4.12 NOISE

INTRODUCTION

This section addresses potential noise and vibration effects from the Plan on the surrounding community. Specifically, the analysis describes the existing noise environment near the Plan Area; the methodology and the regulatory framework that guided this analysis pursuant to federal, State, and local regulations; forecasts of future noise and vibration levels at surrounding land uses resulting from construction and occupancy of the homes and other facilities that would be allowed by the Plan; the potential for significant impacts; and the identification of mitigation measures to address significant impacts, if required. Noise calculation worksheets are included in **Appendix J.**

ENVIRONMENTAL SETTING

Fundamentals of Sound

Sound is mechanical energy transmitted by pressure waves in a compressible medium such as air. Noise is generally defined as unwanted sound. Sound is characterized by various parameters that describe the physical properties of sound waves. These properties include the rate of oscillation (frequency); the distance between successive high and low noise levels, the speed of propagation; and the pressure level or energy content of a given sound wave. In particular, the sound pressure level has become the most common descriptor used to characterize the loudness of an ambient sound level.

The unit of sound pressure expressed as a ratio to the faintest sound detectable to a person with normal hearing is called a decibel (dB). Sound or noise can vary in intensity by more than 1 million times within the range of human hearing. A logarithmic loudness scale, similar to the Richter scale for earthquake magnitude, is used to describe sound-intensity levels. The human ear is not equally sensitive to all sound frequencies within the entire spectrum. Noise levels at maximum human sensitivity are factored more heavily into sound descriptions in a process called A weighting, written as dBA. Further reference to decibels in this analysis should be understood to be A-weighted.

Several noise descriptors have been developed to evaluate the adverse effect of community noise on people. Since noise level fluctuates over time, an equivalent sound level (Leq) descriptor is used to describe typical time-varying instantaneous noise. Finally, because community receptors are more sensitive to unwanted noise intrusion during evening and nighttime hours, State law requires that an artificial decibel increment be added to noise occurring during those time periods. The 24-hour noise descriptor with a specified evening (7:00–10:00 PM) and nighttime (10:00 PM to 7:00 AM) penalty is called the community noise equivalent level (CNEL).

Table 4.12-1: Noise Descriptors provides a summary of the noise descriptors used to measure sound levels over different periods of time.

Table 4.12-1
Noise Descriptors

Term	Definition
Decibel (dB)	The unit for measuring the volume of sound equal to 10 times the logarithm (base 10) of the ratio of the pressure of a measure sound to a reference pressure.
A-weighted decibel (dBA)	A sound measurement scale that adjusts the pressure of individual frequencies according to human sensitivities. The scale accounts for the fact that the region of highest sensitivity for the human ear is between 2,000 and 4,000 cycles per second (hertz).
Equivalent sound level (Leq)	The sound level containing the same total energy as a time-varying signal over a given time period. The Leq is the value that expresses the time-averaged total energy of a fluctuating sound level. Leq can be measured over any time period, but is typically measured for 1-minute, 15-minute, 1-hour, or 24-hour periods.
Community noise equivalent level (CNEL)	A rating of community noise exposure to all sources of sound that differentiates between daytime, evening, and nighttime noise exposure. These adjustments add 5 dBA for the evening, 7:00 PM to 10:00 PM, and add 10 dBA for the night, 10:00 PM to 7:00 AM. The 5- and 10-dB penalties are applied to account for increased noise sensitivity during the evening and nighttime hours. The logarithmic effect of adding these penalties to the 1-hour Leq measurements typically results in a CNEL measurement that is within approximately 3 dBA of the peak-hour Leq.[a]
Sound pressure level	Sound pressure is the force of sound on a surface area perpendicular to the direction of the sound. Sound pressure level is expressed in decibels.
Ambient noise	The level of noise that is all encompassing within a given environment, being usually a composite of sounds from many and varied sources near to and far from the observer. No specific source is identified in the ambient environment.

[a] *California Department of Transportation, Technical Noise Supplement; A Technical Supplement to the Traffic Noise Analysis Protocol (Sacramento, California: November 2009), N51–N54.*

Noise sources can generally be categorized as one of two types: (1) point sources, such as stationary mechanical equipment; and (2) line sources, such as a roadway. Sound generated by a point source typically diminishes (attenuates) at a rate of 6 dBA for each doubling of distance from the source to the receptor at acoustically hard sites, and at a rate of 7.5 dBA at acoustically soft sites.[1] A hard, or reflective site consists of asphalt, concrete, or very hard-packed soil, which does not provide any excess ground-

1 USDOT FHWA, *Fundamentals and Abatement,* 97.

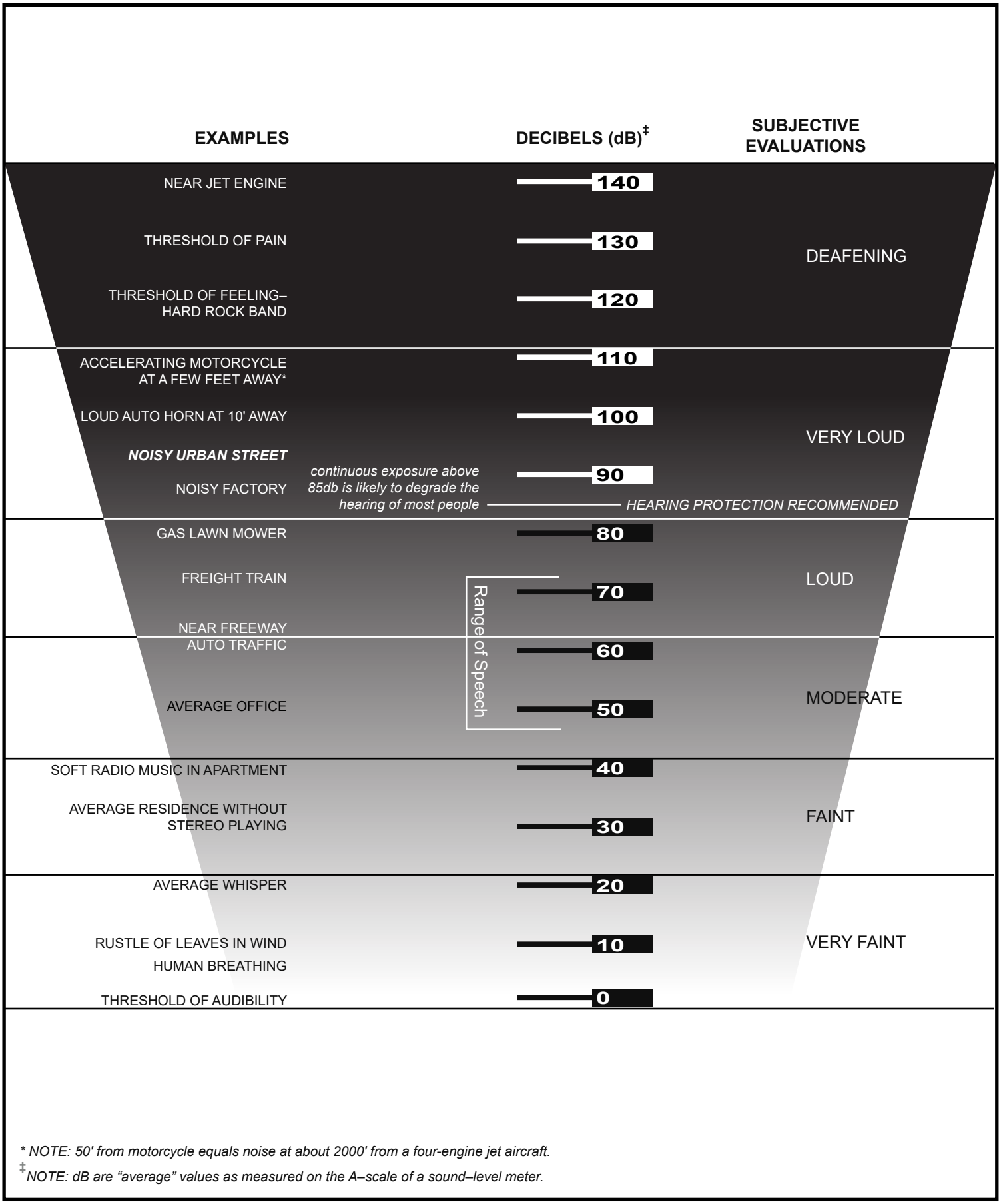
effect attenuation. An acoustically soft or absorptive site is characteristic of normal earth and most ground with vegetation. As an example, a 60-dBA noise level measured at 50 feet from a point source at an acoustically hard site would be 54 dBA at 100 feet from the source and 48 dBA at 200 feet from the source. Noise from the same point source at an acoustically soft site would be 52.5 dBA at 100 feet and 45 dBA at 200 feet from the source. Sound generated by a line source typically attenuates at a rate of 3 dBA and 4.5 dBA per doubling of distance from the source to the receptor for hard and soft sites, respectively.[2] Noise levels generated by a variety of activities are shown in **Figure 4.12-1: Common Noise Levels**. Man-made or natural barriers can also attenuate sound levels, as illustrated in **Figure 4.12-2: Noise Attenuation by Barriers**.

Fundamentals of Vibration

Vibration is commonly defined as an oscillatory motion through a solid medium in which the motion's amplitude can be described in terms of displacement, velocity, or acceleration. The peak particle velocity (PPV) or the root-mean-square (RMS) velocity is usually used to describe vibration amplitudes. PPV is defined as the maximum instantaneous peak of the vibration signal, while RMS is defined as the square root of the average of the squared amplitude of the signal. PPV is typically used for evaluating potential building damage, whereas RMS is typically more suitable for evaluating human response to ground-borne vibration. The RMS vibration velocity level can be presented in inches per second (ips) or in vibration decibels (VdB, a decibel unit referenced to 1 microinch per second). Generally, ground-borne vibration generated by man-made activities (i.e., road traffic, construction activity) attenuates rapidly with distance from the source of the vibration.

The vibration velocity level threshold of perception for humans is approximately 65 VdB. A vibration velocity of 75 VdB is the approximate dividing line between barely perceptible and distinctly perceptible levels for many people. Most perceptible indoor vibration is caused by sources within buildings such as the operation of mechanical equipment, the movement of people, or the slamming of doors. Typical outdoor sources of perceptible ground-borne vibration are construction equipment, steel-wheeled trains, and traffic on rough roads. If a roadway is smooth, the ground-borne vibration from traffic is barely perceptible. The range of interest is from approximately 50 VdB, which is the typical background vibration velocity, to 100 VdB, which is the threshold where minor damage can occur in fragile buildings.

2 USDOT FHWA, *Fundamentals and Abatement,* 97.



** NOTE: 50' from motorcycle equals noise at about 2000' from a four-engine jet aircraft.*

‡*NOTE: dB are "average" values as measured on the A–scale of a sound–level meter.*

FIGURE **4.12-1**

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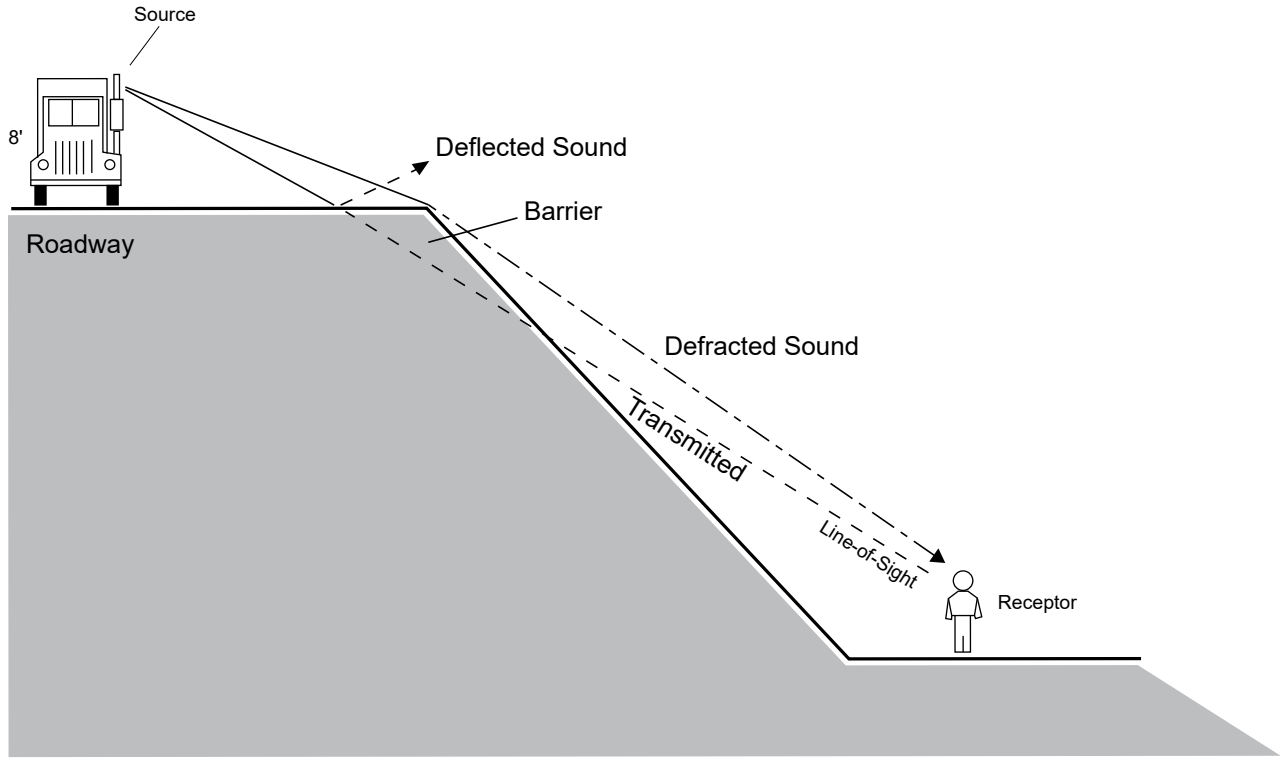
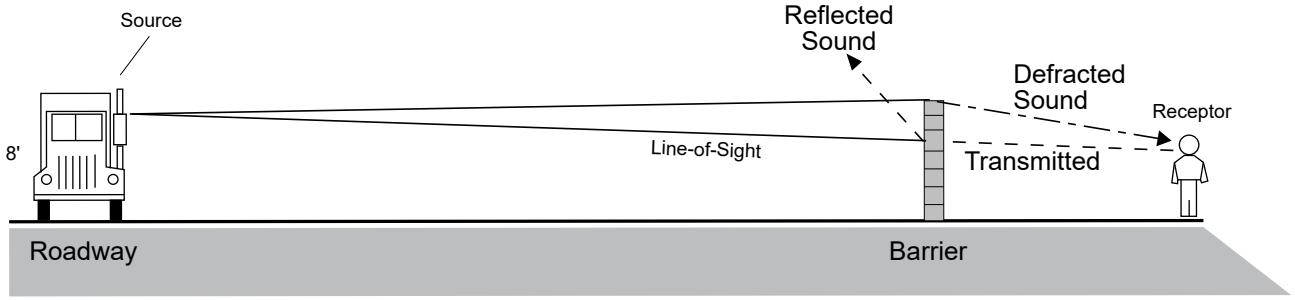
Common Noise Levels



"Barrier Effect" Resulting from Differences in Elevation.



"Barrier Effect" Resulting from Typical Soundwall.

FIGURE **4.12-2**

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Noise Attenuation by Barriers

REGULATORY FRAMEWORK

a. Federal

The Federal Transit Administration (FTA) has published a technical manual, *Transit Noise and Vibration Impacts Assessment*, that provides ground-borne vibration impact criteria with respect to building damage during construction activities.[3] According to the FTA guidelines, a vibration criterion of 0.20 PPV should be considered as the significant impact level for nonengineered timber and masonry buildings. Structures or buildings constructed of reinforced concrete, steel, or timber have a vibration damage criterion of 0.50 PPV based on the FTA guidelines. Structures amplify ground-borne vibration, and wood-frame buildings, such as typical residential structures, are more affected by ground vibration than are heavier buildings. The level at which ground-borne vibration is strong enough to cause architectural damage has not been determined conclusively. The most conservative estimates are reflected in the FTA standards, shown in **Table 4.12-2: Construction Vibration Damage Criteria**. The FTA has also adopted standards for ground-borne vibration impacts related to human annoyance, as shown in **Table 4.12-3: Ground-borne Vibration Sensitivity Criteria**. These criteria are based on extensive research that suggests humans are sensitive to vibration velocities in the range of 8 to 80 Hz.[4]

Table 4.12-2
Construction Vibration Damage Criteria

Building Category	PPV (ips)	Lv (VdB)
I. Reinforced concrete, steel, or timber (no plaster)	0.5	102
II. Engineered concrete and masonry (no plaster)	0.3	98
III. Non-engineered timber and masonry buildings	0.2	94
IV. Buildings extremely susceptible to vibration damage	0.12	90

Source: United States Department of Transportation, Federal Transportation Authority, Transit Noise and Vibration Impact Assessment *(May 2006).*
Note: For Max Lv (VdB), Lv = the velocity level in decibels as measured in 1/3 octave bands of frequency over the frequency ranges of 8 to 80 Hz; VdB = vibration decibels; Hz = hertz; ips = inches per second.

3 US Department of Transportation, Federal Transit Administration (USDOT, FTA), *Transit Noise and Vibration Impact Assessment,* FTA report no. 0123 (September 2018), accessed December 2018, https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/research-innovation/118131/transit-noise-and-vibration-impact-assessment-manual-fta-report-no-0123_0.pdf.

4 USDOT, FTA, *Transit Noise and Vibration Impact Assessment.*

Table 4.12-3
Ground-borne Vibration Sensitivity Criteria

Building Category	Frequent Events	Occasional Events	Infrequent Events
Category 1: High Sensitivity. Buildings where vibration would interfere with interior operations (e.g., vibration-sensitive research and manufacturing facilities, hospitals with vibration-sensitive equipment, and research operations).	65 VdB[1]	65 VdB[1]	65 VdB[1]
Category 2: Residences and buildings where people normally sleep.	72 VdB	75 VdB	80 VdB
Category 3: Institutional land uses, such as schools, churches, other institutions, and quiet offices that do not have vibration-sensitive equipment, but still have the potential for activity interference.	75 VdB	78 VdB	83 VdB

Source: Federal Transit Administration Transit Noise and Vibration Impact Assessment Manual, September 2018.
Note:
[1] This criterion limit is based on levels that are acceptable for most moderately sensitive equipment such as optical microscopes. For equipment that is more sensitive, a Detailed Vibration Analysis must be performed.

b. State

Noise Standards

The California Department of Health Services (DHS) has established guidelines for evaluating the compatibility of various land uses as a function of community noise exposure; these guidelines have been included in the State of California General Plan Guidelines, which is published and updated by the Governor's Office of Planning and Research.[5] According to the State, an exterior noise environment up to 60 dBA CNEL and 65 dBA CNEL is "normally acceptable" for single- and multifamily residential uses, respectively, without special noise insulation requirements. In addition, noise levels up to 75 dBA CNEL are "conditionally acceptable" with special noise insulation requirements, while noise levels at 75 dBA CNEL and above are "clearly unacceptable" for residential uses. In addition, Section 65302(f) of the California Government Code requires each county and city in the State to prepare and adopt a comprehensive long-range general plan for its physical development, with Section 65302(g) requiring a noise element to be included in the general plan. The noise element must (1) identify and appraise noise problems in the community, (2) recognize Office of Noise Control guidelines, and (3) analyze and quantify current and projected noise levels.

DHS's Office of Noise Control has established guidelines to provide communities with noise environments that it deems to be generally acceptable based on land-use categories. These guidelines serve as a primary

5 State of California, Governor's Office of Planning and Research, *General Plan Guidelines 2017* (2018), 374, accessed December 2018, http://opr.ca.gov/planning/general-plan/guidelines.html.

tool for a city to use to assess the compatibility between land uses and outdoor noise. Noise exposure for single-family uses is normally acceptable when the CNEL at exterior residential locations is equal to or below 60 dBA, conditionally acceptable when the CNEL is between 55 to 70 dBA, and normally unacceptable when the CNEL exceeds 70 dBA. Some overlap exists between categories. These guidelines apply to noise sources such as vehicular traffic, aircraft, and rail movements.

Vibration Standards

The California Department of Transportation (Caltrans) published its *Transportation and Construction Vibration Guidance Manual* in September 2013.[6] The manual provides practical guidance to Caltrans engineers, planners, and consultants who must address vibration issues associated with the construction, operation, and maintenance of Caltrans projects. This manual provides guidelines for assessing vibration damage potential to various types of buildings, ranging from 0.08 to 0.12 inches per second for extremely fragile historic buildings, ruins, and ancient monuments, to 0.50 to 2.0 inches per second for modern industrial and commercial buildings.

The guidance and procedures provided in the Caltrans manual should be treated as screening tools for assessing the potential for adverse effects related to human perception and structural damage. General information on the potential effects of vibration on vibration-sensitive research and advanced-technology facilities is also provided, but a discussion of detailed assessment methods in this area is beyond the manual's scope. The document is not an official policy, standard, specification, or regulation. Therefore, the vibration analysis in this Draft EIR is based on the FTA's standards and the Caltrans standards are included for informational purposes only.

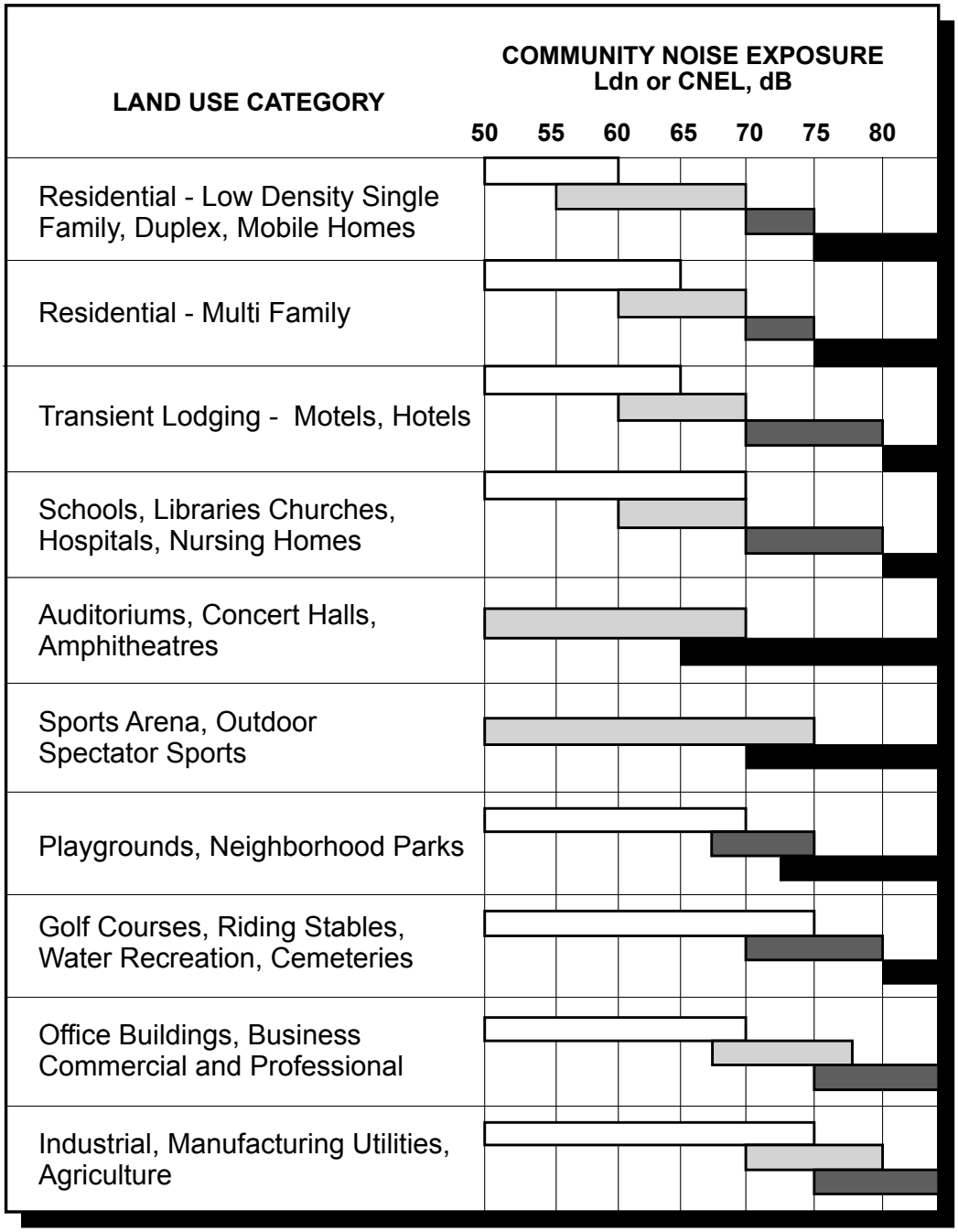
c. Local

City of Rancho Cucamonga General Plan

Figure 4.12-3: Land Use Compatibility to Noise generally reflects guidelines promulgated by the California Office of Noise Control. This matrix provides the City with an integral tool to gauge the compatibility of land uses relative to existing and future noise levels.

Policy PS-13.4 states "Require that acceptable noise levels are maintained near residences, schools, health care facilities, religious institutions, and other noise sensitive uses." The Normally and Conditionally Acceptable maximum noise exposure for residences range from 50 dBA to 70 dBA.

6 California Department of Transportation (Caltrans), *Transportation and Construction Vibration Guidance Manual*, September 2013, accessed January 2019, http://www.dot.ca.gov/hq/env/noise/pub/TCVGM_Sep13_FINAL.pdf.



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 generally be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise reduction features included in the design.

CLEARLY UNACCEPTABLE
New construction or development should generally not be undertaken.

SOURCE: California Governor's Office of Planning and Research, State of California General Plan Guidelines, Appendix C: Guidelines for the Preparation and Content of Noise Elements of the General Plan, October 2003.

FIGURE **4.12-3**

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Land Use Compatibility to Noise

City of Rancho Cucamonga Noise Ordinance

The City's noise ordinance is designed to control vibration and unnecessary, excessive, and annoying noise within the City. Noise ordinance requirements cannot be applied to mobile noise sources such as heavy trucks when traveling on public roadways. Federal and State laws preempt control of mobile noise sources for aviation and on public roads. The provisions apply within all jurisdictions within all zoning districts. Provisions apply based on designated noise zones such as: Noise Zone I (all single- and multiple-family residential properties) and Noise Zone II (all commercial properties.

Exterior Noise Standards

Section 17.66.050 of the City's municipal code sets limits on exterior noise levels. Noise ordinance limits are specified using the "Basic Noise Level" as its reference criteria. The municipal code defines the Basic Noise Level as "the acceptable noise level within a given district." The City's exterior noise standard puts restrictions on the duration of noises of various magnitudes, as shown in **Table 4.12-4: Exterior Noise Standards**. The noise ordinance sets the following time limits on noise excessive noise levels in all residential and commercial districts:

- Basic noise level for a cumulative period of not more than 15 minutes in any one hour; or
- Basic noise level plus five dBA for a cumulative period of not more than ten minutes in any one hour; or
- Basic noise level plus 14 dBA for a cumulative period of not more than five minutes in any one hour; or
- Basic noise level plus 15 dBA at any time.

Table 4.12-4
Exterior Noise Standards

	L25	L16.7	L8.3	Lmax
Noise Level Limit	Basic Noise Level	Basic Noise Level + 5 dBA	Basic Noise Level + 14 dBA	Basic Noise Level + 15 dBA
Noise Level Limit (impulse or pure tone)	Basic Noise Level – 5 dBA	Basic Noise Level	Basic Noise Level | 9 dBA	Basic Noise Level + 10 dBA
Maximum allowable time in any 1-hour period that the noise level can exceed the noise level limit	15 minutes	10 minutes	5 minutes	Never allowed

L25: noise level that is equal to or exceeds for 15 minutes in a 1-hour period.
L16.7: noise level that is equal to or exceeds for 10 minutes in a 1-hour period.
L8.3: noise level that is equal to or exceeds for 5 minutes in a 1-hour period.
Lmax: noise level that is equal to or exceeds at any time.

The noise ordinance exempts certain activities from the standard. These activities include: City- or school-approved activities that take place between 7:00 AM and 10:00 PM; outdoor gatherings with a temporary use permit granted by the City; any mechanical device, apparatus, or equipment used, related to, or connected with emergency machinery, vehicle, work, or warning alarm or bell that operates within any hour no longer than 30 minutes after they start; and construction activities that abide by the restrictions as specified in the construction noise standards.

Construction Noise Standards

Chapter 17.66.050 of the City's Municipal Code states that noise generated by construction activities adjacent to residential uses are allowed only if construction takes place between 7:00 AM and 8:00 PM on weekdays or Saturdays. In addition, construction would be allowed if the construction noise levels conform to all conditions specified by the general standards and would not exceed the noise standard of 65 dBA when measured at the adjacent property line.

Noise generated by construction activities adjacent to commercial or industrial uses are allowed if construction takes place between 6:00 AM and 10:00 PM on weekdays. In addition, construction would be allowed if the construction noise levels conform to all conditions specified by the general standards and would not exceed the noise standard of 70 dBA when measured at the adjacent property line.

Residential Noise Standards

Table 4.12-5: Residential Noise Limits includes the maximum noise limits in residential zones. These are the noise limits when measured at the adjacent residential property line (exterior) or within a neighboring home (interior).

Table 4.12-5
Residential Noise Limits

	Maximum Allowable	
Location	**10:00 PM to 7:00 AM**	**7:00 AM to 10:00 PM**
Exterior	60 dBA	65 dBA
Interior	45 dBA	50 dBA

Source: Section 17.66.050, Noise Standards

Note:

a) It shall be unlawful for any person at any location within the city to create any noise or to allow the creation of any noise which causes the noise level when measured within any other fully enclosed (windows and doors shut) residential dwelling unit to exceed the interior noise standard in the manner described herein.

b) If the intruding noise source is continuous and cannot reasonably be discontinued or stopped for a time period whereby the ambient noise level can be determined, each of the noise limits above shall be reduced by 5 dBA for noise consisting of impulse or simple tone noise.

Vibration Standards

Uses that generate vibration that may be considered a public nuisance or hazard on any adjacent property shall be cushioned or isolated to prevent generation of vibrations. Section 17.66.070 of the City's Municipal Code states that uses shall be operated in compliance with the following provisions:

a. No vibration shall be produced that is transmitted through the ground and is discernible without the aid of instruments at the points of measurement specified in section 17.66.030 (Points of Measurement) of this chapter, nor shall any vibration produced exceed 0.002g peak at up to 50 CPS frequency, measured at the point of measurement specified in section 17.66.030 (Points of Measurement) of this chapter using either seismic or electronic vibration measuring equipment. Vibrations occurring at higher than 50 CPS frequency of a periodic vibration shall not induce accelerations exceeding 0.001g. Single-impulse periodic vibrations occurring at an average interval greater than five minutes shall not induce accelerations exceeding 0.01g.

b. Uses, activities, and processes shall not generate vibrations that cause discomfort or annoyance to reasonable persons of normal sensitivity or which endangers the comfort, repose, health, or peace of residents whose property abuts the property line of the parcel.

c. Uses shall not generate ground vibration that interferes with the operations of equipment and facilities of adjoining parcels.

d. Vibrations from temporary construction/demolition and vehicles that leave the subject parcel (e.g., trucks, trains, and aircraft) are exempt from the provisions of this section.

EXISTING CONDITIONS

Ambient Noise Levels

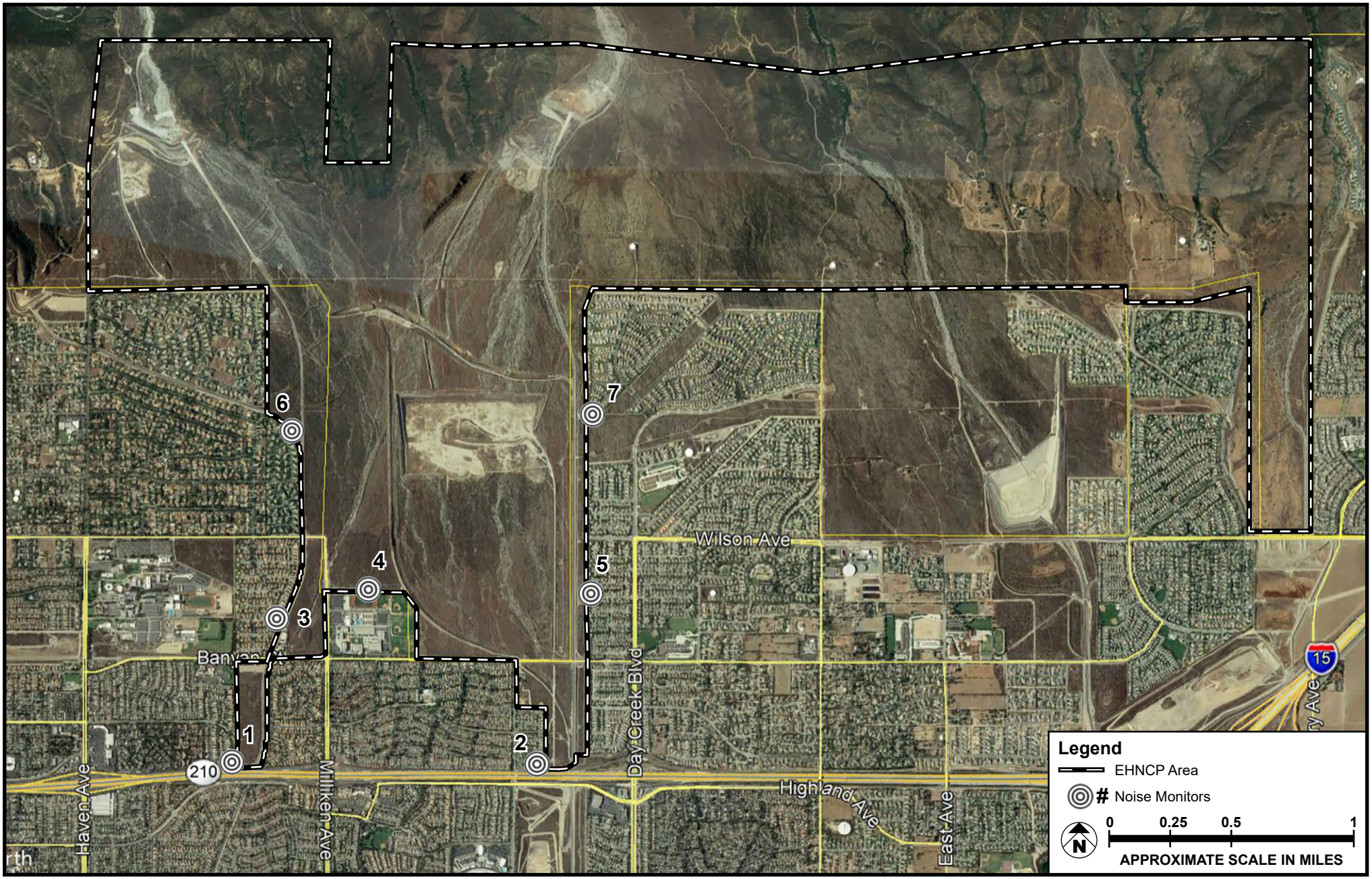
The noise environment surrounding the Plan Area is defined by a variety of noise sources, predominantly vehicular traffic on the roadways in the area (e.g., Banyan Street and Milliken Avenue). In addition, the dominant noise source on the southeast and southwest corners of the Plan Area include the SR-210 Freeway. The extent to which the ambient noise level at any particular location is affected by one or more of these sources depends upon, among other things, the distance of the location to a specific noise source, the presence of intervening structures, and topography.

To establish baseline noise conditions, existing ambient noise levels were monitored at 7 representative receptor locations, as shown in **Figure 4.12-4: Noise Monitoring Locations** (identified as Site 1 to Site 7) in the vicinity of the Plan Area. **Table 4.12-6: Existing Ambient Noise Levels** provides a summary of the ambient noise measurements conducted at the noise receptor locations. Existing noise levels ranged from a low of 41.5 dBA Leq (Site 6) to a high of 56.4 dBA Leq (Site 2). Based on the land use noise compatibility criteria, forecasted CNEL levels are classified as normally acceptable at all locations. As discussed above, the predominant noise source in the Plan area is motor vehicle travel, particularly along the major streets and State Route 210 (SR-210).

Table 4.12-6
Existing Ambient Noise Levels

Site	Location	Land Use	Leq (15-minute)
Site 1	Planning Sub-Area 1	Residential	55.9
Site 2	Planning Sub-Area 8	Residential	56.4
Site 3	Planning Sub-Area 2	Residential	44.8
Site 4	Planning Sub-Area 5	Educational	53.2
Site 5	Planning Sub-Area 4/6/10	Residential	43.3
Site 6	West of the Plan Area; near the intersection of High Meadow Pl and Carriage Pl.	Residential	41.5
Site 7	Planning Sub-Area 3	Residential	47.5

Note: Measurements were taken on February 27, 2019.
*Source: Noise Measurement Datasheets contained in **Appendix J**.*



SOURCE: Google Earth - 2019

FIGURE **4.12-4**

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Noise Monitoring Locations

072-004-18

Roadway Noise Levels

Traffic volumes and estimated speeds were used with the Federal Highway Administration (FHWA) Traffic Noise Prediction Model. Existing traffic volumes for arterials utilized were obtained from the traffic study (**Appendix K**). The existing ambient noise environment for the roadways was determined by calculating noise levels based on average daily trips. The results of the noise modeling are provided in **Table 4.12-7: Existing Roadway Noise Levels.** As shown, roadway noise levels during the AM peak hour ranged from a low of 33.1 dBA CNEL at Cabernet Place, north of Banyan Street (Intersection 15), to a high of 69.1 dBA CNEL at Day Creek Boulevard, south of the SR-210 eastbound ramps. In addition, roadway noise levels during the PM peak hour ranged from a low of 49.1 dBA CNEL at Wilson Avenue, west of Day Creek Boulevard (Intersection 6) to a high of 70.1 dBA CNEL at Foothill Boulevard, east of Day Creek Boulevard (Intersection 41).

Existing Vibration Levels

Based on field observations, the primary source of existing ground-borne vibration near the Plan Area is vehicle traffic on local roadways. According to the FTA, typical road traffic-induced vibration levels are unlikely to be perceptible by people. Trucks and buses typically generated ground-borne vibration velocity levels of approximately 63 VdB (at 50 feet distance), and these levels could reach 72 VdB when trucks and buses pass over bumps in the road. A vibration level of 72 VdB is above the 60 VdB level of perceptibility.

Table 4.12-7
Existing Roadway Noise Levels

		Existing Roadway Noise Level (dBA CNEL)	
Intersection No.	**Roadway Segment**	**AM**	**PM**
Wilson Avenue			
1	East of Amethyst Street	58.9	57.5
1	West of Amethyst Street	58.6	57.2
2	East of Archibald Avenue	60.3	59.3
2	West of Archibald Avenue	60.0	58.5
3	East of Hermosa Avenue	61.8	59.1
3	West of Hermosa Avenue	60.6	58.8
4	East of Haven Avenue	63.2	61.8
4	West of Haven Avenue	61.6	59.1
5	East of College Drive	62.8	61.3
5	West of College Drive	62.0	60.4
6	East of Milliken Avenue	N/A	N/A

Intersection No.	Roadway Segment	Existing Roadway Noise Level (dBA CNEL)	
		AM	PM
6	West of Milliken Avenue	62.5	61.7
7	East of Day Creek Boulevard	60.6	56.7
7	West of Day Creek Boulevard	54.2	49.1
8	East of Etiwanda Avenue	N/A	N/A
8	West of Etiwanda Avenue	57.8	54.6
9	East of East Avenue	64.3	60.1
9	West of East Avenue	N/A	N/A
10	East of Wardman Bullock Road	65.5	61.0
10	West of Wardman Bullock Road	64.5	60.2
11	East of Cherry Avenue	65.1	63.9
11	West of Cherry Avenue	66.1	62.2
Beech Avenue			
12	East of I-15 SB Ramps	65.3	64.9
12	West of I-15 SB Ramps	64.9	63.8
13	East of I-15 NB Ramps	64.6	66.3
13	West of I-15 NB Ramps	64.0	64.8
Los Osos High School			
14	East of Milliken Avenue	61.3	55.2
14	West of Milliken Avenue	58.3	49.1
Banyan Street			
15	East of Cabernet Place	63.4	61.5
15	West of Cabernet Place	63.0	61.0
16	East of Fredericksburg Avenue	63.9	61.6
16	West of Fredericksburg Avenue	64.1	61.6
17	East of Milliken Avenue	62.8	62.0
17	West of Milliken Avenue	63.8	61.7
18	East of Rochester Avenue	63.6	62.8
18	West of Rochester Avenue	63.3	61.8
19	East of Day Creek Boulevard	63.8	62.3
19	West of Day Creek Boulevard	63.8	62.8
SR-210 Ramps (WB and EB)			
20	East of Milliken Avenue	63.5	62.3
20	West of Milliken Avenue	62.5	62.6
21	East of Day Creek Boulevard	62.9	62.2
21	West of Day Creek Boulevard	63.8	62.5
22	East of Milliken Avenue	62.6	62.5

Intersection No.	Roadway Segment	Existing Roadway Noise Level (dBA CNEL) AM	PM
22	West of Milliken Avenue	63.4	62.5
23	East of Day Creek Boulevard	63.9	62.2
23	West of Day Creek Boulevard	62.6	62.6
Lark Drive			
24	East of Rochester Avenue	N/A	N/A
24	West of Rochester Avenue	61.0	54.8
Victoria Park Lane			
25	East of Milliken Avenue	60.6	59.1
25	West of Milliken Avenue	59.0	58.2
26	East of Rochester Avenue	61.9	59.4
26	West of Rochester Avenue	61.6	58.8
27	East of Day Creek Boulevard	61.1	60.0
27	West of Day Creek Boulevard	62.7	59.9
Base Line Road			
28	East of Milliken Avenue	67.7	67.6
28	West of Milliken Avenue	68.2	68.3
29	East of Rochester Avenue	67.7	67.4
29	West of Rochester Avenue	68.0	67.5
30	East of Day Creek Boulevard	67.0	66.5
30	West of Day Creek Boulevard	67.7	67.3
31	East of Etiwanda Avenue	67.5	66.7
31	West of Etiwanda Avenue	67.2	66.5
32	East of I-15 SB Ramps	66.0	66.3
32	West of I-15 SB Ramps	66.2	66.2
33	East of East Avenue	69.0	67.9
33	West of East Avenue	68.9	67.7
34	East of I-15 NB Ramps	68.4	67.7
34	West of I-15 NB Ramps	68.8	67.7
Terra Vista Parkway			
35	East of Milliken Avenue	60.5	61.6
35	West of Milliken Avenue	60.8	62.0
Church Street			
36	East of Rochester Avenue	64.0	65.3
36	West of Rochester Avenue	64.5	65.3
37	East of Day Creek Boulevard	63.0	63.9
37	West of Day Creek Boulevard	63.9	65.0

Intersection No.	Roadway Segment	Existing Roadway Noise Level (dBA CNEL) AM	PM
38	East of Milliken Avenue	65.0	66.7
38	West of Milliken Avenue	64.8	66.4
Foothill Boulevard			
39	East of Milliken Avenue	68.5	69.9
39	West of Milliken Avenue	68.5	70.1
40	East of Rochester Avenue	68.0	69.0
40	West of Rochester Avenue	67.2	68.5
41	East of Day Creek Boulevard	68.9	70.1
41	West of Day Creek Boulevard	68.0	69.0
42	East of I-15 SB Ramps	66.8	68.7
42	West of I-15 SB Ramps	68.8	69.1
43	East of I-15 NB Ramps	66.9	67.7
43	West of I-15 NB Ramps	67.6	67.9
Amethyst Street			
1	North of Wilson Avenue	51.8	51.8
1	South of Wilson Avenue	53.0	52.0
Archibald Avenue			
2	North of Wilson Avenue	57.5	57.3
2	South of Wilson Avenue	60.2	59.5
Hermosa Avenue			
3	North of Wilson Avenue	56.4	56.4
3	South of Wilson Avenue	59.6	57.5
Haven Avenue			
4	North of Wilson Avenue	59.6	59.8
4	South of Wilson Avenue	62.8	62.1
College Drive			
5	North of Wilson Avenue	N/A	N/A
5	South of Wilson Avenue	57.1	57.8
Cabernet Place			
15	North of Banyan Street	33.1	N/A
15	South of Banyan Street	54.3	52.5
Fredericksburg Avenue			
16	North of Banyan Street	54.6	53.5
16	South of Banyan Street	N/A	N/A
Milliken Avenue			
6	North of Wilson Avenue	N/A	N/A

Intersection No.	Roadway Segment	Existing Roadway Noise Level (dBA CNEL)	
		AM	PM
6	South of Wilson Avenue	62.5	61.7
14	North of Grizzly Drive	62.5	61.9
14	South of Grizzly Drive	64.7	62.6
17	North of Banyan Street	67.1	64.3
17	South of Banyan Street	67.2	64.4
20	North of SR-210 WB Ramps	68.0	65.7
20	South of SR-210 WB Ramps	68.4	67.5
22	North of SR-210 EB Ramps	68.4	67.5
22	South of SR-210 EB Ramps	68.6	68.4
25	North of Victoria Park Lane	68.2	68.0
25	South of Victoria Park Lane	67.9	67.9
28	North of Base Line Road	68.3	68.5
28	South of Base Line Road	67.3	68.2
35	North of Terra Vista Parkway	67.0	68.1
35	South of Terra Vista Parkway	66.8	67.8
38	North of Church Street	66.9	68.2
38	South of Church Street	66.9	68.5
39	North of Foothill Boulevard	67.3	68.7
39	South of Foothill Boulevard	67.1	69.4
Rochester Avenue			
18	North of Banyan Street	N/A	N/A
18	South of Banyan Street	61.0	60.0
24	North of Lake Drive	64.5	62.6
24	South of Lake Drive	64.5	62.7
26	North of Victoria Park Lane	65.5	63.2
26	South of Victoria Park Lane	65.2	63.7
29	North of Base Line Road	64.5	64.1
29	South of Base Line Road	64.4	64.7
36	North of Church Street	64.1	64.7
36	South of Church Street	63.3	65.1
40	North of Foothill Boulevard	64.3	65.6
40	South of Foothill Boulevard	63.1	65.3
Day Creek Boulevard			
7	North of Wilson Avenue	66.0	61.1
7	South of Wilson Avenue	66.2	62.5
19	North of Banyan Street	66.5	63.1

Intersection No.	Roadway Segment	Existing Roadway Noise Level (dBA CNEL)	
		AM	PM
19	South of Banyan Street	66.6	63.5
21	North of SR-210 WB Ramps	68.2	65.6
21	South of SR-210 WB Ramps	68.8	66.9
23	North of SR-210 EB Ramps	68.8	66.9
23	South of SR-210 EB Ramps	69.1	68.0
27	North of Victoria Park Lane	67.7	66.7
27	South of Victoria Park Lane	67.1	66.3
30	North of Base Line Road	67.3	66.8
30	South of Base Line Road	66.2	66.9
37	North of Church Street	64.7	65.7
37	South of Church Street	63.9	65.4
41	North of Foothill Boulevard	63.9	66.8
41	South of Foothill Boulevard	60.4	64.7
Cherry Avenue			
11	North of Wilson Avenue	65.1	63.9
11	South of Wilson Avenue	63.2	62.7
I-15 Ramps (NB and SB)			
12	North of Beech Avenue	68.5	65.7
12	South of Beech Avenue	N/A	N/A
13	North of Beech Avenue	64.8	68.0
13	South of Beech Avenue	N/A	N/A
32	North of Base Line Road	62.1	61.8
32	South of Base Line Road	N/A	N/A
34	North of Base Line Road	59.9	62.0
34	South of Base Line Road	61.3	63.4
42	North of Foothill Boulevard	61.6	61.6
42	South of Foothill Boulevard	62.6	N/A
43	North of Foothill Boulevard	N/A	N/A
43	South of Foothill Boulevard	64.3	64.3
Etiwanda Avenue			
8	North of Wilson Avenue	N/A	N/A
8	South of Wilson Avenue	57.8	54.6
31	North of Base Line Road	66.1	62.1
31	South of Base Line Road	64.9	63.9
East Avenue			
9	North of Wilson Avenue	N/A	N/A

Intersection No.	Roadway Segment	Existing Roadway Noise Level (dBA CNEL) AM	PM
9	South of Wilson Avenue	64.3	55.2
33	North of Base Line Road	67.3	63.0
33	South of Base Line Road	65.7	63.7
Wardman Bullock Road			
10	North of Wilson Avenue	57.5	55.5
10	South of Wilson Avenue	61.5	55.3

Source: Fehr & Peers Inc., Etiwanda Heights Specific Plan Transportation Impact Study (March 2019).
*Notes: Roadway noise model results are provided in **Appendix J.** Roadway noise levels are modeled 75 feet from the center of the roadway.*
N/A: Data not available.

ENVIRONMENTAL IMPACTS

Methodology

Construction

Construction Equipment Noise

Construction activities typically generate noise from the operation of equipment required for demolition and construction of various facilities. Noise impacts from on-site construction and staging of construction trucks were evaluated by determining the noise levels generated by different types of construction activity, calculating the construction-related noise level at nearby noise-sensitive receptor locations, and comparing these construction-related noise levels to existing ambient noise levels (i.e., noise levels without Plan-related construction noise). The actual noise level would vary, depending upon the equipment type, model, the type of work activity being performed, and the condition of the equipment.

In order to calculate a construction CNEL, hourly activity or utilization factors (i.e., the percentage of normal construction activity that would occur, or construction equipment that would be active, during each hour of the day) are estimated based on the temporal characteristics of other previous and current construction projects. The hourly activity factors express the percentage of time that construction activities would emit average noise levels. Typical noise levels for each type of construction equipment were obtained from the Federal Highway Administration's (FHWA) Roadway Construction Noise Model. Calculated noise levels associated with construction at noise-sensitive receptor locations were then compared to estimated existing noise levels and the construction noise significance thresholds identified below.

Construction Traffic Noise

The analysis of construction traffic noise impacts focuses on off-site areas by: (1) identifying major roadways that may be used for construction worker commute routes or truck haul routes; (2) generally identifying the nature and location of noise-sensitive receptors along those routes; and (3) evaluating the traffic characteristics along those routes, specifically as related to existing traffic volumes. Construction traffic volume and road parameter data would be input into the TNM 2.5 model to calculate average noise levels for these trips. Construction trucks staging and hauling route noise impacts would be evaluated by determining the noise levels generated by different types of construction activity, calculating the construction-related noise levels to existing ambient noise levels (i.e., noise levels without construction noise).

Construction Equipment Vibration

Construction activity can result in varying degrees of ground vibration, depending on the equipment and methods employed. Operation of construction equipment causes ground vibrations that spread through the ground and diminish in strength with distance. While ground vibrations from construction activities do not often reach the levels that can damage structures, fragile buildings must receive special consideration.

Impacts due to construction activities were evaluated by identifying vibration sources (i.e., construction equipment), measuring the distance between vibration sources and surrounding structure locations, and making a significance determination.

For quantitative construction vibration assessments related to building damage and human annoyance, vibration source levels for construction equipment is taken from the FTA *Transit Noise and Vibration Impact Assessment Manual.* Building damage would be assessed for each piece of equipment individually and assessed in terms of peak particle velocity. Ground-borne vibration related to human annoyance is assessed in terms of rms velocity levels.

The vibration source levels for various types of equipment are based on data provided by the FTA.

Operation

Roadway Noise

Traffic noise levels were modeled using the FHWA TNM. The FHWA TNM calculates noise associated with a specific line source and the results characterize noise generated by motor vehicle travel along a specific roadway segment. The traffic noise impact analysis is based on the 24-hour CNEL noise descriptor and incorporates traffic volumes, vehicle mix, posted speed limits, roadway geometry, and site conditions.

Future conditions take into account the 2040 Southern California Association of Governments (SCAG) land use dataset which includes all pending and approved development projects within the City. Noise levels were evaluated with respect to the following traffic scenarios:

- Existing Conditions (2017);
- Existing plus Proposed Project Conditions (2017);
- Future (2040) without Proposed Project Conditions; and
- Future (2040) plus Proposed Project Conditions.

Thresholds of Significance

To assist in determining whether the proposed Plan would have a significant effect on the environment, the City finds the proposed Plan may be deemed to have a significant impact related to noise if it would:

Threshold NOI-1: **Generate 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.**

Threshold NOI-2: **Generate excessive ground-borne vibration or ground-borne noise levels.**

Threshold NOI-3: **For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within 2 miles of a public airport or public use airport, would the Project expose people residing or working in the Plan area to excessive noise levels.**

Roadway Traffic Noise

The following threshold of significance is applied for traffic noise impacts:

- Any noise increase of 3 dBA or greater is potentially significant when it impacts a sensitive land use, such as a residential area, and the noise level at the sensitive land use would exceed 70 dBA Ldn or CNEL, which is the upper limit for the Normally Acceptable noise exposure to residential residences, as shown in **Figure 4.12-1** above.
- Any noise increase of 5 dBA or greater is potentially significant when it impacts a sensitive land use, such as a residential area, and the noise level at the sensitive land use would exceed 65 dBA Ldn or CNEL.

Construction

The following thresholds of significance are applied for construction noise impacts:

- When adjacent to a residential land use, school, church or similar type of use, the noise generating activity does not take place between the hours of 8:00 PM and 7:00 AM on weekdays, including Saturday, or at any time on Sunday or a national holiday, and provided noise levels created do not exceed the noise standard of 65 dBA when measured at the adjacent property line; and
- When adjacent to a commercial or industrial land use, the noise generating activity does not take place between the hours of 10:00 PM and 6:00 AM on weekdays, including Saturday and Sunday, and provided noise levels created do not exceed the noise standards of 70 dBA when measured at the adjacent property line.

Vibration

The City currently does not have a significance threshold to assess vibration impacts. Thus, the FTA guidelines set forth in FTA's *Transit Noise and Vibration Impact Assessment Manual*[7] are used to evaluate potential impacts related to construction vibration. According to FTA guidelines, impacts relative to ground-borne vibration associated with potential building damage would be considered significant if any of the following future events were to occur:

- Project construction activities cause ground-borne vibration levels to exceed 0.5 PPV at the nearest off-site reinforced-concrete, steel, or timber building.
- Project construction activities cause ground-borne vibration levels to exceed 0.3 PPV at the nearest off-site engineered concrete and masonry building.
- Project construction activities cause ground-borne vibration levels to exceed 0.2 PPV at the nearest off-site nonengineered timber and masonry building.
- Project construction activities cause ground-borne vibration levels to exceed 0.12 PPV at buildings extremely susceptible to vibration damage, such as historic buildings.

Project Impact Analysis

Threshold NOI-1: **Generate 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.**

Construction

Noise impacts from Project construction activities would result from the noise generated by the amount of construction equipment, the location of the equipment, the timing and duration of the noise-

7 Federal Transit Administration, *Transit Noise and Vibration Impact Assessment Manual*, September 2018, accessed March 2019, https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/research-innovation/118131/transit-noise-and-vibration-impact-assessment-manual-fta-report-no-0123_0.pdf

generating construction activities, and the relative distance to noise-sensitive receptors. Construction activities would include: grading, building construction, and building finishing. Each stage of construction would involve the use of various types of construction equipment and would, therefore, have its own distinct noise characteristics. Noise from construction equipment would generate both steady-state and episodic noise that could be heard within and adjacent to the Plan Area. In addition to these on-site sources, construction would include off-site truck travel associated with the hauling of excavated materials from the Plan Area, as well as the delivery of construction materials, including concrete. The analysis of noise levels associated with on-site construction activities as well as off-site truck travel is provided below under separate subheadings. In addition, vibration levels associated with on-site construction activities are evaluated in terms of impacts to both off-site buildings and humans.

On-Site Construction Activities

Individual pieces of construction equipment that would most likely be used for construction within the Plan Area produce maximum noise levels of 74 dBA to 85 dBA at a reference distance of 50 feet from the noise source, as shown in **Table 4.12-8: Typical Maximum Noise Levels for Construction Equipment**. The construction equipment-reference noise levels are based on measured noise data compiled by the FHWA. These maximum noise levels would occur when equipment is operating under full power conditions. However, equipment used on construction sites typically operate at less than full power. The acoustical usage factor is the percentage of time that each type of construction equipment is anticipated to be in full power operation during a typical construction day. These values are estimates and will vary based on the actual construction process and schedule.

Table 4.12-8
Typical Maximum Noise Levels for Construction Equipment

Type of Equipment	Reference Maximum Noise Levels at 50 Feet, [a] dBA (Lmax)	Acoustical Usage Factor (%)
Air compressor	78	40
Cement and mortar mixer	80	50
Concrete mixer truck	79	40
Concrete pump	81	20
Crane	81	16
Dozer	82	40
Drill Rig	84	20
Excavator	81	40
Forklift	75	20
Generator	81	50

Type of Equipment	Reference Maximum Noise Levels at 50 Feet, [a] dBA (Lmax)	Acoustical Usage Factor (%)
Grader	85	40
Dump/Haul truck	76	40
Paver	77	50
Rollers	80	20
Rubber-tire loader	79	40
Tractor/Loader/Backhoe	84	40
Delivery truck	74	40
Water truck	82	10
Welders	74	40

_____

Source: Federal Highway Administration, Construction Noise Handbook, Table 7-3: Example of Possible Construction Equipment Noise Emission Criteria Limits.

To characterize construction-period noise levels, the average (hourly Leq) noise level associated with each construction stage was calculated based on the quantity, type, and usage factors for each type of equipment that would be used during each construction stage. These noise levels are typically associated with multiple pieces of equipment operating simultaneously. Site grading typically requires the use of earth moving equipment, such as excavators, graders, dozers, scrapers, and tractors/loaders/backhoes. Building construction typically involves the use of cranes, forklifts, generators, tractors/loaders/backhoes, and welders. Paving typically involves the use of pavers, paving equipment, and rollers. Architectural coating typically involves air compressors.

Equipment estimates, and noise levels used for the analysis during the construction phases are representative of worst-case conditions because it is unlikely that all construction equipment contained on the Plan Area would operate simultaneously. Construction equipment operates at its nosiest levels for certain percentages of time during operation. Equipment such as excavators, graders, and loaders would operate at different percentages over the course of an hour.[8] Forecasts of construction noise levels are shown in **Table 4.12-9: Construction Noise Levels**, which presents construction noise levels generated by on-site construction equipment at each monitored site.

8 DOT, Federal Highway Administration (FHWA), *Traffic Noise Model* (2006).

Table 4.12-9
Construction Noise Levels

Location	Ambient Noise Levels (dbA Leq)	Estimated Noise Levels by Construction Phase (dBA Leq)				Maximum Increase Over Ambient (without mitigation)	Maximum Increase Over 65 dBA Residential Threshold[1]	Maximum Increase Over 70 dBA Commercial or Industrial Threshold[2]
		Grading	Building Construction	Paving	Architectural Coating			
Site 1	55.9	88.2	88.8	81.6	73.7	+32.9	+23.8	+18.8
Site 2	56.4	88.2	88.8	81.6	73.7	+32.4	+23.8	+18.8
Site 3	44.8	88.2	88.8	81.6	73.7	+44.0	+23.8	+18.8
Site 4	53.2	88.2	88.8	81.6	73.7	+35.6	+23.8	+18.8
Site 5	43.3	88.2	88.8	81.6	73.7	+45.5	+23.8	+18.8
Site 6	41.5	88.2	88.8	81.6	73.7	+47.3	+23.8	+18.8
Site 7	47.5	88.2	88.8	81.6	73.7	+41.3	+23.8	+18.8

Source: RCNM Version 1.1
*Refer to **Appendix J** for construction noise work sheets.*
Note:
[1] When adjacent to a residential land use, school, church, or similar type of use, the noise generating activity may not exceed the noise standard of 65 dBA when measured at the adjacent property line.
[2] When adjacent to a commercial or industrial land use, the noise generating activity may not exceed the noise standard of 70 dBA when measured at the adjacent property line.

Implementation of Mitigation Measure **MM N-1** would provide noise abatement during construction near adjacent receptors. Mitigation Measure **MM N-1** would include the use of optimal muffler systems for all equipment and the break in line of sight to a sensitive receptor would reduce construction noise levels by approximately 10 dB or more.[9] In addition, Mitigation Measure **MM N-1** would limit the number of noise-generating heavy-duty off-road construction equipment (e.g., backhoes, dozers, excavators, loaders, rollers, etc.) simultaneously used on the Plan Area within 50 feet of off-site noise sensitive receptors surrounding the site to no more than one or two pieces of heavy-duty off-road equipment would further reduce construction noise levels by approximately 10 dBA. With implementation of Mitigation Measure **MM N-1**, construction noise would be reduced by, at a minimum, 20 dB, and would not exceed the noise standard of 65 dBA for residential uses and 70 dBA for commercial or industrial uses when measured at the adjacent property line. As such impacts would be less than significant with mitigation incorporated.

Off-Site Construction Activities

Off-site construction noise, as detailed in the methodology section above, has been forecasted using the FHWA TNM and is based on forecasted haul truck activity as well as the delivery of building materials,

9 FHWA, *Special Report – Measurement, Prediction, and Mitigation*, updated June 2017. https://www.fhwa.dot.gov/Environment/noise/construction_noise/special_report/hcn04.cfm, accessed November 2018.

including concrete. The FHWA TNM was used to calculate the hourly Leq noise levels generated by construction-related trucks. Noise impacts were determined by comparing the predicted noise level with that of the existing ambient noise levels along the anticipated truck travel routes. At the maximum, construction would include approximately 1,500 worker trips per day including 492 vendor trips per day (refer to **Appendix C** for Air Quality Output sheets for each Phase of construction). Based on these trips, roadway noise levels would result in 67.8 dBA CNEL at 25 feet from the receptor (refer to **Appendix J** for haul route noise spreadsheet). The noise level increases from construction trips would not exceed existing noise levels greater than 5 dBA at areas that would exceed 65 dBA Ldn or CNEL or greater than 3 dBA at areas that would exceed 70 dBA Ldn or CNEL. As such, impacts related to off-site construction activities would be less than significant.

Operation

The Plan would generate an estimated 35,446 daily trips, which includes both internal trips (4,264) and external trips (31,182). As mentioned previously, to estimate noise level increase and impacts due to the Plan, noise level increases were calculated from the traffic volumes provided in the Traffic Study (refer to **Appendix 4.15**). **Table 4.12-10: Existing plus Project Roadway Noise Levels**, illustrates the change in CNEL from existing traffic volumes and from traffic generated by the Plan. The difference in traffic noise between existing conditions and existing plus Project conditions represents the increase in noise attributable to Project-related traffic. As shown in **Table 4.12-10**, Project-related traffic would cause noise levels along the analyzed roadways to increase by more than 3 dBA at Wilson Avenue west of Day Creek Boulevard (Intersection 7), Day Creek Boulevard south of Wilson Avenue (Intersection 7) and Day Creek Boulevard north and south of Wilson Avenue (Intersection 19). However, as mentioned previously, any noise increases of 5 dBA or greater is potentially significant when it impacts sensitive land uses that would exceed 65 dBA Ldn or CNEL. As shown in **Table 4.12-10**, these intersections exceeding 65 dBA Ldn or CNEL would not result in increases of 5 dBA or greater. Therefore, impacts related to roadway noise levels would be less than significant.

Table 4.12-10
Existing plus Project Roadway Noise Levels

Intersection No.	Roadway Segment	AM Peak Hour		PM Peak Hour		AM Increase	PM Increase	Significant AM Impact	Significant PM Impact
		Existing	Existing plus Project	Existing	Existing plus Project				
		dBA CNEL							
Wilson Avenue									
1	East of Amethyst Street	58.9	59.3	57.5	58.2	0.4	0.7	No	No
1	West of Amethyst Street	58.6	58.8	57.2	57.6	0.2	0.4	No	No
2	East of Archibald Avenue	60.3	60.9	59.3	60.2	0.6	0.9	No	No
2	West of Archibald Avenue	60.0	60.4	58.5	59.3	0.4	0.8	No	No
3	East of Hermosa Avenue	61.8	62.3	59.1	60.3	0.5	1.2	No	No
3	West of Hermosa Avenue	60.6	61.1	58.8	59.8	0.5	1.0	No	No
4	East of Haven Avenue	63.2	63.9	61.8	63.0	0.7	1.2	No	No
4	West of Haven Avenue	61.6	62.1	59.1	60.3	0.5	1.2	No	No
5	East of College Drive	62.8	63.7	61.3	62.9	0.9	1.6	No	No
5	West of College Drive	62.0	62.8	60.4	61.8	0.8	1.4	No	No
6	East of Milliken Avenue	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
6	West of Milliken Avenue	N/A	63.6	N/A	63.6	N/A	N/A	No	No
7	East of Day Creek Boulevard	60.6	61.0	56.7	57.8	0.4	1.1	No	No
7	West of Day Creek Boulevard	54.2	63.1	49.1	64.1	8.9	15.0	No	No
8	East of Etiwanda Avenue	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
8	West of Etiwanda Avenue	57.8	58.4	54.6	56.5	0.6	1.9	No	No
9	East of East Avenue	64.3	64.4	60.1	60.7	0.1	0.6	No	No

Intersection No.	Roadway Segment	AM Peak Hour		PM Peak Hour		AM Increase	PM Increase	Significant AM Impact	Significant PM Impact
		Existing	Existing plus Project	Existing	Existing plus Project				
		dBA CNEL							
9	West of East Avenue	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10	East of Wardman Bullock Road	65.5	65.6	61.0	61.3	0.1	0.3	No	No
10	West of Wardman Bullock Road	64.5	64.6	60.2	60.9	0.1	0.7	No	No
11	East of Cherry Avenue	65.1	65.2	63.9	64.1	0.1	0.2	No	No
11	West of Cherry Avenue	66.1	66.1	62.2	62.5	0.0	0.3	No	No
Beech Avenue									
12	East of I-15 SB Ramps	65.3	65.3	64.9	65.0	0.0	0.1	No	No
12	West of I-15 SB Ramps	64.9	65.0	63.8	63.9	0.1	0.1	No	No
13	East of I-15 NB Ramps	64.6	64.7	66.3	66.4	0.1	0.1	No	No
13	West of I-15 NB Ramps	64.0	64.1	64.8	65.0	0.1	0.2	No	No
Los Osos High School									
14	East of Milliken Avenue	61.3	61.6	55.2	56.5	0.3	1.3	No	No
14	West of Milliken Avenue	58.3	58.3	49.1	49.1	0.0	0.0	No	No
Banyan Street									
15	East of Cabernet Place	63.4	63.8	61.5	62.2	0.4	0.7	No	No
15	West of Cabernet Place	63.0	63.4	61.0	61.9	0.4	0.9	No	No
16	East of Fredericksburg Avenue	63.9	64.3	61.6	62.5	0.4	0.9	No	No
16	West of Fredericksburg Avenue	64.1	64.4	61.6	62.4	0.3	0.8	No	No
17	East of Milliken Avenue	62.8	63.9	62.0	63.7	1.1	1.7	No	No
17	West of Milliken Avenue	63.8	64.3	61.7	62.6	0.5	0.9	No	No

Intersection No.	Roadway Segment	AM Peak Hour		PM Peak Hour		AM Increase	PM Increase	Significant AM Impact	Significant PM Impact
		Existing	Existing plus Project	Existing	Existing plus Project				
		dBA CNEL							
18	East of Rochester Avenue	63.6	64.2	62.8	63.8	0.6	1	No	No
18	West of Rochester Avenue	63.3	64.3	61.8	63.5	1.0	1.7	No	No
19	East of Day Creek Boulevard	63.8	64.2	62.3	63.0	0.4	0.7	No	No
19	West of Day Creek Boulevard	63.8	64.4	62.8	63.7	0.6	0.9	No	No
SR-210 Ramps (WB and EB)									
20	East of Milliken Avenue	63.5	63.5	62.3	62.5	0.0	0.2	No	No
20	West of Milliken Avenue	62.5	64.2	62.6	63.9	1.7	1.3	No	No
21	East of Day Creek Boulevard	62.9	63.7	62.2	64.4	0.8	2.2	No	No
21	West of Day Creek Boulevard	63.8	63.9	62.5	62.6	0.1	0.1	No	No
22	East of Milliken Avenue	62.6	62.7	62.5	62.6	0.1	0.1	No	No
22	West of Milliken Avenue	63.4	64.1	62.5	64.3	0.7	1.8	No	No
23	East of Day Creek Boulevard	63.9	65.4	62.2	63.8	1.5	1.6	No	No
23	West of Day Creek Boulevard	62.6	62.6	62.6	62.7	0.0	0.1	No	No
Lark Drive									
24	East of Rochester Avenue	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
24	West of Rochester Avenue	61.0	61.2	54.8	55.7	0.2	0.9	No	No
Victoria Park Lane									
25	East of Milliken Avenue	60.6	60.8	59.1	59.5	0.2	0.4	No	No
25	West of Milliken Avenue	59.0	59.3	58.2	58.7	0.3	0.5	No	No

Intersection No.	Roadway Segment	AM Peak Hour		PM Peak Hour		AM Increase	PM Increase	Significant AM Impact	Significant PM Impact
		Existing	Existing plus Project	Existing	Existing plus Project				
		dBA CNEL							
26	East of Rochester Avenue	61.9	62.0	59.4	59.7	0.1	0.3	No	No
26	West of Rochester Avenue	61.6	61.6	58.8	58.8	0.0	0.0	No	No
27	East of Day Creek Boulevard	61.1	61.1	60.0	60.0	0.0	0.0	No	No
27	West of Day Creek Boulevard	62.7	62.7	59.9	59.9	0.0	0.0	No	No
Base Line Road									
28	East of Milliken Avenue	67.7	67.7	67.6	67.7	0.0	0.1	No	No
28	West of Milliken Avenue	68.2	68.3	68.3	68.4	0.1	0.1	No	No
29	East of Rochester Avenue	67.7	67.8	67.4	67.4	0.1	0.0	No	No
29	West of Rochester Avenue	68.0	68.0	67.5	67.6	0.0	0.1	No	No
30	East of Day Creek Boulevard	67.0	67.1	66.5	66.6	0.1	0.1	No	No
30	West of Day Creek Boulevard	67.7	67.7	67.3	67.4	0.0	0.1	No	No
31	East of Etiwanda Avenue	67.5	67.6	66.7	66.9	0.1	0.2	No	No
31	West of Etiwanda Avenue	67.2	67.3	66.5	66.6	0.1	0.1	No	No
32	East of I-15 SB Ramps	66.0	66.1	66.3	66.4	0.1	0.1	No	No
32	West of I-15 SB Ramps	66.2	66.3	66.2	66.3	0.1	0.1	No	No
33	East of East Avenue	69.0	69.1	67.9	68.0	0.1	0.1	No	No
33	West of East Avenue	68.9	69.0	67.7	67.8	0.1	0.1	No	No
34	East of I-15 NB Ramps	68.4	68.5	67.7	67.8	0.1	0.1	No	No

Intersection No.	Roadway Segment	AM Peak Hour		PM Peak Hour		AM Increase	PM Increase	Significant AM Impact	Significant PM Impact
		Existing	Existing plus Project	Existing	Existing plus Project				
		dBA CNEL							
34	West of I-15 NB Ramps	68.8	68.9	67.7	67.8	0.1	0.1	No	No
Terra Vista Parkway									
35	East of Milliken Avenue	60.5	60.8	61.6	61.9	0.3	0.3	No	No
35	West of Milliken Avenue	60.8	61.0	62.0	62.2	0.2	0.2	No	No
Church Street									
36	East of Rochester Avenue	64.0	64.3	65.3	65.5	0.3	0.2	No	No
36	West of Rochester Avenue	64.5	64.5	65.3	65.3	0.0	0.0	No	No
37	East of Day Creek Boulevard	63.0	63.0	63.9	63.9	0.0	0.0	No	No
37	West of Day Creek Boulevard	63.9	64.1	65.0	65.3	0.2	0.3	No	No
38	East of Milliken Avenue	65.0	65.0	66.7	66.7	0.0	0.0	No	No
38	West of Milliken Avenue	64.8	64.9	66.4	66.5	0.1	0.1	No	No
Foothill Boulevard									
39	East of Milliken Avenue	68.5	68.5	69.9	69.9	0.0	0.0	No	No
39	West of Milliken Avenue	68.5	68.6	70.1	70.2	0.1	0.1	No	No
40	East of Rochester Avenue	68.0	68.1	69.0	69.1	0.1	0.1	No	No
40	West of Rochester Avenue	67.2	67.2	68.5	68.5	0.0	0.0	No	No
41	East of Day Creek Boulevard	68.9	69.4	70.1	70.5	0.5	0.4	No	No
41	West of Day Creek Boulevard	68.0	68.1	69.0	69.1	0.1	0.1	No	No
42	East of I-15 SB Ramps	66.8	67.0	68.7	69.0	0.2	0.3	No	No

Intersection No.	Roadway Segment	AM Peak Hour		PM Peak Hour		AM Increase	PM Increase	Significant AM Impact	Significant PM Impact
		Existing	Existing plus Project	Existing	Existing plus Project				
		dBA CNEL							
42	West of I-15 SB Ramps	68.8	69.2	70.1	70.5	0.4	0.4	No	No
43	East of I-15 NB Ramps	66.9	67.0	67.7	67.8	0.1	0.1	No	No
43	West of I-15 NB Ramps	67.6	67.8	67.9	68.4	0.2	0.5	No	No
Amethyst Street									
1	North of Wilson Avenue5	51.8	51.8	51.8	51.8	0.0	0.0	No	No
1	South of Wilson Avenue	53.0	53.7	52.0	53.1	0.7	1.1	No	No
Archibald Avenue									
2	North of Wilson Avenue	57.5	57.5	57.3	57.3	0.0	0.0	No	No
2	South of Wilson Avenue	60.2	60.4	59.5	59.8	0.2	0.3	No	No
Hermosa Avenue									
3	North of Wilson Avenue	56.4	56.4	56.4	56.4	0.0	0.0	No	No
3	South of Wilson Avenue	59.6	59.8	57.5	58.0	0.2	0.5	No	No
Haven Avenue									
4	North of Wilson Avenue	59.6	59.6	59.8	59.8	0.0	0.0	No	No
4	South of Wilson Avenue	62.8	63.1	62.1	62.6	0.3	0.5	No	No
College Drive									
5	North of Wilson Avenue	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
5	South of Wilson Avenue	57.1	57.9	57.8	58.6	0.8	0.8	No	No
Cabernet Place									
15	North of Banyan Street	33.1	33.1	N/A	N/A	0.0	N/A	No	N/A
15	South of Banyan Street	54.3	54.3	52.5	52.5	0.0	0.0	No	No
Fredericksburg Avenue									
16	North of Banyan Street	54.6	54.6	53.5	53.5	0.0	0.0	No	No

Intersection No.	Roadway Segment	AM Peak Hour		PM Peak Hour		AM Increase	PM Increase	Significant AM Impact	Significant PM Impact
		Existing	Existing plus Project	Existing	Existing plus Project				
		dBA CNEL							
16	South of Banyan Street	N/A	52.3	N/A	53.6	N/A	N/A	No	No
Milliken Street									
6	North of Wilson Avenue	N/A	62.3	N/A	63.5	N/A	N/A	No	No
6	South of Wilson Avenue	N/A	65.1	N/A	65.3	N/A	N/A	No	No
14	North of Grizzly Drive	62.5	64.5	61.9	64.8	2.0	2.9	No	No
14	South of Grizzly Drive	64.7	66.0	62.6	65.2	1.3	2.6	No	No
17	North of Banyan Street	67.1	68.1	64.3	66.6	1.0	2.3	No	No
17	South of Banyan Street	67.2	68.4	64.4	67.1	1.2	2.7	No	No
20	North of SR-210 WB Ramps	68.0	69.1	65.7	67.9	1.1	2.2	No	No
20	South of SR-210 WB Ramps	68.4	69.0	67.5	68.7	0.6	1.2	No	No
22	North of SR-210 EB Ramps	68.4	68.9	67.5	68.7	0.5	1.2	No	No
22	South of SR-210 EB Ramps	68.6	68.9	68.4	68.8	0.3	0.4	No	No
25	North of Victoria Park Lane	68.2	68.5	68.0	68.5	0.3	0.5	No	No
25	South of Victoria Park Lane	67.9	68.2	67.9	68.3	0.3	0.4	No	No
28	North of Base Line Road	68.3	68.6	68.5	68.8	0.3	0.3	No	No
28	South of Base Line Road	67.3	67.6	68.2	68.5	0.3	0.3	No	No
35	North of Terra Vista Parkway	67.0	67.3	68.1	68.4	0.3	0.3	No	No
35	South of Terra Vista Parkway	66.8	67.0	67.8	68.0	0.2	0.2	No	No
38	North of Church Street	66.9	67.1	68.2	68.4	0.2	0.2	No	No
38	South of Church Street	66.9	67.0	68.5	68.6	0.1	0.1	No	No
39	North of Foothill Boulevard	67.3	67.4	68.7	68.8	0.1	0.1	No	No

Intersection No.	Roadway Segment	AM Peak Hour		PM Peak Hour		AM Increase	PM Increase	Significant AM Impact	Significant PM Impact
		Existing	Existing plus Project	Existing	Existing plus Project				
		dBA CNEL							
39	South of Foothill Boulevard	67.1	67.2	69.4	69.5	0.1	0.1	No	No
Rochester Avenue									
18	North of Banyan Street	N/A	61.0	N/A	62.3	N/A	N/A	No	No
18	South of Banyan Street	61.0	62.5	60.0	62.3	1.5	2.3	No	No
24	North of Lake Drive	64.5	65.3	62.6	64.1	0.8	1.5	No	No
24	South of Lake Drive	64.5	65.2	62.7	64.0	0.7	1.3	No	No
26	North of Victoria Park Lane	65.5	66.1	63.2	64.4	0.6	1.2	No	No
26	South of Victoria Park Lane	65.2	65.8	63.7	64.7	0.6	1.0	No	No
29	North of Base Line Road	64.5	65.2	64.1	65.0	0.7	0.9	No	No
29	South of Base Line Road	64.4	65.0	64.7	65.4	0.6	0.7	No	No
36	North of Church Street	64.1	64.7	64.7	65.4	0.6	0.7	No	No
36	South of Church Street	63.3	63.8	65.1	65.5	0.5	0.4	No	No
40	North of Foothill Boulevard	64.3	64.7	65.6	65.9	0.4	0.3	No	No
40	South of Foothill Boulevard	63.1	63.2	65.3	65.4	0.1	0.1	No	No
Day Creek Boulevard									
7	North of Wilson Avenue	66.2	66.7	61.9	63.5	0.5	1.6	No	No
7	South of Wilson Avenue	66.4	67.7	63.0	66.2	1.3	3.2	No	No
19	North of Banyan Street	66.5	67.9	63.1	66.4	1.4	3.3	No	No
19	South of Banyan Street	66.6	68.0	63.5	66.7	1.4	3.2	No	No
21	North of SR-210 WB Ramps	68.2	69.5	65.6	68.3	1.3	2.7	No	No
21	South of SR-210 WB Ramps	68.8	69.8	66.9	68.5	1.0	1.6	No	No

Intersection No.	Roadway Segment	AM Peak Hour		PM Peak Hour		AM Increase	PM Increase	Significant AM Impact	Significant PM Impact
		Existing	Existing plus Project	Existing	Existing plus Project				
		dBA CNEL							
23	North of SR-210 EB Ramps	68.8	69.8	66.9	68.5	1.0	1.6	No	No
23	South of SR-210 EB Ramps	69.1	69.5	68.0	68.8	0.4	0.8	No	No
27	North of Victoria Park Lane	67.7	68.4	66.7	67.8	0.7	1.1	No	No
27	South of Victoria Park Lane	67.1	67.9	66.3	67.5	0.8	1.2	No	No
30	North of Base Line Road	67.3	68.1	66.8	67.9	0.8	1.1	No	No
30	South of Base Line Road	66.2	67.1	66.9	68.0	0.9	1.1	No	No
37	North of Church Street	64.7	65.7	65.7	66.7	1.0	1.0	No	No
37	South of Church Street	63.9	65.3	65.4	66.8	1.4	1.4	No	No
41	North of Foothill Boulevard	63.9	64.8	66.8	67.5	0.9	0.7	No	No
41	South of Foothill Boulevard	60.4	60.4	64.7	64.7	0.0	0.0	No	No
Cherry Avenue									
11	North of Wilson Avenue	65.1	65.1	63.9	63.9	0.0	0.0	No	No
11	South of Wilson Avenue	63.2	63.2	62.7	62.7	0.0	0.0	No	No
I-15 Ramps (NB and SB)									
12	North of Beech Avenue	68.5	68.6	65.7	65.7	0.1	0.0	No	No
12	South of Beech Avenue	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
13	North of Beech Avenue	64.8	64.9	68.0	68.1	0.1	0.1	No	No
13	South of Beech Avenue	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
32	North of Base Line Road	62.1	62.1	61.8	61.8	0.0	0.0	No	No
32	South of Base Line Road	N/A	46.2	N/A	45.2	N/A	N/A	N/A	N/A
34	North of Base Line Road	59.9	59.9	62.0	62.0	0.0	0.0	No	No

Intersection No.	Roadway Segment	AM Peak Hour		PM Peak Hour		AM Increase	PM Increase	Significant AM Impact	Significant PM Impact
		Existing	Existing plus Project	Existing	Existing plus Project				
		dBA CNEL							
34	South of Base Line Road	61.3	61.4	63.4	63.5	0.1	0.1	No	No
42	North of Foothill Boulevard	61.6	61.6	61.6	61.6	0.0	0.0	No	No
42	South of Foothill Boulevard	62.6	63.5	63.1	63.8	0.9	0.7	No	No
43	North of Foothill Boulevard	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
43	South of Foothill Boulevard	64.3	64.6	64.3	65.3	0.3	1.0	No	No
Etiwanda Avenue									
8	North of Wilson Avenue	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
8	South of Wilson Avenue	57.8	58.5	54.6	56.5	0.7	1.9	No	No
31	North of Base Line Road	66.1	66.3	62.1	62.5	0.2	0.4	No	No
31	South of Base Line Road	64.9	65.1	63.9	64.1	0.2	0.2	No	No
East Avenue									
9	North of Wilson Avenue	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
9	South of Wilson Avenue	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
33	North of Base Line Road	67.3	67.4	63.0	63.2	0.1	0.2	No	No
33	South of Base Line Road	65.7	65.7	63.7	63.8	0.0	0.1	No	No
Wardman Bullock Road									
10	North of Wilson Avenue	57.5	58.1	55.5	56.8	0.6	1.3	No	No
10	South of Wilson Avenue	61.5	61.5	55.3	55.3	0.0	0.0	No	No

Source: Fehr & Peers Inc., Etiwanda Heights Specific Plan Transportation Impact Study.

*Notes: Roadway noise model results are provided in **Appendix J.** Roadway noise levels are modeled 75 feet from the center of the roadway. N/A = not available.*

As described in Section 4.10.2, the General Plan's Public Health and Safety Element includes noise compatibility guidelines. These guidelines and applicable sections of the State building code are used to evaluate the Plan's compatibility with future ambient noise levels.

As mentioned previously, the dominant noise source on the southeast and southwest corners of the Plan area include the SR-210 freeway. As shown in **Table 4.12-6**, ambient noise levels within this area range from 55.9 – 56.4 dBA. However, there is potential for increased noise levels due to increased traffic along SR-210. With implementation of Mitigation Measure **MM N-2** would require the incorporation of architectural features (such as a sound wall adjacent to the SR-210 freeway) to ensure that residential habitable rooms facing the freeway have interior noise levels of 45 dBA or less, as required by the California Building Code. As such, impacts would be less than significant with mitigation incorporated.

Threshold NOI-2: Generate excessive ground-borne vibration or ground-borne noise levels.

Construction

The City does not have a significance threshold to assess construction vibration impacts. Section 17.66.070 of the City's Municipal Code exempts vibration from construction/demolition activities. The FTA guidelines set forth in FTA's *Transit Noise and Vibration Impact Assessment Manual,*[10] are used to evaluate potential impacts related to construction vibration.

Grading and construction of the Plan may result in varying degrees of temporary ground-borne vibration and noise, depending on the specific construction equipment used and activities involved. Pile driving and blasting are generally the sources of the most severe vibration during construction. Neither pile driving nor blasting would be required during construction. Conventional heavy construction equipment would be used for mass grading. **Table 4.12-11: Vibration Levels for Construction Equipment**, summarizes typical vibration levels measured during construction activities for various vibration-inducing pieces of equipment at a distance of 25 feet. It is expected that maximum ground-borne vibration and noise levels would be associated with the use of large dozers, drilling, or heavy construction trucks.

10 Federal Transit Administration, *Transit Noise and Vibration Impact Assessment Manual*, September 2018, accessed March 2019, https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/research-innovation/118131/transit-noise-and-vibration-impact-assessment-manual-fta-report-no-0123_0.pdf

Table 4.12-11
Vibration Levels for Construction Equipment

Equipment		PPV at 25 feet, (in/sec)	Approximate Lv at 25 feet	Exceeds 0.5 PPV Threshold?[1]	Exceeds 0.3 PPV Threshold?[2]	Exceeds 0.2 PPV Threshold?[3]	Exceeds 0.12 PPV Threshold?[4]
Pile driver (impact)*	Upper range	1.518	112	Yes	Yes	Yes	Yes
	Typical	0.644	104	Yes	Yes	Yes	Yes
Pile driver (sonic)*	Upper range	0.734	105	Yes	Yes	Yes	Yes
	Typical	0.170	93	Yes	Yes	Yes	Yes
Clam shovel drop (slurry wall)*		0.202	94	Yes	Yes	Yes	Yes
Hydromill (slurry wall)	In soil	0.008	66	No	No	No	No
	In rock	0.017	75	No	No	No	No
Hoe ram		0.089	87	No	No	No	No
Large bulldozer		0.089	87	No	No	No	No
Caisson drilling		0.089	87	No	No	No	No
Loaded trucks		0.076	86	No	No	No	No
Jackhammer		0.035	79	No	No	No	No
Small bulldozer		0.003	58	No	No	No	No

Source: Federal Transit Administration, Transit Noise and Vibration Impact Assessment Manual, September 2018
Note:
ppv: peak particle velocity; ft: feet; in/sec: inches per second.
** Neither pile driving nor blasting would be required during construction.*
[1] Threshold for off-site reinforced-concrete, steel, or timber building.
[2] Threshold for off-site engineered concrete and masonry building.
[3] Threshold for off-site nonengineered timber and masonry building.
[4] Threshold for buildings extremely susceptible to vibration damage, such as historic buildings.

Maximum ground-borne vibration and noise levels from operational-related activities (e.g. large dozers and dump trucks) would be less than those discussed previously for construction-related activities. According to the FTA (refer to **Table 4.12-11**), levels associated with the use of a large dozer and hoe ram are 0.089 in/sec PPV and 87 VdB at 25 feet. Construction trucks are listed as 0.076 in/sec PPV and 86 VdB at 25 feet. The residential and school uses located off-site of the Plan area are located at distances greater than 25 feet. Vibration levels are anticipated to be below the acceptable vibration decibels for off-site reinforced-concrete, steel or timber buildings (0.5 PPV), off-site engineered concrete and masonry buildings (0.3 PPV), off-site nonengineered timber and masonry building (0.2 PPV) and buildings extremely susceptible to vibration damage, such as historic buildings (0.12 PPV), due the increased distances of the

off-site receptors. Additionally, the utilization of large and small dozers, caisson drilling, trucks, and jackhammering would occur throughout the Plan area and would not be concentrated or confined in any area directly adjacent to the nearest sensitive land uses. Thus, construction would not result in the exposure of existing off-site receptors to excessive ground-borne vibration levels. Impacts related to ground-borne vibrations during construction would be less than significant.

Operation

The primary sources of transient vibration would include passenger vehicle circulation within the Plan Area. The background-vibration velocity level in residential areas is usually 50 VdB or lower, well below the threshold of perceptions for humans which is around 65 VdB.[11] Most perceptible-indoor vibration is caused by sources within buildings such as operation of mechanical equipment, movement of people or slamming of doors. If the roadway is smooth, the vibration from traffic is rarely perceptible. As such, operational vibration impacts associated with operation of the Plan would be below the significance threshold and impacts would be less than significant.

Threshold NOI-3: **For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within 2 miles of a public airport or public use airport, would the Project expose people residing or working in the Plan area to excessive noise levels.**

The Plan area is located approximately 6 miles northeast of the Ontario International Airport. The airport flight path and airport noise contours do not extend to the Plan area. Therefore, the Plan area is located outside of any airport land use plan or any runway landing/take-off flight paths for this airport. No other public or public use airstrips are located within the vicinity of the Plan area and no airport related safety impacts would exist. Potential impacts are less than significant. Accordingly, significant impacts would not occur.

CUMULATIVE IMPACTS

Construction Noise

Noise impacts are localized in nature and decrease with distance. Cumulative construction noise impacts have the potential to occur when multiple construction projects in the local area generate noise within the same time frame and contribute to the local ambient noise environment. Based on noise levels generated by construction activities associated with the Plan and the proximity of both on- and off-site receptors, construction noise from the Plan would contribute to the cumulative noise environment. It is

11 FTA, *Transit Noise and Vibration Impact Assessment*.

expected that, as with the Plan, the related projects would implement Best Management Practices (BMPs), which would minimize any noise-related nuisances during construction and be below the 65 dBA and 70 dBA noise standards for residential land uses and commercial or industrial land uses, respectively. Therefore, combined construction noise impact of the related projects and the Plan's contribution would not cause a significant cumulative impact. Consequently, impacts would be less than significant with mitigation incorporated.

Construction Vibration

As discussed above, vibration impacts are generally less than significant when the receptor is more than 25 feet from the vibration source. There are no identified project anticipating construction concurrently with the Plan and within 25 feet of the sensitive receptors that could be affected by construction. As such, there would be no cumulative sources of construction vibration and no cumulative impact. Impacts would be less than significant.

Roadway Noise

Cumulative traffic noise impacts are measured based on projected long-term noise level increases compared to existing conditions. The long-term scenario is the future year (2040) with project condition, which includes all pending and approved development projects within the City. **Table 4.12-12: Future (2040) plus Project Roadway Noise Levels** illustrates the change in CNEL from future ambient conditions without and with the Plan. As shown in **Table 4.12-12**, future (2040) traffic would cause noise levels along the analyzed roadways to increase by more than 3 dBA at Wilson Avenue west of Day Creek Boulevard (Intersection 7). As discussed in **Section 4.15: Traffic and Transportation**, implementation of mitigation measure **MM TRAF-1** would require striping modifications and improvements, which would reduce the level of service (LOS) at this intersection to acceptable levels during the AM and PM peak hours. Furthermore, the modification would reduce traffic volumes within those intersections and would not result in a doubling of traffic volume.

In addition, future traffic at Milliken Street north of Wilson Avenue (Intersection 6) would increase by 4.7 dBA CNEL and 5.3 dBA CNEL during the AM and PM peak hour respectively. However, noise levels at the residences would be below the 65 dBA CNEL threshold. As such, with implementation of these measures, impacts would be less than significant.

Table 4.12-12
Future (2040) plus Project Roadway Noise Levels

Intersection No.	Roadway Segment	AM Peak Hour		PM Peak Hour		AM Increase	PM Increase	Significant AM Impact	Significant PM Impact
		Future (2040)	Future (2040) plus Project	Future (2040)	Future (2040) plus Project				
		dBA CNEL							
Wilson Avenue									
1	East of Amethyst Street	59.4	59.8	59.4	59.9	0.4	0.5	No	No
1	West of Amethyst Street	59.1	59.3	59.2	59.5	0.2	0.3	No	No
2	East of Archibald Avenue	61.5	61.9	62.1	62.6	0.4	0.5	No	No
2	West of Archibald Avenue	60.8	61.1	61.0	61.4	0.3	0.4	No	No
3	East of Hermosa Avenue	62.7	63.2	61.7	62.4	0.5	0.7	No	No
3	West of Hermosa Avenue	61.8	62.2	61.5	62.0	0.4	0.5	No	No
4	East of Haven Avenue	63.9	64.5	63.4	64.2	0.6	0.8	No	No
4	West of Haven Avenue	62.6	63.1	61.9	62.6	0.5	0.7	No	No
5	East of College Drive	63.6	64.3	63.1	64.1	0.7	1.0	No	No
5	West of College Drive	62.9	63.5	62.5	63.4	0.6	0.9	No	No
6	East of Milliken Avenue	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
6	West of Milliken Avenue	64.1	64.9	63.8	65.1	0.8	1.3	No	No
7	East of Day Creek Boulevard	62.3	63.0	60.7	62.0	0.7	1.3	No	No
7	West of Day Creek Boulevard	58.7	63.4	59.2	64.4	4.7	5.2	No	No
8	East of Etiwanda Avenue	59.1	60.2	60.0	61.2	1.1	1.2	No	No
8	West of Etiwanda Avenue	60.3	61.3	59.9	61.4	1.0	1.5	No	No

Intersection No.	Roadway Segment	AM Peak Hour		PM Peak Hour		AM Increase	PM Increase	Significant AM Impact	Significant PM Impact
		Future (2040)	Future (2040) plus Project	Future (2040)	Future (2040) plus Project				
		dBA CNEL							
9	East of East Avenue	65.0	65.4	62.5	63.4	0.4	0.9	No	No
9	West of East Avenue	59.1	60.2	60.0	61.1	1.1	1.1	No	No
10	East of Wardman Bullock Road	66.1	66.3	63.2	63.9	0.2	0.7	No	No
10	West of Wardman Bullock Road	65.0	65.4	61.9	63.1	0.4	1.2	No	No
11	East of Cherry Avenue	66.1	66.4	65.0	65.5	0.3	0.5	No	No
11	West of Cherry Avenue	66.8	67.0	64.4	64.9	0.2	0.5	No	No
Beech Avenue									
12	East of I-15 SB Ramps	66.3	66.5	65.9	66.1	0.2	0.2	No	No
12	West of I-15 SB Ramps	66.0	66.3	64.9	65.3	0.3	0.4	No	No
13	East of I-15 NB Ramps	65.7	65.7	67.3	67.3	0.0	0.0	No	No
13	West of I-15 NB Ramps	65.0	65.2	65.9	66.1	0.2	0.2	No	No
Los Osos High School									
14	East of Milliken Avenue	61.6	61.9	55.6	56.9	0.3	1.3	No	No
14	West of Milliken Avenue	58.3	58.3	49.1	49.1	0.0	0.0	No	No
Banyan Street									
15	East of Cabernet Place	63.8	64.1	62.0	62.7	0.3	0.7	No	No
15	West of Cabernet Place	63.3	63.7	61.6	62.3	0.4	0.7	No	No
16	East of Fredericksburg Avenue	64.3	64.7	62.2	63.0	0.4	0.8	No	No
16	West of Fredericksburg Avenue	64.5	64.8	62.3	63.0	0.3	0.7	No	No

Intersection No.	Roadway Segment	AM Peak Hour		PM Peak Hour		AM Increase	PM Increase	Significant AM Impact	Significant PM Impact
		Future (2040)	Future (2040) plus Project	Future (2040)	Future (2040) plus Project				
		dBA CNEL							
17	East of Milliken Avenue	63.2	64.2	62.5	64.1	1.0	1.6	No	No
17	West of Milliken Avenue	64.3	64.7	62.5	63.3	0.4	0.8	No	No
18	East of Rochester Avenue	63.6	64.1	63.2	64.0	0.5	0.8	No	No
18	West of Rochester Avenue	63.7	64.6	62.4	64.0	0.9	1.6	No	No
19	East of Day Creek Boulevard	62.7	63.4	62.7	63.4	0.7	0.7	No	No
19	West of Day Creek Boulevard	63.2	63.9	63.2	63.9	0.7	0.7	No	No
SR-210 Ramps (WB and EB)									
20	East of Milliken Avenue	63.9	63.9	62.4	62.6	0.0	0.2	No	No
20	West of Milliken Avenue	62.9	64.5	62.9	64.2	1.6	1.3	No	No
21	East of Day Creek Boulevard	62.6	64.3	62.6	64.3	1.7	1.7	No	No
21	West of Day Creek Boulevard	62.7	62.8	62.7	62.8	0.1	0.1	No	No
22	East of Milliken Avenue	62.6	62.7	62.6	62.7	0.1	0.1	No	No
22	West of Milliken Avenue	66.8	67.1	62.8	64.5	0.3	1.7	No	No
23	East of Day Creek Boulevard	64.1	65.1	64.1	65.1	1.0	1.0	No	No
23	West of Day Creek Boulevard	62.8	62.9	62.8	62.9	0.1	0.1	No	No
Lark Drive									
24	East of Rochester Avenue	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
24	West of Rochester Avenue	61.2	61.3	55.9	56.6	0.1	0.7	No	No

Intersection No.	Roadway Segment	AM Peak Hour		PM Peak Hour		AM Increase	PM Increase	Significant AM Impact	Significant PM Impact
		Future (2040)	Future (2040) plus Project	Future (2040)	Future (2040) plus Project				
		dBA CNEL							
Victoria Park Lane									
25	East of Milliken Avenue	61.1	61.3	60.0	60.3	0.2	0.3	No	No
25	West of Milliken Avenue	59.3	59.6	58.7	59.2	0.3	0.5	No	No
26	East of Rochester Avenue	62.1	62.2	60.3	60.5	0.1	0.2	No	No
26	West of Rochester Avenue	61.8	61.8	59.3	59.3	0.0	0.0	No	No
27	East of Day Creek Boulevard	61.1	61.1	60.3	60.3	0.0	0.0	No	No
27	West of Day Creek Boulevard	62.8	62.8	61.0	61.0	0.0	0.0	No	No
Base Line Road									
28	East of Milliken Avenue	69.2	69.2	68.6	68.7	0.0	0.1	No	No
28	West of Milliken Avenue	69.3	69.4	68.9	69.0	0.1	0.1	No	No
29	East of Rochester Avenue	69.3	69.3	68.9	68.9	0.0	0.0	No	No
29	West of Rochester Avenue	69.4	69.4	68.6	68.7	0.0	0.1	No	No
30	East of Day Creek Boulevard	69.2	69.3	68.5	68.5	0.1	0.0	No	No
30	West of Day Creek Boulevard	69.5	69.6	69.2	69.2	0.1	0.0	No	No
31	East of Etiwanda Avenue	69.7	69.8	68.8	68.9	0.1	0.1	No	No
31	West of Etiwanda Avenue	69.0	69.0	68.3	68.4	0.0	0.1	No	No
32	East of I-15 SB Ramps	68.0	68.1	68.4	68.5	0.1	0.1	No	No
32	West of I-15 SB Ramps	69.0	69.1	68.4	68.5	0.1	0.1	No	No

Intersection No.	Roadway Segment	AM Peak Hour		PM Peak Hour		AM Increase	PM Increase	Significant AM Impact	Significant PM Impact
		Future (2040)	Future (2040) plus Project	Future (2040)	Future (2040) plus Project				
		dBA CNEL							
33	East of East Avenue	70.4	70.5	70.3	70.4	0.1	0.1	No	No
33	West of East Avenue	71.0	71.0	70.1	70.2	0.0	0.1	No	No
34	East of I-15 NB Ramps	63.2	63.3	69.8	69.9	0.1	0.1	No	No
34	West of I-15 NB Ramps	70.0	70.0	70.1	70.2	0.0	0.1	No	No
Terra Vista Parkway									
35	East of Milliken Avenue	63.1	63.3	64.3	64.4	0.2	0.1	No	No
35	West of Milliken Avenue	63.9	64.0	64.5	64.7	0.1	0.2	No	No
Church Street									
36	East of Rochester Avenue	65.1	65.3	66.2	66.4	0.2	0.2	No	No
36	West of Rochester Avenue	66.0	66.0	67.1	67.1	0.0	0.0	No	No
37	East of Day Creek Boulevard	63.7	63.7	64.4	64.4	0.0	0.0	No	No
37	West of Day Creek Boulevard	64.8	65.0	65.9	66.1	0.2	0.2	No	No
38	East of Milliken Avenue	66.5	66.5	68.4	68.6	0.0	0.2	No	No
38	West of Milliken Avenue	66.0	66.0	69.1	69.3	0.0	0.2	No	No
Foothill Boulevard									
39	East of Milliken Avenue	69.9	69.9	70.5	70.5	0.0	0.0	No	No
39	West of Milliken Avenue	69.7	69.7	70.6	70.7	0.0	0.1	No	No
40	East of Rochester Avenue	69.0	69.1	68.6	69.5	0.1	0.9	No	No
40	West of Rochester Avenue	68.8	68.8	68.5	69.1	0.0	0.6	No	No

Intersection No.	Roadway Segment	AM Peak Hour		PM Peak Hour		AM Increase	PM Increase	Significant AM Impact	Significant PM Impact
		Future (2040)	Future (2040) plus Project	Future (2040)	Future (2040) plus Project				
		dBA CNEL							
41	East of Day Creek Boulevard	69.9	70.3	70.2	70.7	0.4	0.5	No	No
41	West of Day Creek Boulevard	69.0	69.1	69.3	69.4	0.1	0.1	No	No
42	East of I-15 SB Ramps	68.0	68.2	68.5	68.9	0.2	0.4	No	No
42	West of I-15 SB Ramps	68.8	69.2	69.0	69.5	0.4	0.5	No	No
43	East of I-15 NB Ramps	68.6	68.7	69.7	69.8	0.1	0.1	No	No
43	West of I-15 NB Ramps	68.8	69.0	69.0	69.4	0.2	0.4	No	No
Amethyst Street									
1	North of Wilson Avenue5	53.0	53.5	53.3	53.3	0.5	0	No	No
1	South of Wilson Avenue	53.3	54.0	53.0	53.9	0.7	0.9	No	No
Archibald Avenue									
2	North of Wilson Avenue	58.8	58.8	59.5	59.5	0.0	0.0	No	No
2	South of Wilson Avenue	60.5	60.7	59.8	60.1	0.2	0.3	No	No
Hermosa Avenue									
3	North of Wilson Avenue	57.0	57.0	56.9	56.9	0.0	0.0	No	No
3	South of Wilson Avenue	59.8	60.0	58.0	58.4	0.2	0.4	No	No
Haven Avenue									
4	North of Wilson Avenue	60.0	60.0	60.2	60.2	0.0	0.0	No	No
4	South of Wilson Avenue	63.6	63.9	63.1	63.5	0.3	0.4	No	No
College Drive									
5	North of Wilson Avenue	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
5	South of Wilson Avenue	57.3	58.0	58.2	58.9	0.7	0.7	No	No

Intersection No.	Roadway Segment	AM Peak Hour		PM Peak Hour		AM Increase	PM Increase	Significant AM Impact	Significant PM Impact
		Future (2040)	Future (2040) plus Project	Future (2040)	Future (2040) plus Project				
		dBA CNEL							
Cabernet Place									
15	North of Banyan Street	43.1	43.1	N/A	N/A	0.0	N/A	No	N/A
15	South of Banyan Street	55.1	55.1	53.9	53.9	0.0	0.0	No	No
Fredericksburg Avenue									
16	North of Banyan Street	55.1	55.1	54.2	54.2	0.0	0.0	No	No
16	South of Banyan Street	N/A	52.3	N/A	53.6	N/A	N/A	No	No
Milliken Street									
6	North of Wilson Avenue	58.3	63.0	58.0	63.3	4.7	5.3	No	No
6	South of Wilson Avenue	63.4	65.7	63.0	66.0	2.3	3.0	No	No
14	North of Grizzly Drive	63.0	64.9	62.9	65.4	1.9	2.5	No	No
14	South of Grizzly Drive	65.1	66.4	63.5	65.7	1.3	2.2	No	No
17	North of Banyan Street	67.4	68.4	65.1	67.2	1.0	2.1	No	No
17	South of Banyan Street	67.5	68.7	65.5	67.8	1.2	2.3	No	No
20	North of SR-210 WB Ramps	68.3	69.3	66.6	68.5	1.0	1.9	No	No
20	South of SR-210 WB Ramps	68.8	69.3	68.2	69.3	0.5	1.1	No	No
22	North of SR-210 EB Ramps	70.1	70.5	68.2	69.3	0.4	1.1	No	No
22	South of SR-210 EB Ramps	69.0	69.2	69.0	69.4	0.2	0.4	No	No
25	North of Victoria Park Lane	68.7	69.0	68.7	69.1	0.3	0.4	No	No
25	South of Victoria Park Lane	68.5	68.8	68.7	69.1	0.3	0.4	No	No
28	North of Base Line Road	69.1	69.3	69.3	69.6	0.2	0.3	No	No
28	South of Base Line Road	69.2	69.4	70.0	70.3	0.2	0.3	No	No

Intersection No.	Roadway Segment	AM Peak Hour		PM Peak Hour		AM Increase	PM Increase	Significant AM Impact	Significant PM Impact
		Future (2040)	Future (2040) plus Project	Future (2040)	Future (2040) plus Project				
		dBA CNEL							
35	North of Terra Vista Parkway	68.5	68.7	69.4	69.7	0.2	0.3	No	No
35	South of Terra Vista Parkway	67.0	67.2	67.9	68.1	0.2	0.2	No	No
38	North of Church Street	67.2	67.4	68.1	68.1	0.2	0	No	No
38	South of Church Street	67.6	67.7	67.3	67.4	0.1	0.1	No	No
39	North of Foothill Boulevard	67.8	68.0	69.2	69.3	0.2	0.1	No	No
39	South of Foothill Boulevard	68.4	68.5	70.5	70.6	0.1	0.1	No	No
Rochester Avenue									
18	North of Banyan Street	N/A	60.6	N/A	61.9	N/A	N/A	N/A	N/A
18	South of Banyan Street	61.6	63.0	60.3	62.5	1.4	2.2	No	No
24	North of Lake Drive	64.7	65.4	62.8	64.2	0.7	1.4	No	No
24	South of Lake Drive	64.7	65.4	62.9	64.2	0.7	1.3	No	No
26	North of Victoria Park Lane	65.5	66.3	63.6	64.8	0.8	1.2	No	No
26	South of Victoria Park Lane	65.1	66.0	63.9	64.8	0.9	0.9	No	No
29	North of Base Line Road	64.9	65.5	64.5	65.4	0.6	0.9	No	No
29	South of Base Line Road	65.3	65.8	66.0	66.6	0.5	0.6	No	No
36	North of Church Street	65.0	65.5	65.9	66.4	0.5	0.5	No	No
36	South of Church Street	64.2	64.6	65.9	66.3	0.4	0.4	No	No
40	North of Foothill Boulevard	65.8	66.1	66.9	67.3	0.3	0.4	No	No
40	South of Foothill Boulevard	64.5	64.6	66.9	67.0	0.1	0.1	No	No
Day Creek Boulevard									
7	North of Wilson Avenue	66.2	66.7	61.9	63.5	0.5	1.6	No	No

Intersection No.	Roadway Segment	AM Peak Hour		PM Peak Hour		AM Increase	PM Increase	Significant AM Impact	Significant PM Impact
		Future (2040)	Future (2040) plus Project	Future (2040)	Future (2040) plus Project				
		dBA CNEL							
7	South of Wilson Avenue	66.4	67.7	63.0	66.2	1.3	3.2	No	No
19	North of Banyan Street	66.9	68.1	63.7	66.6	1.2	2.9	No	No
19	South of Banyan Street	66.9	68.1	64.2	66.9	1.2	2.7	No	No
21	North of SR-210 WB Ramps	68.6	69.7	66.1	68.4	1.1	2.3	No	No
21	South of SR-210 WB Ramps	69.2	70.0	67.2	68.6	0.8	1.4	No	No
23	North of SR-210 EB Ramps	69.6	70.0	67.2	68.6	0.4	1.4	No	No
23	South of SR-210 EB Ramps	69.4	69.8	68.6	69.3	0.4	0.7	No	No
27	North of Victoria Park Lane	68.0	68.6	67.1	68.1	0.6	1.0	No	No
27	South of Victoria Park Lane	67.4	68.1	66.9	67.9	0.7	1.0	No	No
30	North of Base Line Road	68.0	68.6	67.7	68.7	0.6	1.0	No	No
30	South of Base Line Road	66.5	67.4	67.3	68.3	0.9	1.0	No	No
37	North of Church Street	65.1	66.0	66.4	67.3	0.9	0.9	No	No
37	South of Church Street	64.2	65.4	65.5	66.8	1.2	1.3	No	No
41	North of Foothill Boulevard	64.1	65.0	67.2	67.8	0.9	0.6	No	No
41	South of Foothill Boulevard	61.7	61.7	65.1	65.1	0.0	0.0	No	No
Cherry Avenue									
11	North of Wilson Avenue	65.5	65.5	65.6	65.6	0.0	0.0	No	No
11	South of Wilson Avenue	64.5	64.5	64.8	64.8	0.0	0.0	No	No
I-15 Ramps (NB and SB)									
12	North of Beech Avenue	70.0	70.1	66.9	67.3	0.1	0.4	No	No
12	South of Beech Avenue	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Intersection No.	Roadway Segment	AM Peak Hour		PM Peak Hour		AM Increase	PM Increase	Significant AM Impact	Significant PM Impact
		Future (2040)	Future (2040) plus Project	Future (2040)	Future (2040) plus Project				
		dBA CNEL							
13	North of Beech Avenue	66.0	66.4	69.0	69.2	0.4	0.2	No	No
13	South of Beech Avenue	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
32	North of Base Line Road	65.7	65.7	62.8	62.8	0.0	0.0	No	No
32	South of Base Line Road	N/A	46.2	N/A	45.2	N/A	N/A	N/A	N/A
34	North of Base Line Road	60.8	60.8	65.7	65.7	0.0	0.0	No	No
34	South of Base Line Road	63.2	63.3	65.6	65.6	0.1	0.0	No	No
42	North of Foothill Boulevard	62.3	62.3	61.6	61.6	0.0	0.0	No	No
42	South of Foothill Boulevard	N/A	56.5	N/A	55.5	N/A	N/A	N/A	N/A
43	North of Foothill Boulevard	N/A	N/A -	N/A	N/A	N/A	N/A	N/A	N/A
43	South of Foothill Boulevard	63.3	63.7	62.6	63.7	0.4	1.1	No	No
Etiwanda Avenue									
8	North of Wilson Avenue	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
8	South of Wilson Avenue	59.0	59.3	57.6	58.3	0.3	1.7	No	No
31	North of Base Line Road	66.4	66.5	63.1	63.6	0.1	0.5	No	No
31	South of Base Line Road	66.3	66.4	65.4	65.6	0.1	0.2	No	No
East Avenue									
9	North of Wilson Avenue	55.6	55.6	56.8	56.8	0.0	0.0	No	No
9	South of Wilson Avenue	64.8	64.9	61.6	61.8	0.1	0.2	No	No
33	North of Base Line Road	67.9	68.0	64.0	64.2	0.1	0.1	No	No
33	South of Base Line Road	66.9	67.0	66.3	66.3	0.1	0.0	No	No

Intersection No.	Roadway Segment	AM Peak Hour		PM Peak Hour		AM Increase	PM Increase	Significant AM Impact	Significant PM Impact
		Future (2040)	Future (2040) plus Project	Future (2040)	Future (2040) plus Project				
		dBA CNEL							
Wardman Bullock Road									
10	North of Wilson Avenue	60.1	60.4	60.1	60.4	0.3	0.3	No	No
10	South of Wilson Avenue	62.2	62.2	62.2	62.2	0.0	0.0	No	No

Source: Fehr & Peers Inc., Etiwanda Heights Specific Plan Transportation Impact Study (March 2019).
*Notes: Roadway noise model results are provided in **Appendix J.** Roadway noise levels are modeled 75 feet from the center of the roadway.*
N/A = not available.

MITIGATION MEASURES

The following noise attenuation measures shall be utilized to reduce potential significant noise impacts from construction to less than significant.

MM N-1: Prior to the issuance of each permit for grading within the vicinity of existing residences, the Property Owner/Developer shall submit a construction-related noise mitigation plan to the Rancho Cucamonga Planning Department. The plan shall depict the location of the construction equipment and how the noise from this equipment would be mitigated during construction of the project. The plan shall demonstrate that the construction plans and specifications include the following noise abatement, notification, and control measures:

- All construction equipment, fixed or mobile, shall be equipped with properly operating and maintained mufflers and other State-required noise-attenuation devices.
- Limiting the number of noise-generating heavy-duty off-road construction equipment (e.g., backhoes, dozers, excavators, loaders, rollers, etc.) simultaneously within 50 feet of off-site noise sensitive receptors surrounding the site.
- Stationary construction equipment shall be placed such that emitted noise is directed away from sensitive noise receivers.
- On-site and off-site construction haul routes shall be designed to avoid noise-sensitive uses, as feasible.
- If a perimeter block wall is required for a project, the wall shall be constructed as early as possible during the first phase of construction.

- A "Construction Noise Coordinator" shall be identified. The Construction Noise Coordinator shall be responsible for responding to any local complaints about construction noise. When a complaint is received, the Construction Noise Coordinator shall notify the City within 48 hours of the complaint and determine the cause of the noise complaint (e.g., starting too early, bad muffler) and shall implement reasonable measures to resolve the compliant, as deemed acceptable by the Planning Department. Signs shall be posted at the construction that include the contact information for the Construction Noise Coordinator.

MM N-2: Prior to issuance of building permits for buildings at the southeast and southwest corners of the Plan area, the Property Owner/Developer shall submit an acoustical study to the City of Rancho Cucamonga Building Official that demonstrates that the proposed architectural design would provide an interior noise level of 45 dBA CNEL or less (based on buildout traffic noise conditions) in all habitable rooms of the proposed buildings facing the SR-210. The Property Owner/Developer shall also submit plans and specifications showing that:

- All residential units shall be provided with a means of mechanical ventilation, as required by the California Building Code for occupancy with windows closed.

LEVEL OF SIGNIFICANCE AFTER MITIGATION

Construction

Implementation of Mitigation Measure **MM N-1** would include the use of optimal muffler systems for all equipment and the break in line of sight to a sensitive receptor would reduce construction noise levels by approximately 10 dB or more.[12] Limiting the number of noise-generating heavy-duty off-road construction equipment (e.g., backhoes, dozers, excavators, loaders, rollers, etc.) simultaneously used on the Plan Area within 50 feet of off-site noise sensitive receptors surrounding the site to no more than one or two pieces of heavy-duty off-road equipment would further reduce construction noise levels by approximately 10 dBA. With implementation of Mitigation Measure **MM N-1**, construction noise would be reduced by, at a minimum, 20 dB, and would not exceed the noise standard of 65 dBA for residential uses and 70 dBA for commercial or industrial uses when measured at the adjacent property line. As such, impacts would be less than significant with mitigation incorporated.

12 FHWA, *Special Report – Measurement, Prediction, and Mitigation*, updated June 2017. https://www.fhwa.dot.gov/Environment/noise/construction_noise/special_report/hcn04.cfm, accessed November 2018.

Operation

As discussed previously, noise increases of 5 dBA or greater is potentially significant when it impacts sensitive land uses that would exceed 65 dBA Ldn or CNEL. As shown in **Table 4.12-10**, intersections exceeding 65 dBA Ldn or CNEL would not result in increases of 5 dBA or greater. Therefore, impacts related to roadway noise levels would be less than significant.

The dominant noise source on the southeast and southwest corners of the Plan area include the SR-210 freeway. Mitigation Measure **MM N-3** would require the incorporation of architectural features (such as a sound wall adjacent to the SR-210 freeway) to ensure that residential habitable rooms facing the freeway have interior noise levels of 45 dBA or less, as required by the California Building Code. With implementation of these measures, impacts related to operation would be reduced to a less than significant level.

Cumulative

Construction

As mentioned previously, it is expected that, as with the Plan, related projects would implement Best Management Practices (BMPs), which would minimize any noise-related nuisances during construction. Currently, there are no identified projects anticipating construction concurrently with the Plan within the Plan vicinity. Therefore, combined construction noise impact of the related projects and the Plan's contribution would not cause a significant cumulative impact. As such, impacts would be reduced to a less than significant level.

Operation

Cumulative conditions take into account the 2040 Southern California Association of Governments (SCAG) land use dataset which includes all pending and approved development projects within the City. As shown in **Table 4.12-12**, intersections exceeding 65 dBA Ldn or CNEL would not result in increases of 5 dBA or greater. Therefore, impacts related to cumulative roadway noise levels would be less than significant.