5.7 NOISE

This section analyzes project-related noise source impacts on site and on surrounding land uses. This section evaluates short-term construction-related impacts, as well as future buildout conditions. Information in this section was obtained from the *Duarte General Plan Noise Element*, dated 2005, and the *Duarte Municipal Code* (*Municipal Code*). For the purposes of mobile source noise modeling, traffic information contained in the *Duarte Station Specific Plan Transportation Impact Study,* dated April 2019, was utilized; refer to Appendix D, Transportation Impact Study.

5.7.1 BACKGROUND

This section summarizes important background information regarding environmental acoustics, sound and vibration transmission, and the evaluation of sound and vibration levels.

FUNDAMENTALS OF ENVIRONMENTAL ACOUSTICS

Noise Definition and Measurement

Noise is generally defined as unwanted sound and is widely recognized as a form of environmental degradation. Airborne sound is the rapid fluctuation of air pressure above and below atmospheric pressure. The frequency (pitch), amplitude (intensity or loudness), and duration of a sound all contribute to the effect on a listener, or receptor, and whether or not the receptor perceives the sound as "noisy" or annoying. A summary of the key environmental noise and vibration analysis terms used in this chapter is provided in *Table 5.7-1*, *Noise and Vibration Descriptors*.

Table 5.7-1
NOISE AND VIBRATION DESCRIPTORS

Term	Definition
Decibel (dB)	A decibel is one-tenth of a bel. It is a measure on a logarithmic scale that indicates the squared ratio of sound pressure to a reference sound pressure (unit for sound pressure level) or the ratio of sound power to a reference sound power (unit for sound power level.)
Frequency or Hertz (Hz)	The number of oscillations per second of a periodic wave sound and of a vibrating solid, expressed in units of Hertz; formerly, cycles per second.
A-Weighted Sound Level (dBA)	Expressed in dBA or dB(A). Frequency-weighted sound pressure level approximating the frequency response of the human ear.
L01, L10, L50, L90	The energy-average of the A-weighted noise levels that are exceeded 1%, 10%, 50%, and 90% of the time during the measurement period.
Equivalent Noise Level (Leq)	The equivalent steady-state sound level that in a given period of time would contain the same acoustical energy as the time-varying sound level during the same period.

Table 5.7-1
NOISE AND VIBRATION DESCRIPTORS

Term	Definition
Community Noise Equivalent Level (CNEL)	A noise level that accounts for all the A-weighted noise energy from a source during 24 hours and weights the evening (7 PM to 10 PM) and night (10 PM to 7 AM) noise by adding 5 and 10 dBA, respectively, during these periods.
Day/Night Noise Level (DNL or Ldn)	The energy average of the A-weighted sound levels occurring during a 24-hour period, with 10 dB added to the A-weighted sound levels occurring from 10 PM to 7 AM
Lmax, Lmin	The maximum and minimum A-weighted noise level during the measurement period.
Ambient Noise	All-encompassing noise at a given place and time. This is usually a composite of sounds from all sources near and far, including any specific sources of interest.
Atmospheric Effects	Sound absorption by air molecules and water vapor, sound refraction caused by temperature and near-ground wind gradients, and air turbulence are collectively called atmospheric effects. Although atmospheric effects are mostly responsible for substantial noise fluctuations at distant receivers, they also can have a significant effect at distances within 330 feet.
Shielding	A noise reduction at the receiver because of the placement or existence of natural or artificial barriers (e.g., walls, berms, rows of buildings, or trees, if thick and dense enough).
Vibration	An oscillation wherein the quantity is a parameter that defines the motion of a mechanical system.
Peak Particle Velocity	The peak signal value of an oscillating vibration velocity waveform. Usually expressed in inches/second in the United States.
Source: Caltrans, 2013a	

Pitch is the height or depth of a tone or sound and depends on the frequency of the vibrations by which it is produced. Sound frequency is expressed in terms of cycles per second, or Hertz (Hz). Humans generally hear sounds with frequencies between 20 and 20,000 Hz, and perceive higher-frequency sounds, or high-pitch noise, as louder than low-frequency sound or sounds low in pitch.

Noise intensity or loudness is a function of the amplitude of the pressure wave generated by a noise source combined with the reception characteristics of the human ear. Atmospheric factors and obstructions between the noise source and receptor also affect the loudness perceived by the receptor. Sound pressure amplitude is measured in terms of micro-Pascals (mPa). One mPa is approximately 100 billionth (0.00000000001) of normal atmospheric pressure; however, sound pressure levels are rarely expressed in terms of mPa. Rather, sound pressure levels are expressed on a logarithmic scale in terms of decibels (dB). A dB is a unit of measurement that indicates the relative amplitude (i.e., intensity or loudness) of a sound, with 0 dB corresponding roughly to the threshold of hearing for the healthy, unimpaired human ear (approximately 20 mPa).

Sound levels in decibels are calculated on a logarithmic basis. An increase of 10 dB represents a ten-fold increase in acoustic energy, while 20 dB is 100 times more intense, 30 dB is 1,000 times more intense, and so forth. In general, there is a relationship between the subjective noisiness or loudness of a sound and its intensity, with each 10-dB increase in sound level perceived as approximately a doubling of loudness. Due to the logarithmic basis, decibels cannot be directly added or subtracted together using common arithmetic operations:

$$50 \text{ decibels} + 50 \text{ decibels} \neq 100 \text{ decibels}$$

Instead, the combined sound level from two or more sources must be combined logarithmically. For example, if one noise source produces a sound power level of 50 dBA, two of the same sources would combine to produce 53 dB as shown below.

$$10 * \ 10\log\left(10^{\left(\frac{50}{10}\right)} + 10^{\left(\frac{50}{10}\right)}\right) = 53 \text{ decibels}$$

In general, when one source is 10 dB higher than another source, the quieter source does not add to the sound levels produced by the louder source because the louder source contains ten times more sound energy than the quieter source.

Sound Characterization Methods

Humans generally can hear sounds with frequencies between 20 and 20,000 Hz. Most of the sounds humans are normally exposed to do not consist of a single frequency, but rather a broad range of frequencies that are perceived differently by the human ear. In general, humans are most sensitive to sounds with frequencies in the range of 1,000 to 8,000 Hz; the human ear perceive sounds within that range better than sounds of the same amplitude at higher or lower frequency ranges. Instruments used to measure sound, therefore, include an electrical filter that enables the instrument's detectors to replicate human hearing. This filter, known as the "A-weighting" or "A-weighted sound level" filters low and very high frequencies, and gives greater importance to the frequencies of sound that the human ear is typically most sensitive to. Most environmental measurements are reported in dBA, meaning decibels on the A-scale. A list of common noise sources and their associated A-weighted noise level is provided in *Table 5.7-2*, *Typical Noise Levels*. Other weightings include the B-, C-, and D-weighting, but these scales are not commonly used for environmental noise because human annoyance correlates well with the A-weighting, and these weighting scales are not incorporated in typical environmental noise descriptors.

Sound levels are usually not steady and vary over time. Therefore, a method for describing either the average character of the sound or the statistical behavior of the variations over a period of time is necessary. The continuous equivalent noise level (L_{eq}) descriptor is used to represent the average character of the sound over a period of time. The L_{eq} represents the level of steady-state noise that would have the same acoustical energy as time-varying noise measured over a given time period. L_{eq} is useful for evaluating shorter time periods over the course of a day. The most common L_{eq} averaging period is hourly, but L_{eq} can describe any series of noise events over a given time period.

Table 5.7-2
TYPICAL NOISE LEVELS

Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
	110	Rock Band
Jet flyover at 1,000 feet	105	
	100	
Gas lawn mower at 3 feet	95	
	90	
Diesel truck at 50 feet at 50 mph	85	Food blender at 3 feet
	80	Garbage disposal at 3 feet
Noise urban area, daytime	75	
Gas lawnmower, 100 feet	70	Vacuum cleaner at 10 feet
Commercial area	65	Normal speech at 3 feet
Heavy traffic at 300 feet	60	
	55	Large business office
Quiet urban daytime	50	Dishwasher next room
	45	
Quiet urban nighttime	40	Theater, large conference room
Quiet suburban nighttime	35	
	30	Library
Quite rural nighttime	25	Bedroom at night
	20	
	15	Broadcast/recording studio
	10	
	5	
Typical threshold of human hearing	0	Typical threshold of human hearing
Source: Caltrans, 2013a		

Variable noise levels are the values that are exceeded for a portion of the measured time period. Therefore, the L_{01}, L_{10}, L_{50}, and L_{90} descriptors represent the sound level's exceeded 1 percent, 10 percent, 50 percent, and 90 percent of the time the measurement was performed. The L_{90} value usually corresponds to the background sound level at the measurement location.

When considering environmental noise, it is important to account for the different responses people have to daytime and nighttime noise. In general, nighttime background noise levels are quieter than the daytime, but also more noticeable due to the fact that household noise has decreased as people begin to retire and sleep. Noise exposure over the course of an entire day is described by the day/night average sound level, DNL (or L_{dn}), and the community noise equivalent level, or CNEL, descriptors. Both descriptors represent the 24-hour noise exposure in a community or area. For DNL, the 24-hour day is divided into a 15-hour daytime period (7 AM to 10 PM) and a 9-hour nighttime period (10 PM to 7 AM), and a 10 dB "penalty" is added to measured nighttime noise levels when calculating the 24-hour average noise level. For example, a 45 dBA nighttime sound level would contribute as much to the overall day-night average as a 55 dBA daytime sound level. The CNEL descriptor is similar to DNL, except that it includes an additional 5 dBA penalty for noise events that occur during the evening time period (7 PM to 10 PM). The artificial penalties imposed during DNL and CNEL calculations are intended to account for a receptor's increased sensitivity to noise levels during quieter nighttime periods.

Sound Propagation

The energy contained in a sound pressure wave dissipates and is absorbed by the surrounding environment as the sound wave spreads out and travels away from the noise-generating source. The strength of the source is often characterized by its "sound power level." Sound power level is independent of the distance a receiver is from the source and is a property of the source alone. Knowing the sound power level of an idealized source and its distance from a receiver, the sound pressure level at a specific point (e.g., a property line or a receiver) can be calculated based on geometrical spreading and attenuation (noise reduction) as a result of distance and environmental factors, such as ground cover (asphalt versus grass or trees), atmospheric absorption, and shielding by terrain or barriers.

For an ideal "point" source of sound, such as mechanical equipment, the energy contained in a sound pressure wave dissipates and is absorbed by the surrounding environment as the sound wave spreads out in a spherical pattern and travels away from the point source. Theoretically, the sound level attenuates, or decreases, by 6 dB with each doubling of distance from the point source. In contrast, a "line" source of sound, such as roadway traffic or a rail line, spreads out in a cylindrical pattern and theoretically attenuates by 3 dB with each doubling of distance from the line source; however, the sound level at a receptor location can be modified further by additional factors. The first is the presence of a reflecting plane such as the ground. For hard ground, a reflecting plane typically increases A-weighted sound pressure levels by 3 dB. If some of the reflected sound is absorbed by the surface, this increase will be less than 3 dB. Other factors affecting the predicted sound pressure level are often lumped together into a term called "excess attenuation." Excess attenuation is the amount of additional attenuation that occurs beyond simple spherical or cylindrical spreading. For sound propagation outdoors, there is almost always excess attenuation, producing lower levels than what would be predicted by spherical or cylindrical spreading. Some examples include attenuation by sound absorption in air; attenuation by natural or man-made topography, barriers, or structures; attenuation by rain, sleet, snow, or fog; attenuation by soft ground cover such as grass, shrubbery, and trees; and attenuation from shadow zones created by wind and temperature gradients. Under certain meteorological conditions, like fog and low-level clouds, some of these excess attenuation mechanisms can be reduced or eliminated due to noise reflection.

Noise Effects

Human response to sound is highly individualized because many factors influence a person's response to a particular noise, including the type of noise, the variability of the sound level, the presence of tones or impulses, and the time of day of the noise occurs. In addition, non-acoustical factors, such as the person's opinion of the noise source, the ability to adapt to the noise, the attitude towards the source and those associated with it, and the predictability of the noise, all influence a person's response. As such, response to noise varies widely from one person to another and with any particular noise, individual responses will range from "not annoyed" to "highly annoyed" with annoyance being an expression of negative feelings resulting from interference with activities, the disruption of one's peace of mind, or degradation of the enjoyment of one's environment.

Noise effects on human beings are generally categorized as:

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

Most environmental noise levels produce subjective or interference effects. Noise can mask important sounds and disrupt communication between individuals in a variety of settings, resulting in a slight irritation to a serious safety hazard, depending on the circumstance. Noise-induced sleep interference is a critical factor in community and personal annoyance. Sound level, frequency distribution, duration, repetition, and variability can make it difficult to fall asleep and may cause momentary shifts in the natural sleep pattern, or level of sleep resulting in short-term adverse effects such as mood changes, job/school performance, etc.

Physiological effects are usually limited to prolonged and/or repeated exposure to high noise environments at facilities such as, but not limited to, industrial and manufacturing facilities or airports.

Predicting the subjective and interference effects of noise is difficult due to the wide variation in individual thresholds of annoyance and past experiences with noise; however, an accepted method to determine a person's subjective reaction to a new noise source is to compare it to the existing environment without the noise source, or the "ambient" noise environment. In general, the more a new noise source exceeds the ambient noise level, the more likely it is to be considered annoying and to disturb normal activities.

Under controlled conditions in an acoustical laboratory, the trained, healthy human ear is able to discern 1 dB changes in sound levels when exposed to steady, single-frequency ("pure-tone") signals in the mid-frequency (1,000–8,000 Hz) range. In typical noisy environments, changes in noise of 1 to 2 dB are generally not perceptible; however, it is widely accepted that people are able to begin to detect sound level increases of 3 dB in typical noisy environments. Further, a 5 dB increase is generally perceived as a distinctly noticeable increase, and a 10 dB increase is generally perceived as a doubling of loudness that would almost certainly cause an adverse response from community noise receptors.

GROUNDBORNE VIBRATION AND NOISE

Vibration is the movement of particles within a medium or object such as the ground or a building. Vibration may be caused by natural phenomena (e.g., earthquakes, volcanic eruptions, sea waves, landslides) or humans (e.g., explosions, machinery, traffic, trains, construction equipment). Vibration sources are usually characterized as continuous, such as factory machinery, or transient, such as explosions.

As is the case with airborne sound, groundborne vibrations may be described by amplitude and frequency; however, unlike airborne sound, there is no standard way of measuring and reporting amplitude. Vibration amplitudes can be expressed in terms of velocity (inches per second) or discussed in dB units to compress the range of numbers required to describe vibration. Vibration impacts to buildings are usually discussed in terms of peak particle velocity (PPV) in inches per second (in/sec). PPV represents the maximum instantaneous positive or negative peak of a vibration signal and is most appropriate for evaluating the potential for building damage. Vibration can impact people, structures, and sensitive equipment. The primary concern related to vibration and people is the potential to annoy those working and residing in the area. Vibration with high enough amplitudes can damage structures (such as crack plaster or destroy windows). Ground-borne vibration can also disrupt the use of sensitive medical and scientific instruments, such as electron microscopes.

Groundborne noise is noise generated by vibrating building surfaces such as floors, walls, and ceilings that radiate noise inside buildings subjected to an external source of vibration. The vibration level, the acoustic radiation of the vibrating element, and the acoustical absorption of the room are all factors that affect potential groundborne noise generation.

5.7.2 REGULATORY SETTING

This section summarizes the laws, ordinances, regulations, and standards applicable to the project. Regulatory requirements related to environmental noise are typically promulgated at the local level; however, Federal and State agencies provide standards and guidelines to the local jurisdictions.

FEDERAL GUIDELINES

Federal Transit Administration (FTA)

No federal regulations apply to noise or vibration from the proposed project, but the FTA's 2018 *Transit Noise and Vibration Impact Assessment Manual* document sets ground-borne vibration annoyance criteria for general assessments. The criteria vary by the type of building being subjected to the vibrations, and the overall number of vibration events occurring each day. Category 1 buildings are considered buildings where vibration would interfere with operation, even at levels that are below human detection. These include buildings with sensitive equipment, such as research facilities and recording studios. Category 2 buildings include residential lands and buildings were people sleep, such as hotels and hospitals. Category 3 buildings consist of institutional land uses with primary daytime uses. The FTA standards vary for "frequent" events (occurring more than 70 times per day such as a rapid transit project), "occasional" events (occurring between 30 to 70 times per day) and "infrequent" events (occurring less than 30 times per day). The FTA's vibration annoyance criteria are summarized in *Table 5.7-3*, *FTA Ground-Borne Vibration Impact Criteria for General Assessment*.

Table 5.7-3
FTA GROUND-BORNE VIBRATION IMPACT CRITERIA FOR GENERAL ASSESSMENT

Vibration Land Use Category/Type	Frequent Events	Occasional Events	Infrequent Events
Category 1 – Buildings with sensitive equipment	65 VdB	65 VdB	65 VdB
Category 2 – Buildings where people sleep	72 VdB	75 VdB	80 VdB
Category 3 – Institutional buildings	75 VdB	78 VdB	83 VdB
Source: FTA, 2018			

STATE OF CALIFORNIA GUIDELINES

California Building Standards Code

The California Building Standards Code is contained in Title 24 of the California Code of Regulations and consists of 11 different parts that set various construction and building requirements. Part 2, California Building Code, Section 1207, Sound Transmission, establishes sound transmission standards for interior walls, partitions, and floor/ceiling assemblies. Specifically, Section 1207.4 establishes that interior noise levels attributable to exterior noise sources shall not exceed 45 dBA DNL or CNEL (as set by the local General Plan) in any habitable room.

California Green Building Standards Code

The California Green Building Standards Code is Part 11 to the California Building Standards Code. Chapter 5, Nonresidential Mandatory Standards, Section 5.507 establishes the following requirements for non-residential development that may be applicable to the proposed Specific Plan:

> 5.507.4.1.1 sets forth that buildings exposed to a noise level of 65 dB L_{eq} (1-hour) during any hour of operation shall have exterior wall and roof-ceiling assemblies exposed to the noise source meeting a composting sound transmission class (STC) rating of at least 45 (or an outdoor indoor transmission class (OITC) of 35), with exterior windows of a minimum STC of 40.

Section 5.507.4.2 sets forth that wall and roof assemblies for buildings exposed to a 65 dBA L_{eq} pursuant to Section 5.507.4.1.1, shall be constructed to provide an interior noise environment attributable to exterior sources that does not exceed 50 dBA Leq in occupied areas during any hour of operation. This requirement shall be documented by preparing an acoustical analysis documenting interior sound levels prepared by personnel approved by the architect or engineer of record.

California Department of Transportation (Caltrans)

The California Department of Transportation's (Caltrans) *Transportation and Construction Vibration Guidance Manual* provides a summary of vibration criteria that have been reported by researchers, organizations, and governmental agencies (Caltrans, 2013b). Chapters Six and Seven of this manual summarize vibration detection and annoyance criteria from various agencies and provide Caltrans' recommended guidelines and thresholds for evaluating potential vibration impacts on buildings and humans from transportation and construction projects. These thresholds are summarized in *Table 5.7-4*, *Caltrans' Vibration Threshold Criteria for Building Damage*, and *Table 5.7-5*, *Caltrans' Vibration Threshold Criteria for Human Response*.

Table 5.7-4
CALTRANS VIBRATION THRESHOLD CRITERIA FOR BUILDING DAMAGE

Structural Integrity	Maximum PPV (in/sec)	
	Transient	Continuous
Extremely fragile buildings, ruins, monuments	0.12	0.08
Fragile buildings	0.2	0.1
Historic and some older buildings	0.50	0.25
Older residential structures	0.50	0.30
New residential structures	1.00	0.50
Modern industrial and commercial structures	2.00	0.50
Source: Caltrans, 2013b		

Table 5.7-5
CALTRANS VIBRATION THRESHOLD CRITERIA FOR HUMAN RESPONSE

Human Response	Maximum PPV (in/sec)	
	Transient	Continuous
Barely perceptible	0.035	0.012
Distinctly perceptible	0.24	0.035
Strongly perceptible	0.90	0.10
Severely perceptible	2.00	0.40
Source: Caltrans, 2013b		

LOS ANGELES COUNTY VIBRATION GUIDELINES

Section 12.08.560 of the *Los Angeles County Noise Control Ordinance* limits vibration levels from a source to other properties of 0.01 in/sec PPV.

LOCAL GUIDELINES

Duarte Comprehensive General Plan 2005 – 2020

The *California Government Code* requires that a noise element be included in the general plan of each county and City in the state. The Noise Element of the *Duarte General Plan* evaluates sources of noise and provides goals and policies that ensure that noise from various sources does not create an unacceptable noise environment. Chapter 4, Noise Element, of the *Duarte General Plan* includes the following goals and policies that are relevant to the proposed project:

Noise Goal 1: To reduce noise impacts from transportation sources.

Policies:

N1.1.1: Ensure noise mitigation measures are included in the design of new developments.

N 1.1.2: Encourage the State Department of Transportation (Caltrans) to continue Programs that lead to the reduction of the noise levels on I-210 and I-605.

N 1.1.3: Continue the City's beautification program along arterials to help reduce noise levels.

N 1.1.4: Encourage acoustical materials in all new residential and commercial developments where noise levels exceed the compatibility standards outlined in the Noise Element.

N 1.1.5: Limit construction, delivery, and through truck traffic to designated routes.

N 1.1.6: Ensure Community Noise Equivalent Levels (CNEL) for noise sensitive land uses meet or exceed normally acceptable levels, as defined by State of California standards.

N 1.1.7: The City should encourage, support, and enforce all State and Federal legislation designed to abate and control noise pollution.

N 1.1.8: The City should encourage the use of rubberized asphalt city streets.

Noise Goal 2: Develop measures to control non-transportation noise impacts.

Policies:

N 2.1.1: Continuously review the Noise Ordinance to ensure noise-generating uses are adequately addressed.

N 2.1.2: Strive to resolve existing and potential conflicts between noise generating uses and human activities.

N 2.1.3: Reduce noise from rock quarrying operations.

N 2.1.4: Prohibit significant noise generating activities from locating adjacent to residential neighborhoods and near schools.

N 2.1.5: Evaluate the noise impacts from projects and existing uses in adjacent cities and work cooperatively with these cities to develop mitigation measures that will improve ambient noise conditions in Duarte.

Noise Goal 3: To establish land uses which are compatible with noise levels within the community.

N 3.1.1: Establish a system of locating land uses according to the maximum noise levels they generate.

N 3.1.2: Enforce limits set by the State to control noise levels, particularly those governing motor vehicles.

N 3.1.3: Ensure that construction noise does not cause an adverse impact to the residents of the City.

N 3.1.4: Minimize noise and light spillage onto other residential properties.

The Noise Element also identifies noise sensitive land uses and noise sources, and defines areas of noise impact for the purpose of developing programs to ensure that City of Duarte residents will be protected from excessive noise intrusion. *Table 5.7-6*, *Noise and Land Use Compatibility* (Table N-1 of the *General Plan*), shows the City's exterior and interior noise compatibility standards.

Table 5.7-6
NOISE AND LAND USE COMPATIBILTY CRITERIA

Land Use Category	Community Noise Exposure (L_{dn} or CNEL, dBA)			
	Normally Acceptable	Conditionally Acceptable	Normally Unacceptable	Clearly Unacceptable
Residential - Low Density, Single-Family, Duplex, Mobile Homes	50 - 60	55 - 70	70-75	75-85
Residential - Multiple Family	50 - 65	60 - 70	70 - 75	70 – 85
Transient Lodging - Motel, Hotels	50 - 65	60 - 70	70 - 80	80 – 85
Schools, Libraries, Churches, Hospitals, Nursing Homes	50 - 70	60 - 70	70 - 80	80 – 85
Auditoriums, Concert Halls, Amphitheaters	NA	50 - 70	NA	65 – 85
Sports Arenas, Outdoor Spectator Sports	NA	50 - 75	NA	70 – 85
Playgrounds, Neighborhood Parks	50 - 70	NA	67.5 - 75	72.5 – 85
Golf Courses, Riding Stables, Water Recreation, Cemeteries	50 - 70	NA	70 - 80	80 – 85
Office Buildings, Business Commercial and Professional	50 - 70	67.5 - 77.5	75 - 85	NA
Industrial, Manufacturing, Utilities, Agriculture	50 - 75	70 - 80	75 - 85	NA
NA: Not Applicable				

Table 5.7-6
NOISE AND LAND USE COMPATIBILTY CRITERIA

Land Use Category	Community Noise Exposure (L_{dn} or CNEL, dBA)			
	Normally Acceptable	Conditionally Acceptable	Normally Unacceptable	Clearly Unacceptable

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 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 requirements must be made and needed noise insulation features included in the design.
Clearly Unacceptable – New construction or development should generally not be undertaken.
Source: City of Duarte, *2005*

Duarte Municipal Code

Title 9, Public Peace and Safety, Chapter 9.68, Noise Regulations, of the *Duarte Municipal Code* prohibits unnecessary, excessive, and annoying noises from all sources subject to the City's police power. The *Municipal Code* declares that at certain levels, noises are unfavorable to the public health and welfare of the citizenry and, in the public interest, such noise levels shall be systematically proscribed.

Municipal Code Section 9.68.050 (Ambient Base Noise Levels) sets forth that it is unlawful for any person within the City to make, cause, or allow to be produced noise which is received on property occupied by another person in a designated zone in excess of the standards listed in *Table 5.7-7*, *City of Duarte Municipal Code Noise Standards*.

Table 5.7-7
CITY OF DUARTE MUNICIPAL CODE NOISE STANDARDS

Noise Zone[(A)]	Day (7 AM to 9 PM)	Night (9 PM to 7 AM)
R-1 and R-2[(B)]	55 dBA	45 dBA
R-3 and R-4[(B)]	55 dBA	50 dBA
Commercial	60 dBA	55 dBA
Industrial and Light Manufacturing	70 dBA	70 dBA

(A) At the boundary line between a residential property and a commercial and manufacturing property, the noise level of the quieter zone shall be used.
(B) Per Section 9.68.020(q) of the *Municipal Code,* R-1 refers to single family residential zones while R-2, R-3, and R-4 refer to multiple residential zones.
Source: City of Duarte, 2019

Per the *Municipal Code*, the standards listed in Table 5.7-7 shall be adjusted using the corrections listed in *Table 5.7-8*, *City of Duarte Municipal Code Noise Standard Corrections.*

Table 5.7-8
CITY OF DUARTE MUNICIPAL CODE NOISE STANDARD CORRECTIONS

Noise Condition	Correction
Repetitive impulsive noise, pure tones and sound with cyclically varying amplitude	-5 dB
Steady whine, screech, or hum	-5 dB
Noise occurring more than 5 but less than 15 minutes per hour (daytime only)	+5 dB
Noise occurring more than 1 but less than 5 minutes per hour (daytime only)	+10 dB
Noise occurring less than 1 minute per hour (daytime only)	+15 dB
Source: City of Duarte, 2019	

Municipal Code Section 9.68.120 (Construction of Building and Projects*)* sets forth that is unlawful for any person within a residential zone, or within a radius of 500 feet, to operate equipment or perform any outside construction or repair work on buildings, structures, or projects or to operate any pile-driver, power shovel, pneumatic hammer, derrick, power hoist, or any other construction type device (between the hours of 10:00 PM of one day and 7:00 AM of the next day) in such a manner that a reasonable person of normal sensitiveness residing in the area is caused discomfort or annoyance unless beforehand a permit has been obtained from the planning and zoning division.

Municipal Code Section 9.68.160 (Machinery, equipment, fans and air conditioning*)* sets forth that is unlawful for any person to operate any machinery, equipment, pump, fan, air conditioning apparatus, or similar mechanical device (between the hours of 10:00 PM of one day and 7:00 AM of the following day), use of which is attended by loud or unusual noises.

5.7.3 ENVIRONMENTAL SETTING

This section describes the existing noise and vibration setting of the proposed project.

EXISTING NOISE AND VIBRATION ENVIRONMENT

Located in the south-central portion of the City of Duarte, the approximately 19.08-acre planning area is generally configured in an east-west orientation and is bounded by Fairdale Avenue to the west, Interstate 210 (I-210) to the north, Highland Avenue to the east, and the Metro Gold Line to the south. The existing planning area currently consists of four parcels under separate ownerships, developed with a mix of industrial uses totaling approximately 313,955 square feet.

- The southernmost parcel, parcel 8528-011-023, is approximately 6.60 acres in size, abuts the Metro Gold Line, and is developed with an approximately 128,466-square-foot warehousing building.
- The west-central parcel, parcel 8528-011-023, is approximately 7.63 acres in size, and is developed with an approximately 114,599-square-foot industrial building.
- The east-central parcel, parcel 8528-011-906, is approximately 1.37 acres in size, and is currently a Metro Gold Line parking lot. This parcel is vacant.
- The northernmost parcel, parcel 8528-001-024, is approximately 3.32 acres in size, and is developed with an approximately 70,890-square-foot warehouse building.

The planning area is generally surrounded by other, light industrial land uses. As described previously, the site is adjacent to the Duarte Metro Gold Line Station and I-210. Interstate 605 (I-605) is approximately 0.4 miles to the southeast. The nearest airport is the San Gabriel Valley Airport, located approximately 4.6 miles to the southwest.

The *General Plan* Noise Element identifies that the major sources of noise in Duarte are transportation related. Highland Avenue, Duarte Avenue, and I-210 are specifically identified as major sources of noise in the City (City of Duarte 2005, pgs. 11-12). In addition to the high volume of traffic that travels along I-210, it is elevated above the cityscape and sounds travels farther from it into the City as a result. The eastbound segment of I-210 that runs adjacent to the planning area is elevated approximately 20 feet above it.

At the time the *General Plan* Noise Element was prepared, the Duarte Gold Line Metro Station had not yet been constructed; however, the Gold Line Foothill Extension Pasadena to Montclair FEIR predicted the following noise levels for eastbound and westbound light rail service at residential receptors in the City:

- Eastbound Gold Line noise levels south of the right-of-way were predicted to be 72 DNL or less within approximately 40 feet of the eastbound track, 65 DNL or less within approximately 50 feet of the eastbound track, and less than 60 DNL approximately 100 feet of the eastbound track (MGLFECA 2007, Table 3-11.6).
- Westbound Gold Line noise levels north of the right-of-way were predicted to be 71 DNL or less within approximately 40 feet of the westbound track, 68 DNL or less within approximately 60 feet of the westbound track, and less than 60 DNL approximately 100 feet of the eastbound track (MGLFECA 2007, Table 3-11.6).

The exiting ambient noise and vibration environment at and near the planning area is described in more detail below.

AMBIENT NOISE MEASUREMENTS

Ambient noise level monitoring was conducted for the proposed project on May 7 and 8, 2019 (MIG 2019; see Appendix F). Ambient noise levels were measured with two Larson Davis SoundTrack LxT Type 1 sound level meters; ambient noise measurements were collected in 15-minute intervals. Conditions during the monitoring were generally overcast during the daytime, with a daily high of approximately 65 degrees Fahrenheit and winds light and variable.

The ambient noise monitoring conducted for this EIR included four short-term (ST) and one long-term (LT) measurements at locations selected to:

- Provide direct observations of existing noise sources at an in the vicinity of the planning area;
- Determine typical ambient noise level at an in vicinity of the planning area; and
- Evaluate potential project noise levels at nearby sensitive receptor locations.

The ambient noise monitoring locations and measured sound levels are described below and presented in *Table 5.7-9, Existing Ambient Noise Levels in the Project Area (dBA)*.

- **Location ST-1** was located at the southwest corner of Glenford Avenue and Business Center Drive, near the center of the planning area. The ambient noise levels at location ST-1 are considered representative of background daytime noise levels associated with local light-industrial land uses in the area, the I-210, and traffic on Business Center Drive. Location ST-1 was located approximately 410 feet from I-210.
- **Location ST-2** was located at the eastern terminus of Three Ranch Road, adjacent to the planning area's western boundary. The ambient noise levels at location ST-2 are considered representative of background daytime noise levels in the residential community to the west, which are influenced by operation of the Metro Gold Line. Location ST-2 was located approximately 150 feet from the Metro Gold Line right-of-way. A wall that stands approximately eight feet tall separates Three Ranch Road from the planning area.
- **Location ST-3** was located on the western side of Highland Avenue, approximately 50 feet from the Metro Gold Line right-of-way, near the planning area's southern boundary. The ambient noise levels measured at location ST-3 are considered representative of background daytime noise levels associated with vehicular traffic along Highland Avenue and operation of the Metro Gold Line.
- **Location ST-4** was located at the southwest corner of the Highland Avenue and Business Center Drive intersection, along the eastern boundary of planning area. The ambient noise levels at location ST-4 are considered representative of background daytime noise levels from traffic on Highland Avenue and I-210. Location ST-4 was approximately 410 feet from I-210.
- **Location LT-1** was located along Evergreen Street, approximately 80 feet from I-210. The ambient noise levels measured at location LT-1 are considered representative of 24-hour ambient noise exposure levels along the northern portion of the planning area.

Based on observations made during the ambient noise monitoring, the existing noise environment in the project vicinity consists primarily of transportation noise sources, particularly vehicular traffic on I-210 and rail activity on the Metro Gold Line.

Table 5.7-9
EXISTING AMBIENT NOISE LEVELS IN THE PROJECT AREA (dBA)

Monitoring Site	Duration	Lmin	Lmax	Leq Range			CNEL
				Daytime (7 AM – 7 PM)	Evening (7PM – 10PM)	Nighttime (10 PM – 7 AM)	
ST-1	30 Minutes	55.1	67.7	59.1 – 59.9	--(A)	--(A)	--(A)
ST-2	30 Minutes	49.5	65.6	54.0 – 54.4	--(A)	--(A)	--(A)
ST-3	30 Minutes	52.1	82.2	66.4 – 67.6	--(A)	--(A)	--(A)
ST-4	45 Minutes	58.2	81.0	64.6 – 66.1	--(A)	--(A)	--(A)
LT-1	24-Hours	49.4	88.2	66.4 – 70.6	68.5 – 69.5	64.0 – 71.0	74.6

Source: MIG, 2019 (see Appendix F)
(A) Data is not available for these noise metrics because noise data was not collected for the time period in question or the noise metric was not available for use in this table.

MOBILE SOURCES – EXISTING AND FUTURE TRAFFIC NOISE LEVELS

Existing (2019) traffic noise levels were computed using the U.S. Department of Transportation Federal Highway Administration's Traffic Noise Model (TNM), Version 2.5. The model uses traffic volume, vehicle mix, vehicle speed, roadway geometry, and other variables to compute 24-hour traffic noise levels at user-defined receptor distances from the roadway center. The TNM modeling conducted for this EIR incorporates worst-case assumptions about motor vehicle traffic and noise levels; specifically, calculations are based on "hard" site conditions and do not incorporate any natural or artificial shielding, with the exception of modeling for I-210, which included shielding associated with the sound barrier wall present along a portion of this freeway adjacent to the planning area.

Information on existing average daily traffic volumes was obtained from City traffic speed zone surveys (KOA 2017), the *Transportation Impact Study* prepared for the project (Fehr and Peers, 2019), and Caltrans traffic count information (for I-210; Caltrans, 2018). Traffic noise levels were estimated on a 24-hour, CNEL exposure basis assuming equal hourly distribution of vehicle traffic. The mix of automobiles (95%), medium (2%) and heavy-duty trucks (1%), and motorcycles (2%) assigned to the roadway system was generated using the CARB EMFAC2017 model, which contains vehicle population data by different geographic regions. Vehicles were assumed to travel between 25 and 40 miles per hour depending on the roadway. Existing modeled traffic noise levels can be found in *Table 5.7-10*, *Existing (2019) Traffic Noise Levels*. As shown in *Table 5.7-10*, noise at and near the project area from vehicle traffic ranges from 53.2 dBA to 74.2 dBA. Please refer to Appendix F for detailed information on future baseline traffic noise modeling assumptions.

Table 5.7-10
EXISTING (2019) TRAFFIC NOISE LEVELS

Roadway Segment	Average Daily Traffic (ADT)	dBA @ 100 Feet from Roadway Centerline	Distance in Feet from Roadway Centerline to:		
			60 CNEL Noise Contour	65 CNEL Noise Contour	70 CNEL Noise Contour
Buena Vista Street					
Huntington Drive to Central Avenue	13,800	66.4	437	138	44
Central Avenue to I-210 Westbound Ramp	15,410	63.4	219	69	22
I-210 Westbound On-Ramp to I-210 Eastbound Ramp	14,260	64.9	309	98	31
I-210 Eastbound On-Ramp to Three Ranch Road	12,270	65.4	347	110	35
Three Ranch Road to Duarte Road	12,390	64.4	275	87	28
Central Ave					
East of Mountain Avenue	13,880	66.2	417	132	42
West of Buena Vista Street	5,320	62.3	170	54	17
Buena Vista Street to I-210 WB Off-Ramp	11,350	64.4	275	87	28
I-210 WB Off-Ramp to Duncannon Avenue	11,480	62.3	170	54	17
Duncannon Avenue to Highland Avenue	8,330	64.3	269	85	27
Duarte Road					
Mountain Avenue to Buena Vista Street	11,570	67.4	550	174	55
Buena Vista Street to Cinco Robles Drive	13,080	67.3	537	170	54
Cinco Robles Drive to Village Road	12,240	66.3	427	135	43
Village Road to Highland Avenue	10,350	66.9	490	155	49
Duncannon Avenue					
Central Avenue to Evergreen Street	1,940	53.2	21	7	2
Evergreen Street					
East of Mountain Ave	17,350	67.5	562	178	56
West of Buena Vista Street	6,940	63.3	214	68	21
Duncannon Avenue to Highland Avenue	1,420	55	32	10	3
Highland Avenue					
Huntington Drive to Central Avenue	10,850	62.1	162	51	16
Central Avenue to Evergreen Street	13,590	65.1	324	102	32
Evergreen Street to Business Center Drive	12,240	64.3	269	85	27
Business Center Drive to Duarte Road	11,660	65.3	339	107	34
Huntington Drive					
Buena Vista Street to Highland Avenue	22,310	70.3	1,072	339	107
Highland Avenue to Mount Olive Drive	25,040	70.8	1,202	380	120
Mountain Avenue					
Central Avenue to Evergreen Street	18,140	65.9	389	123	39
Evergreen Street to Duarte Road	14,010	66.3	427	135	43
I-210					
Adjacent to Evergreen Street (without barrier)	263,757	74.2	10,258	3,244	1,026
Adjacent to Evergreen Street (with barrier)	263,757	64.3	1,050	332	105

Notes: ADT = average daily traffic; dBA = A-weighted decibels; CNEL = community noise equivalent level.

Source: Noise modeling conducted by MIG (see Appendix F) based on traffic data within the *Transportation Impact Study,* prepared by Fehr and Peers, dated April 2019.

The *Transportation Impact Study* prepared for the project includes an analysis of future traffic conditions that would occur in 2025 without implementation of the Project. This future baseline scenario assumes traffic would grow in the City by approximately 1.0% compared to existing 2019 conditions.

The future baseline year 2025 traffic noise levels were computed using TNM, Version 2.5 and the same roadway geometry factors assumed for 2019 traffic noise levels. The future vehicle mix was adjusted to account for changes in the vehicle fleet contained within the CARB EMFAC2017 model; the mix of vehicles assigned to the roadway system was assumed to be automobiles (94%), medium (2%) and heavy duty trucks (1%), and motorcycles (3%). Future 2025 modeled traffic noise levels can be found in *Table 5.7-11, Future (2025) Traffic Noise Levels (Projected)*. As shown in *Table 5.7-11*, future noise levels at and near the project area from vehicle traffic would range from 53.5 dBA to 74.7 dBA. Please refer to Appendix F for detailed information on future baseline traffic noise modeling assumptions. The increase in traffic and change in fleet characteristics generally increased noise levels by approximately 0.3 to 1.2 dBA for all modeled roadway segments.

Table 5.7-11
FUTURE 2025 TRAFFIC NOISE LEVELS (PROJECTED)

Roadway Segment	Average Daily Traffic (ADT)	dBA @ 100 Feet from Roadway Centerline	Distance in Feet from Roadway Centerline to:		
			60 CNEL Noise Contour	65 CNEL Noise Contour	70 CNEL Noise Contour
Buena Vista Street					
Huntington Drive to Central Avenue	16,110	67.3	537	170	54
Central Avenue to I-210 Westbound Ramp	17,710	64.2	263	83	26
I-210 Westbound On-Ramp to I-210 Eastbound Ramp	17,270	65.9	389	123	39
I-210 Eastbound On-Ramp to Three Ranch Road	15,850	66.7	468	148	47
Three Ranch Road to Duarte Road	15,980	65.6	363	115	36
Central Ave					
East of Mountain Avenue	14,870	66.7	468	148	66.7
West of Buena Vista Street	5,490	62.6	182	58	62.6
Buena Vista Street to I-210 WB Off-Ramp	12,370	64.9	309	98	64.9
I-210 WB Off-Ramp to Duncannon Avenue	12,010	62.6	182	58	62.6
Duncannon Avenue to Highland Avenue	8,620	64.7	295	93	64.7
Duarte Road					
Mountain Avenue to Buena Vista Street	13,020	68.1	646	204	65
Buena Vista Street to Cinco Robles Drive	16,290	68.5	708	224	71
Cinco Robles Drive to Village Road	15,410	67.5	562	178	56
Village Road to Highland Avenue	11,540	67.6	575	182	58
Duncannon Avenue					
Central Avenue to Evergreen Street	2,000	53.5	22	7	2
Evergreen Street					
East of Mountain Ave	19,140	68.1	646	204	65
West of Buena Vista Street	8,480	64.3	269	85	27
Duncannon Avenue to Highland Avenue	1,470	55.4	35	11	3
Highland Avenue					
Huntington Drive to Central Avenue	11,700	62.6	182	58	18
Central Avenue to Evergreen Street	14,610	65.6	363	115	36
Evergreen Street to Business Center Drive	13,200	64.8	302	95	30

Table 5.7-11
FUTURE 2025 TRAFFIC NOISE LEVELS (PROJECTED)

Roadway Segment	Average Daily Traffic (ADT)	dBA @ 100 Feet from Roadway Centerline	Distance in Feet from Roadway Centerline to:		
			60 CNEL Noise Contour	65 CNEL Noise Contour	70 CNEL Noise Contour
Business Center Drive to Duarte Road	12,610	65.8	380	120	38
Huntington Drive					
Buena Vista Street to Highland Avenue	24,940	71	1,259	398	126
Highland Avenue to Mount Olive Drive	28,660	71.6	1,445	457	145
Mountain Avenue					
Central Avenue to Evergreen Street	20,890	66.7	468	148	47
Evergreen Street to Duarte Road	14,680	66.7	468	148	47
I-210					
Adjacent to Evergreen Street (without barrier)	279,984	74.7	11,510	3,640	1,151
Adjacent to Evergreen Street (with barrier)	279,984	65.1	1,262	399	126

Notes: ADT = average daily traffic; dBA = A-weighted decibels; CNEL = community noise equivalent level.

Source: Noise modeling conducted by MIG (see Appendix F) based on traffic data within the *Transportation Impact Study,* prepared by Fehr and Peers, dated April 2019.

EXISTING METRO GOLD LINE NOISE AND VIBRATION LEVELS

The project area is located adjacent to the Metro Gold Line. Rail-related noise comes from several potential sources. A locomotive engine's propulsion system generates noise from mechanical and electrical systems. The interaction of wheels with the track produces various noises, particularly where the wheel encounters a flaw or defect along smooth wheel / track surfaces. Finally, train horn or bells and railroad crossing warning devices generate short but loud alerts pursuant to federal safety regulations.

The Metro Gold Line is a commuter rail line with eastbound and westbound service at the Duarte Station every seven to 14 minutes Monday through Friday. Peak hourly weekday activity occurs during the morning and eve in g commuter periods when nine eastbound and westbound trains can occur in an hour; typical service involves four to five northbound and southbound trains per hour. During the weekday, service runs nearly 20 hours a day. Weekend service also runs nearly 24 hours a day, with three to five northbound and southbound trains per hour. The Metro Gold Line crosses Highland Avenue at grade, with guards and warning bells provided for safety.

During the ambient noise monitoring, noise levels associated with the Metro Gold Line were observed to be in the range from 68 to 81 dB while passing at distance of approximately 70 feet from the center of the eastbound track (i.e., the northernmost track). The higher noise levels were associated with eastbound trains accelerating from the Duarte Station.

Vibration monitoring was not conducted specifically for the proposed project; however, vibration monitoring was conducted in January 2018 for the nearby South Station Square Project IS/MND in the City of Monrovia (City of Monrovia 2018). The vibration monitoring for the South Station Square Project was conducted approximately 1.8 miles from the proposed project area, at a distance of 20 feet from the track centerline. The results of this monitoring indicate vibration levels generated by the existing Metro Gold Line are less than 0.002 PPV and 61 VdB.

STATIONARY AND OTHER NON-TRANSPORTATION NOISE SOURCES

Non-transportation sources also contribute to the City's existing noise environment. Commercial, residential, and light industrial land uses located near the planning area generate noise from daily operations of landscaping equipment, stationary sources such as heating, ventilation, and air conditioning (HVAC) equipment, business deliveries, solid waste pickup services, etc. Such sources are considered local source of noise that only influence the immediate surroundings.

SENSITIVE RECEPTORS

Noise-sensitive receptors are buildings or areas where unwanted sound or increases in sound may have an adverse effect on people or land uses. Residential areas, motels and hotels, hospitals and health care facilities, school facilities, and parks are examples of noise receptors that could be sensitive to changes in existing environmental noise levels. Sensitive receptors are listed below in *Table 5.7-12*, *Sensitive Receptors*. The distances are measured from the exterior project boundary only and not from individual construction projects/areas within the interior of the project site.

Table 5.7-12
SENSITIVE RECEPTORS

Type of Receptor	Location	Distance from Project Site	Direction from Project Site
Residential	Along Business Center Drive, Denning Avenue, and Glenford Avenue	70	North
	Along Orange Grove Road	740	North, across the I-210
	Along Fairdale Avenue and 3 Ranch Road	30	West
School	Northview Intermediate School	700	North
	Duarte High School	700	Northwest
Public Park	Northview Park	700	North
	Pioneer Park	600	Southwest

In addition, once constructed and occupied, residential receptors associated with the Duarte Station Specific Plan residential buildings would represent new noise-sensitive receptors.

5.7.4 SIGNIFICANCE THRESHOLD CRITERIA

The issues presented in the Initial Study Environmental Checklist (*CEQA Guidelines* Appendix G) have been utilized as thresholds of significance in this Section. Accordingly, a project may create a significant environmental impact if it causes one or more of the following to occur:

- 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;
- Generation of excessive groundborne vibration or groundborne noise levels; and/or

- 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, expose people residing or working in the project area to excessive noise levels.

TRAFFIC NOISE

A proposed project would normally have a significant offsite traffic noise impact if both of the following criteria are met:

- Project traffic would cause a noise level increase of 3dB or more on a roadway segment adjacent to a noise-sensitive land use.
- The resulting "future with project" noise level exceeds the noise standard for sensitive land uses as identified in the City of Duarte General Plan (refer to *Table 5.7-6*).

STATIONARY NOISE

The project would normally have a significant noise impact if it would:

- Exceed the stationary source noise criteria for the City of Duarte as identified in *Table 5.7-7*, *City of Duarte Municipal Code Noise Standards*.

Based on these significance thresholds and criteria, the proposed project's effects have been categorized as either "no impact," a "less than significant impact," or a "potentially significant impact." Mitigation measures are recommended for potentially significant impacts. If a potentially significant impact cannot be reduced to a less than significant level through the application of mitigation, it is categorized as a significant unavoidable impact.

5.7.5 PROJECT IMPACTS AND MITIGATION MEASURES

SHORT-TERM CONSTRUCTION NOISE AND VIBRATION IMPACTS

GRADING AND CONSTRUCTION ASSOCIATED WITH IMPLEMENTATION OF THE PROPOSED PROJECT COULD RESULT IN SIGNIFICANT TEMPORARY NOISE IMPACTS TO NEARBY NOISE SENSITIVE RECEIVERS.

Impact Analysis:

Temporary Construction Noise Impacts

As shown in *Table 3-2*, *Development Scenario*, the project could result in up to 1,400 high-density residential dwelling units, 12,500 square feet of retail/restaurant space, and 100,000 square feet of office space. This development would replace approximately 314,000 square feet of industrial space currently present in the approximately 19.08-acre project area. Since the City has received a preliminary application for a proposed development project located within the Specific Plan area, development of the planning area is anticipated to occur in two phases. Phase 1, which would begin in 2020, consists of developing the two middle parcels (Parcels 2 and 3; see *Figure 3-3*, *Specific Plan Area*) with approximately 700 apartment units, 1,348 parking garage spaces, and 6,250 square feet of retail/commercial use. Phase 2 would consist of developing the northern- and southernmost parcels with an additional 700 apartment units, 6,250 square feet of retail/commercial use, and 100,000 square feet of commercial space. Although it is unknown when construction of Phase 2 would begin, it is anticipated Phase 2 would be operational by 2025. As such, this analysis assumes construction of Phase 2 would begin in 2022, approximately two years after construction of Phase 1 has begun, and would not overlap with Phase 1 construction activities.

Since project-specific information is not available at this time, potential short-term (construction-related) noise impacts can only be evaluated based on the typical construction activities associated with the residential, commercial, and retail development. Potential construction source noise and vibration levels were developed based on methodologies, reference noise levels, and equipment usage and other operating factors documented and contained in the Federal Highway Administration's (FHWA) Construction Noise Handbook (FHWA 2006), Federal Transit Administration's (FTA) *Transit Noise and Vibration Impact Assessment* document (FTA 2018), and Caltrans' *Transportation and Construction Vibration Guidance Manual* (Caltrans, 2013a). Reference levels are noise emissions for specific equipment or activity types that are well documented and for which their usage is common practice in the field of acoustics.

Construction activities associated with potential development projects could include: staging, demolition, site preparation (e.g., land clearing), grading, utility trenching, foundation work (e.g., excavation, pouring concrete pads, drilling for piers), material deliveries (requiring travel along City roads), building construction (e.g., framing, concrete pouring, welding), paving, coating application, and site finishing work. In general, these activities would involve the use of worker vehicles, delivery trucks, dump trucks, and heavy-duty construction equipment such as (but not limited to) backhoes, tractors, loaders, graders, excavators, rollers, cranes, material lifts, generators, and air compressors.

These types of construction activities would generate noise and vibration from the following sources:

- Heavy equipment operations at different work areas. Some heavy equipment would consist of mobile equipment such as a loader and excavator that would move around work areas; other equipment would consist of stationary equipment (e.g., cranes or material hoists/lifts) that would generally operate in a fixed location until work activities are complete. Heavy equipment generates noise from engine operation, mechanical systems, and components (e.g., fans, gears, propulsion of wheels or tracks), and other sources such as back-up alarms. Mobile equipment generally operates at different loads, or power outputs, and produces higher or lower noise levels depending on the operating load. Stationary equipment generally operates at a steady power output that produces a constant noise level.
- Vehicle trips, including worker, vendor, and haul truck trips. These trips would occur on Duarte Road, Highland Avenue, Business Center Drive, and Evergreen Avenue.

Table 5.7-13, *Maximum Noise Levels Generated by Construction Equipment*, indicates the anticipated noise levels of construction equipment at difference distances from equipment work areas.

Table 5.7-13
MAXIMUM NOISE LEVELS GENERATED BY CONSTRUCTION EQUIPTMENT

Equipment	Reference Noise Level at 25 Feet (Lmax)(A)	Percent Usage Factor(B)	Predicted Noise Levels (Leq) at Distance(C)					
			25 Feet	50 Feet	100 Feet	200 Feet	300 Feet	400 Feet
Bulldozer	91	40	87	81	75	71	67	64
Backhoe	86	40	82	76	70	66	62	59
Compact Roller	86	20	79	73	67	63	59	56
Concrete Mixer	91	40	87	81	75	71	67	64
Crane	91	16	83	77	71	67	63	60
Excavator	91	40	87	81	75	71	67	64
Generator	88	50	85	79	73	69	65	62
Pneumatic tools	91	50	88	82	76	72	68	65
Scraper	91	40	88	82	76	72	68	64
Delivery Truck	91	40	87	81	75	71	67	64
Vibratory Roller	86	20	79	73	67	63	59	56

Sources: Caltrans, 2013a and FHWA, 2010.

(A) L_{max} noise levels based on manufacturer's specifications.

(B) Usage factor refers to the amount of time the equipment produces noise over the time period.

(C) Estimate does not account for any atmospheric or ground attenuation factors. Calculated noise levels based on Caltrans, 2009: L_{eq} (hourly) = L_{max} at 50 feet – 20log (D/50) + 10log (UF), where: L_{max} = reference L_{max} from manufacturer or other source; D = distance of interest; UF = usage fraction or fraction of time period of interest equipment is in use.

Construction noise impacts generally occur when construction activities occur in areas immediately adjoining noise-sensitive land uses, during noise-sensitive times of the day, or when construction durations last over extended periods of time. Construction activities associated with the proposed project would occur in multiple phases and may last several years in total. The closest that construction activities could occur to nearby sensitive receptors would be:

- Approximately 25 feet from single family residences on Three Ranch Road, directly adjacent to the Planning Area's western boundary. A six-foot-tall concrete block wall separates these residences from the project sire.
- Approximately 25 feet from single family residences on Denning Avenue, Glenford Avenue, and Business Center Drive, directly adjacent to the site's northern boundary.

The above distances are measured from the edge of the project boundary to the closest sensitive receptor locations (i.e., houses); however, the majority of potential construction activities would occur at distances of 100 to 400 feet or more from the nearest sensitive receptors and would not be expected to interfere with normal residential activities.

With regards to construction noise, the demolition, site preparation, and grading phases typically result in the highest temporary noise levels due to the use of heavy-duty equipment such as dozers, excavators, graders, loaders, scrapers, and trucks. As shown in *Table 5.7-13*, the worst-case Leq and Lmax noise levels associated with the operation of a dozer, excavator, scraper, etc., are predicted to be approximately 87 and 91 dBA, respectively, at a distance of 25 feet from the equipment operating area. At an active construction site, it is not uncommon for two or more pieces of construction equipment to operate at the same time and in close proximity. The concurrent operation of two or more pieces of construction equipment would result in noise levels of approximately 90 to 94 dBA at a distance of 25 feet from equipment operating areas[1].

The magnitude of each individual future project's temporary and periodic increase in ambient noise levels would be dependent upon a number of project-specific factors that are not known at this time, including: the amount and type of equipment being used; the distance between the area where equipment is being operated and the location of the specific land use, receptor, etc. where noise levels are being evaluated; the time of day construction activities are occurring; the presence or absence of any walls, buildings, or other barriers that may absorb or reflect sound waves, the total duration of the construction activities, and the existing ambient noise levels near construction areas. For example, a noise level of 94 dBA Lmax would be similar to typical Lmax levels measured in and near the planning area, but sustained Leq levels of 90 dBA would be approximately 19 to 36 dBA above daytime ambient conditions in and near the planning area. Typically, sustained construction noise levels of 80 to 85 dBA or higher would require the implementation of construction noise control practices such as staging area restrictions (e.g., siting staging areas away from sensitive receptors), equipment controls (e.g., covered engines and use of electrical hook-ups instead of generators), and/or the installation of temporary noise barriers of sufficient height, size (length or width), and density to achieve targeted noise reductions.

The City's *General Plan* Noise Element, as discussed above in Section 5.7.2, focuses on protecting Duarte citizens from non-transportation noise impacts. Specifically, Policy 3.1.3 focuses on ensuring that construction noise does not cause an adverse impact to the residents of the City. Furthermore, *Municipal Code* Section 9.68.120 limits the hours of construction activity from 7:00 AM to 10:00 PM.

As noted in Section 5.7.2, the *Municipal Code* does not have specific, numeric noise standards (e.g., 90 dB, Leq) for construction noise. Although the *General Plan* sets forth a requirement to assess and minimize noise levels into the development review process, it does not specifically stipulate a requirement for project proponents to minimize potential construction noise levels (e.g., through the use of best management practices or noise control measures such as sound barriers). While all projects in the planning area would be subject to the permissible construction hours established by the *Municipal Code*, construction activities could result in temporary increases in noise levels above ambient conditions of 10 to 30 dBs or more during permissible time frames, which would be perceived by noise-sensitive land uses as doubling or quadrupling of loudness, respectively. This situation is most likely to occur when construction occurs closest to the eastern and northern boundaries, and is considered a potentially significant impact.

The implementation of Mitigation Measure N-1 would reduce construction noise associated with future development by requiring the preparation of a construction noise management plan that would include limiting construction to the less noise sensitive periods of the day (i.e., between the hours of 7:00 AM and 10:00 PM per *Municipal Code* Section 9.68.120) and ensuring that proper operating procedures are followed during construction so that nearby sensitive receptors

[1] As shown in *Table 5.7-13*, a single bulldozer provides a sound level of 87 dBA Leq at a distance of 25 feet; when two identical sound levels are combined, the noise level increases to 90 dBA Leq and when three identical sound levels are combined, the noise level increases to 91 dBA Leq. These estimates assume no shielding or other noise control measures are in place at or near the work areas.

are not adversely affected by noise and vibration. However, the specific details (e.g., timing/duration, sequencing, grading volumes, and exact proximity to receptors, etc.) of future construction activities are not known at this time. As a result, construction has the potential to occur in close proximity to existing sensitive receptors to the west and north. Therefore, despite the implementation of Mitigation Measure N-1, construction noise impacts would remain significant and unavoidable.

Temporary Construction Vibration Impacts

There is the potential that site preparation, grading, foundation construction, and other construction activities associated with development could result in groundborne vibration that would, at worst case, occur approximately 25 feet from existing structures adjacent to the Planning Area. *Table 5.7-14*, *Maximum Vibration Levels Generated by Construction Equipment*, lists the groundborne vibration levels associated with the potential type of construction equipment that would most likely be required during construction.

Table 5.7-14
MAXIMUM VIBRATION LEVELS GENERATED BY CONSTRUCTION EQUIPMENT

Equipment	Peak Particle Velocity (in/sec) (A)			Velocity Decibels (VdB) (B)		
	25 feet	60 feet	100 feet	25 feet	60 feet	100 feet
Large bulldozer	0.089	0.034	0.019	87.0	75.6	68.9
Small bulldozer	0.03	0.011	0.007	58.0	46.6	39.9
Loaded truck	0.076	0.029	0.017	86.0	74.6	67.9
Jackhammer	0.035	0.013	0.008	79.0	67.6	60.9

Sources: Caltrans 2013b and FTA 2018.

(A) Estimated PPV calculated as: PPV(D)=PPV(ref)*(25/D)^1.1 where PPV(D)= Estimated PPV at distance; PPVref= Reference PPV at 25 ft; D= Distance from equipment to receiver; and n= ground attenuation rate (1.1 for dense compacted hard soils).

(B) Estimated Lv calculated as: Lv(D)=Lv(25 feet)-30Log(D/25) where Lv(D)= estimated velocity level in decibels at distance, Lv(25 feet)= RMS velocity amplitude at 25 f; and D= distance from equipment to receiver.

As shown in *Table 5.7-14*, receptors 25 feet away from construction activities could be exposed to groundborne vibration levels of up to 0.089 in/sec PPV and 87 VdB during operation of large bulldozers. Based on Caltrans' transient criteria (see *Table 5.7-4*), these vibration levels would be "barely perceptible." At a distance of 60 feet, heavy equipment operations would result in vibration levels that are below Caltran's barely perceptible threshold criteria. Most construction activities would occur 100 to 400 feet or more from nearby sensitive receptor locations and, therefore, would not result in perceptible vibration levels. Under no circumstances are groundborne vibration levels predicted to exceed Caltrans' vibration damage threshold criteria for historic or older buildings (0.25 in/sec PPV), a threshold considered protective of all nearby buildings, which are presumed to be of more recent construction and thus are not as susceptible to damage from vibration as older, unreinforced structures. Although groundborne vibration from construction activities may be barely perceptible at nearby sensitive receptor locations for short periods of time, this impact would be infrequent and short in duration (lasting a few hours or days as equipment would not operate in the same location for a prolonged amount of time), would not damage buildings or structures, would not result in long-term incompatibility with existing land uses, and would, therefore, not be excessive. Thus, this impact would be less than significant.

Mitigation Measures

N-1 Individual project applicants shall prepare a construction noise management plan that identifies measures to be taken to minimize construction noise on surrounding sensitive receptors (e.g., residential uses and schools) and includes specific noise management measures to be included into project plans and specifications subject to review and approval by the City. These measures shall include, but not be limited to the following:

- All construction equipment shall be equipped with mufflers and sound control devices (e.g., intake silencers and noise shrouds) no less effective than those provided on the original equipment and no equipment shall have an un-muffled exhaust.
- The City shall require that the contractor maintain and tune-up all construction equipment to minimize noise emissions.
- Stationary equipment shall be placed to maintain the greatest possible distance to the sensitive receptors.
- All equipment servicing shall be performed to maintain the greatest possible distance to the sensitive receptors.
- During construction, electrical hook-ups shall be provided in work areas to avoid the use of stationary, diesel- or other alternatively fueled power generators
- Impact tools (e.g., jack hammers, pavement breakers, and rock drills) used for project construction shall be hydraulically or electronically powered wherever possible to avoid noise associated with compressed air exhaust from pneumatically powered tools. However, where use of pneumatic tools is unavoidable, an exhaust muffler 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 where feasible, and this could achieve a reduction of 5 dBA. Quieter procedures shall be used, such as drills rather than impact equipment, whenever feasible.
- Select demolition methods to minimize vibration, where possible (e.g., sawing masonry into sections rather than demolishing it by pavement breakers).
- Construction truck traffic, including soil hauling, equipment deliveries, potential concrete deliveries, and other vendor deliveries shall follow designated delivery routes prepared for the project, which are anticipated to include Duarte Road and Highland Avenue. The use of Evergreen Avenue and Business Center Drive for deliveries shall be avoided when feasible.
- Construction activities shall not take place outside of the allowable hours specified by the City's Municipal Code Section *9.68.120* (7:00 AM and 10:00 PM).
- Each project applicant shall provide, to the satisfaction of the City of Duarte Planning Department, a qualified "Noise Disturbance Coordinator." The Disturbance Coordinator shall be responsible for responding to any local complaints about construction noise. When a complaint is received, the 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, malfunctioning muffler, etc.) and shall implement reasonable measures to resolve the compliant, as deemed acceptable by the Duarte Planning Department. Notices shall be sent to residential units immediately surrounding the construction site. The notices that are sent and the signs posted at the construction site shall include the contact name and the telephone number for the Noise Disturbance Coordinator.

Level of Significance: Significant Unavoidable Impact.

LONG-TERM NOISE EXPOSURE IMPACTS

THE PROPOSED PROJECT COULD RESULT IN LAND USES THAT MAY BE INCOMPATIBLE WITH THE PROJECT AREA'S EXISTING AMBIENT NOISE ENVIRONMENT.

Impact Analysis:

Existing Ambient Noise Levels

General Plan Noise Element Goal 3 calls for establishing land uses which are compatible with noise levels within the community. As shown earlier in *Table 5.7-9*, the project area is subject to high ambient noise levels that are primarily associated with traffic noise from I-210 and rail noise from the Metro Gold Line. Measured daytime and nighttime hourly noise levels were generally above 65 dBA Leq (as measured at the project area boundary) and did not fluctuate significantly, indicating noise levels associated with I-210 and the Metro Gold Line are consistent throughout the daytime and nighttime periods.

The calculated CNEL at the project area boundary adjacent to I-210 is 74.6 CNEL (see *Table 5.7-9),* while the calculated noise exposure level adjacent to the Metro Gold Line is reported to be approximately 71 DNL north of the right-of-way (MGLFECA 2007, Table 3-11.6). Although these noise levels represent existing conditions, they are not expected to change substantially in the future since traffic volumes on I-210 are already substantial and the Metro Gold Line currently operates with a high level of frequency.

The *General Plan* establishes exterior noise level guidelines for multi-family residential land uses and office buildings, business commercial, and professional land uses (see *Table 5.7-6*). Although the City has received a preliminary application for development, no finalized site plans, grading plans, floor plans, elevations, building orientation diagrams, building material palettes, or mechanical drawings associated with the updated Duarte Station Specific Plan are available at this time to determine specific noise impacts to future residential and non-residential uses. However, the ambient noise measurement data collected for the EIR indicate:

- Exterior noise levels at the northern boundary of the planning area (74.6 CNEL) exceed the *General Plan's* "Conditionally Acceptable" exterior noise guideline for multi-family residential land uses (70 CNEL) and approach the "Normally Unacceptable" exterior noise limit for multi-family residential land uses (75 CNEL). Noise levels at the northern boundary of the planning area would be within the "Conditionally Acceptable" exterior noise guideline for office, business commercial, and professional land uses (77.5 CNEL).

- Exterior noise levels at the southern boundary of the planning area (71 DNL) would be within the normally unacceptable range for multi-family residential land uses but within the conditionally acceptable range for office, business commercial, and professional land uses.

- Exterior noise levels along Highland Avenue adjacent to the planning area's eastern boundary are approximately 64 to 66 CNEL (at a distance of 100 feet from the road center) under 2019 and 2025 conditions (see *Table 5.7-10* and *Table 5.7-11).* These values are within the *General Plan's* conditionally acceptable levels for multi-family residential land uses, and are considered normally acceptable for office, business commercial, and professional land uses.

- Exterior noise levels along the planning area's eastern boundary are in the range of 54 dBA L_{eq} and are considered to be acceptable for all land use types.

- The preliminary application received by the City for a proposed development project on the two middle parcels (Parcels 2 and 3; see *Figure 3-3*, *Specific Plan Area*) would involve development approximately 400 feet south of I-210 and between 150 feet to 390 feet north of the Metro Gold Line right-of-way. At these distances, noise exposure from I-210 at the northern boundaries of Parcels 2 and 3 are estimated to be approximately 67.6 CNEL; noise exposure from the Metro Gold Line at the southern boundaries of Parcel 2 and 3 are estimated to be 61.1 (Parcel 3) to 65.3 (Parcel 2), although an existing industrial building would block much of the noise associated with the Metro Gold Line until it is removed. These exterior noise values are within the conditionally acceptable noise exposure range for multi-family residential land uses and are considered acceptable for office, business commercial, and professional land uses.

As described above, ambient noise levels are considered to be in the conditionally acceptable to normally acceptable range across the majority of the planning area. Ambient noise levels also exceed the levels at which the California Building Standards Code, California Green Building Standards Code, and the *General Plan* require the preparation of an acoustical analysis documenting compliance with applicable interior noise standards of 45 CNEL in any habitable room (pursuant to the Section 1207.4 of the California Building Code, Part 2, Volume 1) and 50 dBA Leq (1-hour) for any occupied room (pursuant to Section 5.507.4.2 of the California Green Building Standards Code)[2].

Standard construction techniques and materials are commonly accepted to provide a minimum exterior to interior noise attenuation (i.e., reduction) of 22 to 25 dBA with all windows and doors closed, which would result in interior noise levels of approximately 49.6 to 52.6 CNEL dBA for units fronting I-210 and approximately 46 to 49 CNEL for units fronting the Metro Gold Line right-of-way[3]. Since exterior and interior noise levels would exceed applicable City and State standards, this is considered a potentially significant impact.

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2 Part 2 of the California Building Code, Section 1207, Sound Transmission, establishes sound transmission standards for interior walls, partitions, and floor/ceiling assemblies. Specifically, Section 1207.4 establishes that interior noise levels attributable to exterior noise sources shall not exceed 45 dBA DNL or CNEL (as set by the local General Plan) in any habitable room. Chapter 5 of the California Green Building Standards Code, Section 5.507 sets forth environmental comfort/acoustical control requirements for building assemblies that are prescriptive- based (i.e., assemblies meet certain prescribed exterior to interior noise attenuation levels) or performance-based (i.e., the interior noise environment shall not exceed 50 dBA on an hourly equivalent noise level basis in occupied areas. Both the prescriptive and performance standard contained in the Green Building Standards Code apply to projects located within a 65 CNEL noise contour of an airport, freeway, railroad, industrial source, etc. or otherwise exposed to a noise level of 65 dBA on an hourly Leq basis.

3 The U.S. Department of Housing and Urban Development (HUD) Noise Guidebook and supplement (2009a, 2009b) includes information on noise attenuation provided by building materials and different construction techniques. As a reference, a standard exterior wall consisting of 5/8-inch siding, wall sheathing, fiberglass insulation, two by four wall studs on 16-inch centers, and 1/2-inch gypsum wall board with single strength windows provides approximately 35 dBs of attenuation between exterior and interior noise levels. This reduction may be slightly lower (2-3 dBs) for traffic noise due to the specific frequencies associated with traffic noise. Increasing window space may also decrease attenuation, with a reduction of 10 dBs possible if windows occupy 30% of the exterior wall façade.

To ensure potential noise levels meet applicable standards, the City shall require all development proposals in the project area to implement Mitigation Measure N-2, which requires the preparation of an acoustical analysis to document compliance with exterior and interior noise level requirements. Mitigation Measure N-2 would ensure applicable exterior and interior noise standards are met by development within the project area. Thus, this measure would render the potential for the proposed project to expose people to incompatible noise levels a less than significant impact.

Mitigation Measures:

N-2 Prior to the issuance of a building permit for any development in the project area, the City shall review and approve an acoustical analysis, prepared by or on behalf of the project applicant, and based on the final project design, that:

1) Identifies the exterior noise levels at:
   a. Exterior building facades that face Evergreen Street/I-210, Highland Avenue, and Duarte Road/the Metro Gold Line ROW; and
   b. Exterior recreation areas, including patios, that face and have a line of sight to Evergreen Street/I-210, Highland Avenue, and Duarte Road/the Metro Gold Line ROW.
2) Identifies the final site and building design features that would:
   a. Attenuate exterior building façade noise levels to interior levels that do not exceed 45 CNEL in habitat rooms and 50 dBA Leq (1-hour) in other occupied rooms. Potential noise insulation site and building design features capable of achieving this requirement may include, but are not limited to:
      - Sound barriers
      - Enhanced exterior wall construction/noise insulation design
      - Use of enhanced window, door, and roof assemblies with above average sound transmission class or outdoor/indoor transmission class values
      - Use of mechanical, forced air ventilation systems to permit a window closed condition in residential units.

Level of Significance: Less than Significant with Mitigation Incorporated

LONG-TERM MOBILE NOISE IMPACTS

TRAFFIC GENERATED BY THE PROPOSED PROJECT COULD SIGNIFICANTLY CONTRIBUTE TO EXISTING TRAFFIC NOISE IN THE AREA OR EXCEED THE CITY'S ESTABLISHED STANDARDS.

Impact Analysis:

Off-Site Noise Conditions

Existing 2019 Plus Project Traffic Noise Levels
Existing 2019 plus project traffic noise levels were computed using the same methodology (TNM Version 2.5) and data sources used to calculate existing 2019 and future baseline 2040 traffic noise levels (see *Section 5.7.3*), except that project traffic levels were obtained from the

Transportation Impact Study prepared for the project and entered into the traffic model. *Table 5.7-15*, *Existing Noise Scenario* summarizes the net change in average daily traffic and traffic noise levels (at a distance of 100 feet) that would occur with project implementation. Please refer to Appendix F for detailed existing plus project traffic noise modeling results.

As indicated in *Table 5.7-15*, *Existing 2019 Noise Scenario*, under the “Existing 2019” scenario, noise levels at a distance of 100 feet from the centerline would range from approximately 53.2 dBA to 74.2 dBA. The highest noise levels under “Existing 2019” conditions would be adjacent to Evergreen Street, along the portion of I-210 that does not have a noise barrier. Under the “Existing 2019 Plus Project” scenario, noise levels at a distance of 100 feet from the centerline would range from 53.5 dBA to 74.2 dBA, with the highest noise levels continuing to occur adjacent to Evergreen Street. As shown in *Table 5.7-15*, the proposed project would increase noise levels on the surrounding roadways by a maximum of 0.8 dBA along Highland Avenue between Business Center Drive and Huntington Drive. As stated under the *Significance Criteria*, a significant impact would occur if noise levels increase by 3.0 dBA or more. Therefore, existing plus project noise levels would be less than significant.

Future 2025 Plus Project Traffic Noise levels

Under certain circumstances, an existing plus project analysis can only be analyzed at a hypothetical level, resulting in hypothetical impacts. For example, a project may not be expected to become operational for several years. During the period after the environmental analysis has been prepared but before the project becomes operational, traffic conditions may change due to regional or areawide growth or planned and funded traffic improvements. As another example, a noise barrier may be constructed along a freeway or roadway. In those instances, the “Existing Plus Project” analysis would be less accurate than an analysis that takes into account the reasonably foreseeable interim changes in the environment, versus assuming static environmental conditions.

The “Future 2025” and “Future 2025 Plus Project” conditions were compared to evaluate conditions with additional growth in the City over time. As indicated in *Table 5.7-16 Future 2025 Noise Scenario*, under the “Future 2025” scenario, noise levels at a distance of 100 feet from the centerline would range from approximately 53.5 dBA to 74.7 dBA. Similar to the existing conditions analysis, the highest noise levels under the “Future 2025” and “Future 2025 Plus Project” conditions would occur adjacent to Evergreen Street, along the portion of I-210 that does not have a noise barrier. The proposed project would increase noise levels on the surrounding roadways in 2025 by a maximum of 0.8 dBA along Highland Avenue between Business Center Drive and Huntington Drive. As stated under the *Significance Criteria*, a significant impact would occur if noise levels increase by 3.0 dBA or more. Therefore, future plus project noise levels would be less than significant.

Mitigation Measures: No mitigation measures are required.

Level of Significance: Less Than Significant Impact.

Table 5.7-15
EXISTING 2019 ROADWAY NOISE SCENARIO

Roadway Segment	Existing 2019					Existing 2019 Plus Project					Difference in dBA @ 100 feet from Roadway	Potentially Significant Impact?
	ADT	dBA @ 100 Feet from Roadway Centerline	Distance in Feet from Roadway Centerline to:			ADT	dBA @ 100 Feet from Roadway Centerline	Distance in Feet from Roadway Centerline to:				
			60 CNEL Noise Contour	65 CNEL Noise Contour	70 CNEL Noise Contour			60 CNEL Noise Contour	65 CNEL Noise Contour	70 CNEL Noise Contour		
Buena Vista Street												
Huntington Drive to Central Avenue	13,800	66.4	437	138	44	13,800	66.4	437	138	44	0.0	***No***
Central Avenue to I-210 Westbound Ramp	15,410	63.4	219	69	22	15,660	63.5	224	71	22	0.1	***No***
I-210 Westbound On-Ramp to I-210 Eastbound Ramp	14,260	64.9	309	98	31	14,370	64.9	309	98	31	0.0	***No***
I-210 Eastbound On-Ramp to Three Ranch Road	12,270	65.4	347	110	35	13,050	65.7	372	117	37	0.3	***No***
Three Ranch Road to Duarte Road	12,390	64.4	275	87	28	13,400	64.7	295	93	30	0.3	***No***
Central Ave												
East of Mountain Avenue	13,880	66.2	417	132	42	13,880	66.2	417	132	42	0.0	***No***
West of Buena Vista Street	5,320	62.3	170	54	17	5,320	62.3	170	54	17	0.0	***No***
Buena Vista Street to I-210 WB Off-Ramp	11,350	64.4	275	87	28	11,600	64.5	282	89	28	0.1	***No***
I-210 WB Off-Ramp to Duncannon Avenue	11,480	62.3	170	54	17	12,060	62.5	178	56	18	0.2	***No***
Duncannon Avenue to Highland Avenue	8,330	64.3	269	85	27	8,850	64.6	288	91	29	0.3	***No***
Duarte Road												
Mountain Avenue to Buena Vista Street	11,570	67.4	550	174	55	12,110	67.6	575	182	58	0.2	***No***
Buena Vista Street to Cinco Robles Drive	13,080	67.3	537	170	54	14,830	67.8	603	191	60	0.5	***No***
Cinco Robles Drive to Village Road	12,240	66.3	427	135	43	13,980	66.8	479	151	48	0.5	***No***
Village Road to Highland Avenue	10,350	66.9	490	155	49	12,140	67.6	575	182	58	0.7	***No***
Duncannon Avenue												
Central Avenue to Evergreen Street	1,940	53.2	21	7	2	2,080	53.5	22	7	2	0.3	***No***
Evergreen Street												
East of Mountain Ave	17,350	67.5	562	178	56	17,530	67.6	575	182	58	0.1	***No***
West of Buena Vista Street	6,940	63.3	214	68	21	7,060	63.4	219	69	22	0.1	***No***
Duncannon Avenue to Highland Avenue	1,420	55	32	10	3	1,640	55.7	37	12	4	0.7	***No***
Highland Avenue												
Huntington Drive to Central Avenue	10,850	62.1	162	51	16	13,000	62.9	195	62	19	0.8	***No***
Central Avenue to Evergreen Street	13,590	65.1	324	102	32	16,300	65.9	389	123	39	0.8	***No***
Evergreen Street to Business Center Drive	12,240	64.3	269	85	27	14,910	65.1	324	102	32	0.8	***No***
Business Center Drive to Duarte Road	11,660	65.3	339	107	34	13,760	66	398	126	40	0.7	***No***
Huntington Drive												
Buena Vista Street to Highland Avenue	22,310	70.3	1,072	339	107	22,610	70.3	1,072	339	107	0.0	***No***
Highland Avenue to Mount Olive Drive	25,040	70.8	1,202	380	120	26,700	71.1	1,288	407	129	0.3	***No***
Mountain Avenue												
Central Avenue to Evergreen Street	18,140	65.9	389	123	39	18,390	65.9	389	123	39	0.0	***No***
Evergreen Street to Duarte Road	14,010	66.3	427	135	43	14,260	66.4	437	138	44	0.1	***No***
I-210												
Adjacent to Evergreen Street (without barrier)	263,757	74.2	10,258	3,244	1,026	263,805	74.2	10,258	3,244	1,026	0.0	***No***
Adjacent to Evergreen Street (with barrier)	263,757	64.3	1,050	332	105	263,805	64.3	1,050	332	105	0.0	***No***

Notes: ADT = average daily traffic; dBA = A-weighted decibels; CNEL = community noise equivalent level

Source: Noise modeling conducted by MIG (see Appendix F) based on traffic data within the *Duarte Station Specific Plan Transportation Impact Study, prepared by Fehr and Peers, dated April 2019.*

Table 5.7-16
FUTURE 2025 TRAFFIC NOISE SCENARIO

Roadway Segment	Future 2025					Future 2025 Plus Project					Difference in dBA @ 100 feet from Roadway	Potentially Significant Impact?
	ADT	dBA @ 100 Feet from Roadway Centerline	Distance in Feet from Roadway Centerline to:			ADT	dBA @ 100 Feet from Roadway Centerline	Distance in Feet from Roadway Centerline to:				
			60 CNEL Noise Contour	65 CNEL Noise Contour	70 CNEL Noise Contour			60 CNEL Noise Contour	65 CNEL Noise Contour	70 CNEL Noise Contour		
Buena Vista Street												
Huntington Drive to Central Avenue	16,110	67.3	537	170	54	16,110	67.3	537	170	54	0.0	***No***
Central Avenue to I-210 Westbound Ramp	17,710	64.2	263	83	26	17,960	64.3	269	85	27	0.1	***No***
I-210 Westbound On-Ramp to I-210 Eastbound Ramp	17,270	65.9	389	123	39	17,380	65.9	389	123	39	0.0	***No***
I-210 Eastbound On-Ramp to Three Ranch Road	15,850	66.7	468	148	47	16,630	66.9	490	155	49	0.2	***No***
Three Ranch Road to Duarte Road	15,980	65.6	363	115	36	16,990	65.9	389	123	39	0.3	***No***
Central Ave												
East of Mountain Avenue	14,870	66.7	468	148	47	14,870	66.7	468	148	47	0.0	***No***
West of Buena Vista Street	5,490	62.6	182	58	18	5,490	62.6	182	58	18	0.0	***No***
Buena Vista Street to I-210 WB Off-Ramp	12,370	64.9	309	98	31	12,730	65	316	100	32	0.1	***No***
I-210 WB Off-Ramp to Duncannon Avenue	12,010	62.6	182	58	18	12,590	62.8	191	60	19	0.2	***No***
Duncannon Avenue to Highland Avenue	8,620	64.7	295	93	30	9,140	64.9	309	98	31	0.2	***No***
Duarte Road												
Mountain Avenue to Buena Vista Street	13,020	68.1	646	204	65	13,560	68.3	676	214	68	0.2	***No***
Buena Vista Street to Cinco Robles Drive	16,290	68.5	708	224	71	18,040	68.9	776	245	78	0.4	***No***
Cinco Robles Drive to Village Road	15,410	67.5	562	178	56	17,150	67.9	617	195	62	0.4	***No***
Village Road to Highland Avenue	11,540	67.6	575	182	58	11,370	67.5	562	178	56	-0.1	***No***
Duncannon Avenue												
Central Avenue to Evergreen Street	2,000	53.5	22	7	2	2,140	53.8	24	8	2	0.3	***No***
Evergreen Street												
East of Mountain Ave	19,140	68.1	646	204	65	19,320	68.2	661	209	66	0.1	***No***
West of Buena Vista Street	8,480	64.3	269	85	27	8,600	64.4	275	87	28	0.1	***No***
Duncannon Avenue to Highland Avenue	1,470	55.4	35	11	3	1,690	56	40	13	4	0.6	***No***
Highland Avenue												
Huntington Drive to Central Avenue	11,700	62.6	182	58	18	13,850	63.4	219	69	22	0.8	***No***
Central Avenue to Evergreen Street	14,610	65.6	363	115	36	17,320	66.3	427	135	43	0.7	***No***
Evergreen Street to Business Center Drive	13,200	64.8	302	95	30	15,870	65.6	363	115	36	0.8	***No***
Business Center Drive to Duarte Road	12,610	65.8	380	120	38	14,710	66.5	447	141	45	0.7	***No***
Huntington Drive												
Buena Vista Street to Highland Avenue	24,940	71	1,259	398	126	25,240	71	1,259	398	126	0.0	***No***
Highland Avenue to Mount Olive Drive	28,660	71.6	1,445	457	145	30,320	71.8	1,514	479	151	0.2	***No***
Mountain Avenue												
Central Avenue to Evergreen Street	20,890	66.7	468	148	47	21,140	66.7	468	148	47	0.0	***No***
Evergreen Street to Duarte Road	14,680	66.7	468	148	47	14,930	66.8	479	151	48	0.1	***No***
I-210												
Adjacent to Evergreen Street (without barrier)	279,984	74.7	11,510	3,640	1,151	280,032	74.7	11,510	3,640	1,151	0.0	***No***
Adjacent to Evergreen Street (with barrier)	279,984	65.1	1,262	399	126	280,032	65.1	1,262	399	126	0.0	***No***

Notes: ADT = average daily traffic; dBA = A-weighted decibels; CNEL = community noise equivalent level
Source: Noise modeling conducted by MIG (see Appendix F) based on traffic data within the *Duarte Station Specific Plan Transportation Impact Study, prepared by Fehr and Peers, dated April 2019.*

LONG-TERM STATIONARY NOISE IMPACTS

IMPLEMENTATION OF THE PROPOSED PROJECT COULD RESULT IN A SIGNIFICANT INCREASE IN LONG-TERM STATIONARY AMBIENT NOISE LEVELS.

Impact Analysis: The proposed project would allow for a mix of residential, office, and commercial land uses that are anticipated to be constructed through 2025. Potential noise associated with operational activities of the proposed land uses could include:

- Residential uses
- Delivery Trucks
- Mechanical equipment (air conditioners, trash compactors, emergency generators, etc.)
- Typical parking lot activities (e.g., parking lot traffic and car door slamming)

The potential noise levels generated by these activities and equipment are described below.

Residential Uses

The proposed project would increase the amount of residential dwelling units in the area. Residential developments would include ground-level and rooftop recreational spaces, plus potentially resident amenities such as, but not limited to, fitness centers, pools, pet spas, and storage areas. Recreational spaces and amenities would provide residents recreation and residential services, including areas to sit, eat, and socialize. Noise from these areas may include human speech, music, and play activities. These types of activities and noise sources would be similar to other land uses in the area and would be subject to noise control regulations in the *Municipal Code.* Noise impacts to surrounding uses associated with implementation of the proposed residential uses would be less than significant.

Slow-Moving Trucks (Deliveries)

The proposed project includes office and retail uses that would necessitate occasional truck delivery operations. Multi-family residential development, as well as the proposed non-residential development, would also require garbage collection services and moving vans. By nature of their commercial-based operations, office and retail uses would be located on the perimeter of the planning area, fronting Duarte Road, Highland Avenue, Evergreen Street, or Business Center Drive. This would result in loading docks (if provided) and other delivery areas on the interior of the site.

Typically, small- to medium-sized trucks (two- or three-axle) used to make deliveries or collect garbage can generate a maximum noise level of 75 dBA at a distance of 50 feet for a few minutes or more, presuming a high engine load (i.e., engine revving or acceleration). Although it is anticipated that most, if not all, delivery and garbage collection services would occur on the interior of the site, away from adjacent land uses, it is possible some delivery and garbage collection services could be located adjacent to existing noise sensitive land uses (e.g., existing residential land uses approximately 60 feet to the east of, across Denning Avenue, or directly adjacent to the site's eastern border), resulting in noise levels that exceed the standards contained in Section 9.68.050 of the *Municipal Code*. Thus, sensitive receptors surrounding the project site could be directly exposed to noise from on-site delivery or garbage collection operations created by the proposed project. In addition, on-site delivery or garbage collection services could impact on-site residential receptors. Therefore, Mitigation Measure N-3 is required to ensure that any potential delivery and/or garbage would be located away from existing or proposed sensitive receptors. Impacts would be mitigated to a less than significant level in this regard.

Mechanical Equipment

Mechanical equipment associated with the proposed residential, office, and commercial land uses could include pool equipment (e.g., pumps), elevators, and individual HVAC units. In addition, proposed parking garages may include fresh air supply or exhaust fans to provide ventilation and promote air flow. Such fans would be required for underground parking levels that do not have fresh air flows.

Pool and elevator equipment would be contained within electrical and machine rooms or other enclosures and would not generate significant on- or off-site noise levels.

Information on the HVAC units that would be used to cool and ventilate conditioned residential, commercial, and office space is not currently known. HVAC systems can range in size from small charge/load units intended to serve to individual dwelling units or small non-residential spaces to large charge/load units intended to serve multiple dwelling units and larger non-residential spaces. The noise levels generated by these systems can range from approximately 40 to 70 dBA at a distance of 50 feet, which could exceed the daytime and/or nighttime standards contained in Section 9.68.050 of the *Municipal Code*. Therefore, Mitigation Measure N-3 would be required to ensure that mechanical equipment is shielded or placed a sufficient distance away to comply with the City's noise standards. Impacts would be mitigated to a less than significant level with the inclusion of this measure.

Specific information on potential parking garage fresh air supply or exhaust fans is also currently not known. The size and noise-generating potential for such systems is contingent on the size of the area requiring air supply, the necessary amount of air turnover needed in the enclosed area, and the location of intakes and exhaust vents; however, due to the size of the area that can require ventilation, such systems can generate noise levels of 75 to 90 dBA at a distance of 50 feet under uncontrolled conditions. These noise levels could exceed the City's daytime and nighttime noise standards contained in the *Municipal Code*. Therefore, Mitigation Measure N-3 would be required to ensure that parking garage ventilation fans are shielded, enclosed, or otherwise noise-controlled to comply with the City's noise standards. Impacts would be mitigated to a less than significant level with the inclusion of this measure.

Parking Areas

Potential parking garages would increase the noise levels at the site by providing additional parking capacity, reflection of sound waves, etc. Noise sources associated with the parking garages (e.g., car horns, doors slamming, cars starting, etc.) are intermittent and would primarily affect on-site receptors. These types of noises would not differ substantially from the noise generated by existing parking activities in the project area, but the frequency of these events would increase with increased parking capacity.

Potential increases in noise resulting from a new parking garage were quantified using the following equations contained in the FTA's *Transit Noise and Vibration Impact Assessment* manual (FTA 2018).

$$Leq(h) = SEL_{ref} + C_N - 36.5$$

and

$$C_N = 10 \times \log(N_A / 1{,}000)$$

Where:

Leq(h)	=	Hourly Leq at 50 feet
SEL_{ref}	=	Source Reference Level at 50 feet
C_N	=	Volume Adjustment (SEL_{ref} is based on 1,000 cars in peak activity hour)
N_A	=	Number of Automobiles per Hour

According to the FTA, the SEL_{ref} for parking garages is 92 dBA. As indicated in the equation, this SEL_{ref} is based on 1,000 cars per hour during peak time periods. The proposed project would generate much lower activity levels; the *Transportation Impact Study* estimates the the project would generate a total of approximately 374 trips during the AM peak hour, 486 trips during the PM peak hour, and 6,209 total trips throughout the rest of the day (see Chapter 19).

To calculate the Leq and and CNEL at 50 feet from the parking garage, hourly noise levels were first calculated throughout the day using the equations above. The morning peak hour calculations accounted for 374 hourly trips, the evening peak hour calculations accounted for 486 hourly trips, and the remaining 5,349 trips were evenly distributed throughout the daytime (80% of remaining trips, or approximately 285 trips per hour) and nighttime period (20% of remaining trips, or approximately 95 trips per hour). This methodology is considered conservative (i.e., likely to overestimate CNEL) since it likely overestimates activity at the parking garage from the hours of 10:00 PM to 7:00 AM, when a 10 dBA penalty is applied to the hourly noise levels used to calculate the CNEL (see *Section 5.7.1*).

The results of the calculations indicate the parking garage would result in a worst-case hourly Leq value of 53.3 dBA (during the evening peak hour activity), and a CNEL of 54.8 at distance of 50 feet. During the typical nighttime hour, parking garage noise levels could be approximately 46.2 dBA at a distance of 50 feet. These values exceed the nighttime noise standards for single family residential zones contained in Section 9.58.050 of the *Municipal Code*; however, calculated noise levels are also substantially lower (approximately 17 to 25 dBA) than the evening and nighttime ambient noise levels measured at and near the planning area (see *Table 5.7-9*). In general, when two noise levels are 10 dB or more apart, the lower value does not contribute significantly (less than 0.5 dB) to the total noise level. In addition, based on the noise level calculations, nighttime parking garage noise levels would be below the City's 45 dBA nighttime standard if setback a distance of 75 feet or more from perimeter property lines. Accordingly, Mitigation Measure N-4 requires parking structures to have a closed design for exterior walls that face residences and are located within 75 feet of the residences. With the implementation of Mitigation Measure N-4, sensitive receptors would not be exposed to excessive noise from parking areas and a less than significant impact would occur with regard to this impact.

Mitigation Measures:

N-3 Prior to issuance of building permits, a noise assessment shall be prepared for residential, office, commercial, and enclosed parking garage uses to ensure that any loading dock and/or outdoor mechanical equipment (e.g., heating, ventilation, and air conditioning equipment, dock material lifts, garage fresh air supply and exhaust fans, etc.) would not exceed the City's noise limits identified in *Municipal Code* Section 9.68.050. The noise assessment shall identify any noise control measures necessary to comply with the *Municipal Code* Noise Regulations. Individual project applicants shall implement all noise control measures identified in the assessment.

N-4 Prior to site plan approval, the Community Development Director shall confirm that all applicable building plans and specifications include a closed design (i.e., a solid wall) for the walls of parking structures that are within 75 feet of residences. The closed design is only required for walls that face residences.

Level of Significance: Less Than Significant with Mitigation Incorporated.

LONG-TERM VIBRATION IMPACTS FROM METRO GOLD LINE OPERATIONS

IMPLEMENTATION OF THE PROPOSED PROJECT COULD EXACERBATE EXPOSURE OF ON-SITE RECEPTORS TO EXCESSIVE GROUNDBORNE VIBRATION FROM METRO GOLD LINE OPERATIONS.

Impact Analysis:

Approval of the proposed updated Duarte Station Specific Plan would result in the placement of new, sensitive residential land uses in close proximity to the Metro Gold Line. As explained in Section 5.7.3, "Existing Metro Gold Line Noise and Vibration Levels," vibration monitoring was not conducted for the proposed project; however, vibration monitoring was conducted in January 2018 for a different Specific Plan less than two miles to the west (City of Monrovia 2018). This vibration assessment measured groundborne vibration levels 20 feet from the Metro Gold Line track centerline (Veneklassen 2018). The results of the vibration monitoring indicated groundborne vibration from passing Metro Gold Line trains was below 0.002 in/sec PPV and 65 VdB. These vibration levels are below both the Los Angeles County vibration limit of 0.01 in/sec PPV and the FTA's recommended vibration limit of 72 VdB for frequent events where people sleep (see Table 5.7-3).

The proposed project would not result in the placement of structures 20 feet or closer to the Metro Gold Line due to the width of the Metro ROW and City zoning setback requirements. Thus, the operation of the Metro Gold Line would not exacerbate exposure of people to excessive groundborne vibration or groundborne noise levels. This impact would be less than significant.

Mitigation Measures: No mitigation measures are required.

Level of Significance: Less Than Significant Impact.

5.7.6 CUMULATIVE IMPACTS AND MITIGATION MEASURES

Table 4-1, *Cumulative Projects List*, identifies the related projects and other possible development in the area determined as having the potential to interact with the proposed project to the extent that a significant cumulative effect may occur. The following discussions are included per topic area to determine whether a significant cumulative effect would occur.

SHORT-TERM CONSTRUCTION NOISE IMPACTS

DEVELOPMENT ASSOCIATED WITH IMPLEMENTATION OF THE PROPOSED PROJECT AND OTHER RELATED CUMULATIVE PROJECTS COULD RESULT IN SIGNIFICANT SHORT-TERM NOISE IMPACTS TO NEARBY NOISE SENSITIVE RECEIVERS.

Impact Analysis: Construction activities associated with the proposed project and cumulative projects may overlap, resulting in construction noise in the area. However, as analyzed above, construction noise impacts primarily affect the areas immediately adjacent to the construction site. Construction noise for the proposed project was determined to be significant and unavoidable despite implementation of Mitigation Measure N-1 due to the fact that several existing residences adjoin the project site. This project-level impact is due to local receptors and would not contribute cumulatively to construction noise in other areas of the adjacent cities of Duarte, Irwindale, or Azusa. Since construction noise is localized in nature and drops off rapidly from the source, and with implementation of project-specific mitigation measures, cumulative construction-related noise impacts would be less than significant.

Mitigation Measures: Refer to Mitigation Measure N-1. No additional mitigation measures are required.

Level of Significance: Less Than Significant Impact with Mitigation Incorporated.

LONG-TERM CUMULATIVE NOISE IMPACTS

DEVELOPMENT ASSOCIATED WITH IMPLEMENTATION OF THE PROPOSED PROJECT AND OTHER RELATED CUMULATIVE PROJECTS COULD RESULT IN CUMULATIVELY CONSIDERABLE LONG-TERM NOISE IMPACTS.

Impact Analysis:

Cumulative Stationary Noise

Although related cumulative projects have been identified within the project study area, the noise generated by stationary equipment on site cannot be quantified due to the speculative nature of each development. However, each cumulative project would require separate discretionary approval and CEQA assessment, which would address potential noise impacts and identify necessary attenuation measures, where appropriate. Additionally, because noise dissipates as it travels away from its source, noise impacts from stationary sources would be limited to each of the respective sites and vicinities. As no other project sites are located within the immediate vicinity of the proposed project that would involve stationary noise sources, the proposed project would not contribute to a cumulative stationary noise impact and impacts would be less than significant.

As noted above, with the implementation of Mitigation Measures N-3 and N-4, the proposed project would not result in significant stationary noise impacts. Thus, the proposed project and identified cumulative projects are not anticipated to result in a significant cumulative impact. Cumulative impacts would be less than significant.

Cumulative Mobile Noise

The cumulative mobile noise analysis is conducted in a two-step process. First, the combined effects from both the proposed project and other projects are compared. Second, for combined effects that are determined to be cumulatively significant, the project's incremental effects then are analyzed. A project's contribution to a cumulative traffic noise increase would be considered significant when the combined effect exceeds perception level (i.e., auditory level increase) threshold. The combined effect compares the "cumulative plus project" condition to "existing" conditions. This comparison accounts for the traffic noise increase from the proposed project generated in combination with traffic generated by projects in the cumulative projects list. The following criteria have been utilized to evaluate the combined effect of the cumulative noise increase.

- *Combined Effects*: The cumulative with project noise level ("2025 Plus Project") would cause a significant cumulative impact if a 3 dBA increase over existing conditions occurs and the resulting noise level exceeds the applicable exterior standard at a sensitive use.

Although there may be a significant noise increase due to the proposed project in combination with identified cumulative projects (combined effects), it must also be demonstrated that the project has an incremental effect. In other words, a significant portion of the noise increase must be due to the proposed project. The following criteria have been utilized to evaluate the incremental effect of the cumulative noise increase.

- *Incremental Effects:* The "2025 Plus Project" causes a 1 dBA increase in noise over the "2025 No Project" noise level.

A significant impact would result only if both the combined and incremental effects criteria have been exceeded. Noise by definition is a localized phenomenon that and dissipates drastically as distance from the source increases. Consequently, only proposed projects and growth due to occur in the general vicinity of the project site would contribute to cumulative noise impacts. *Table 5.7-17*, *Cumulative Noise Scenario*, lists the traffic noise effects along roadway segments in the project vicinity for "Existing 2019," "2025 No Project," and "2025 Plus Project," including incremental and net cumulative impacts.

Table 5.7-17
CUMULATIVE NOISE SCENARIO

Roadway Segment	Existing 2019	2025 Without Project	2025 With Project	Combined Effects	Incremental Effects	Cumulatively Significant Impact?
	dBA @ 100 Feet from Roadway Centerline	dBA @ 100 Feet from Roadway Centerline	dBA @ 100 Feet from Roadway Centerline	Difference in dBA Between Existing and 2025 With Project	Difference in dBA Between 2025 Without Project and 2025 With Project	
Buena Vista Street						
Huntington Drive to Central Avenue	66.4	67.3	67.3	0.9	0	No
Central Avenue to I-210 Westbound Ramp	63.4	64.2	64.3	0.9	0.1	No
I-210 Westbound On-Ramp to I-210 Eastbound Ramp	64.9	65.9	65.9	1	0	No
I-210 Eastbound On-Ramp to Three Ranch Road	65.4	66.7	66.9	1.5	0.2	No
Three Ranch Road to Duarte Road	64.4	65.6	65.9	1.5	0.3	No
Central Ave						
East of Mountain Avenue	66.2	66.7	66.7	0.5	0	No
West of Buena Vista Street	62.3	62.6	62.6	0.3	0	No
Buena Vista Street to I-210 WB Off-Ramp	64.4	64.9	65	0.6	0.1	No
I-210 WB Off-Ramp to Duncannon Avenue	62.3	62.6	62.8	0.5	0.2	No
Duncannon Avenue to Highland Avenue	64.3	64.7	64.9	0.6	0.2	No
Duarte Road						
Mountain Avenue to Buena Vista Street	67.4	68.1	68.3	0.9	0.2	No
Buena Vista Street to Cinco Robles Drive	67.3	68.5	68.9	1.6	0.4	No
Cinco Robles Drive to Village Road	66.3	67.5	67.9	1.6	0.4	No
Village Road to Highland Avenue	66.9	67.6	67.5	0.6	-0.1	No
Duncannon Avenue						
Central Avenue to Evergreen Street	53.2	53.5	53.8	0.6	0.3	No
Evergreen Street						
East of Mountain Ave	67.5	68.1	68.2	0.7	0.1	No
West of Buena Vista Street	63.3	64.3	64.4	1.1	0.1	No
Duncannon Avenue to Highland Avenue	55	55.4	56	1	0.6	No
Highland Avenue						No
Huntington Drive to Central Avenue	62.1	62.6	63.4	1.3	0.8	No
Central Avenue to Evergreen Street	65.1	65.6	66.3	1.2	0.7	No
Evergreen Street to Business Center Drive	64.3	64.8	65.6	1.3	0.8	No
Business Center Drive to Duarte Road	65.3	65.8	66.5	1.2	0.7	No
Huntington Drive						
Buena Vista Street to Highland Avenue	70.3	71	71	0.7	0	No
Highland Avenue to Mount Olive Drive	70.8	71.6	71.8	1	0.2	No
Mountain Avenue						
Central Avenue to Evergreen Street	65.9	66.7	66.7	0.8	0	No
Evergreen Street to Duarte Road	66.3	66.7	66.8	0.5	0.1	No
I-210						
Adjacent to Evergreen Street (without barrier)	74.2	74.7	74.7	0.5	0	No
Adjacent to Evergreen Street (with barrier)	64.3	65.1	65.1	0.8	0	No

Notes: ADT = average daily trips; dBA = A-weighted decibels; CNEL = community noise equivalent level

Source: Noise modeling conducted by MIG (see Appendix F) based on traffic data within the *Duarte Station Specific Plan Transportation Impact Study,* prepared by Fehr and Peers, dated April 2019.

First, it must be determined whether the Cumulative Plus Project Increase Above Existing Conditions (*Combined Effects*) is exceeded. Per *Table 5.7-17*, this criterion is not exceeded along any of the evaluated roadway segments. Next, under the *Incremental Effects* criteria, cumulative noise impacts are defined by determining if the ambient (2020 No Project) noise level is increased by 1 dB or more. Based on the results of *Table 5.7-17*, no roadway segment would experience an increase of more than 0.8 dBA (Highland Avenue). Therefore, there would not be any roadway segments that would result in significant impacts, as they would not exceed both the combined and incremental effects criteria. The proposed project would not result in long-term mobile noise impacts based on project-generated traffic as well as cumulative and incremental noise levels. Therefore, the proposed project, in combination with cumulative background traffic noise levels, would result in a less than significant cumulative impact.

Mitigation Measures: No mitigation measures are required.

Level of Significance: Less Than Significant Impact.

5.7.7 SIGNIFICANT UNAVOIDABLE IMPACTS

With implementation of the proposed Duarte Station Specific Plan Update, significant unavoidable project impacts would occur for short-term construction noise.

All other project and cumulative project noise impacts associated with implementation of the proposed updated Duarte Station Specific Plan are either less than significant or can be mitigated to less than significant levels.

If the City of Duarte approves the updated Duarte Station Specific Plan, the City shall be required to cite its findings in accordance with *CEQA Guidelines* Section 15091 and prepare a Statement of Overriding Considerations in accordance with *CEQA Guidelines* Section 15093.

5.7.8 SOURCES CITED

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List of Acronyms, Abbreviations, and Symbols	
Acronym / Abbreviation	**Full Phrase or Description**
ADT	Average Daily Traffic
Caltrans	California Department of Transportation
CCR	California Code of Regulations
CEQA	California Environmental Quality Act
CNEL	Community Noise Equivalent Level
dB	Decibel
dBA	Decibels, A-Weighted
dBV / VdB	Decibels, Velocity
Ldn / DNL	Day-Night Noise Level
EIR	Environmental Impact Report
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
HVAC	Heating, Ventilation, and Air Conditioning
Hz	Hertz
Leq	Average / Equivalent Noise Level
Lmax	Maximum Noise Level
Lmin	Minimum Noise Level
LT	Long Term (noise measurement)
OITC	Outdoor/Indoor Transmission Class
PPV	Peak Particle Velocity
ROW	Right of Way
ST	Short Term (noise measurement)
STC	Sound Transmission Class
TIs	Transportation Impact study

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