Classrooms*

The nearest on-site building is approximately 180 feet from the center of construction activities. At that distance, exterior noise levels could reach up to approximately 75 dBA $L_{eq}$. Typical exterior-to-interior noise attenuation is 25 dBA with windows closed, resulting in interior noise levels of approximately 50 dBA $L_{eq}$. The CALGreen requirements for nonresidential interior spaces is 50 dBA $L_{eq}$. Therefore, because average construction noise levels are not expected to exceed 50 dBA $L_{eq}$, this would result in a less-than-significant impact to students on-site.

## Phase 2

### *Off-Site Residential*

As shown in Table 5.6-7, *Phase 2 Project-Related Construction Noise Levels*, the loudest activity phase would be paving, which would generate noise levels up to 72 dBA $L_{eq}$. Noise levels at the nearest residences could exceed the County's stationary construction equipment noise limit of 60 dBA. This would result in a potentially

significant impact. Implementation of Mitigation Measure N-1 would reduce this impact to a level of less than significant.

**Table 5.6-7 Phase 2 Project-Related Construction Noise Levels**

| | Sound Level at Various Distances from Construction Activities, dBA $L_{eq}$ | | |
|---|---|---|---|
| | Nearest Residential | New School | |
| Construction Activity Phase | Residences to east 280 ft. east | School property line to south 170 ft | School buildings to south 460 ft |
| Site Preparation | 71 | 75 | 67 |
| Grading | 71 | 75 | 67 |
| Utility Trenching | 67 | 71 | 62 |
| Building Construction | 69 | 73 | 64 |
| Paving | 72 | 76 | 67 |
| Architectural Coating | 59 | 63 | 54 |
| Demolition | 71 | 76 | 67 |
| Finishing and Landscaping | 65 | 70 | 61 |

Calculations performed with the FHWA's RCNM software are included in Appendix I. Distance measurements were taken from the acoustical center of the Phase 2 construction site.

### *New Wedgeworth Elementary School*

After the completion of Phase 1 of the new Wedgeworth Elementary School and the sale of additional property for Phase 2 residential development, the elementary school would be a sensitive receptor to construction of the proposed residential development. Exterior noise levels at the nearest academic building could reach up to 67 dBA $L_{eq}$. Interior noise levels, when considering typical exterior-to-interior noise attenuation is 25 dBA with windows closed, would result in approximately 42 dBA $L_{eq}$. CALGreen requirements for nonresidential interior spaces is 50 dBA $L_{eq}$. Therefore, because average construction noise levels are not expected to exceed 50 dBA $L_{eq}$, this would result in a less-than-significant impact to students on-site.

***Level of Significance Before Mitigation:*** Potentially Significant

**Impact 5.6-2 Project implementation would not result in a substantial permanent increase in ambient noise levels in the vicinity of the project site in excess of local standards. [Threshold N-1 (part)]**

## Stationary Noise

### *HVAC Noise*

Heating, ventilation, and air conditioning (HVAC) systems will be installed at the new proposed residential units. Typical HVAC equipment generates noise levels ranging up to 72 dBA at distance of 3 feet. The nearest residences are north, south and east approximately 50 feet or greater from the property line of the proposed project. At 50 feet, noise levels would attenuate to approximately 48 dBA. This would not exceed the County's noise limit of 55 dBA for refrigeration and HVAC equipment at the nearest residential property lines.

### *Student Recreational Noise*

Implementation of the project would result in a student capacity increase from 600 to 1,200 students. However it is not anticipated that all students would be outside in the same location at once for recess and PE class, for example. In addition, no public address system is proposed for sports or other recreational activities. There would be some limited after school and weekend recreational use of the project site. However, recreational noise during these times is expected to be less compared to existing conditions, since the project would displace the existing baseball field currently used by baseball leagues. Per Section 12.08.570, noise from student recreational activity is exempt from the County noise level standards shown. This would result in a less-than-significant impact.

## Traffic Noise

Noise impacts can be broken down into three categories. The first is "audible" impacts, which refer to increases in noise level that are perceptible to humans. Audible increases in general community noise levels generally refer to a change of 3 dBA or more since this level has been found to be the threshold of perceptibility in exterior environments. The second category, "potentially audible" impacts, refers to a change in noise level between 1 and 3 dBA. The last category includes changes in noise level of less than 1 dBA that are typically "inaudible" to the human ear except under quiet conditions in controlled environments. Only "audible" changes in noise levels at sensitive receptor locations (i.e., 3 dBA or more) are considered potentially significant. Note that a doubling of traffic flows (i.e., 10,000 vehicles per day to 20,000 per day) would be needed to create a 3 dBA increase in traffic-generated noise levels. An increase of 3 dBA is used as a threshold for a substantial increase.

### *Phase 2 (Full Buildout)*

To determine the traffic noise level increase due to the project, the existing peak hour volumes were compared to the existing plus project peak hour volumes. Table 5.6-8, *Project-Related Increase in Traffic from Noise Phase 2 (Full Buildout*), summarizes project-related traffic noise increases. Project-related traffic noise increase was estimated to be 1.02 dBA or less throughout all traffic study roadway segments. Since the noise level increase due to project-generated traffic and cumulative traffic would be less than 3 dBA, the proposed project would not cause a substantial permanent noise level increase at surrounding noise-sensitive receptors on weekday events. This is a less than significant impact. Cumulative traffic noise increase is discussed below under *Cumulative Impacts*.

**Table 5.6-8 Project-Related Increase in Traffic from Noise Phase 2 (Full Buildout)**

| Roadway Segment | Existing No Project | Existing Plus Project | 2026 No Project | 2026 Plus Project | Project Noise Increase | Cumulative Noise Increase |
|---|---|---|---|---|---|---|
| Hacienda Blvd - North of Halliburton Road | 2,782 | 2,787 | 2,868 | 2,873 | 0.01 | 0.14 |
| Hacienda Blvd - South of Halliburton Road | 2,551 | 2,553 | 2,628 | 2,630 | 0.00 | 0.13 |
| Halliburton Rd. - East of Hacienda Boulevard | 1,015 | 1,024 | 1,051 | 1,060 | 0.04 | 0.19 |
| Halliburton Rd. - West of Hacienda Boulevard | 16 | 18 | 23 | 25 | 0.51 | 1.94 |
| Hacienda Blvd - North of Colima Road | 1,872 | 1,872 | 1,928 | 1,928 | 0.00 | 0.13 |
| Hacienda Blvd - South of Colima Road | 365 | 369 | 376 | 380 | 0.05 | 0.17 |
| Colima Rd - East of Hacienda Boulevard | 2,330 | 2,343 | 2,409 | 2,422 | 0.02 | 0.17 |

**Table 5.6-8 Project-Related Increase in Traffic from Noise Phase 2 (Full Buildout)**

| Roadway Segment | Existing No Project | Existing Plus Project | 2026 No Project | 2026 Plus Project | Project Noise Increase | Cumulative Noise Increase |
|---|---|---|---|---|---|---|
| Colima Rd - West of Hacienda Boulevard | 3,579 | 3,588 | 3,695 | 3,704 | 0.01 | 0.15 |
| Stimson Ave - North of Halliburton Road | 1,349 | 1,353 | 1,402 | 1,406 | 0.01 | 0.18 |
| Stimson Ave - South of Halliburton Road. | 1,201 | 1,203 | 1,249 | 1,251 | 0.01 | 0.18 |
| Halliburton Rd.- East of Stimson Avenue | 1,150 | 1,165 | 1,203 | 1,218 | 0.06 | 0.25 |
| Halliburton Rd. - West of Stimson Avenue | 1,226 | 1,235 | 1,268 | 1,277 | 0.03 | 0.18 |
| Stimson Ave - North of Colima Road | 684 | 686 | 713 | 715 | 0.01 | 0.19 |
| Sierra Ridge Way- South of Colima Road | 47 | 49 | 48 | 50 | 0.18 | 0.27 |
| Colima Rd - East of Stimson Avenue | 2,034 | 2,051 | 2,110 | 2,127 | 0.04 | 0.19 |
| Colima Rd- West of Stimson Avenue | 2,331 | 2,344 | 2,409 | 2,422 | 0.02 | 0.17 |
| Halliburton Rd. - North of Colima Road | 997 | 1,018 | 1,046 | 1,067 | 0.09 | 0.29 |
| Dawn Haven Rd. - South of Colima Road | 278 | 280 | 287 | 289 | 0.03 | 0.17 |
| Colima Rd. - East of Halliburton Road | 2,841 | 2,887 | 2,970 | 3,016 | 0.07 | 0.26 |
| Colima Rd - West of Halliburton Road | 2,110 | 2,133 | 2,195 | 2,218 | 0.05 | 0.22 |
| Countrywood Ave. - North of Wedgeworth Drive | 100 | 102 | 105 | 107 | 0.09 | 0.29 |
| Countrywood Ave. - South of Wedgeworth Drive | 366 | 368 | 385 | 387 | 0.02 | 0.24 |
| Wedgeworth Dr. - East of Countrywood Avenue | 231 | 237 | 238 | 244 | 0.11 | 0.24 |
| Wedgeworth Dr. - West of Countrywood Avenue | 447 | 449 | 466 | 468 | 0.02 | 0.20 |
| Countrywood Ave. - North of Colima Road | 325 | 325 | 344 | 344 | 0.00 | 0.25 |
| Countrywood Ave. - South of Colima Road | 126 | 128 | 140 | 142 | 0.07 | 0.52 |
| Colima Rd. - East of Countrywood Avenue | 2,831 | 2,879 | 2,976 | 3,024 | 0.07 | 0.29 |
| Colima Rd - West of Countrywood Avenue | 2,782 | 2,828 | 2,910 | 2,956 | 0.07 | 0.26 |
| Park Lawn Rd. - North of Colima Road | 189 | 239 | 199 | 249 | 1.02 | 1.20 |
| Park Lawn Rd. - South of Colima Road | 115 | 117 | 125 | 127 | 0.07 | 0.43 |
| Colima Rd. - East of Park Lawn Road | 2,815 | 2,815 | 2,971 | 2,971 | 0.00 | 0.23 |
| Colima Rd - West of Park Lawn Road | 2,905 | 2,953 | 3,053 | 3,101 | 0.07 | 0.28 |
| Manor Gate Rd. - North of Colima Road | 159 | 171 | 165 | 177 | 0.32 | 0.47 |
| Manor Gate Rd. - South of Colima Road | 388 | 395 | 542 | 549 | 0.08 | 1.51 |
| Colima Rd. - East of Manor Gate Road | 2,731 | 2,736 | 2,886 | 2,891 | 0.01 | 0.25 |
| Colima Rd - West of Manor Gate Road | 2,814 | 2,814 | 2,969 | 2,969 | 0.00 | 0.23 |
| Azusa Ave - North of Gale Avenue | 3,633 | 3,644 | 3,766 | 3,777 | 0.01 | 0.17 |
| Azusa Ave - South of Gale Avenue | 4,026 | 4,046 | 4,191 | 4,211 | 0.02 | 0.20 |
| Gale Ave - East of Azusa Avenue | 1,979 | 1,983 | 2,045 | 2,049 | 0.01 | 0.15 |
| Gale Ave - West of Azusa Avenue | 2,352 | 2,357 | 2,458 | 2,463 | 0.01 | 0.20 |
| Azusa Ave - North of I-60 West Bound | 4,184 | 4,204 | 4,352 | 4,372 | 0.02 | 0.19 |
| Azusa Ave - South of I-60 West Bound | 3,903 | 3,945 | 4,051 | 4,094 | 0.05 | 0.21 |
| I-60 WB- East of Azusa Avenue | 1,643 | 1,665 | 1,701 | 1,724 | 0.06 | 0.21 |
| I-60 WB - West of Azusa Avenue | 896 | 896 | 928 | 928 | 0.00 | 0.15 |
| Azusa Ave - North of I-60 East Bound | 4,428 | 4,479 | 4,587 | 4,638 | 0.05 | 0.20 |
| Azusa Ave - South of I-60 East Bound | 3,760 | 3,824 | 3,892 | 3,956 | 0.07 | 0.22 |
| I-60 EB- East of Azusa Avenue | 714 | 715 | 735 | 736 | 0.01 | 0.13 |
| I-60 EB - West of Azusa Avenue | 1,474 | 1,486 | 1,526 | 1,538 | 0.04 | 0.18 |
| Azusa Ave - North of Pepper Brook Way | 3,667 | 3,732 | 3,797 | 3,861 | 0.08 | 0.22 |

**Table 5.6-8 Project-Related Increase in Traffic from Noise Phase 2 (Full Buildout)**

| Roadway Segment | Existing No Project | Existing Plus Project | 2026 No Project | 2026 Plus Project | Project Noise Increase | Cumulative Noise Increase |
|---|---|---|---|---|---|---|
| Azusa Ave - South of Pepper Brook Way | 2,586 | 2,608 | 2,678 | 2,700 | 0.04 | 0.19 |
| Pepper Brook Way - East of Azusa Avenue | 981 | 988 | 1,015 | 1,022 | 0.03 | 0.18 |
| Pepper Brook Way - West of Azusa Avenue | 972 | 1,066 | 1,002 | 1,095 | 0.40 | 0.52 |
| Azusa Ave - North of Colima Road | 2,488 | 2,510 | 2,578 | 2,600 | 0.04 | 0.19 |
| Azusa Ave - South of Colima Road | 929 | 931 | 986 | 988 | 0.01 | 0.27 |
| Colima Rd - East of Azusa Avenue | 3,245 | 3,270 | 3,373 | 3,398 | 0.03 | 0.20 |
| Colima Rd - West of Azusa Avenue | 2,722 | 2,727 | 2,877 | 2,882 | 0.01 | 0.25 |
| Albatross Rd - North of Colima Road | 837 | 844 | 865 | 872 | 0.04 | 0.18 |
| Albatross Rd - South of Colima Road | 840 | 842 | 873 | 875 | 0.01 | 0.18 |
| Colima Rd - East of Albatross Road | 2,314 | 2,330 | 2,400 | 2,416 | 0.03 | 0.19 |
| Colima Rd - West of Albatross Road | 2,953 | 2,978 | 3,072 | 3,097 | 0.04 | 0.21 |
| Fullerton Ave- North of Colima Road | 2,160 | 2,167 | 2,231 | 2,238 | 0.01 | 0.15 |
| Fullerton Ave - South of Colima Road | 2,452 | 2,459 | 2,532 | 2,539 | 0.01 | 0.15 |
| Colima Rd - East of Fullerton Avenue | 2,559 | 2,561 | 2,642 | 2,644 | 0.00 | 0.14 |
| Colima Rd - West of Fullerton Avenue | 2,415 | 2,431 | 2,505 | 2,521 | 0.03 | 0.19 |

Source: PlaceWorks 2019.

***Level of Significance Before Mitigation:*** Less than significant.

**Impact 5.6-3: The Proposed Project would not create excessive groundborne vibration and groundborne noise. [Threshold N-2]**

Potential vibration impacts associated with development projects are usually related to the use of heavy construction equipment during the demolition and grading phases of construction. Construction can generate varying degrees of ground vibration, depending on the construction procedures and equipment. Construction equipment generates vibrations that spread through the ground and diminish with distance from the source. The effect on buildings in the vicinity of the construction site varies depending on soil type, ground strata, and receptor-building construction. The effects from vibration can range from no perceptible effects at the lowest vibration levels, to low rumbling sounds and perceptible vibrations at moderate levels, to slight structural damage at the highest levels. Vibration from construction activities rarely reaches the levels that can damage structures.

## Operational Vibration

The operation of the proposed project would not include any substantial long-term vibration sources. Thus, no significant vibration effects from operations sources would occur.

## Vibration Annoyance

The County of Los Angeles has an established vibration threshold equivalent to 80 VdB. Tables 5.6-9, *Vibration Annoyance Levels for Typical Construction Equipment, Phase 1*, and 5.6-10, *Vibration Annoyance Levels for Typical Construction Equipment, Phase 2*, show typical VdB levels for typical construction equipment for developmental Phases 1 and 2 and estimated vibration levels at nearby sensitive receptors.

**Table 5.6-9 Vibration Annoyance Levels for Typical Construction Equipment, Phase 1**

| | VdB Levels | | |
|---|---|---|---|
| Equipment | Reference levels at 25 feet | Residences 400 feet west[1] | On-site School building 150 feet east[1] |
| Vibratory Roller | 94 | 58 | 71 |
| Large Bulldozer | 87 | 51 | 64 |
| Caisson Drilling | 87 | 51 | 64 |
| Loaded Trucks | 86 | 50 | 63 |
| Jackhammer | 79 | 43 | 56 |
| Small Bulldozer | 58 | 22 | 35 |

Source: FTA 2018.
[1] As measured from the center of Phase 1 construction site.

**Table 5.6-10 Vibration Annoyance Levels for Typical Construction Equipment, Phase 2**

| | VdB levels | | |
|---|---|---|---|
| Equipment | Reference levels at 25 feet | Residences east 280 feet[1] | School property line 170 feet south[1] |
| Vibratory Roller | 94 | 63 | 69 |
| Large Bulldozer | 87 | 56 | 62 |
| Caisson Drilling | 87 | 56 | 62 |
| Loaded Trucks | 86 | 55 | 61 |
| Jackhammer | 79 | 48 | 54 |
| Small Bulldozer | 58 | 27 | 33 |

Source: FTA 2018.
[1] As measured from the center of Phase 2 construction site.

As shown above, average vibration levels would not exceed 80 VdB at sensitive receptors. Vibration annoyance impacts would be less than significant.

## Architectural Damage

For reference, a peak particle velocity of 0.2 in/sec PPV is used as the limit for nonengineered timber and masonry buildings (which would apply to the surrounding structures for both Phase 1 and Phase 2) (FTA 2018). At a distance greater than 25 feet, construction-generated vibration levels at the nearest building would be less than the 0.2 PPV in/sec.

### *Phase 1*

The nearest off-site receptors are single-family homes to the south and west. Vibration levels at the nearest residences, as shown in Table 5.6-11, *Vibration Impact Levels for Typical Construction Equipment, Phase 1*, would be less than 0.2 in/sec PPV. Therefore, impacts to off-site receptors would be less than significant.

**Table 5.6-11 Vibration Impact Levels for Typical Construction Equipment, Phase 1**

| | in/sec PPV | |
|---|---|---|
| Equipment | Reference levels at 25 feet | Residences 55 feet south and west[1] |
| Vibratory Roller | 0.21 | 0.064 |
| Large Bulldozer | 0.089 | 0.027 |
| Caisson Drilling | 0.089 | 0.027 |
| Loaded Trucks | 0.076 | 0.023 |
| Jackhammer | 0.035 | 0.011 |
| Small Bulldozer | 0.003 | 0.001 |

Source: FTA 2018.
[1] As measured from the edge of Phase 1 construction site.

### *Phase 2*

Phase 2 would occur after the completion of Phase 1, and upon the sale of designated property for residential development. The nearest sensitive receptors to Phase 2 would be the residences to the east and west. As shown in Table 5.6-12, *Vibration Impact Levels for Typical Construction Equipment, Phase 2*, vibration levels would diminish to less than 0.2 in/sec PPV at sensitive receptors. Therefore, impacts would be less than significant.

**Table 5.6-12 Vibration Impact Levels for Typical Construction Equipment, Phase 2**

| | in/sec PPV | |
|---|---|---|
| Equipment | Reference levels at 25 feet | Residences 90 feet east[1] |
| Vibratory Roller | 0.21 | 0.03 |
| Large Bulldozer | 0.089 | 0.013 |
| Caisson Drilling | 0.089 | 0.013 |
| Loaded Trucks | 0.076 | 0.011 |
| Jackhammer | 0.035 | 0.005 |
| Small Bulldozer | 0.003 | <0.001 |

Source: FTA 2018.
[1] As measured from the edge of Phase 2 construction site.

***Level of Significance Before Mitigation:*** Less than significant impact.

## 5.6.5 Cumulative Impacts

### Cumulative Operational Impact

A significant cumulative traffic noise increase would be considered significant if a cumulative traffic noise increase is greater than the 3 dBA, and the relative contribution from Project traffic is calculated to contribute 1 dBA or more to the overall cumulative increase. As shown in Table 5.6-8, the cumulative traffic noise increase would be 1.94 dBA or less, which does not exceed the 3 dBA significance threshold. Therefore, the proposed project traffic noise combined with cumulative projects would not result in a significant impact.

### Construction Noise and Vibration

Cumulative impacts would occur if other projects are being constructed in the vicinity of the proposed project at the same time. There are four planned and approved development projects within a one-mile radius of the project site. Out of the four, the closest are two fast-food restaurants half a mile south the proposed project. Considering that the closest are half a mile away, there would be no cumulative construction noise impacts. Project construction noise would not combine with other planned and approved construction projects to create cumulatively considerable impacts. Cumulative construction and vibration impacts would be less than significant.

***Level of Significance Before Mitigation:*** Less than significant impact.

## 5.6.6 Level of Significance Before Mitigation

The following impact would be less than significant: 5.6-2, 5.6-3, and 5.6-4.

Without mitigation, the following impacts would be **potentially significant**:

- **Impact 5.6-1** Construction noise levels could exceed the 60 dBA standard set forth in the municipal code of the Los Angeles County at the nearest residences during Phase 1 and Phase 2.

## 5.6.7 Mitigation Measures

### Impact 5.6-1

N-1 Prior to issuance of demolition, grading and/or building permits, a note shall be provided on construction plans indicating that during grading, demolition, and construction, the project applicant shall be responsible for requiring contractors to implement the following measures to limit construction-related noise:

- Per County of LA requirements, construction activity shall be limited to the hours of 7:00 AM and 7:00 PM on weekdays and Saturdays. Construction activity shall not occur on Sundays or holidays.

- During the entire active construction period, equipment and trucks used for project construction shall utilize the best available noise control techniques (e.g., optimized mufflers, equipment redesign, use of intake silencers, ducts, engine enclosures, and acoustically attenuating shields or shrouds), wherever feasible.
- Require that impact tools (e.g., jack hammers and hoe rams) be hydraulically or electrically powered wherever possible. Where the use of pneumatic tools is unavoidable, an exhaust muffler on the compressed air exhaust shall be used along with external noise jackets on the tools.
- Stationary equipment such as generators and air compressors shall be located as far as feasible from nearby noise-sensitive uses.
- Stockpiling of materials shall be located as far as feasible from nearby noise-sensitive receptors.
- At least 10 days prior to the start of construction activities, a sign shall be posted at the entrance(s) to the job site, clearly visible to the public, that includes permitted construction days and hours, as well as the telephone numbers of the District's and contractor's authorized representatives that are assigned to respond in the event of a noise or vibration complaint. If the authorized contractor's representative receives a complaint, he/she shall investigate, take appropriate corrective action, and report the action to the District.
- Signs shall be posted at the job site entrance(s), within the on-site construction zones and along queueing lanes (if any) to reinforce the prohibition of unnecessary engine idling. All other equipment shall be turned off if not in use for more than 5 minutes.
- During the entire active construction period and to the extent feasible, the use of noise-producing signals, including horns, whistles, alarms, and bells, shall be for safety warning purposes only. The construction manager shall use smart back-up alarms, which automatically adjust the alarm level based on the background noise level, or switch off back-up alarms and replace with human spotters in compliance with all safety requirements and laws.
- Erect temporary noise barriers (at least as high as the exhaust of equipment and breaking line-of-sight between noise sources and sensitive receptors) to maintain construction noise levels at or below the performance standard of 60 dBA at the property line of nearby sensitive receptors. Barriers shall be constructed with a solid material that has a density of at least 4 pounds per square foot with no gaps from the ground to the top of the barrier. Effective locations for barriers are shown in Figure 5.6-1, *Approximate Noise Barrier Locations*.

## 5.6.8 Level of Significance After Mitigation

### Impact 5.13-1

Mitigation Measure N-1 would reduce construction noise levels by approximately 15 dBA through the use of optimized muffler systems and temporary noise barriers,[5,6] which would reduce construction noise levels below the significance threshold of 60 dBA at nearby sensitive receptors (estimated up to 57 dBA $L_{eq}$ during Phase 2 paving). Therefore, with implementation of Mitigation Measure N-1, construction noise impacts would be reduced to a level of less than significant.

## 5.6.9 References

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[5] Wilson Acoustics Limited, 2014. *Lightweight Noise Barrier*.
6 Federal Highway Administration. 2017, June. *Special Report – Measurement, Prediction, and Mitigation*.

# Figure 5.6-1 - Approximate Temporary Noise Barrier Locations


*Source: Nearmap, 2019*

# 5. Environmental Analysis
**NOISE**

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