3.6 Noise

This section addresses noise and vibration. The analysis describes existing environmental conditions, methods used for the assessment, and the impacts of implementing the proposed project. Mitigation measures are proposed to address potentially significant impacts. This section also provides a brief overview of relevant policies and regulations pertaining to noise and vibration. Cumulative noise impacts are addressed in Chapter 4, “Cumulative Impacts.” See Appendix D of this document for the results of noise monitoring and modeling conducted in support of this analysis.

3.6.1 Noise Fundamentals

Noise is undesirable or unwanted sound. The perception of noise is subjective and can vary substantially from person to person. Noise can be generated by mobile (transportation) noise sources, such as automobiles, trucks, and airplanes, and by stationary (nontransportation) noise sources, such as construction activity, machinery, and commercial and industrial operations.

The decibel (dB) scale is a conventional unit for measuring the amplitude of sound that accounts for large variations in sound pressure amplitudes and reflects the way that people perceive changes in sound amplitude. The addition of sound levels in dB is calculated using a logarithmic (energy) basis.[1] There is a strong correlation between the way humans perceive sound and A-weighted decibels (dBA). All sound levels reported in this section are in terms of A-weighted decibels unless specifically stated otherwise. Table 3.6-1 shows typical A-weighted sound levels of common noise sources.

Several different terms are used to describe noise levels. The noise descriptors most often used to describe environmental noise are listed and defined below.

- **L_{max} (maximum noise level):** The maximum instantaneous noise level during a specific period of time.
- **L_{eq} (equivalent noise level):** The average noise level. The L_{eq} represents an average of the sound energy occurring over a specified time period. The 1-hour, A-weighted equivalent sound level (L_{eq}[h]) is the energy average of A-weighted sound levels occurring during a 1-hour period. The L_{eq} shows very good correlation with community response to noise.
- **L_{dn} (day-night average noise level):** The 24-hour L_{eq} with a 10-dB “penalty” for noise events that occur during the noise-sensitive hours between 10 p.m. and 7 a.m. In other words, 10 dB is “added” to noise events that occur in the nighttime hours, and this generates a higher reported noise level when determining compliance with noise standards. The L_{dn} accounts for the fact that noise during this specific period of time is a potential source of disturbance with respect to normal sleeping hours.
- **CNEL (community noise equivalent level):** The CNEL is similar to the L_{dn} described above, but with an additional 5-dB “penalty” added to noise events that occur during the noise-sensitive hours between 7 p.m. and 10 p.m., which are typically reserved for relaxation, conversation, reading, and other activities that could be disrupted by noise. When the same 24-hour noise data are used, the reported CNEL is typically approximately 0.5 dB higher than the L_{dn}.

[1] A decibel is logarithmic; it does not follow normal algebraic methods and cannot be directly added. For example, a 65-dB source of sound, such as a truck, when joined by another 65-dB source results in a sound amplitude of 68 dB, not 130 dB (i.e., doubling the source strength increases the sound pressure by 3 dB). A sound level increase of 10 dB corresponds to 10 times the acoustical energy, and an increase of 20 dB equates to a 100-fold increase in acoustical energy.

Table 3.6-1. Sources of Common Environmental Noises

Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
	— 110 —	Rock band
Jet fly-over at 1,000 feet		
	— 100 —	
Gas lawn mower at 3 feet		
	— 90 —	
Diesel truck at 50 feet at 50 mph		Food blender at 3 feet
	— 80 —	Garbage disposal at 3 feet
Noisy urban area, daytime		
Gas lawn mower, 100 feet	**— 70 —**	Vacuum cleaner at 10 feet
Commercial area		Normal speech at 3 feet
Heavy traffic at 300 feet	**— 60 —**	
		Large business office
Quiet urban daytime	**— 50 —**	Dishwasher next room
Quiet urban nighttime	**— 40 —**	Theater, large conference room (background)
Quiet suburban nighttime		
	— 30 —	Library
Quiet rural nighttime		Bedroom at night, concert hall (background)
	— 20 —	
		Broadcast/recording studio
	— 10 —	
Lowest threshold of human hearing	**— 0 —**	Lowest threshold of human hearing

Source: Caltrans 2013a

3.6.1.1 Human Response to Noise

Excessive and chronic exposure to elevated noise levels can result in auditory and nonauditory effects on humans. Auditory effects of noise on people are related to temporary or permanent hearing loss caused by loud noises; nonauditory effects are behavioral and physiological. The nonauditory behavioral effects of noise on humans are primarily the subjective effects of annoyance, nuisance, and dissatisfaction, which can interfere with activities such as communications, sleep, and learning. Researchers have attempted to discover correlations between exposure to elevated noise levels and physiological health problems, such as hypertension and cardiovascular disease. The research infers that noise-related health issues are primarily the result of behavioral stressors, rather than a direct noise-induced response. The extent to which noise contributes to nonauditory health effects remains a subject of considerable research (Basner et al. 2014).

The degree to which noise causes annoyance and interference is highly subjective and may be influenced by several nonacoustic environmental and physical factors. The number and effect of these factors vary depending on the individual characteristics of the noise environment, such as sensitivity, level of activity, location, time of day, and length of exposure. One key to predicting human response to a new noise environment is the individual level of adaptation to the existing noise environment. The greater the noise-level change that can be attributed to a new noise source, relative to the environment to which an individual has become accustomed, the less tolerable the new noise source will be to the individual.

A 1-dBA increase in the noise level is imperceptible to humans, a 3-dBA increase is barely perceptible, a 6-dBA increase is clearly noticeable, and a 10-dBA increase is subjectively perceived as approximately twice as loud (Egan 1988). These subjective reactions were identified based on test subjects' reactions to changes in the levels of steady-state pure tones or broadband noise, and to changes in noise levels from a given source. This research is most applicable to noise levels in the range of 50–70 dBA, which is the usual range of voice and interior noise levels.

The rate at which noise attenuates (lessens) with distance from the source varies by the type of noise source:

- **Stationary point sources:** Noise from these sources (e.g., mechanical equipment at commercial or industrial sites or multiple pieces of construction equipment) attenuates at approximately 6 dB per doubling of distance from the source. At greater distances, environmental (i.e., atmospheric) conditions can increase attenuation, as can either vegetation or a manufactured noise barrier at any distance between a source and receiver.
- **Moving point sources:** Noise from these sources (typically traffic along a roadway or train operations along a rail corridor) attenuates at approximately 4.5 dB per doubling of distance from the source, with the same atmospheric and barrier effects as noted for stationary point sources.
- **Line sources:** Noise from these sources (e.g., high-volume roadways) typically attenuates at approximately 3 dB per doubling of distance from the source.

Studies have been conducted regarding the effects of single-event noise on sleep disturbance, with the sound exposure level (SEL) metric being a common metric used for such assessments. SEL represents the entire sound energy of a given single-event normalized into a one-second period, regardless of event duration. Due to the wide variation in test subjects' reactions to noises of various levels (some test subjects were awakened by indoor SEL values of 50 dB, whereas others slept through indoor SEL values exceeding 80 dB), no definitive consensus has been reached with respect to a universal criterion to apply to environmental noise assessments. One percent of individuals would be awakened by a SEL of 50 dBA, 1.5 percent would be awakened by a SEL of 60 dBA, 1.8 percent of individuals would be awakened by a SEL of 65 dBA, and 2.8 percent of individuals would be awakened by a SEL of 75 (Finegold and Bartholomew 2001).

3.6.1.2 Vibration Fundamentals

Vibration is the periodic oscillation of a medium or object with respect to a given reference point. Sources of vibration include natural phenomena (earthquakes, volcanic eruptions, sea waves, landslides) and human activity (explosions; traffic; and operation of machinery, trains, or construction equipment). Vibration sources may be continuous (e.g., operating factory machinery) or transient (e.g., explosions).

Vibration amplitudes are commonly expressed in peak particle velocity (PPV) or root-mean-square (RMS) vibration velocity. PPV is defined as the maximum instantaneous positive or negative peak of a vibration signal. RMS is a measurement of the effective energy content in a vibration signal, expressed mathematically as the average of the squared amplitude of the signal. PPV is typically used in the monitoring of transient and impact vibration and has been found to correlate well to the stresses experienced by buildings (FTA 2018; Caltrans 2013b). PPV and RMS vibration velocity are normally described in inches per second (in/sec).

Although PPV is appropriate for evaluating the potential for building damage, it is not always suitable for evaluating human response to vibration. The response of the human body to vibration relates well to average vibration amplitude. Therefore, vibration impacts on humans are evaluated in terms of RMS vibration velocity, and like airborne sound impacts on humans, vibration velocity can be expressed in decibel notation, as vibration decibels (VdB).[2]

The effects of groundborne vibration include movement of building floors, rattling of windows, shaking of items that sit on shelves or hang on walls, and rumbling sounds. In extreme cases, vibration can damage buildings, although this is not a factor for most projects. Human annoyance from groundborne vibration often occurs when vibration exceeds the threshold of perception by only a small margin. A vibration level that causes annoyance can be well below the damage threshold for normal buildings. Table 3.6-2 shows the general thresholds for structural responses to vibration levels.

[2] Vibration levels described in VdB are referenced to 1 microinch per second.

Table 3.6-2. Structural Responses to Vibration Levels

Structure and Condition	Peak Vibration Threshold (in/sec PPV)	
	Transient Sources	Continuous/Frequent Intermittent Sources
Extremely fragile historic buildings, ruins, ancient monuments	0.12	0.08
Fragile buildings	0.2	0.1
Historic and some old buildings	0.5	0.25
Older residential structures	0.5	0.3
New residential structures	1.0	0.5
Modern industrial/commercial buildings	2.0	0.5

Notes: in/sec = inches per second; PPV = peak particle velocity
Source: Caltrans 2013b

3.6.2 Existing Conditions

3.6.2.1 Sensitive Land Uses

Noise-sensitive land uses are those uses where quiet is essential to the purpose of the land use. Such land uses include residences and buildings where people normally sleep (hospitals, hotels), and uses such as schools, libraries, theaters, and houses of worship, where it is important to avoid interference with such activities as speech, meditation, and concentration on reading material. Noise-sensitive land uses near the project site include residences along Hunter Drive (single-family residences with adjacent backyards to the east) and Brace Road (multifamily residences to the north). These sensitive uses are located approximately 50 feet from the project site.

3.6.2.2 Existing Noise Sources

The existing noise environment near the project site is influenced primarily by vehicular traffic using roadways adjacent to the project site: Sierra College Boulevard, Brace Road, and Hunter Drive as well as I-80. Other noise sources in the project vicinity include the commercial and retail uses north of Brace Road and west of Sierra College Boulevard. The Union Pacific Railroad line is oriented northeast to southwest and parallel to Taylor Road approximately 1,000 feet northwest of the project site is also an existing source of noise.

3.6.2.3 Ambient Noise-Level Surveys

Ambient noise levels were measured November 7–8, 2017, to document the existing (baseline) noise environment and identify noise sources. Table 3.6-3 summarizes the measurements of ambient noise levels at each survey location. Five receptor locations were selected for short-term measurements (15–20 minutes) and two locations for long-term measurements (24 hours) (Figure 3.6-1).

The long-term measurements were conducted at two locations, LT-01 and LT-02, on November 7–8, 2017:

- LT-01 is located south of the multifamily development that is just north of the project site. This location provides an overall assessment of the existing noise environment, which is dominated by roadway traffic noise attributable to Brace Road and Sierra College Boulevard. The noise level at LT-01 was 57.8 dBA L_{dn}. This noise level is within the range considered normally acceptable for outdoor activity areas exposed to continuous noise sources such as traffic as described below in Section 3.6.3, "Regulatory Setting."
- LT-02 is in the southeastern portion of the project site. This location provides an overall assessment of existing noise environment dominated by roadway traffic noise attributable to Sierra College Boulevard and I-80. The noise level at LT-02 was 61.6 dBA L_{dn}. This noise level is within the range considered normally acceptable for outdoor activity areas exposed to continuous noise sources as described below in Section 3.6.3, "Regulatory Setting."

Short-term (15-minute) monitoring was conducted on November 8, 2017, at five locations, ST-01 through ST-05. Average daytime hourly noise levels documented during these short-term measurements ranged from 57 dBA L_{eq} (ST-04) to 66 dBA L_{eq} (ST-02), with maximum noise levels between 63 and 83 dBA L_{max}. Dominant noise sources included local traffic and natural sources (e.g., wind, birds).[3] Noise levels obtained from short-term measurements indicate that adopted noise standards for short duration events (15–30 minutes) in the adjacent residential areas are periodically exceeded during daytime hours.

Table 3.6-3. Summary of Ambient Noise-Level Survey Results—November 3–8, 2017

Site	Noise Sources	Location	Date(s)	Start Time	L_{dn}/ CNEL	Average Measured Hourly Noise Levels, dB			
						Daytime (7 a.m.–7 p.m.)		Nighttime (10 p.m.–7 a.m.)	
						L_{eq}	L_{max}	L_{eq}	L_{max}
LT-01	Traffic, parking activities	Northern portion of the project site	November 7–8, 2017	3:00 p.m.	57.8	54.1	67.7	50.7	62.7
LT-02	Traffic, birds, and wind	Southeastern portion of the project site	November 7–8, 2017	4:00 p.m.	61.6	56.5	65.0	54.9	65.9
ST-01	Traffic	Northwestern portion of the project site	November 8, 2017	2:11 p.m.	–	63.9	82.2	–	–
ST-02	Traffic, neighborhood activities, birds, and wind	Western portion of the project site	November 8, 2017	2:32 p.m.	–	65.8	75.7	–	–
ST-03	Traffic, neighborhood activities, birds, and wind	Eastern portion of the project site	November 8, 2017	3:06 p.m.	–	58.3	63.6	–	–
ST-04	Traffic	4111 Hunters Drive, just east of the project site	November 8, 2017	3:31 p.m.	–	57.1	63.7	–	–
ST-05	Traffic	Southwestern portion of the project site	November 8, 2017	3:59 p.m.	–	57.1	67.9	–	–

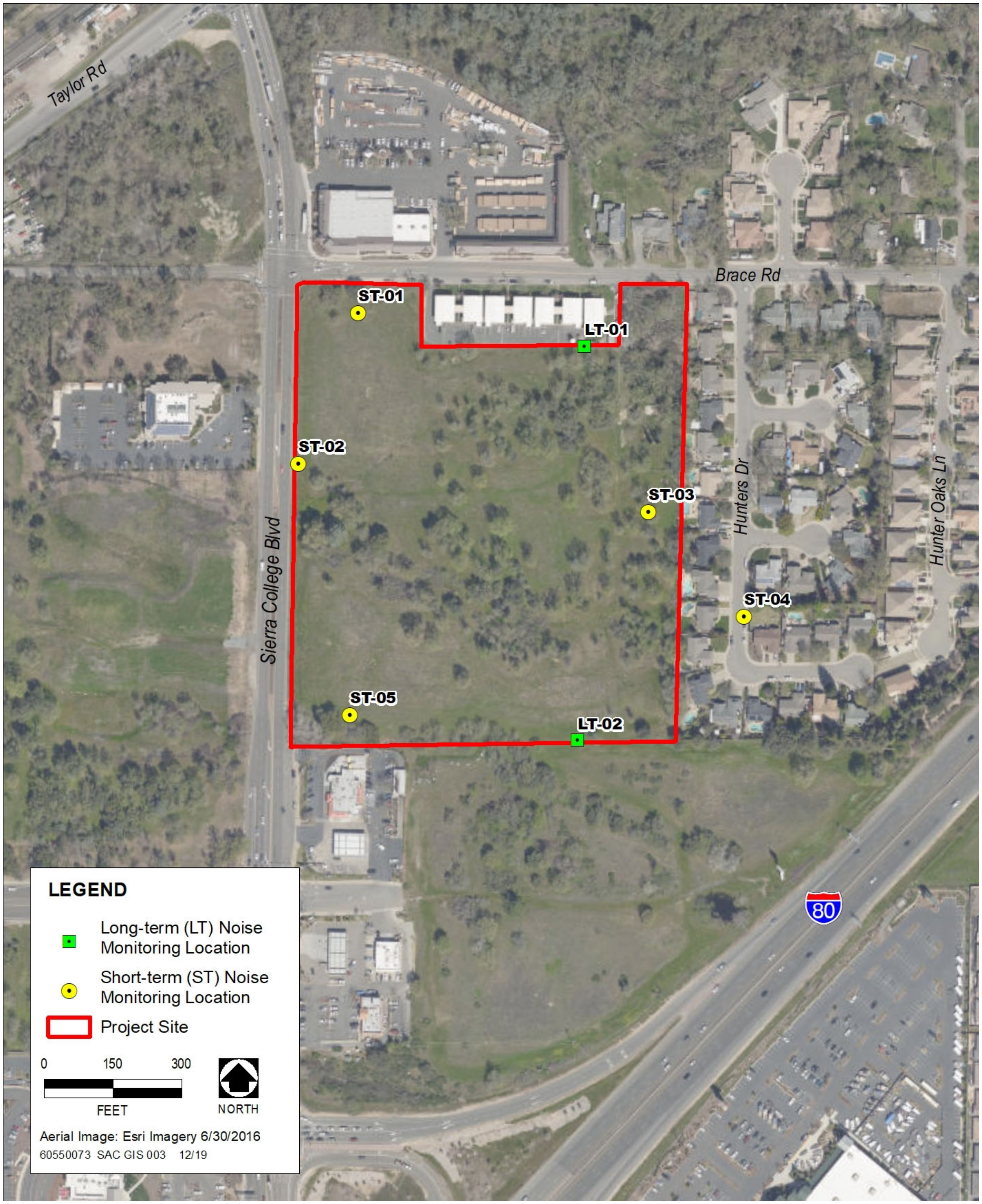
Notes:

– = nonapplicable periods for short-term measurements (see note below for explanation); CNEL = community noise equivalent level; dB = decibels; L_{dn} = day-night average noise level; L_{eq} = equivalent noise level; L_{max} = maximum instantaneous noise level during a specific period of time; LT = long term; ST = short term

Long-term (LT) measurements are taken to measure noise levels continuously over a relatively long period of time (usually 24 hours or more) to determine the day, evening, and night (CNEL/L_{dn}) levels for the project site and the affected vicinity. Short-term (ST) measurements are spot checks in the study area used to calibrate the roadway noise model. Short-term measurements are taken for about 10–20 minutes (depending on traffic volumes) with concurrent traffic counts (for calibration) and during the daytime, when ambient traffic noise is highest.

Source: Data compiled by AECOM in 2017

[3] Short-term, 15-minute and continuous, 24-hour long-term measurements of ambient noise levels were taken in accordance with applicable American National Standards Institute (ANSI) standards (ANSI 2002) using Larson Davis Laboratories (LDL) Model 820 and Model 824 precision integrating sound-level meters. The sound-level meters were calibrated before and after use with an LDL Model CAL200 acoustical calibrator to ensure measurement accuracy. The equipment used meets all pertinent ANSI specifications for Class 1 sound-level meters (ANSI S1.4-1983[R2006]).



Source: Data compiled by AECOM in 2017–2018

Figure 3.6-1. Ambient Noise Measurement Sites

3.6.2.4 Existing Roadway Traffic

In addition to the ambient noise measurements, existing traffic noise on roadways in the vicinity of the project site was estimated, based on existing traffic volumes (see the transportation impact assessment for this project in Appendix E of this EIR). Table 3.6-4 summarizes the modeled traffic noise levels 100 feet from the centerline of the roadways near the project site[4] and shows the modeled noise levels and estimated distances to the 70 dBA L_{dn}, 65 dBA L_{dn}, and 60 dBA L_{dn} traffic noise contours. As shown, the locations of the 70 dBA L_{dn} and 60 dBA L_{dn} contours range from less than 7 feet to 125 feet and from 71 feet to 1,514 feet, respectively, from the centerline of the modeled surface roadways in the project area.[5]

Table 3.6-4. Traffic Noise Contours—Existing Conditions

Roadway	Roadway Segment	dBA, L_{dn} at 100 feet		Distance to Contours, feet					
				Weekday			Weekend		
		Weekday	Weekend	70 dBA L_{dn}	65 dBA L_{dn}	60 dBA L_{dn}	70 dBA L_{dn}	65 dBA L_{dn}	60 dBA L_{dn}
I-80	From Horseshoe Bar Road to Sierra College Boulevard	80	81	1,054	3,334	10,544	1,170	3,698	11,695
I-80	From Sierra College Boulevard to Rocklin Road	80	81	1,003	3,171	10,026	1,155	3,653	11,551
Sierra College Boulevard	From King Road to Taylor Road	69	67	87	276	874	53	167	528
Sierra College Boulevard	From Taylor Road to Brace Road	70	68	90	284	897	63	198	625
Sierra College Boulevard	From Brace Road to Granite Drive	68	67	70	220	697	51	160	506
Sierra College Boulevard	From Granite Drive to I-80 ramps	69	68	85	267	845	60	191	604
Sierra College Boulevard	From I-80 ramps to Rocklin Road	72	70	151	479	1,514	94	299	945
Granite Drive	From Rocklin Road to Sierra College Boulevard	64	64	28	88	277	25	79	249
Taylor Road	From Horseshoe Bar Road to Sierra College Boulevard	66	65	39	125	395	30	95	301
Taylor Road	From Sierra College Boulevard to Delmar Avenue	67	66	49	157	495	36	114	360
Pacific Street	From Delmar Avenue to Rocklin Road	68	66	60	190	600	40	126	399
Brace Road	From Barton Road to Sierra College Boulevard	59	59	8	27	85	7	23	71
Rocklin Road	From Sierra College Boulevard to I-80 ramps	69	67	84	266	841	51	160	507
Rocklin Road	From I-80 ramps to Granite Drive	69	67	82	258	816	52	166	525
Rocklin Road	From Granite Drive to Pacific Street	67	65	53	167	527	32	101	320

Notes: dBA = A-weighted decibels; I-80 = Interstate 80; L_{dn} = day-night average noise level

Source: Modeling conducted by AECOM in 2018

[4] 100 feet is a representative distance from the roadway centerline to noise-sensitive uses, such as residences.

[5] The Federal Highway Administration (FHWA) Highway Traffic Noise Prediction Model (FHWA-RD-77-108) combined with the California Vehicle Noise Reference Energy Mean Emission Levels was used to predict existing traffic noise levels in the project area. The FHWA model is the traffic noise prediction model currently preferred by FHWA, the California Department of Transportation (Caltrans), and county and city governments for assessing traffic noise.

3.6.2.5 Existing Vibration

The existing vibration environment, like the noise environment, is dominated by transportation-related vibration. Heavy truck traffic can generate groundborne vibration, which varies considerably depending on vehicle type, weight, and pavement conditions. However, groundborne vibration levels generated from vehicular traffic are not typically perceptible outside of the road right-of-way (FTA 2018). The primary source of existing groundborne vibration in the vicinity of the project site would be heavy trucks operating on nearby roadways.

3.6.3 Regulatory Setting

3.6.3.1 Federal Plans, Policies, Regulations, and Laws

The U.S. Environmental Protection Agency (EPA) Office of Noise Abatement and Control was originally established to coordinate federal noise control activities. After its inception, EPA's Office of Noise Abatement and Control implemented the federal Noise Control Act of 1972, establishing programs and guidelines to identify and address the effects of noise on public health, welfare, and the environment. In 1981, EPA administrators determined that noise would be better addressed by state and local governments. Consequently, in 1982, responsibilities for regulating noise control policies were transferred to state and local governments.[6]

The Federal Transit Administration (FTA) has published a technical manual titled *Transit Noise and Vibration Impact Assessment*, which provides criteria for determining groundborne vibration impacts related to building damage during construction activities (FTA 2018). Although the proposed project would not be subject to the FTA guidelines, the research that underpins these guidelines is relevant to this assessment. According to the FTA guidelines, a vibration-damage criterion of 0.20 in/sec PPV should be considered for nonengineered timber and masonry buildings. Structures or buildings constructed of reinforced concrete, steel, or timber have a vibration-damage criterion of 0.50 in/sec PPV, pursuant to the FTA guidelines.

To address human response (annoyance) to groundborne vibration, FTA has established vibration thresholds for different land uses. These guidelines recommend 80 VdB or less for residential uses and buildings where people normally sleep (infrequent events), and 83 VdB or less for institutional land uses with primarily daytime operations (e.g., schools, churches, clinics, offices) (FTA 2018).

3.6.3.2 State Plans, Policies, Regulations, and Laws

Title 24 of the California Code of Regulations, also known as the California Building Standards Code, establishes building standards applicable to all occupancies throughout the state. The code provides acoustical regulations for exterior-to-interior sound insulation, and for sound and impact insulation between adjacent spaces of various occupied units. The Title 24 regulations state that interior noise levels generated by exterior noise sources shall not exceed 45 dB L_{dn}, with windows closed, in any habitable room for residential uses (OPR 2017).

3.6.3.3 Local Plans, Policies, Regulations, and Ordinances

The applicable sections of the *Town of Loomis General Plan* and Loomis Municipal Code are outlined below.

Town of Loomis General Plan Public Health and Safety Element—Noise

The Town of Loomis General Plan has established an exterior standard of 65 dBA L_{dn} for noise-sensitive structures and an interior standard of 45 dBA L_{dn} for continuous noise sources, such as roadway traffic noise (Table 3.6-5). However, standards based on 24-hour weighting are not adequate to address certain noise sources, particularly commercial noise sources, which occur infrequently but at potentially higher intensity.

[6] However, the noise-control guidelines and regulations contained in EPA rulings from prior years remain in place with designated federal agencies, allowing more individualized control by designated federal, state, and local government agencies for specific issues.

Table 3.6-5. Maximum Allowable Noise Exposures—Town of Loomis General Plan

Noise-Sensitive Uses	Outdoor Activity Areas[1,2]	Interior Spaces	
	dBA L_{dn}	dBA L_{dn}	dBA L_{eq}
Residential	65	45	-
Transient lodging	65	45	-
Hospitals and nursing homes	65	45	--
Theaters, auditoriums, music hall	_	_	35
Churches, meeting halls	65	_	40
Office Buildings	_	_	45
Schools, libraries, museums	_	_	45
Playgrounds, neighborhood parks	70	_	_

Notes:

dBA = A-weighted decibels; L_{dn} = day-night average noise level; L_{eq} = equivalent noise level

[1] Where the location of outdoor activity areas is unknown, the exterior noise level standard shall be applied to the property line of the receiving land use.

[2] Where it is not possible to reduce noise in outdoor activity areas to 65 dBA L_{dn}/community noise equivalent level (CNEL) or less using practical application of the best available noise reduction measures, an exterior noise level of up to 70 dBA L_{dn}/CNEL may be allowed provided that available exterior noise level reduction measures have been implemented and interior noise levels are in compliance with this table.

Source: Town of Loomis 2001: Table 8-3

The *Town of Loomis General Plan* also includes standards addressing noise events of a shorter duration that are attributable to stationary sources (Table 3.6-6). For these source types, Loomis's daytime and nighttime average hourly and maximum noise-level standards are 50 dBA L_{eq}/70 dBA L_{max} and 40 dBA L_{eq}/60 dBA L_{max}, respectively.

Table 3.6-6. Noise Standards, Short-Duration Events near Residential Areas—Loomis General Plan

Noise-Sensitive Use	Duration of Sound (minutes per hour)	Standard	
		Day/Evening (7 a.m.–10 p.m.) dBA	Night 10 p.m.–7 a.m.) dBA
All residential	30–60	50	40
	15–30	55	45
	5–15	60	50
	1–5	65	55
	< 1 minute	70	60

Notes:

dBA = A-weighted decibels

Where the offensive noise contains a steady, audible tone (such as a screech or hum), or is a repetitive noise such as hammering, or contains speech or music, the standard limits shown shall be reduced by 5 dBA

Source: Town of Loomis 2001: Table 8-4

The following policies and noise compatibility standards in the Public Health and Safety Element of the *Town of Loomis General Plan* (Town of Loomis 2001) are applicable to the proposed project.

- **Policy 1:** New commercial and industrial development in the Town shall be sited and designed to minimize the potential for harmful or annoying noise to create conflict with existing land uses.
- **Policy 6:** Where noise mitigation is necessary, the following order of preference among options shall be considered: distance from the noise source; muffling of the noise source; design and orientation of the receptor; landscaped berms; landscaped berms in combination with walls.
- **Policy 7:** Use the land use/noise compatibility matrix shown on Figure 8-4 [of the *Town of Loomis General Plan*] to determine the appropriateness of land uses relative to roadway noise.
- **Policy 15:** Require that automobile and truck access to industrial and commercial properties adjacent to residential areas be located at the maximum practical distance from the residential area.
- **Policy 16:** Require that when no other feasible location for industrial or commercial use parking exists other than adjacent to residential uses, the parking shall be buffered from the residential uses by barriers.
- **Policy 17:** Limit the use of leaf blowers, motorized lawn mowers, parking lot sweepers, or other high-noise equipment on commercial properties if their activity will result in noise which adversely affects residential areas.
- **Policy 18:** Require that the hours of truck deliveries to industrial and commercial properties adjacent to residential uses be limited to daytime hours unless there is no feasible alternative or there are overriding transportation benefits by scheduling deliveries at night.
- **Policy 19:** Require that construction activities adjacent to residential units be limited as necessary to prevent adverse noise impacts.
- **Policy 20:** Future industrial or commercial development in areas determined to be near noise-sensitive land uses shall be subject to an acoustical analysis to determine the potential for stationary source noise impacts to neighboring land uses.

Loomis Municipal Code

Section 13.30.070 of the Loomis Municipal Code includes quantitative noise standards and limitations. The noise standards for exterior and interior receptors exposed to daytime or nighttime noise from continuous or stationary sources are the same as outlined in the *Town of Loomis General Plan* and summarized above. The Municipal Code's limitations on construction hours and truck deliveries are applicable to the proposed project. Allowable construction hours in the town of Loomis are Monday through Friday from 7 a.m. to 7 p.m. and Saturdays from 8 a.m. to 7 p.m. Construction activities on Sundays and national holidays may be allowed by the commission or the council only between 9 a.m. and 5 p.m.

3.6.4 Impact Analysis

3.6.4.1 Methodology

Data included in Chapter 2, "Project Description," and obtained during on-site noise monitoring were used to determine potential locations of sensitive receptors and land uses that could generate noise and vibration on the project site. Noise-sensitive land uses and major noise sources near the site were identified based on existing documentation (e.g., equipment noise levels and attenuation rates) and site reconnaissance data.

To assess the impacts of potential short-term construction noise on sensitive receptors, sensitive receptors were identified, along with their relative exposure to impacts, considering intervening building façades and distance. FTA's Noise and Vibration Impact Assessment methodology (FTA 2018) was used to predict the construction noise that would be generated by the proposed project. The emission noise levels referenced and usage factors were based on the FHWA Roadway Construction Noise Model. Noise levels were determined for the specific construction equipment that would be used, and the resulting noise levels at the locations of sensitive receptors were calculated.

Traffic noise modeling was conducted based on average daily traffic volumes and the vehicle fleet mix obtained from the traffic analysis prepared for this project by Kittelson and Associates, Inc., as discussed in Section 3.7, "Transportation and Traffic." The FHWA Highway Traffic Noise Prediction Model (FHWA 1978) was used to calculate traffic noise levels along affected roadways, based on the trip distribution estimates discussed in Section 3.7. To determine the project's contribution to existing traffic noise levels along area roadways, the analysis compared the predicted noise levels for baseline and cumulative conditions with and without project-generated traffic, using a reference distance of 100 feet from the roadway centerline.

Potential noise impacts from long-term (operational) stationary sources were assessed based on existing documentation (e.g., equipment noise levels) and site reconnaissance data. This analysis also included an evaluation of the proposed noise-generating uses that could affect noise-sensitive receptors near the project site.

To assess the proposed project's land use compatibility with on-site noise levels, predicted traffic noise contours were used to determine whether development of the proposed land uses would exceed the applicable noise criteria.

Groundborne vibration impacts were assessed qualitatively based on existing documentation (e.g., vibration levels produced by operation of specific construction equipment) and the distance of sensitive receptors from the given source.

The standards of significance applied in this analysis address the exterior noise standards established by the Town of Loomis. Unless otherwise stated, standards for interior noise levels would not be exceeded if exterior noise-level standards are achieved.

3.6.4.2 Thresholds of Significance

State CEQA Guidelines

Based on Appendix G of the State CEQA Guidelines, the proposed project would result in a significant impact if it would result in:

- generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies; (Impact 3.6-1 and Impact 3.6-3)
- generation of excessive groundborne vibration or groundborne noise levels; (Impact 3.6-2)
- for a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels.

Noise impacts of the proposed project are analyzed below based on local noise standards and the resulting increase to ambient conditions. The above thresholds from the State CEQA Guidelines have been consolidated into four identified impacts and responded to for each noise impact that would result from implementation of the proposed project.

Town of Loomis Standards

Town of Loomis standards have also been considered in defining the significance of noise impacts. Applicable standards are described below.

- **Transportation Impacts.** Long-term transportation noise impacts would be significant if noise levels would exceed the applicable exterior standard (65 dB L_{dn}) or result in a substantial increase (i.e., 3 dB) in ambient noise levels at existing nearby noise-sensitive land uses.
- **Land Use Compatibility Impacts**. Land use compatibility impacts would be significant if project-generated stationary noise levels would exceed the Town of Loomis's exterior daytime or nighttime average hourly or maximum noise level standard (50 dBA L_{eq}/70 dBA L_{max} or 40 dBA L_{eq}/60 dBA L_{max}, respectively).
- **Vibration Impacts.** Vibration impacts would be significant if vibration levels would exceed the Caltrans-recommended standard of 0.2 in/sec PPV with respect to the prevention of structural damage for normal buildings or FTA's maximum-acceptable vibration standard of 80 VdB with respect to human response for residential uses (i.e., annoyance) at nearby vibration-sensitive land uses.

3.6.4.3 Topics Not Addressed Further

The project site is not located within an airport land use plan, within 2 miles of a public airport or public use airport, or within the vicinity of a private airstrip. Therefore, impacts related to exposure of people residing or working in the project area to excessive noise levels within an airport land use plan, within 2 miles of a public airport or public use airport, or within the vicinity of a private airstrip are not evaluated further in this document.

3.6.4.4 Environmental Impacts and Mitigation Measures

Impact 3.6-1: Exposure of People to Short-Term Construction Noise Levels Exceeding Local Standards. *During short-term site preparation and construction activities, the proposed project could expose noise-sensitive uses to exterior noise levels that exceed standards for short-duration events near residential areas listed in the Town of Loomis General Plan. This impact would be **significant**.*

The proposed project would generate construction noise in the vicinity of the project site for all Project Driveway Access Options. Noise would come from equipment moving on- and off-site, workers traveling to and from the project site, and equipment operating on the site. Construction activities would include site clearing, excavation, site preparation, and construction of buildings and other improvements on-site. Based on similar projects previously analyzed, a conservative assumption that project construction could require up to 500 daily trips has been applied. Using this assumption, project construction–related increases in traffic noise levels along these roadway segments would range from 0 to 1 dB.

Heavy-duty construction equipment would be operated intermittently throughout the day during construction periods. Construction would occur over the course of approximately 6 months. Construction noise levels would vary over this time, with the highest noise levels expected to occur during site preparation and foundation construction. These activities are expected to last for a relatively short time compared to building construction, which would generate substantially lower levels of construction noise. The approach used in this EIR focuses on the worst-case location for sensitive receptors and the worst-case (noisiest) construction activities.

Noise would be generated by equipment such as graders, backhoes, skip loaders, water trucks, and other miscellaneous equipment. Construction noise levels for the project were estimated using the FHWA Roadway Construction Noise Model (FHWA 2006) at nearby off-site sensitive receptors (Table 3.6-5). Noise levels generated by various construction activities during the site grading and excavation stage would be 89 dBA L_{eq} at 50 feet, resulting in noise levels of 83-89 dBA L_{eq} at the closest sensitive receptors, which are a approximately 50-100 feet from the closest proposed construction activities. Transmission loss of noise for common building materials ranges between 18 dBA and 40 dBA, depending on the type, thickness, and weight of walls (FHWA 2011). The approximate national average sound-level reduction would be 15 dB with windows open and 25 dB with windows closed (EPA 1974, The Building Performance Centre 2007). Table 3.6-7 shows the most likely range of indoor noise levels for noise-sensitive uses near the project site. Modern residential construction and renovation (with insulated windows, door weatherstripping and thresholds, and exterior wall insulation) would be expected to provide an exterior-to-interior noise level reduction of at least 34 dBA with doors and windows closed (FHWA 2011; The Building Performance Centre 2007).

Table 3.6-7. Worst-Case Construction Noise Levels at the Nearest Use-All Options

Receiver	Ambient Measured Noise Level, dBA L_{eq}	Location	Distance between Noise-Sensitive Uses and Proposed Construction Areas	Worst-Case Outdoor Construction Noise Level, dBA L_{eq}	Doors and Windows Open, dBA L_{eq}	Doors and Windows Closed, dBA L_{eq}
LT-1	54	Northern portion of the project site	50	89	74	64
LT-2	57	Southeastern portion of the project site	100	83	68	58
ST-1	64	Northwestern portion of the project site	100	83	68	58
ST-3	58	Western portion of the project site	100	83	68	58
ST-4	57	Eastern portion of the project site	100	83	68	58
ST-5	57	4111 Hunters Drive, just east of the project site	100	83	68	58

Notes: dBA = A-weighted decibels; L_{eq} = equivalent noise level; LT = long term; ST = short term

Source: Modeling conducted by AECOM in 2018

Construction equipment would be used in different portions of the site, so no single receptor would be exposed to all of the construction noise generated. Therefore, this is an estimated worst-case temporary noise level. Assuming an exterior-to-interior noise level reduction of at least 25 dB for wooden structures (doors and windows closed) (EPA 1974), noise from construction equipment could result in a maximum temporary interior noise level of approximately 64 dBA L_{eq} at residences located north of the construction area when the noisiest construction activities occur directly adjacent to these residences (existing level of 89 dBA L_{eq} minus 25 dB equals 64) and 74 dBA L_{eq} with windows open. The predicted values exceed the maximum allowable noise exposure for short duration events as shown above in Table 3.6-6. This impact would be **significant**.

Mitigation Measure Noise-1: Minimize Construction Noise.

Prior to issance of a grading permit, the project applicant shall prepare a construction noise control plan for submittal to the Town of Loomis.The measures outlined by the noise control plan shall be implemented by construction contractor(s) during all construction phases. At a minimum, the plan shall include the following:

- Comply with Section 13.30.070, Noise Standards, of the Loomis Municipal Code, including limitations on the hours of construction (7 a.m. to 7 p.m. Monday through Friday and 8 a.m. to 7 p.m. on Saturdays).
- Provide acoustical shielding for stationary construction equipment, such as compressors.
- Minimize idling times of equipment by either shutting equipment off when not in use or reducing the maximum idling time to 5 minutes.
- Designate a disturbance coordinator and conspicuously post this person's number around the project site and in construction notifications. The disturbance coordinator shall receive complaints about construction disturbances and, in coordination with the Town of Loomis, shall determine the cause of the complaint and implementation of feasible measures to alleviate the problem. Such measures may include use of acoustic blankets on construction equipment, placement of portable acoustic barriers along a residential property line, or limiting the duration of equipment operation.
- Provide written notice to all known occupied noise-sensitive uses (i.e., residential, educational, religious, lodging) within 400 feet of the edge of the project site boundary at least 2 weeks before the start of each construction phase, in particular grading and site preparation. This written notice shall also include the name and contact information of the project disturbance coordinator.

Significance after Mitigation

Section 13.30.070(C)(3), Limitation on Hours of Construction, of the Loomis Municipal Code exempts construction noise from the daytime standards for exterior noise levels. Designating a disturbance coordinator as described in Mitigation Measure Noise-1 would allow the project applicant, the construction contractor(s), and the Town of Loomis to address problems that arise during construction, to the extent feasible. These approaches have been shown to be effective in reducing temporary and short-term construction impacts.

Implementing Mitigation Measure Noise-1 would reduce the impact related to construction noise, but not to a less-than-significant level, because interior noise levels at adjacent noise-sensitive uses could exceed adopted standards during peak periods of the initial phase of construction. The Loomis Municipal Code exempts certain activities in recognition that construction noise is temporary, is more acceptable when limited to daylight hours, and is expected as part of typical development. Nonetheless, the Town cannot demonstrate at this time that implementing this mitigation measure would enable the proposed project to avoid a substantial temporary, short-term increase in ambient noise levels, or that it would fully reduce the impact to a less-than-significant level. Therefore, this impact would be **significant and unavoidable.**

Impact 3.6-2: Exposure of People to Groundborne Noise and Vibration Levels. *The proposed project would expose new sensitive receptors to groundborne noise and vibration. However, the levels of groundborne noise and vibration would not exceed FTA and Caltrans guidelines. This impact would be* ***less than significant.***

Project construction activities have the potential to result in varying degrees of temporary and short-term ground vibration, depending on the specific construction equipment used and the operations involved. In general, vibration-induced structural damage occurs only when certain types of construction activity (e.g., pile driving, heavy earthmoving) and material haul routes used by heavy trucks take place very close to existing structures. Vibration-induced disruption/annoyance could occur during more common types of construction activity (e.g., use of heavy earthmoving equipment, hauling of material) at a greater distance from the activity area. Table 3.6-8 lists the groundborne vibration levels associated with various types of construction equipment, as published by FTA.

Table 3.6-8. Typical Construction Equipment Vibration Levels

Equipment	PPV at 25 feet (in/sec)	Approximate Lv at 25 feet
Large bulldozer	0.089	87
Truck	0.076	86
Jackhammer	0.035	79
Small bulldozer	0.003	58

Notes:
in/sec = inches per second; Lv = velocity level in decibels, based on the root mean square velocity amplitude; PPV = peak particle velocity
Source: FTA 2018

On-site construction equipment would include excavators, backhoes, bulldozers, scrapers, rollers, graders, loaders, compactors, equipment to remove trees, and heavy trucks. The most intense ground vibration would result from large bulldozers, which generate vibration at levels of 0.089 in/sec PPV and 87 VdB at a distance of 25 feet, and from heavy trucks hauling material, which generate vibration levels of 0.076 in/sec PPv and 86 VdB at a distance of 25 feet. These levels would attenuate to 0.031 in/sec PPV or 74 VdB at a distance of 50 feet, the nearest vibration-sensitive residences. Vibration generated by heavy-duty construction equipment would not exceed the FTA standard (80 VdB) for potential human annoyance at these residences. Vibration from heavy trucks would not exceed the Caltrans-recommended standard of 0.2 in/sec PPV with respect to the prevention of structural damage during construction or operation. It is not expected that sleep disturbance would occur because no nighttime construction or heavy truck hauling activities would occur. The impact is **less than significant**.

Impact 3.6-3: Exposure of Existing Noise-Sensitive Receivers to a Substantial Permanent Increase in Ambient Noise Levels in the Project Vicinity Above Levels Existing Without the Project from Increased Long-Term Traffic. *The proposed project would result in an increase in average daily vehicular trips in the vicinity of the project site. However, this increased traffic volume would not increase noise levels above allowable levels nor result in a noticeable (3 dB or greater) increase in traffic noise. This impact would be **less than significant**.*

Long-term operation of the proposed project would result in an increase in average daily trip volumes on the local roadway network. To examine the affect of project-generated traffic increases, traffic noise levels associated with the proposed project were calculated for roadway segments near the project site using the FHWA Highway Noise Prediction Model (FHWA-RD-77-108) (FHWA 1978). Traffic noise levels for weekday and weekend traffic patterns were modeled under existing, with and without the implementation of the proposed project. Study segment traffic volumes were derived from p.m. peak intersection turning movements provided by the project's traffic consultant (Kittelson & Associates) using a K factor (multiplication factor used to compute average daily trips) of 10 to compute the average daily trips on roadway segments. Vehicle speeds and truck volumes on local roadways were determined based on field observations conducted by AECOM.

Field observations show that roadway noise including noise from Interstate 80 is the dominant noise source on the project site. Table 3.6-9 summarizes the modeled traffic noise levels at 100 feet from the centerline of affected roadway segments near the project site. These segments either showed the greatest increase in traffic volumes attributable to the proposed project or are adjacent to existing noise-sensitive land uses. Additional input data included day/night percentages of automobiles, medium and heavy trucks, vehicle speeds, and ground attenuation factors. See Appendix D of this EIR for complete modeling inputs and results.

Table 3.6-9. Predicted Traffic Noise Levels, No Project and Plus Project Conditions

Roadway	Segment	L_{dn} at 100 Feet, dBA					
		Weekday			Weekend		
		No Project	Plus Project	Net Change	No Project	Plus Project	Net Change
I-80	From Horseshoe Bar Road to Sierra College Boulevard	80	80	0	80	80	0
I-80	From Sierra College Boulevard to Rocklin Road	81	81	0	81	81	0
Sierra College Boulevard	From King Road to Taylor Road	69	70	1	67	68	1
Sierra College Boulevard	From Taylor Road to Brace Road	70	70	0	68	69	1
Sierra College Boulevard	From Brace Road to Granite Drive	68	69	1	67	68	1
Sierra College Boulevard	From Granite Drive to I-80 ramps	69	70	1	68	70	2
Sierra College Boulevard	From I-80 ramps to Rocklin Road	72	72	0	70	70	0
Granite Drive	From Rocklin Road to Sierra College Boulevard	64	64	0	64	64	0
Taylor Road	From Horseshoe Bar Road to Sierra College Boulevard	66	66	0	65	65	0
Taylor Road	From Sierra College Boulevard to Delmar Avenue	67	67	0	66	66	0
Pacific Street	From Delmar Avenue to Rocklin Road	68	68	0	66	66	0
Brace Road	From Barton Road to Sierra College Boulevard	59	59	0	59	59	0
Rocklin Road	From Sierra College Boulevard to I-80 ramps	69	69	0	67	67	0
Rocklin Road	From I-80 ramps to Granite Drive	69	69	0	67	68	1
Rocklin Road	From Granite Drive to Pacific Street	67	67	0	65	65	0

Notes: dBA = A-weighted decibels; I-80 = Interstate 80; L_{dn} = day-night average noise level

Traffic noise levels are predicted at a standard distance of 100 feet from the roadway centerline and do not account for shielding from existing noise barriers or intervening structures. Traffic noise levels may vary depending on actual setback distances and localized shielding.

Source: Data modeled by AECOM in 2018

Impact 3.6-4: Exposure of Existing Noise-Sensitive Receivers to a Substantial Temporary or Periodic Increase in Ambient Noise Levels in the Project Vicinity Above Levels Existing Without the Project from Operation of Stationary Sources. *The proposed project would result in increases in on-site stationary-source noise. These stationary-source noise sources would exceed the Town's noise standards (hourly and maximum) at adjacent residential uses. This impact would be* ***significant****.*

A variety of noise sources associated with future development of the project site may generate noise at levels that could annoy existing noise-sensitive receptors. Specific uses with the potential to annoy existing noise-sensitive receptors include leaf blowers and parking lot sweepers; heating, ventilation, and air conditioning (HVAC) operation; use of pnuematic impact wrench at the tire center, loading dock and truck delivery activities; and parking stall movements. Under all three Project Driveway Access Options described in Chapter 2, "Project Description," the mechanical room where HVAC compoments would be housed is completely enclosed to shield noise-sensitive land uses to the east and north. Furthermore, the mechanical room would be situated on the west side of the proposed structure, opposite the location from noise-sensitive land uses located to the north and east. Similarly, the loading dock would also be situated on the west side of the proposed structure, facing onto Sierra College Boulevard. As with HVAC, loading dock noise would be shielded by the proposed structure and loading dock wall.

Parking lot and property maintenance activities involving leaf blowers, weed eaters, or parking lot sweepers would be restricted to the daytime hours as outlined by the Town's noise Policy 17, which limits the use of leaf blowers, motorized lawn mowers, parking lot sweepers, or other high-noise equipment on commercial properties if their activity will result in noise which adversely affects residential areas. The ordinance would be followed under all three Project Driveway Access Options.

The proposed project also includes up to 784 parking spaces that would be dispersed around the proposed structure to the north and east, adjacent to existing noise-sensitive residences, and to the south, adjacent to a non-noise-sensitive commercial use. Because of the layout of the parking lot, adjacent noise-sensitive receptors would not be exposed to noise from all 784 parking spaces.[7]

Approximately 80 and 100 of the proposed parking spaces would be located adjacent to the noise-sensitive residential uses north and east of the project site, respectively. Based on the noise measurements described earlier in this section, the sound equivalent level (SEL) associated with a parking event typically results in a noise level of 71 dBA SEL at 50 feet. When quantifying the associated noise level for the 80 and 100 parking stalls adjacent to the residential uses, a conservative approach was taken to determine the number of parking events that may occur within a peak hour. Assuming that each parking space adjacent to a residential use would be filled and emptied during the peak hour (for a total of 160–200 parking events), the noise level would be 52 dBA L_{eq} at 65 feet from the center of the parking space cluster to the nearest noise-sensitive use.

Existing daytime noise levels at adjacent residential uses north and east of the project site were measured to be 54 dBA and 57 dBA L_{eq}, respectively. Existing nighttime noise levels measured 50 dBA L_{eq}. Existing ambient noise levels currently exceed the Town of Loomis's exterior daytime and nighttime average hourly noise level standards of 50 dBA L_{eq} and 40 dBA L_{eq}, respectively, and the ambient noise level then becomes the accepted noise level standard. The increase from existing noise levels at these residential uses attributable to the proposed project's parking events would be approximately 2 dBA, which is not audible to most people. As a result, noise from parking events during project operation would not cause a temporary or periodic noise-level increase at noise-sensitive receptors of 3 dBA, nor would project-related parking noise exceed stationary noise level standards when adjusted for ambient conditions. Therefore, this impact would be **less than significant**.

Deliveries to the warehouse under all three Project Driveway Access Options would occur exclusively from an entry off Brace Road, west of and adjacent to the existing noise-sensitive apartment building. Warehouse delivery trucks would enter the site approximately 75 feet from the apartment building façade on Brace Road and exit at the driveway on Sierra College Boulevard (Option 1A) or at the new Granite Driveway Access (Option 1B and Option 1C). Warehouse shipments would be received between 2 a.m. and 9 p.m., and average 10 to 13 trips per day with most deliveries completed by 10 a.m.

Fueling station deliveries under all three options would enter and exit the site from the Costco driveway on Sierra College Boulevard. Five to seven fuel deliveries are anticipated per day on average. During busy holiday weeks, an additional delivery is often required during the day. These deliveries occur any time between 6:00 a.m. and 7:00 p.m.; however, these deliveries would not occur near sensitive receptors.

Policy 18 of the *Town of Loomis General Plan* Public Health and Safety Element requires that the hours of truck deliveries to industrial and commercial properties adjacent to residential uses be limited to daytime hours unless there is no feasible alternative or there are overriding transportation benefits by scheduling deliveries at night. In order to limit the impact of heavy truck trips to level of service at study intersections, Costco plans to conduct warehouse deliveries during the nighttime hours, with up to three trucks per hour, resulting in an hourly noise level of 54 dBA L_{eq} at the apartment building façade. The primary noise sources associated with the truck unloading areas are the heavy trucks stopping (air brakes), backing into the loading docks (backup alarms), pulling out of the loading docks (engines accelerating), and short-term refrigeration unit operation.

Instantaneous maximum noise levels attributable to delivery trucks entering or exiting the project site under all three options would be approximately 75 dBA L_{max} at the apartment building façade. Existing daytime noise levels at adjacent residential uses east of the project site's delivery access point were measured to be 64 dBA L_{eq} and 82 dBA L_{max}. The increase from existing noise levels at these residential uses attributable to the proposed project's delivery trucks would be negligible; however, nighttime interior noise levels may exceed noise standards for short durations during each delivery. Therefore, this impact would be **potentially significant.**

An automotive tire shop is part of the proposed project, introducing a new nontransportation noise source to the adjacent noise-sensitive land uses. Based on the project description (see Chapter 2 of this EIR), the automotive

[7] Some option/s may have fewer than 784 parking spaces, but parking lot noise was evaluated for the worst-case option.

repair shop would be located on the east side of the proposed building. The bay doors would face the adjacent noise-sensitive land uses; however, all repair activities would be conducted within the building. The nearest noise-sensitive property line is approximately 260 feet from the automotive bay doors. Typical noise sources for this type of use are pneumatic wrenches and tire breakers, with an hourly operational noise level of 61 dBA L_{eq} at 100 feet. Noise emanating from the tire repair shop is anticipated to attenuate to 57 dBA L_{eq} with roll up door open and 52 dBA L_{eq} with roll up door closed at the nearest noise-sensitive property line.

Existing daytime noise levels at adjacent residential uses east of the project site were measured to be 57 dBA L_{eq}. Existing nighttime noise levels measured 50 dBA L_{eq}. Existing ambient noise levels currently exceed the Town of Loomis's exterior daytime and nighttime average hourly noise level standards of 50 dBA L_{eq} and 40 dBA L_{eq}, respectively, and the ambient noise level then becomes the accepted noise level standard. The increase from existing noise levels at these residential uses attributable to the proposed project's tire center would be approximately 3 dBA with roll up door open. Also, other project-related noise sources, such as parking lot and vehicular traffic on adjacent streets would contribute to the noise level received at noise-sensitive uses. The contribution form other project-related noise sources would vary, because the parking lot and roadway traffic would be located at greater distances to the receiver closest to the tire center. In a worst-case scenario, all noise sources would contribute to noise level received at a receiver if all happens at the same time and with the same level and at the same distance from the receiver. In that case, two noise sources with the same noise level would increase the noise exposure by approximately 3 dB and four noise-sources with the same levels would increase the noise exposure at the senstive uses by approximately 6 dB. Noise from the tire center during project operation could cause a temporary or periodic noise-level increase at noise-sensitive receptors of 3 dBA. This impact would be **potentially significant**.

Mitigation Measure Noise-2: Minimize Operational Noise (All Site Options)

Prior to issuance of a certificate of occupancy, the project applicant shall construct or fund construction of the following improvements to address noise exposure experienced at sensitive receptors during operational hours:

- Construct a 13-foot tall soundwall along the western property boundary of the adjacent Sierra Meadows apartment complex in order to shield first floor sensitive spaces from nighttime truck delivery noise generated by diesel engines and exhaust stacks.
- Install dual pane windows with an STC rating of 35 or higher at second floor apartment units facing the delivery road in order to reduce interior noise levels attributable to nighttime truck deliveries.
- Construct a 6-foot soundwall along the eastern boundary of the project site at the residential property line to reduce tire center noise.

Significance after Mitigation

Complying with the noise policies of the *Town of Loomis General Plan* as described in Mitigation Measure Noise-2 would allow the project applicant, the construction contractor(s), and the Town of Loomis to address problems that arise during operation, to the extent feasible. These approaches have been shown to be effective in reducing temporary and long-term operational impacts. Solid walls, berms, or elevation differences typically reduce noise levels by 5.0 to 10.0 dB(A).[8]

Implementing Mitigation Measure Noise-2 would reduce the impact related to operational noise to a less-than-significant level, because interior noise levels at adjacent noise-sensitive uses would not exceed adopted standards during individual delivery truck movements with the inclusion of a soundwall and second floor window upgrades. Effective noise barriers typically reduce noise levels by 5 to 10 decibels (dB) (FHWA 2017).

Noise associated with delivery trucks in the worst-case location would be approximately 75 dBA L_{max} at the adjacent apartment building the average sound-level reduction would be 15 dB with windows open and 25 dB with windows closed (EPA 1974), so noise levels would be between 50 dBA and 60 dBA during a delivery, which are expected to occur during noise-sensitive nighttime hours. Installation of dual-pane windows would reduce reduce noise levels further, but even if this imnprovement was not made, approximately one percent of individuals would be anticipated to be awakened by a SEL of 50 dBA and 1.5 percent would be awakened by a SEL of 60 dBA (Finegold and

[8] Highway Noise Mitigation, (Springfield, Virginia: U.S. Department of Transportation, Federal Highway Administration, September 1980), pg., 97.

Bartholomew 2001). Material with an STC rating of 35 has a transmission loss (reduction in noise) of about 25 to 30 dBA for traffic noise (Caltrans 2013).

Additionally, Mitigation Measure Noise-2 would reduce the tire center noise impact to a less-than-significant level because exterior noise levels at adjacent residential uses to the east would be below the thresholds with the inclusion of a soundwall and also located farther away than the residences to the north.[9] The combination of mitigation measures will reduce noise exposure to a level that is consistent with applicable local standards – the combination of dual pane windows with an STC rating of 36 or higher and a sound wall would reduce the interior noise to 40 dB or less. But, the installation of dual pane windows with an STC rating of 36 or higher at second floor apartment units facing the delivery road cannot be guaranteed since neither the Town nor the applicant own this property. Therefore, the impact is **significant and unavoidable**.

3.6.5 Significance after Mitigation

Implementing Mitigation Measures Noise-1 and Noise-2 would reduce project-related impacts under all three Project Driveway Access Options but not all noise impacts would be reduced to a less-than-significant level. The Town cannot demonstrate at this time that implementing these mitigation measures would enable the proposed project to avoid a substantial temporary, short-term increase in ambient noise levels due to construction, or that it would fully reduce the construction short-term impacts to a less-than-significant level. No additional feasible mitigation is available. Therefore, Impact 3.6-1 would be **significant and unavoidable.**

Noise associated with delivery trucks entering or exiting the project site under all three options could exceed applicable standards at the adjacent apartment building under all of the access options. Noise levels at residential uses attributable to the proposed project's tire center could cause a temporary or periodic noise-level increase. Implementing Mitigation Measure Noise-2 would reduce the impact related to operational noise to a less-than-significant level, but the installation of dual pane windows with an STC rating of 36 or higher at second floor apartment units facing the delivery road cannot be guaranteed since neither the Town nor the applicant own this property. No additional feasible mitigation is available. Therefore, the impact is **significant and unavoidable**.

9 Ibid