Environmental Noise Assessment

Sierra View Shopping Center

City of Roseville, California

June 23, 2026

Project #260506

Prepared for:

Warberg Partners, Inc.
12001 Bella Italia Drive, Suite 300
Fort Worth, TX 76126

Prepared by:

Saxelby Acoustics LLC

Luke Saxelby, INCE Bd. Cert.
Principal Consultant
Board Certified, Institute of Noise Control Engineering (INCE)

(916) 760-8821
www.SaxNoise.com | Luke@SaxNoise.com
915 Highland Pointe Drive, Suite 250
Roseville, CA 95678

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

APPENDICES

INTRODUCTION

The Sierra View Shopping Center project at 1875 Pleasant Grove Boulevard is located southwest of the Fiddyment Road and Pleasant Grove Boulevard intersection in the City of Roseville, California. The project will provide neighborhood-serving uses including a grocery store, retail spaces, fast food restaurants with drive-throughs, and a fuel station. The site is bordered by Pleasant Grove Boulevard to the north, Fiddyment Road to the east, Upland Drive and future multifamily residential uses to the west, and existing single-family homes to the south. The project site is designated Community Commercial (CC) in the Sierra Vista Specific Plan. The Sierra Vista Specific Plan Environmental Impact Report (2010) evaluated buildout of the project with community commercial uses.

Figure 1 shows the project site plan. **Figure 2** shows an aerial photo of the project site.

BACKGROUND INFORMATION ON NOISE

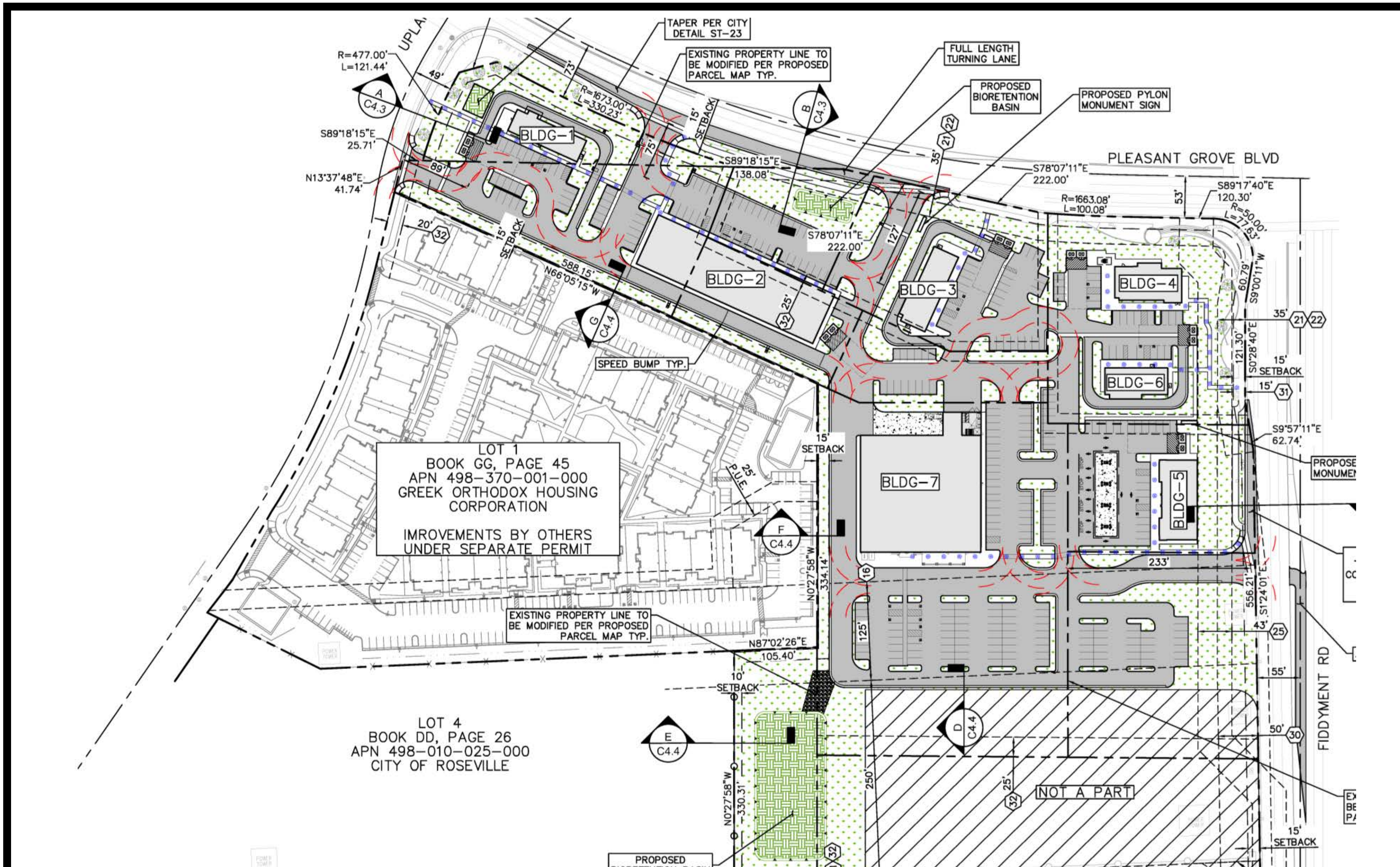
FUNDAMENTALS OF ACOUSTICS

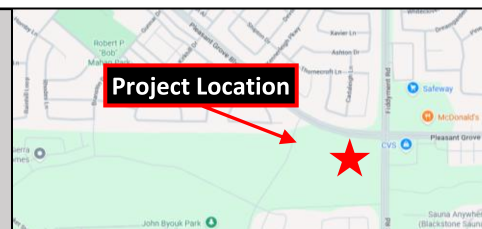
Acoustics is the science of sound. Sound may be thought of as mechanical energy of a vibrating object transmitted by pressure waves through a medium to human (or animal) ears. If the pressure variations occur frequently enough (at least 20 times per second), then they can be heard and are called sound. The number of pressure variations per second is called the frequency of sound and is expressed as cycles per second or Hertz (Hz).

Noise is a subjective reaction to different types of sounds. Noise is typically defined as (airborne) sound that is loud, unpleasant, unexpected or undesired, and may therefore be classified as a more specific group of sounds. Perceptions of sound and noise are highly subjective from person to person.

Measuring sound directly in terms of pressure would require a very large and awkward range of numbers. To avoid this, the decibel scale was devised. The decibel scale uses the hearing threshold (20 micropascals), as a point of reference, defined as 0 dB. Other sound pressures are then compared to this reference pressure, and the logarithm is taken to keep the numbers in a practical range. The decibel scale allows a million-fold increase in pressure to be expressed as 120 dB, and changes in levels (dB) correspond closely to human perception of relative loudness.

The perceived loudness of sounds is dependent upon many factors, including sound pressure level and frequency content. However, within the usual range of environmental noise levels, perception of loudness is relatively predictable, and can be approximated by A-weighted sound levels. There is a strong correlation between A-weighted sound levels (expressed as dBA) and the way the human ear perceives sound. For this reason, the A-weighted sound level has become the standard tool of environmental noise assessment.



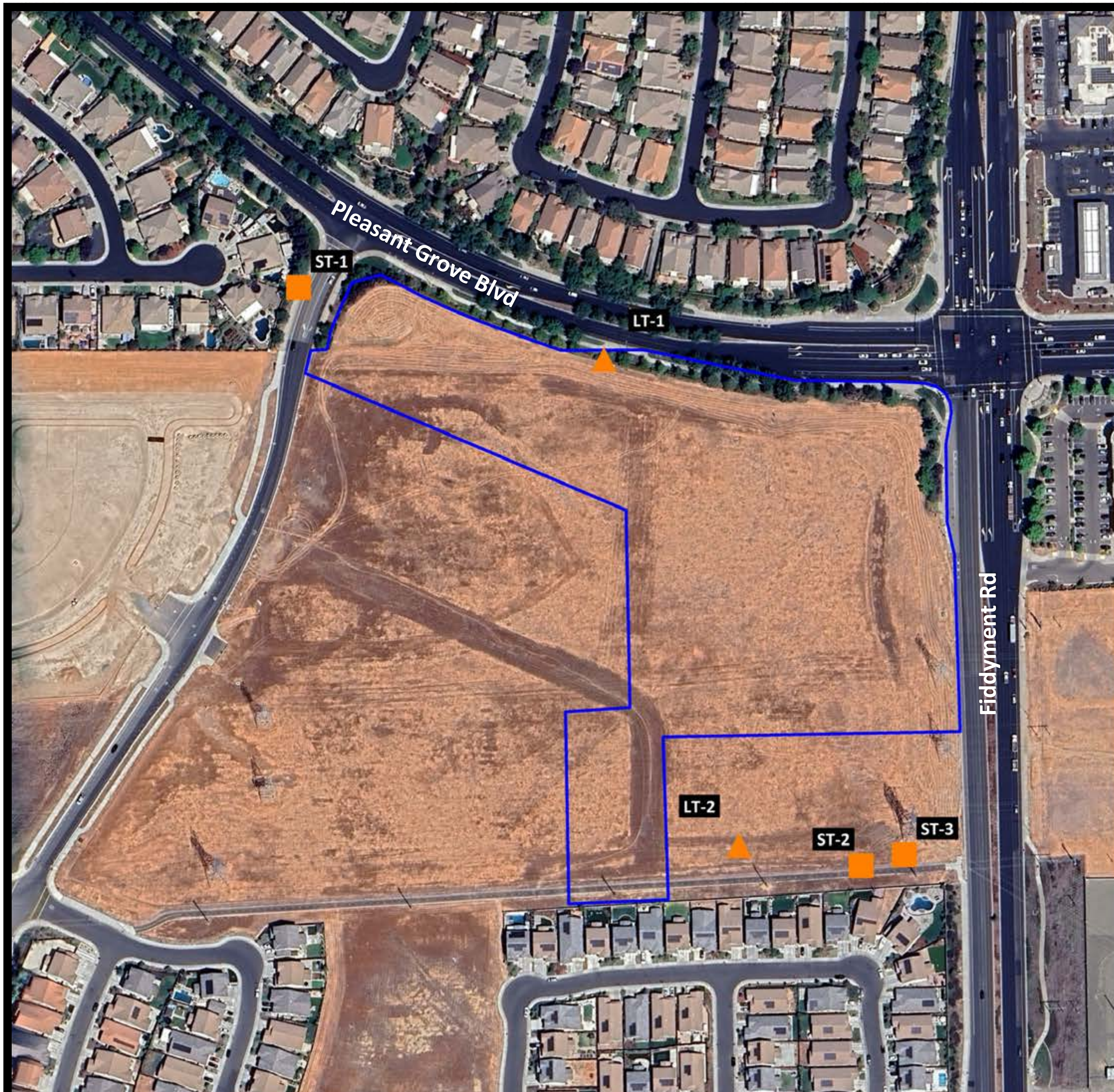


Sierra View Shopping Center

City of Roseville, California

Figure 1

Project Site Plan



Sierra View Shopping Center

City of Roseville, California

Figure 2

Noise Measurement Sites

Legend

Project Site

Noise Measurement Site - Long-Term

Noise Measurement Site - Short Term

100 ft 250 ft 400 ft

Projection: UTM Zone 10 / WGS84 / meters
Rev. Date: 06/23/2026

SAXELBY ACOUSTICS
Acoustics · Noise · Vibration

The decibel scale is logarithmic, not linear. In other words, two sound levels 10-dB apart differ in acoustic energy by a factor of 10. When the standard logarithmic decibel is A-weighted, an increase of 10-dBA is generally perceived as a doubling in loudness. For example, a 70-dBA sound is half as loud as an 80-dBA sound, and twice as loud as a 60-dBA sound.

Community noise is commonly described in terms of the ambient noise level, which is defined as the all-encompassing noise level associated with a given environment. A common statistical tool is the average, or equivalent, sound level (L_{eq}), which corresponds to a steady-state A-weighted sound level containing the same total energy as a time varying signal over a given time period (usually one hour). The L_{eq} is the foundation of the composite noise descriptor, L_{dn}, and shows very good correlation with community response to noise.

The day/night average level (DNL or L_{dn}) is based upon the average noise level over a 24-hour day, with a +10-decibel weighing applied to noise occurring during nighttime (10:00 p.m. to 7:00 a.m.) hours. The nighttime penalty is based upon the assumption that people react to nighttime noise exposures as though they were twice as loud as daytime exposures. Because L_{dn} represents a 24-hour average, it tends to disguise short-term variations in the noise environment.

Table 1 lists several examples of the noise levels associated with common situations. **Appendix A** provides a summary of acoustical terms used in this report.

TABLE 1: TYPICAL NOISE LEVELS

Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
	--110--	Rock Band
Jet Fly-over at 300 m (1,000 ft.)	--100--	
Gas Lawn Mower at 1 m (3 ft.)	--90--	
Diesel Truck at 15 m (50 ft.), at 80 km/hr. (50 mph)	--80--	Food Blender at 1 m (3 ft.) Garbage Disposal at 1 m (3 ft.)
Noisy Urban Area, Daytime Gas Lawn Mower, 30 m (100 ft.)	--70--	Vacuum Cleaner at 3 m (10 ft.)
Commercial Area Heavy Traffic at 90 m (300 ft.)	--60--	Normal Speech at 1 m (3 ft.)
Quiet Urban Daytime	--50--	Large Business Office Dishwasher in Next Room
Quiet Urban Nighttime	--40--	Theater, Large Conference Room (Background)
Quiet Suburban Nighttime	--30--	Library
Quiet Rural Nighttime	--20--	Bedroom at Night, Concert Hall (Background)
	--10--	Broadcast/Recording Studio
Lowest Threshold of Human Hearing	--0--	Lowest Threshold of Human Hearing

Source: Caltrans, Technical Noise Supplement, Traffic Noise Analysis Protocol. September, 2013.

EFFECTS OF NOISE ON PEOPLE

The effects of noise on people can be placed in three categories:

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

Environmental noise typically produces effects in the first two categories. Workers in industrial plants can experience noise in the last category. There is no completely satisfactory way to measure the subjective effects of noise or the corresponding reactions of annoyance and dissatisfaction. A wide variation in individual thresholds of annoyance exists and different tolerances to noise tend to develop based on an individual's past experiences with noise.

Thus, an important way of predicting a human reaction to a new noise environment is the way it compares to the existing environment to which one has adapted: the so-called ambient noise level. In general, the more a new noise exceeds the previously existing ambient noise level, the less acceptable the new noise will be judged by those hearing it.

With regards to increases in A-weighted noise level, the following relationships occur:

- Except in carefully controlled laboratory experiments, a change of 1-dBA cannot be perceived;
- Outside of the laboratory, a 3-dBA change is considered a just-perceivable difference;
- A change in level of at least 5-dBA is required before any noticeable change in human response would be expected; and
- A 10-dBA change is subjectively heard as approximately a doubling in loudness and can cause an adverse response.

Stationary point sources of noise – including stationary mobile sources such as idling vehicles – attenuate (lessen) at a rate of approximately 6-dB per doubling of distance from the source, depending on environmental conditions (i.e. atmospheric conditions and either vegetative or manufactured noise barriers, etc.). Widely distributed noises, such as a large industrial facility spread over many acres or a street with moving vehicles, would typically attenuate at a lower rate.

ENVIRONMENTAL SETTING

Existing Noise Receptors

Some land uses are considered more sensitive to noise than others. Land uses often associated with sensitive receptors generally include residences, schools, libraries, hospitals, and passive recreational areas. Sensitive noise receptors may also include threatened or endangered noise-sensitive biological species, although many jurisdictions have not adopted noise standards for wildlife areas. Noise sensitive land uses are typically given special attention in order to achieve protection from excessive noise.

Sensitivity is a function of noise exposure (in terms of both exposure duration and insulation from noise) and the types of activities involved. In the vicinity of the project site, sensitive land uses include existing single-family residential uses to the north, south, and west of the project site. The Sierra Vista Apartments are approved, but not constructed, immediately southwest of the project. A six-foot masonry wall would separate the multifamily residential uses from the proposed Sierra View Shopping Center project.

Existing General Ambient Noise Levels

The existing noise environment in the project area is primarily defined by traffic on Pleasant Grove Boulevard and Fiddyment Road. To quantify the existing ambient noise environment in the project vicinity, Saxelby Acoustics conducted a continuous (24-hr.) noise level measurement at two locations on the project site and short-term noise level measurements at three locations. Noise measurement locations are shown on **Figure 2**. A summary of the noise level measurement survey results is provided in **Table 2**. **Appendix B** contains the complete results of the noise monitoring.

The sound level meters were programmed to record the maximum, median, and average noise levels at each site during the survey. The maximum value, denoted L_{max}, represents the highest noise level measured. The average value, denoted L_{eq}, represents the energy average of all the noise received by the sound level meter microphone during the monitoring period. The median value, denoted L_{50}, represents the sound level exceeded 50 percent of the time during the monitoring period.

Larson Davis Laboratories (LDL) model 820 and 831 precision integrating sound level meters were used for the ambient noise level measurement survey. The meters were calibrated before and after use with a CAL200 acoustical calibrator to ensure the accuracy of the measurements. The equipment used meets all pertinent specifications of the American National Standards Institute for Type 1 sound level meters (ANSI S1.4).

TABLE 2: SUMMARY OF EXISTING BACKGROUND NOISE MEASUREMENT DATA

Location	Date	L_{dn}	Daytime L_{eq}	Daytime L_{50}	Daytime L_{max}	Nighttime L_{eq}	Nighttime L_{50}	Nighttime L_{max}
LT-1: 60 ft. to CL of Pleasant Grove Blvd.	5/21/26	70	67	65	83	63	52	80
LT-2: 430 ft. to CL of Fiddyment Blvd.	5/21/26	55	49	46	63	48	45	61
ST-1: 135 ft. to CL of Pleasant Grove Blvd.	5/20/26 12:23 PM	N/A	61	58	74	N/A	N/A	N/A
ST-2: 240 ft. to CL of Fiddyment Road	5/20/26 1:12 PM	N/A	54	52	69	N/A	N/A	N/A
ST-3: 100 ft. CL of Fiddyment Road	5/22/26 9:48 AM	N/A	58	56	67	N/A	N/A	N/A

Notes:

- *All values shown in dBA*
- *Daytime hours: 7:00 a.m. to 10:00 p.m.*
- *Nighttime Hours: 10:00 p.m. to 7:00 a.m.*
- *Source: Saxelby Acoustics, 2026.*

FUTURE TRAFFIC NOISE ENVIRONMENT AT OFF-SITE RECEPTORS

To assess noise impacts due to project-related traffic increases on the local roadway network, traffic noise levels are predicted at sensitive receptors for existing and future, project and no-project conditions.

Existing and Cumulative noise levels due to traffic are calculated using the Federal Highway Administration Highway Traffic Noise Prediction Model (FHWA RD-77-108). The model is based upon the Calveno reference noise factors for automobiles, medium trucks and heavy trucks, with consideration given to vehicle volume, speed, roadway configuration, distance to the receiver, and the acoustical characteristics of the site.

The FHWA model was developed to predict hourly L_{eq} values for free-flowing traffic conditions. To predict traffic noise levels in terms of L_{dn}, it is necessary to adjust the input volume to account for the day/night distribution of traffic.

Project trip generation volumes were provided by the project traffic engineer (Fehr & Peers 2026). Saxelby Acoustics conservatively assumed that approximately 50% of peak hour project trips could be routed on each roadway segment. Existing roadway volumes were obtained from the City of Roseville (2026). Cumulative roadway volumes were obtained from the traffic engineer (Fehr & Peers 2026). Truck usage and vehicle speeds on the local area roadways were estimated from field observations. The predicted increases in traffic noise levels on the local roadway network for Existing and Cumulative conditions which would result from the project are provided in terms of L_{dn}.

Traffic noise levels are predicted at the sensitive receptors located at the closest typical setback distance along each project-area roadway segment. In some locations sensitive receptors may not receive full shielding from noise barriers or may be located at distances which vary from the assumed calculation distance.

Tables 3 and 4 summarize the modeled traffic noise levels at the nearest sensitive receptors along each roadway segment in the Project area. **Appendix C** provides the complete inputs and results of the FHWA traffic modeling.

TABLE 3: PREDICTED TRAFFIC NOISE LEVEL AND PROJECT-RELATED TRAFFIC NOISE LEVEL INCREASES

Roadway	Segment	Existing (dBA L_{dn})	Existing + Project (dBA L_{dn})	Change (dBA)
Fiddyment Road	North of Pleasant Grove	63.6	64.0	0.4
Fiddyment Road	South of Pleasant Grove	63.6	64.0	0.4
Pleasant Grove Blvd	East of Fiddyment	65.9	66.1	0.2
Pleasant Grove Blvd	West of Fiddyment	60.2	61.1	0.9
Upland Drive	South of Pleasant Grove	60.7	61.7	1.0

TABLE 4: CUMULATIVE TRAFFIC NOISE LEVEL AND PROJECT-RELATED TRAFFIC NOISE LEVEL INCREASES

Roadway	Segment	Cumulative (dBA L_{dn})	Cumulative + Project (dBA L_{dn})	Change (dBA)
Fiddyment Road	North of Pleasant Grove	65.2	65.5	0.3
Fiddyment Road	South of Pleasant Grove	67.7	67.8	0.1
Pleasant Grove Blvd	East of Fiddyment	66.6	66.8	0.2
Pleasant Grove Blvd	West of Fiddyment	65.6	65.9	0.3
Upland Drive	South of Pleasant Grove	60.7	61.7	1.0

Based upon the **Tables 3 and 4** data, the proposed project is predicted to result in an increase in a maximum traffic noise level increase of 1.0 dBA.

EVALUATION OF PROJECT OPERATIONAL NOISE ON EXISTING SENSITIVE RECEPTORS

The grocery store loading dock, trash compactor, rooftop mechanical equipment, drive thru speaker boxes, and vehicle circulation through the project site are the main noise sources associated with the project. The following assumptions were utilized in prediction of noise levels for the proposed project.

LOADING DOCK AND TRUCK CIRCULATION NOISE GENERATION

The proposed grocery store is predicted to receive ten heavy truck deliveries per week and fifteen to twenty medium truck deliveries per week. Saxelby Acoustics assumed that during a peak hour, two heavy truck deliveries and five medium truck deliveries could occur. It was assumed that the peak hour of activity of the loading dock could occur during nighttime (10:00 p.m. to 7:00 a.m.) hours.

To determine typical noise levels associated with the proposed loading docks, Saxelby Acoustics utilized previously collected noise level measurements at a similar grocery store located in Roseville, California.

Activities during the peak hour of loading dock activities included truck arrival/departures, truck idling, truck backing, air brake release, backup alarms, operation of truck-mounted refrigeration units, operation of truck lifts, and noise from vendor hand trucks.

One medium truck delivery produced a sound exposure level of 84 dBA SEL at 60 feet and a maximum noise level of 76 dBA L_{max} at 60 feet. One heavy truck delivery produced a sound exposure level of 85 dBA SEL at 85 feet and a maximum noise level of 75 dBA L_{max} at 85 feet.

TRASH COMPACTOR

The proposed trash compactor is expected to generate a continuous noise level of 70 dBA L_{eq} at 10 feet and a noise level maximum of 85 dBA L_{max} (Michael Brandman Associates, 2011). A typical trash compactor cycle would operate for one minute. The trash compactor will run for approximately one cycle per hour. Daytime (7:00 a.m. to 10:00 p.m.) use only.

HVAC EQUIPMENT

Saxelby Acoustics assumed each quick-service restaurant and the gas station convenience store would have three ten-ton packaged units (Sound Power Level: 88.3 dBA each) and one ten-ton air-cooled chiller unit (Sound Power Level: 91 dBA). Saxelby Acoustics also assumed that each retail space would be serviced by one ten-ton packaged unit (Sound Power Level: 88.3 dBA) and the proposed grocery store would include a 50-ton packaged HVAC rooftop unit (Sound Power Level: 91 dBA). All equipment is assumed to operate 75% of the time during the daytime and 25% of the time at night. Saxelby Acoustics assumed that the HVAC units would be installed on the rooftop of the proposed commercial buildings surrounded by 4-foot parapets. Sound levels were obtained from manufacturer's data for equivalent units.

DRIVE THRU LANES AND SPEAKERS

The drive-thru lanes were modeled as continuously filled with idling cars during both daytime and nighttime hours. Idling automobile queues were measured to produce 51 dBA L_{eq} and 61 dBA L_{max} at 10 feet. The drive thru speaker boxes are predicted to produce a noise level of 68 dBA L_{eq} and 78 dBA L_{max} at a distance of three feet based upon previously collected data of similar facilities. The drive thru speakers were assumed to operate at this level continuously and simultaneously during both daytime and nighttime hours.

The City of Roseville General Plan and Municipal Code require that noise sources which consist primarily of speech, such as a drive-thru speaker box, are subject to noise level standards that are 5 dBA lower than the standards listed in the General Plan and Municipal Code. To account for this requirement in the context of all other project noise sources which are not subject to lower standards, Saxelby Acoustics increased modeled sound levels for the speaker boxes by +5 dBA.

VEHICLE CIRCULATION

The project is projected to generate 828 trips in the p.m. peak hour (Fehr & Peers 2026). Saxelby Acoustics assumed that 8 of the peak trips could be heavy trucks to account for deliveries and garbage collection based on similar projects. Saxelby Acoustics utilized existing file data for measurements of passenger vehicles and heavy truck movements to predict noise levels associated with project vehicle circulation. Passenger vehicle movements are predicted to generate a sound exposure level (SEL) of 71 dBA at 50 feet and a typical maximum noise level of 63 dBA L_{max} at 50 feet. Heavy truck movements generate a SEL of 85 dBA at 50 feet and 80 dBA

L_{max} at 50 feet. Nighttime traffic outside of the AM or PM peak hour is estimated to be approximately 1/4 of daytime trips during nighttime hours (10:00 p.m. to 7:00 a.m.) based on time-of-day vehicle distribution data published by the Institute of Transportation Engineering (ITE) (ITE 2022).

NOISE PROPAGATION MODELING

Saxelby Acoustics used the SoundPLAN noise prediction model. Inputs to the model included sound power levels for the proposed equipment, vehicle circulation, existing and proposed buildings, terrain type, and locations of sensitive receptors. These predictions are made in accordance with International Organization for Standardization (ISO) standard 9613-2:2024 (Acoustics – Attenuation of sound during propagation outdoors). ISO 9613 is the most commonly used method for calculating exterior noise propagation.

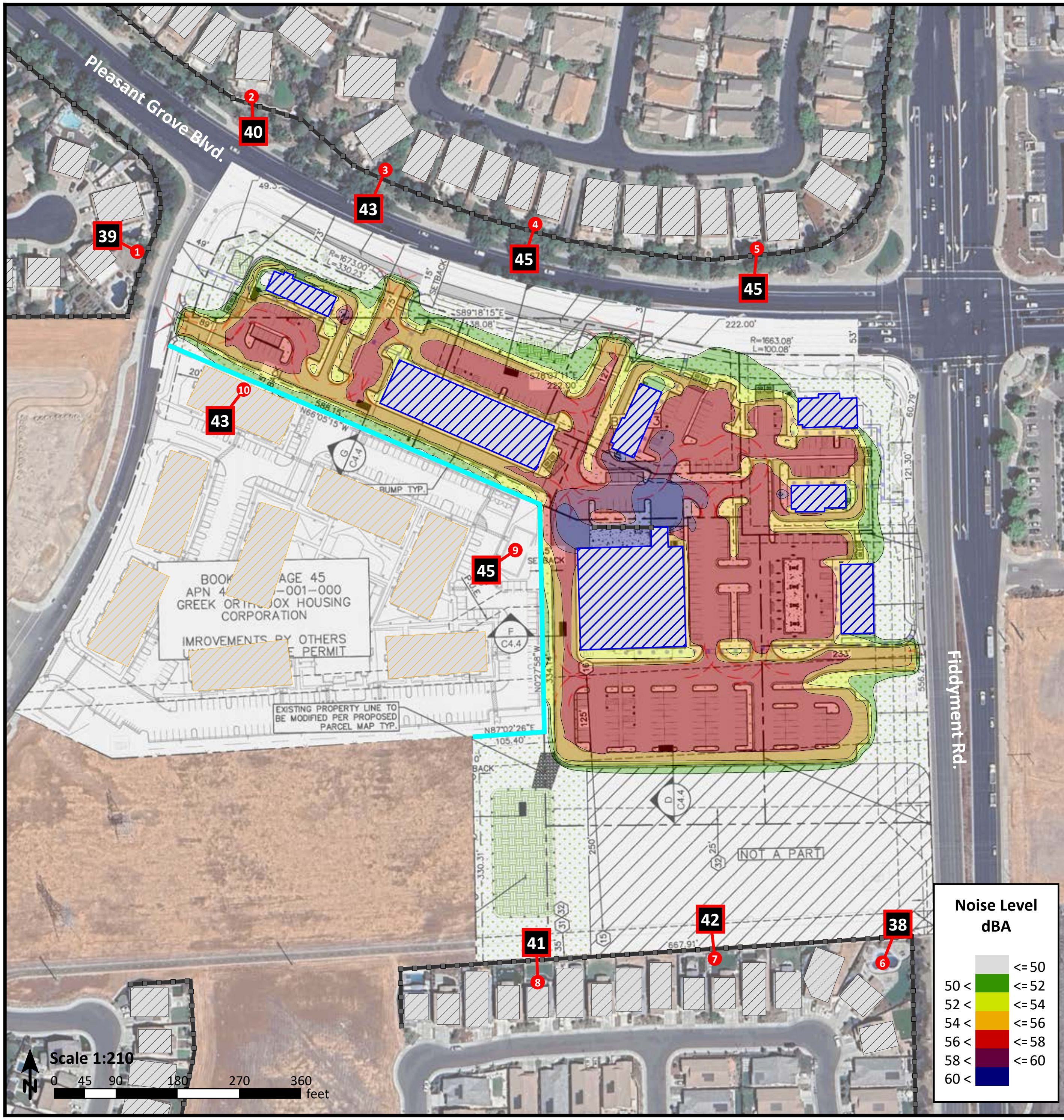
Figure 3 shows the predicted project noise level contours in terms of the daytime average (L_{eq}) noise descriptor.

Sierra View Shopping Center

City of Roseville, California

Figure 3

Project Generated Noise (Leq, dBA)



Legend

- Project Building
- Existing Building
- Future Building
- Existing Sound Wall
- 6' Project Sound Wall
- Receiver
- Noise Level

SAXELBY ACOUSTICS
Acoustics · Noise · Vibration

CONSTRUCTION NOISE ENVIRONMENT

The Federal Highway Administration's (FHWA) Roadway Construction Noise Model (RCNM) was used to predict noise levels for standard construction equipment used for roadway improvement projects. The assessment of potential significant noise effects due to construction is based on the standards and procedures described in the Federal Transit Authority (FTA) guidance manual and FHWA's RCNM.

The RCNM is a Windows-based noise prediction model that enables the prediction of construction noise levels for a variety of construction equipment based on a compilation of empirical data and the application of acoustical propagation formulas. It enables the calculation of construction noise levels in more detail than the manual methods, which eliminates the need to collect extensive amounts of project-specific input data. RCNM allows for the modeling of multiple pieces of construction equipment working either independently or simultaneously, the character of noise emission, and the usage factors for each piece of equipment.

Construction noise varies depending on the construction process, type of equipment involved, location of the construction site with respect to sensitive receptors, the schedule proposed to carry out each task (e.g., hours and days of the week), and the duration of the construction work.

Noise sources in the RCNM database include actual noise levels and equipment usage percentages. This source data was used in this construction noise analysis. **Table 5** shows predicted construction noise levels for the project site.

TABLE 5: CONSTRUCTION EQUIPMENT NOISE LEVELS

Equipment	Quantity	Usage (%)	Maximum, L_{max} (dBA at 50 feet)	Hourly Average, L_{eq} (dBA at 50 feet)
Grading				
Excavator	2	40	81	80
Grader	2	40	85	84
Dozer	1	40	82	78
Scraper	2	40	84	83
Compactor (ground)	2	20	83	79
Flat Bed / Water Truck	2	40	74	73
Front End Loader	2	40	79	78
			Total:	**89**
Concrete Work				
Concrete Pump Truck	1	20	81	74
Concrete Mixer Truck	6	40	79	83
Fork Lift	2	40	83	82
Front End Loader	2	40	79	78
Concrete Saw	2	20	90	86
			Total:	**89**
Paving				
Paver	1	50	77	74
Roller	1	20	80	73
Paving Equipment	1	50	77	74
Tractor/Loader/Backhoe	1	40	84	80
Dump Truck	8	40	76	81
			Total:	**85**
Building Construction				
Crane	1	16	81	73
Front End Loader	3	40	79	80
Fork Lift	2	40	83	82
Front End Loader	4	40	79	81
Man Lift	6	20	75	76
Generator	2	50	81	81
Backhoe	1	40	78	74
			Total:	**88**

Source: FHWA, Roadway Construction Noise Model (RCNM), January 2006.

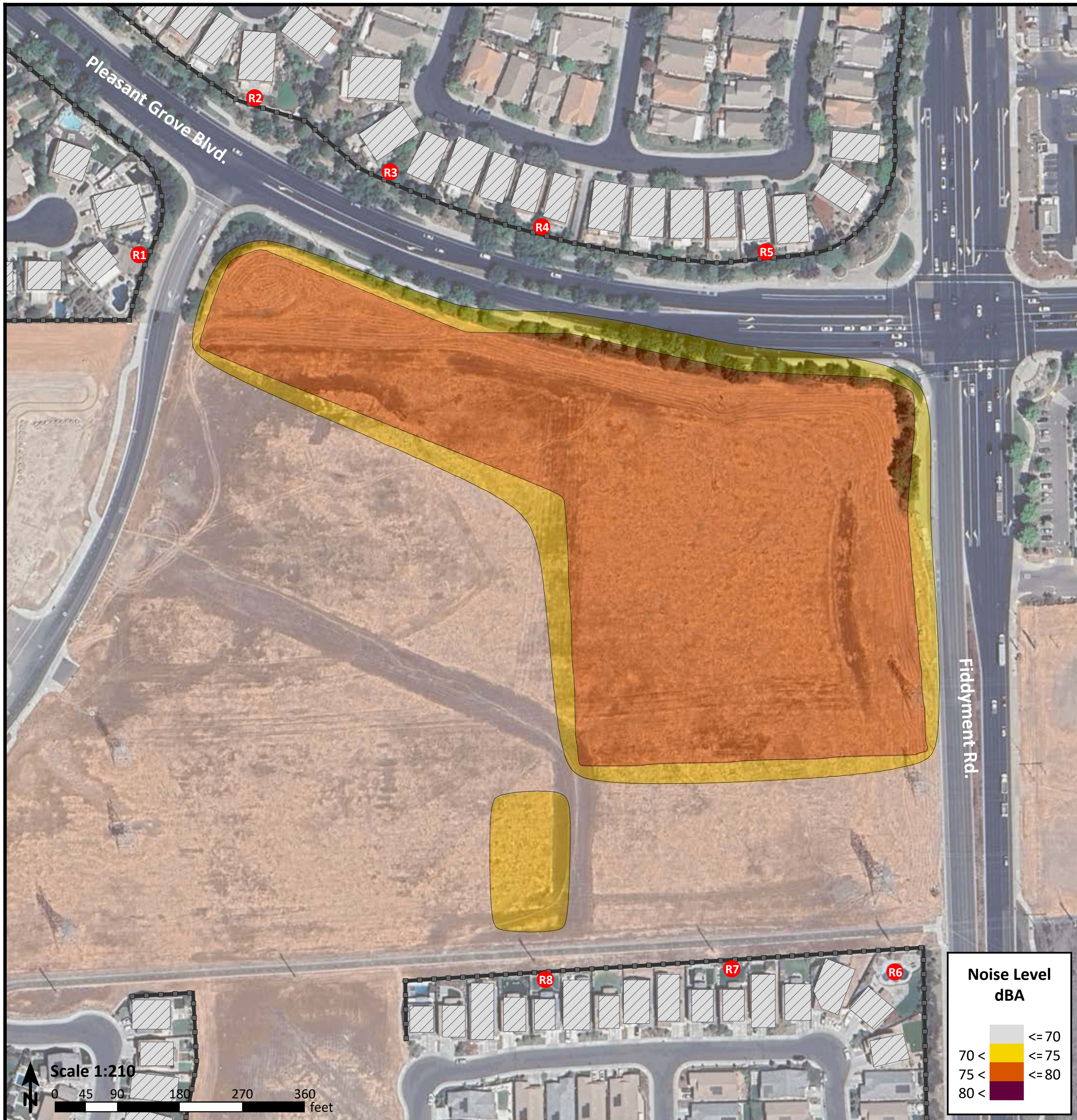
Based upon the **Table 5** data, the loudest phases of construction on the project site would be grading and concrete work with an average noise exposure of 89 dBA L_{eq} at 50 feet from the center of activity. The results of the construction noise analysis are shown graphically on **Figure 4**.

Sierra View Shopping Center

City of Roseville, California

Figure 4

Construction Noise
(Leq, dBA)



Legend

- Project Building
- Existing Building
- Existing Sound Wall
- Receiver

SAXELBY ACOUSTICS
Acoustics · Noise · Vibration

CONSTRUCTION VIBRATION ENVIRONMENT

The primary vibration-generating activities associated with the proposed project would occur during construction when activities such as grading, utilities placement, and parking lot construction occur. **Table 5** shows the typical vibration levels produced by construction equipment.

TABLE 6: VIBRATION LEVELS FOR VARIOUS CONSTRUCTION EQUIPMENT

Type of Equipment	Peak Particle Velocity at 25 feet (inches/second)	Peak Particle Velocity at 50 feet (inches/second)	Peak Particle Velocity at 100 feet (inches/second)
Large Bulldozer	0.089	0.031	0.011
Loaded Trucks	0.076	0.027	0.010
Small Bulldozer	0.003	0.001	0.000
Auger/drill Rigs	0.089	0.031	0.011
Jackhammer	0.035	0.012	0.004
Vibratory Hammer	0.070	0.025	0.009
Vibratory Compactor/roller	0.210 (Less than 0.20 at 26 feet)	0.074	0.026

Source: Transit Noise and Vibration Impact Assessment Guidelines. Federal Transit Administration. May 2006.

REGULATORY CONTEXT

FEDERAL

There are no federal regulations related to noise that apply to the Proposed Project.

STATE

There are no state regulations related to noise that apply to the Proposed Project.

LOCAL

CITY OF ROSEVILLE GENERAL PLAN

The City of Roseville General Plan Noise Element Table 1X-3 (**Table 7**) establishes acceptable exterior noise levels for stationary noise sources.

TABLE 7: CITY OF ROSEVILLE NOISE ELEMENT TABLE 1X-3

Noise Level Descriptor	Daytime (7 a.m. to 10 p.m.)	Nighttime (10 p.m. to 7 a.m.)
Hourly L_{eq}, dB	50	45
Maximum Level, dB	70	65

Source: City of Roseville General Plan Noise Element 2035 Table 1X-3.
Notes :

- *For municipal power plants consisting primarily of broadband, stead state noise sources, the hourly (L_{eq}) noise standards may be increased up to 10 dB(A), but no exceed 55 dB(A) Hourly L_{eq}, dB.*
- *Each of the noise levels specified above should be lowered by five dB for simple tone noises, noises consisting primarily of speech or music, or for recuring impulsive noises. Such noises are generally considered by residents to be particularly annoying and are a primary source of noise complaints. These noise level standards do not apply to resident units established in conjunction with industrial or commercial uses.*
- *No standards have been included for interior noise levels. Standard construction practices should, with exterior noise levels identified, result in acceptable interior noise levels.*

CITY OF ROSEVILLE NOISE ORDINANCE

The City of Roseville Municipal Code outlines the following sound limits for sensitive receptors:

§ 9.24.100 Sound limits for sensitive receptors.

It is unlawful for any person at any location to create any sound, or to allow the creation of any sound, on property owned, leased, occupied or otherwise controlled by such person, which causes the exterior sound level when measured at the property line of any affected sensitive receptor to exceed the ambient sound level by three dBA or exceed the sound level standards as set forth in Table 1, by three dBA, whichever is greater.

TABLE 8: SOUND LEVEL STANDARD FOR NON-TRANSPORTATION OR FIXED SOUND SOURCES

Sound Level Descriptor	Daytime (7:00 a.m. to 10:00 p.m.)	Nighttime (10:00 p.m. to 7:00 a.m.)
Hourly L_{eq}, dB	50	45
Maximum level, dB	70	65

Source: City of Roseville Municipal Code Section 9.24.100 Table 1
Notes:

- *Each of the sound level standards specified in Table 1 shall be reduced by five dB for simple tone noises, consisting of speech and music. However, in no case shall the sound level standard be lower than the ambient sound level plus three dB.*
- *If the intruding sound source is continuous and cannot reasonably be discontinued or stopped for a time period whereby the ambient sound level can be measured, the sound level measured while the source is in operation shall be compared directly to the sound level standards of Table 1. (Ord. 3638 § 1, 2001.)*

§ 9.24.030 Exemptions.

Sound or noise emanating from the following sources and activities are exempt from the provisions of this title:

A. Sound sources typically associated with residential uses (e.g., children at play, air conditioning and similar equipment, but not including barking dogs);

B. Sound sources associated with property maintenance (e.g., lawn mowers, edgers, blowers, pool pumps, power tools, etc.) provided such activities take place between the hours of 8:00 a.m. and 9:00 p.m.;

C. Safety, warning and alarm devices, including house and car alarms, and other warning devices that are designed to protect the health, safety and welfare, provided such devices are not negligently maintained or operated;

D. The normal operation of public and private schools typically consisting of classes and other school-sponsored activities;

E. Maintenance (e.g., lawn mowers, edgers, aerators, blowers, etc.) of golf courses, provided such activities take place between the hours of 5:00 a.m. and 9:00 p.m. May through September, and 6:00 a.m. and 9:00 p.m. October through April;

F. Emergencies involving the execution of the duties of duly authorized governmental personnel and others providing emergency response to the general public, including, but not limited to, sworn peace officers, emergency personnel, utility personnel, and the operation of emergency response vehicles and equipment;

G. Private construction (e.g., construction, alteration or repair activities) between the hours of 7:00 a.m. and 7:00 p.m. Monday through Friday, and between the hours of 8:00 a.m. and 8:00 p.m. Saturday and Sunday; provided, however, that all construction equipment shall be fitted with factory installed muffling devices and that all construction equipment shall be maintained in good working order. (Ord. 3638 § 1, 2001.)

Criteria for Acceptable Vibration

Vibration is like noise in that it involves a source, a transmission path, and a receiver. While vibration is related to noise, it differs in that noise is generally considered to be pressure waves transmitted through air, whereas vibration usually consists of the excitation of a structure or surface. As with noise, vibration consists of an amplitude and frequency. A person's perception to the vibration will depend on their individual sensitivity to vibration, as well as the amplitude and frequency of the source and the response of the system which is vibrating.

Vibration can be measured in terms of acceleration, velocity, or displacement. A common practice is to monitor vibration measures in terms of peak particle velocities in inches per second. Standards pertaining to perception as well as damage to structures have been developed for vibration levels defined in terms of peak particle velocities.

Human and structural response to different vibration levels is influenced by a number of factors, including ground type, distance between source and receptor, duration, and the number of perceived vibration events. **Table 9**, which was developed by Caltrans, shows the vibration levels which would normally be required to result in damage to structures. The vibration levels are presented in terms of peak particle velocity in inches per second.

Table 9 indicates that the threshold for architectural damage to structures is 0.20 in/sec p.p.v. A threshold of 0.20 in/sec p.p.v. is considered to be a reasonable threshold for short-term construction projects.

TABLE 9: EFFECTS OF VIBRATION ON PEOPLE AND BUILDINGS

Peak Particle Velocity		Human Reaction	Effect on Buildings
mm/second	in/second		
0.15-0.30	0.006-0.019	Threshold of perception; possibility of intrusion	Vibrations unlikely to cause damage of any type
2.0	0.08	Vibrations readily perceptible	Recommended upper level of the vibration to which ruins and ancient monuments should be subjected
2.5	0.10	Level at which continuous vibrations begin to annoy people	Virtually no risk of "architectural" damage to normal buildings
5.0	0.20	Vibrations annoying to people in buildings (this agrees with the levels established for people standing on bridges and subjected to relative short periods of vibrations)	Threshold at which there is a risk of "architectural" damage to normal dwelling - houses with plastered walls and ceilings. Special types of finish such as lining of walls, flexible ceiling treatment, etc., would minimize "architectural" damage
10-15	0.4-0.6	Vibrations considered unpleasant by people subjected to continuous vibrations and unacceptable to some people walking on bridges	Vibrations at a greater level than normally expected from traffic, but would cause "architectural" damage and possibly minor structural damage

Source: Transportation Related Earthborne Vibrations. Caltrans. TAV-02-01-R9601. February 20, 2002.

IMPACTS AND MITIGATION MEASURES

THRESHOLDS OF SIGNIFICANCE

Appendix G of the California Environmental Quality Act (CEQA) Guidelines states that a project would normally be considered to result in significant noise impacts if noise levels conflict with adopted environmental standards or plans or if noise generated by the project would substantially increase existing noise levels at sensitive receivers on a permanent or temporary basis. Significance criteria for noise impacts are drawn from CEQA Guidelines Appendix G (Items XIII [a-c]).

Would the project:

a. 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?

b. Generate excessive groundborne vibration or groundborne noise levels?

c. 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 LEVEL INCREASE CRITERIA FOR LONG-TERM PROJECT-RELATED NOISE LEVEL INCREASES

Transportation Noise Level Increases

The CEQA guidelines define a significant impact of a project if it "increases substantially the ambient noise levels for adjoining areas." Generally, a project may have a significant effect on the environment if it will substantially increase the ambient noise levels for adjoining areas or expose people to severe noise levels. In practice, more specific professional standards have been developed. These standards state that a noise impact may be considered significant if it would generate noise that would conflict with local project criteria or ordinances, or substantially increase noise levels at noise sensitive land uses. The potential increase in traffic noise from the project is a factor in determining significance. Research into the human perception of changes in sound level indicates the following:

- A 3-dB change is barely perceptible,
- A 5-dB change is clearly perceptible, and
- A 10-dB change is perceived as being twice or half as loud.

A limitation of using a single noise level increase value to evaluate noise impacts is that it fails to account for pre-project noise conditions. **Table 10** is based upon recommendations made by the Federal Interagency Committee on Noise (FICON) to provide guidance in the assessment of changes in ambient noise levels resulting from aircraft operations. The recommendations are based upon studies that relate aircraft noise levels to the percentage of persons highly annoyed by the noise. Although the FICON recommendations were specifically developed to assess aircraft noise impacts, it has been accepted that they are applicable to all sources of noise described in terms of cumulative noise exposure metrics such as the L_{dn}.

TABLE 10: SIGNIFICANCE OF CHANGES IN NOISE EXPOSURE

Ambient Noise Level Without Project, L_{dn}	Increase Required for Significant Impact
<60 dB	+5.0 dB or more
60-65 dB	+3.0 dB or more
>65 dB	+1.5 dB or more

Source: Federal Interagency Committee on Noise (FICON).

Based on the FICON data, an increase in the traffic noise level of 5 dB or more would be significant where the pre-project noise levels are less than 60 dB L_{dn}, or 3 dB or more where existing noise levels are between 60 to 65 dB L_{dn}. Extending this concept to higher noise levels, an increase in the traffic noise level of 1.5 dB or more may be significant where the pre-project traffic noise level exceeds 65 dB L_{dn}. The rationale for the FICON criteria is that, as ambient noise levels increase, a smaller increase in noise resulting from a project is sufficient to cause annoyance.

Stationary Noise Level Increases

Per the City of Roseville Municipal Code Section 9.24.100, an increase in ambient noise levels due to stationary noise sources exceeding 3 dBA would be considered significant.

NOISE LEVEL INCREASE CRITERIA FOR SHORT-TERM PROJECT-RELATED NOISE LEVEL INCREASES

With temporary noise impacts (construction), identification of “substantial increases” depends upon the duration of the impact, the temporal daily nature of the impact, and the absolute change in decibel levels. Per the City of Roseville Municipal Code, construction activities are exempt assuming that they occur between the hours of 7:00 a.m. and 7:00 p.m. Monday through Friday, and between the hours of 8:00 a.m. and 8:00 p.m. Saturday and Sunday; provided, however, that all construction equipment shall be fitted with factory installed muffling devices and that all construction equipment shall be maintained in good working order.

The City has not adopted any formal standard for evaluating temporary increases in existing noise levels due to construction which occurs within allowable hours. For short-term noise associated with Project construction, Saxelby Acoustics recommends use of the Caltrans increase criteria of 12 dBA (Caltrans Traffic Noise Protocol, 2020), applied to existing residential receptors in the project vicinity. This level of increase is approximately equivalent to a doubling of sound energy and has been the standard of significance for Caltrans projects at the state level for many years. Application of this standard to construction activities is considered reasonable considering the temporary nature of construction activities.

PROJECT-SPECIFIC IMPACTS AND MITIGATION MEASURES

IMPACT 1: ***WOULD THE PROJECT 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?***

Traffic Noise Increases at Off-Site Receptors

Based upon the FICON criteria, where existing traffic noise levels are greater than 65 dBA L_{dn}, at the outdoor activity areas of noise-sensitive uses, a +1.5 dBA increase in roadway noise levels will be considered significant.

Where traffic noise levels are between 60 dBA L_{dn} and 65 dBA L_{dn}, a +3.0 dB increase in roadway noise levels will be considered significant. Where traffic noise levels are less than 60 dBA L_{dn}, a +5.0 dB increase in roadway noise levels will be considered significant. Additionally, if existing noise levels are below the City's normally acceptable 60 dBA L_{dn} standard, increases causing traffic noise to exceed this threshold are also considered significant.

According to **Tables 3 and 4**, the maximum increase is traffic noise at the nearest sensitive receptor is predicted to be 1.0 dBA. This is less than the minimum significance criterion of +1.5. Additionally, project traffic would not cause an exceedance of the normally acceptable noise level of 60 dBA L_{dn}. Therefore, impacts resulting from increased traffic noise would be considered ***less-than-significant***, and no mitigation is required.

Operational Noise at Existing Sensitive Receptors

The City of Roseville General Plan and Municipal Code establish acceptable noise limits of 50 dBA L_{eq} and 70 dBA L_{max} during daytime (7:00 a.m. to 10:00 p.m.) hours and 45 dBA L_{eq} and 65 dBA L_{max} during nighttime (10:00 p.m. to 7:00 a.m.) hours.

Figure 3 shows the predicted project-generated noise level contours and locations of noise sensitive receptors. **Table 11** below shows the L_{eq} and L_{max} values for daytime and nighttime operation at nearby sensitive receptors and compares predicted noise levels to the City's noise level standards.

TABLE 11: PROPOSED PROJECT OPERATIONAL NOISE LEVELS

Location	L_{eq} Day, dBA	L_{max} Day, dBA	L_{eq} Night, dBA	L_{max} Night, dBA	Complies with Standards?
Standard	**50.0**	**70.0**	**45.0**	**65.0**	
R1	39.4	45.3	34.4	45.3	Yes
R2	40.9	48.7	36.1	48.7	Yes
R3	43.7	54.7	39.3	54.7	Yes
R4	45.4	56.7	41.1	56.7	Yes
R5	45.8	58.7	42.0	58.7	Yes
R6	38.5	42.7	33.2	42.7	Yes
R7	41.9	45.1	36.7	45.1	Yes
R8	41.6	51.6	36.7	51.6	Yes
R9	45.8	59.9	42.5	59.9	Yes
R10	44.0	42.7	38.4	42.7	Yes

As shown in the above table, the proposed project is predicted to comply with the City of Roseville noise level standards as designed. Therefore, this is a ***less-than-significant*** impact.

Increase Above Existing Ambient Noise Levels

The City of Roseville Municipal Code specifies that a +3.0 dBA increase above existing ambient noise levels constitutes a significant impact.

Tables 12 and 13 show the predicted increase in existing noise levels for daytime and nighttime hours, respectively, due to project-related stationary noise sources.

TABLE 12: DAYTIME EXISTING PLUS PROJECT OPERATIONAL NOISE

Location	Representative Noise Receptor	L_{eq} Day, Existing dBA	Threshold	L_{eq} Day, Project dBA	L_{eq} Day Existing + Project dBA	Difference	Complies with Standards?
R1	LT-1	67.4	+3.0 dBA	39.4	67.4	0.0	Yes
R2	LT-1	67.4	+3.0 dBA	40.9	67.4	0.0	Yes
R3	LT-1	67.4	+3.0 dBA	43.7	67.5	0.0	Yes
R4	LT-1	67.4	+3.0 dBA	45.4	67.5	0.0	Yes
R5	LT-1	67.4	+3.0 dBA	45.8	67.5	0.0	Yes
R6	LT-2	49.3	+3.0 dBA	38.5	49.6	0.3	Yes
R7	LT-2	49.3	+3.0 dBA	41.9	50.0	0.7	Yes
R8	LT-2	49.3	+3.0 dBA	41.6	50.0	0.7	Yes

Notes: Increases above existing noise levels are only evaluated at existing receptors. Receivers R9-R10, representing the approved but not constructed Sierra Vista Apartments project, are not analyzed in this table.

TABLE 13: NIGHTTIME EXISTING PLUS PROJECT OPERATIONAL NOISE

Location	Representative Noise Receptor	L_{eq} Day, Existing dBA	Threshold	L_{eq} Day, Project dBA	L_{eq} Day Existing + Project dBA	Difference	Complies with Standards?
R1	LT-1	63.1	+3.0 dBA	34.4	63.1	0.0	Yes
R2	LT-1	63.1	+3.0 dBA	36.1	63.1	0.0	Yes
R3	LT-1	63.1	+3.0 dBA	39.3	63.1	0.0	Yes
R4	LT-1	63.1	+3.0 dBA	41.1	63.1	0.0	Yes
R5	LT-1	63.1	+3.0 dBA	42.0	63.1	0.0	Yes
R6	LT-2	48.0	+3.0 dBA	33.2	48.1	0.1	Yes
R7	LT-2	48.0	+3.0 dBA	36.7	48.3	0.3	Yes
R8	LT-2	48.0	+3.0 dBA	36.7	48.3	0.3	Yes

Notes: Increases above existing noise levels are only evaluated at existing receptors. Receivers R9-R10, representing the approved but not constructed Sierra Vista Apartments project, are not analyzed in this table.

As shown in the above tables, the stationary noise sources associated with the proposed project are not predicted to generate a significant permanent increase in existing noise levels at the nearby residences. Therefore, this is a ***less-than-significant*** impact.

Construction Noise

During the construction phases of the project, noise from construction activities would add to the noise environment in the immediate project vicinity. Construction activities would be temporary in nature and are anticipated to occur during normal daytime working hours. Noise would also be generated during the construction phase by increased truck traffic on area roadways. A project-generated noise source would be truck traffic associated with transport of heavy materials and equipment to and from the construction site. This noise increase would be of short duration and would occur during daytime hours.

Per the City of Roseville Municipal Code, construction activities are exempt assuming that they occur between the hours of 7:00 a.m. and 7:00 p.m. Monday through Friday, and between the hours of 8:00 a.m. and 8:00 p.m. Saturday and Sunday; provided, however, that all construction equipment shall be fitted with factory installed muffling devices and that all construction equipment shall be maintained in good working order.

To assess short-term project-related temporary increases in the ambient noise environment, Saxelby Acoustics refers to the Caltrans standards for noise level increases. Caltrans defines a significant increase due to noise as an increase of 12.0 dBA over existing ambient noise levels; Saxelby Acoustics used this criterion to evaluate increases due to construction noise associated with the project. Construction noise levels were modeled using the input data shown in **Table 5** and evaluated for significance in **Table 14** below. **Figure 4** shows modeled construction noise level contours as well as the locations of the analyzed receptors.

TABLE 14: CONSTRUCTION NOISE LEVELS INCREASES

Receptor	Representative Noise Receptor	Existing Ambient (dBA L_{eq})	Construction Noise (dBA L_{eq})	Ambient + Construction (dBA L_{eq})	Difference (dBA L_{eq})	Complies with Standards?
R1	LT-1	67.4	60.5	68.2	0.8	Yes
R2	LT-1	67.4	60.5	68.2	0.8	Yes
R3	LT-1	67.4	62.8	68.7	1.3	Yes
R4	LT-1	67.4	64.6	69.3	1.9	Yes
R5	LT-1	67.4	64.8	69.3	1.9	Yes
R6	LT-2	49.3	58.1	58.6	9.3	Yes
R7	LT-2	49.3	60.8	61.1	11.8	Yes
R8	LT-2	49.3	59.9	60.3	11.0	Yes

Notes: Construction noise levels are only evaluated at existing receptors due to the temporary nature of construction. Receivers R9-R10, representing the approved but not constructed Sierra Vista Apartments project, are not analyzed in this table.

As shown in the above table, the proposed project is predicted to generate short-term noise level increases of up to 11.8 dBA at the existing sensitive receptors. This is less than the threshold of 12.0 dB.

Although construction activities are temporary in nature and would occur during normal daytime working hours, construction-related noise could result in sleep interference at existing noise-sensitive land uses in the vicinity of the construction if construction activities were to occur outside the normal daytime hours. Therefore, impacts resulting from noise levels temporarily exceeding the threshold of significance due to construction would be considered ***potentially significant***. Mitigation measure 1(a) would reduce construction noise impacts to ***less-than-significant***.

Mitigation Measures

1(a) The City of Roseville shall establish the following as conditions of approval for any permit that results in the use of construction equipment:

- Construction activities (excluding activities that would result in a safety concern to the public or construction workers) shall be limited to between 7:00 a.m. and 7:00 p.m. Monday through Friday, and between the hours of 8:00 a.m. and 8:00 p.m. Saturday and Sunday.
- Construction equipment shall be properly maintained and equipped with noise-reduction intake and exhaust mufflers and engine shrouds, in accordance with manufacturers' recommendations. Equipment engine shrouds shall be closed during equipment operation.
- When not in use, motorized construction equipment shall not be left idling for more than 5 minutes.
- Stationary equipment (power generators, compressors, etc.) shall be located at the furthest practical distance from nearby noise-sensitive land uses or sufficiently shielded to reduce noise-related impacts.

Timing/Implementation: Implemented prior to approval of grading and/or building permits
Enforcement/Monitoring: City of Roseville

Mitigation Measure 1(a) would help to reduce construction-related noise levels. With mitigation, this impact would be considered ***less-than-significant***.

IMPACT 2: WOULD THE PROJECT GENERATE EXCESSIVE GROUNDBORNE VIBRATION OR GROUNDBORNE NOISE LEVELS?

Construction vibration impacts include human annoyance and building structural damage. Human annoyance occurs when construction vibration rises significantly above the threshold of perception. Building damage can take the form of cosmetic or structural.

The **Table 6** data indicate that construction vibration levels anticipated for the project are less than the 0.2 in/sec threshold at distances of 26 feet. Sensitive receptors which could be impacted by construction related vibrations, especially vibratory compactors/rollers, are located further than 26 feet from typical construction activities. At distances greater than 26 feet construction vibrations are not predicted to exceed acceptable levels. Additionally, construction activities would be temporary in nature and would likely occur during normal daytime working hours.

This is a ***less-than-significant*** impact and no mitigation is required.

IMPACT 3: FOR A PROJECT LOCATED WITHIN THE VICINITY OF A PRIVATE AIRSTRIP OR AN AIRPORT LAND USE PLAN OR, WHERE SUCH A PLAN HAS NOT BEEN ADOPTED, WITHIN TWO MILES OF A PUBLIC AIRPORT OR PUBLIC USE AIRPORT, WOULD THE PROJECT EXPOSE PEOPLE RESIDING OR WORKING IN THE PROJECT AREA TO EXCESSIVE NOISE LEVELS?

There are no airports within two miles of the project vicinity. Therefore, this impact is not applicable to the proposed project.

REFERENCES

American National Standards Institute. (1998). *[Standard] ANSI S1.43-1997 (R2007): Specifications for integrating-averaging sound level meters*. New York: Acoustical Society of America.

American Standard Testing Methods, *Standard Guide for Measurement of Outdoor A-Weighted Sound Levels, American Standard Testing Methods (ASTM) E1014-08*, 2008.

ASTM E1014-12. *Standard Guide for Measurement of Outdoor A-Weighted Sound Levels*. ASTM International. West Conshohocken, PA. 2012.

ASTM E1780-12. *Standard Guide for Measuring Outdoor Sound Received from a Nearby Fixed Source.* ASTM International. West Conshohocken, PA. 2012.

Barry, T M. (1978). *FHWA highway traffic noise prediction model* (FHWA-RD-77-108). Washington, DC: U.S. Department of transportation, Federal highway administration, Office of research, Office of environmental policy.

California Department of Transportation (Caltrans), *Technical Noise Supplement, Traffic Noise Analysis Protocol*, September 2013.

California Department of Transportation (Caltrans), *Traffic Noise Analysis Protocol*, May 2011.

City of Roseville. (n.d.). *Noise control regulations. City of Roseville Municipal Code (Title 9, Chapter 9.24)*.

City of Roseville. (2020). *Roseville General Plan 2035: Noise element* (Chapter IX). City of Roseville.

City of Roseville. (2010). *Sierra Vista Specific Plan Final EIR.*

Egan, M. D. (1988). Architectural acoustics. United States of America: McGraw-Hill Book Company.

Federal Highway Administration. *FHWA Roadway Construction Noise Model User's Guide.* FHWA-HEP-05-054 DOT-VNTSC-FHWA-05-01. January 2006.

Hanson, Carl E. (Carl Elmer). (2006). *Transit noise and vibration impact assessment*. Washington, DC: U.S. Department of Transportation, Federal Transit Administration, Office of Planning and Environment.

Institute of Transportation Engineers. (2022). *List Of Land Uses With Vehicle Time-Of-Day Data* [Data set]. ITE Trip Generation Manual, 11th Edition. https://www.ite.org/tripgenappendices/

International Electrotechnical Commission. Technical committee 29: Electroacoustics. International Organization of Legal Metrology. (2013). *Electroacoustics: Sound level meters*.

International Organization for Standardization. (1996). *Acoustic - ISO 9613-2: Attenuation of sound during propagation outdoors. Part 2: General methods of calculation*. Ginevra: I.S.O.

Michael Brandman Associates. (2011). *Del Rio Road Commercial Area Specific Plan Partially Recirculated Draft EIR, Section 3.9 – Noise.*

Miller, L. N., Bolt, Beranek, & and Newman, Inc. (1981). *Noise control for buildings and manufacturing plants*. Cambridge, MA: Bolt, Beranek and Newman, Inc.

SoundPLAN. SoundPLAN GmbH. Backnang, Germany. http://www.soundplan.eu/english/

Appendix A: Acoustical Terminology

Acoustics The science of sound.

Ambient Noise The distinctive acoustical characteristics of a given space consisting of all noise sources audible at that location. In many cases, the term ambient is used to describe an existing or pre-project condition such as the setting in an environmental noise study.

ASTC Apparent Sound Transmission Class. Similar to STC but includes sound from flanking paths and correct for room reverberation. A larger number means more attenuation. The scale, like the decibel scale for sound, is logarithmic.

Attenuation The reduction of an acoustic signal.

A-Weighting A frequency-response adjustment of a sound level meter that conditions the output signal to approximate human response.

Decibel or dB Fundamental unit of sound, A Bell is defined as the logarithm of the ratio of the sound pressure squared over the reference pressure squared. A Decibel is one-tenth of a Bell.

CNEL Community Noise Equivalent Level. Defined as the 24-hour average noise level with noise occurring during evening hours (7 - 10 p.m.) weighted by +5 dBA and nighttime hours weighted by +10 dBA.

DNL See definition of Ldn.

IIC Impact Insulation Class. An integer-number rating of how well a building floor attenuates impact sounds, such as footsteps. A larger number means more attenuation. The scale, like the decibel scale for sound, is logarithmic.

Frequency The measure of the rapidity of alterations of a periodic signal, expressed in cycles per second or hertz (Hz).

Ldn Day/Night Average Sound Level. Similar to CNEL but with no evening weighting.

Leq Equivalent or energy-averaged sound level.

Lmax The highest root-mean-square (RMS) sound level measured over a given period of time.

L(n) The sound level exceeded a described percentile over a measurement period. For instance, an hourly L50 is the sound level exceeded 50% of the time during the one-hour period.

Loudness A subjective term for the sensation of the magnitude of sound.

NIC Noise Isolation Class. A rating of the noise reduction between two spaces. Similar to STC but includes sound from flanking paths and no correction for room reverberation.

NNIC Normalized Noise Isolation Class. Similar to NIC but includes a correction for room reverberation.

Noise Unwanted sound.

NRC Noise Reduction Coefficient. NRC is a single-number rating of the sound-absorption of a material equal to the arithmetic mean of the sound-absorption coefficients in the 250, 500, 1000, and 2,000 Hz octave frequency bands rounded to the nearest multiple of 0.05. It is a representation of the amount of sound energy absorbed upon striking a particular surface. An NRC of 0 indicates perfect reflection; an NRC of 1 indicates perfect absorption.

RT60 The time it takes reverberant sound to decay by 60 dB once the source has been removed.

Sabin The unit of sound absorption. One square foot of material absorbing 100% of incident sound has an absorption of 1 Sabin.

SEL Sound Exposure Level. SEL is a rating, in decibels, of a discrete event, such as an aircraft flyover or train pass by, that compresses the total sound energy into a one-second event.

SPC Speech Privacy Class. SPC is a method of rating speech privacy in buildings. It is designed to measure the degree of speech privacy provided by a closed room, indicating the degree to which conversations occurring within are kept private from listeners outside the room.

STC Sound Transmission Class. STC is an integer rating of how well a building partition attenuates airborne sound. It is widely used to rate interior partitions, ceilings/floors, doors, windows and exterior wall configurations. The STC rating is typically used to rate the sound transmission of a specific building element when tested in laboratory conditions where flanking paths around the assembly don't exist. A larger number means more attenuation. The scale, like the decibel scale for sound, is logarithmic.

Threshold of Hearing The lowest sound that can be perceived by the human auditory system, generally considered to be 0 dB for persons with perfect hearing.

Threshold of Pain Approximately 120 dB above the threshold of hearing.

Impulsive Sound of short duration, usually less than one second, with an abrupt onset and rapid decay.

Simple Tone Any sound which can be judged as audible as a single pitch or set of single pitches.

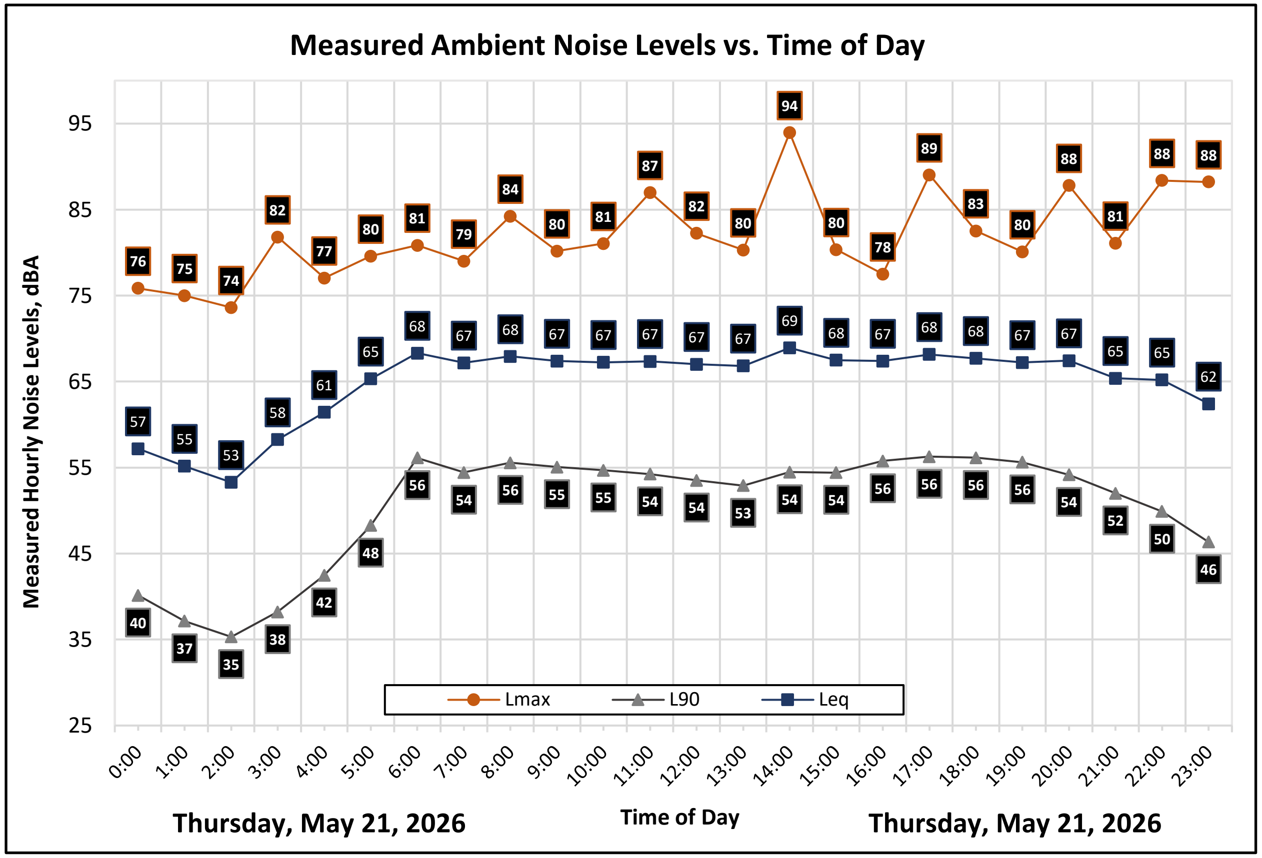
Appendix B: Continuous Ambient Noise Measurement Results

Appendix B1: Continuous Noise Monitoring Results

Site: LT-1
Project: Sierra View Shopping Center
Location: North of Project Site
Coordinates: (38.7662287, -121.3608797)
Meter: LDL 820-8
Calibrator: CAL200

Date	Time	Measured Level, dBA			
		L_{eq}	L_{max}	L_{50}	L_{90}
Thursday, May 21, 2026	0:00	57	76	47	40
Thursday, May 21, 2026	1:00	55	75	44	37
Thursday, May 21, 2026	2:00	53	74	41	35
Thursday, May 21, 2026	3:00	58	82	46	38
Thursday, May 21, 2026	4:00	61	77	51	42
Thursday, May 21, 2026	5:00	65	80	59	48
Thursday, May 21, 2026	6:00	68	81	65	56
Thursday, May 21, 2026	7:00	67	79	65	54
Thursday, May 21, 2026	8:00	68	84	66	56
Thursday, May 21, 2026	9:00	67	80	65	55
Thursday, May 21, 2026	10:00	67	81	65	55
Thursday, May 21, 2026	11:00	67	87	65	54
Thursday, May 21, 2026	12:00	67	82	64	54
Thursday, May 21, 2026	13:00	67	80	64	53
Thursday, May 21, 2026	14:00	69	94	65	54
Thursday, May 21, 2026	15:00	68	80	65	54
Thursday, May 21, 2026	16:00	67	78	66	56
Thursday, May 21, 2026	17:00	68	89	66	56
Thursday, May 21, 2026	18:00	68	83	66	56
Thursday, May 21, 2026	19:00	67	80	65	56
Thursday, May 21, 2026	20:00	67	88	64	54
Thursday, May 21, 2026	21:00	65	81	62	52
Thursday, May 21, 2026	22:00	65	88	60	50
Thursday, May 21, 2026	23:00	62	88	56	46

Statistics	Leq	Lmax	L50	L90
Day Average	67	83	65	55
Night Average	63	80	52	44
Day Low	65	78	62	52
Day High	69	94	66	56
Night Low	53	74	41	35
Night High	68	88	65	56
Ldn	70	Day %		82
CNEL	71	Night %		18



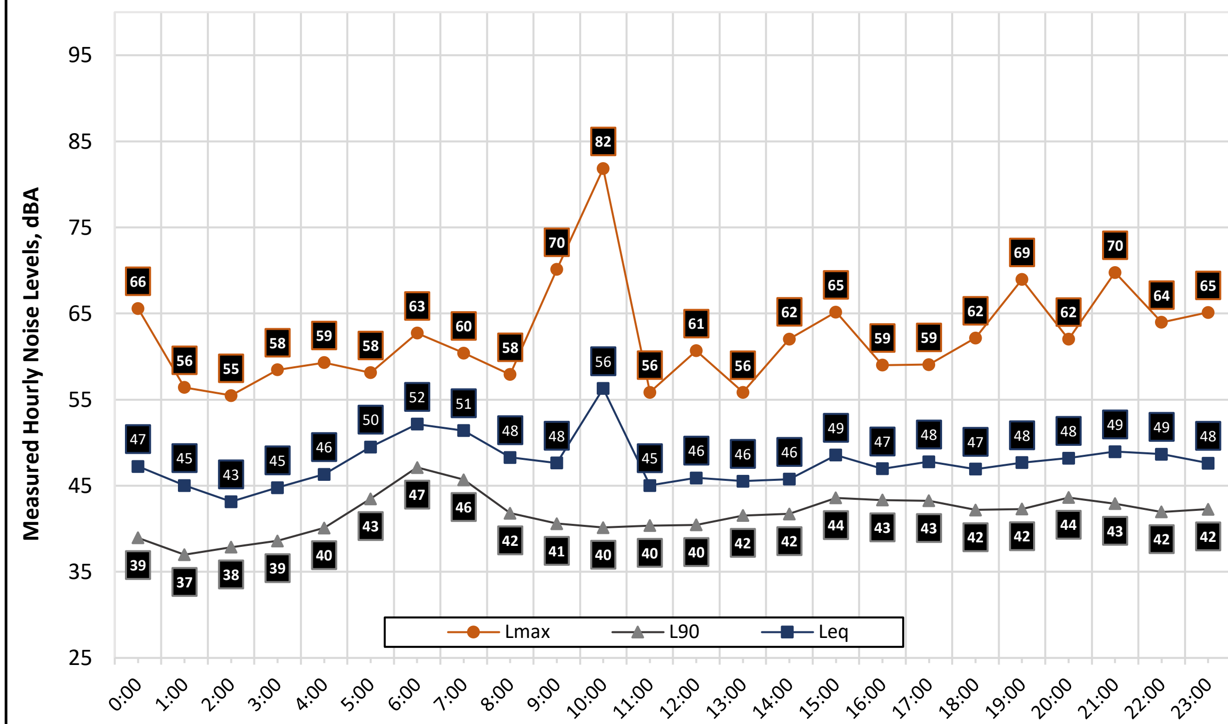
Appendix B2: Continuous Noise Monitoring Results

Date	Time	Measured Level, dBA			
		L_{eq}	L_{max}	L_{50}	L_{90}
Thursday, May 21, 2026	0:00	47	66	44	39
Thursday, May 21, 2026	1:00	45	56	41	37
Thursday, May 21, 2026	2:00	43	55	40	38
Thursday, May 21, 2026	3:00	45	58	42	39
Thursday, May 21, 2026	4:00	46	59	45	40
Thursday, May 21, 2026	5:00	50	58	48	43
Thursday, May 21, 2026	6:00	52	63	51	47
Thursday, May 21, 2026	7:00	51	60	50	46
Thursday, May 21, 2026	8:00	48	58	47	42
Thursday, May 21, 2026	9:00	48	70	45	41
Thursday, May 21, 2026	10:00	56	82	44	40
Thursday, May 21, 2026	11:00	45	56	44	40
Thursday, May 21, 2026	12:00	46	61	44	40
Thursday, May 21, 2026	13:00	46	56	45	42
Thursday, May 21, 2026	14:00	46	62	45	42
Thursday, May 21, 2026	15:00	49	65	46	44
Thursday, May 21, 2026	16:00	47	59	46	43
Thursday, May 21, 2026	17:00	48	59	47	43
Thursday, May 21, 2026	18:00	47	62	46	42
Thursday, May 21, 2026	19:00	48	69	45	42
Thursday, May 21, 2026	20:00	48	62	47	44
Thursday, May 21, 2026	21:00	49	70	47	43
Thursday, May 21, 2026	22:00	49	64	46	42
Thursday, May 21, 2026	23:00	48	65	46	42

Statistics	Leq	Lmax	L50	L90
Day Average	49	63	46	42
Night Average	48	61	45	41
Day Low	45	56	44	40
Day High	56	82	50	46
Night Low	43	55	40	37
Night High	52	66	51	47
Ldn	55	Day %		69
CNEL	55	Night %		31

Site: LT-2
Project: Sierra View Shopping Center
Meter: LDL 820-3
Location: Southern Boundary of Project Site
Calibrator: CAL200
Coordinates: (38.7639609, -121.3601300)

Measured Ambient Noise Levels vs. Time of Day



Appendix B: Short-Term Ambient Noise Measurement Results

Appendix B3 : Short Term Noise Monitoring Results

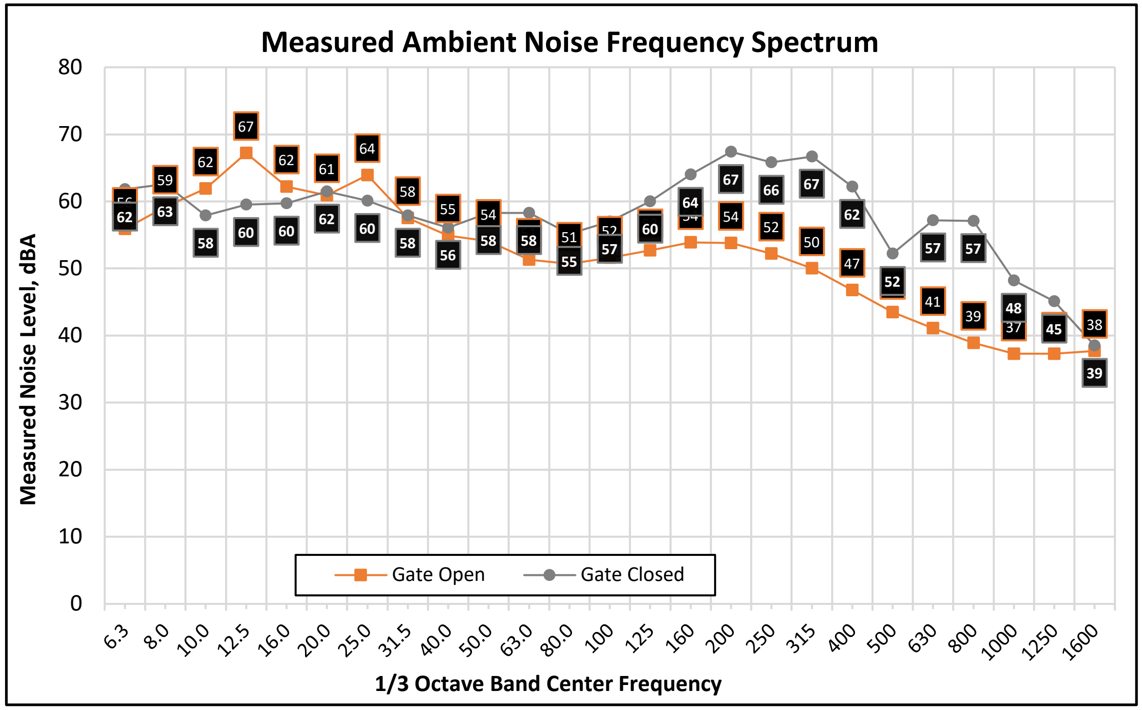
Site: ST-1
Project: Sierra View Shopping Center
Meter: LDL 831-5
Location: West of Project Site
Calibrator: CAL200
Coordinates: (38.7665858, -121.3626818)

Start: 2026-05-20 12:23:52
Stop: 2026-05-20 12:33:52
SLM: Model 831
Serial: 2658

Measurement Results, dBA			
Duration:	0:10		
L_{eq}:	61	**L_{10}:**	65
L_{max}:	74	**L_{50}:**	58
L_{min}:	40	**L_{90}:**	46

Notes

Primary noise source was traffic noise from Pleasant Grove Boulevard. Secondary noise sources include traffic on Upland Drive.



Appendix B4 : Short Term Noise Monitoring Results

Site: ST-2

Project: Sierra View Shopping Center

Meter: LDL 831-5

Location: Southeast of Project Site

Calibrator: CAL200

Coordinates: (38.7638553, -121.3594075)

Start: 2026-05-20 13:12:18

Stop: 2026-05-20 13:22:18

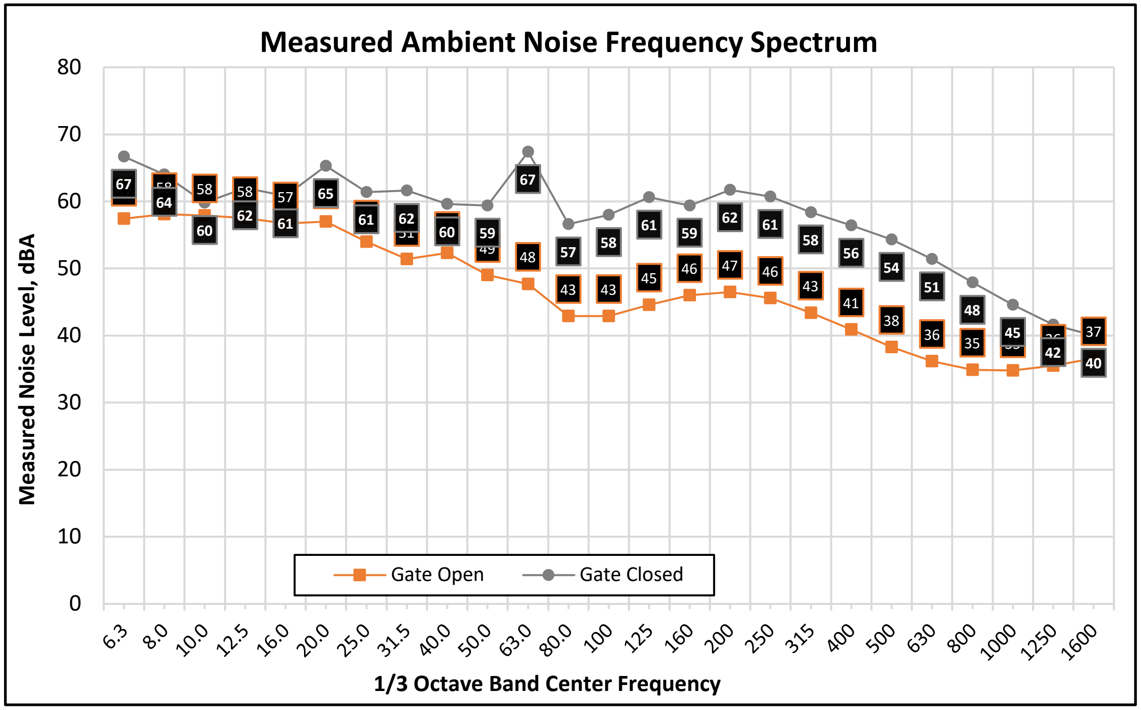
SLM: Model 831

Serial: 2658

Measurement Results, dBA			
Duration:	0:10		
L_{eq}:	54	**L_{10}:**	57
L_{max}:	69	**L_{50}:**	52
L_{min}:	38	**L_{90}:**	44

Notes

Primary noise source was traffic noise from Fiddyment Road. Secondary noise sources include plane overhead.



Appendix B5 : Short Term Noise Monitoring Results

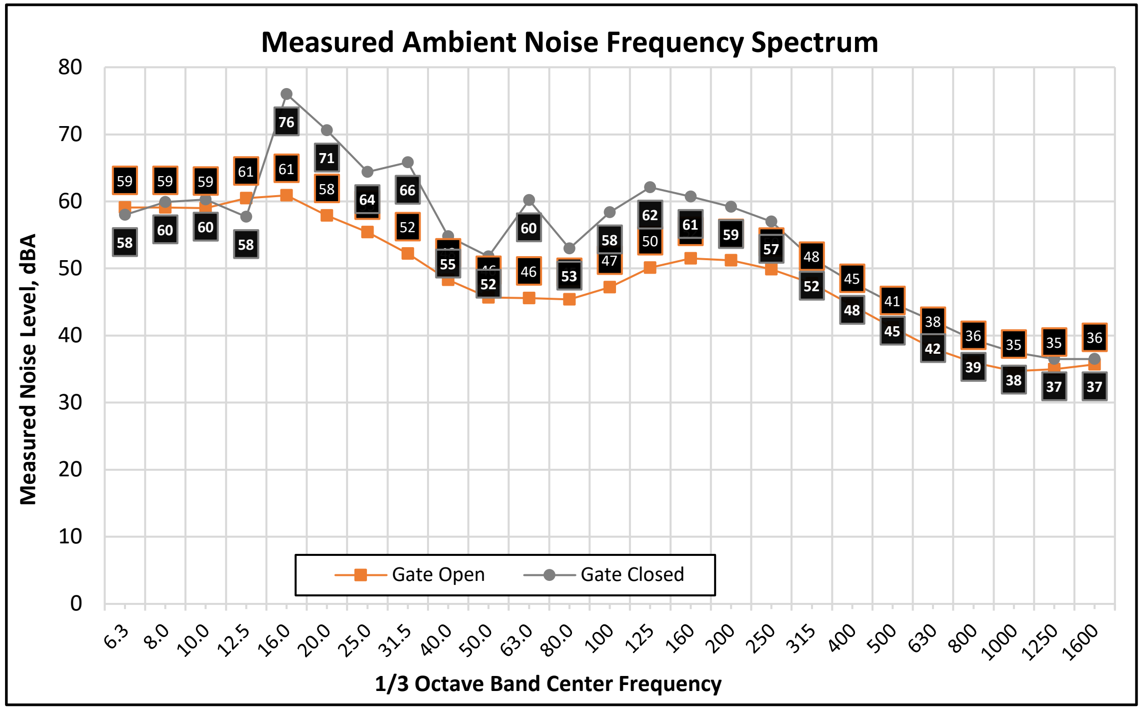
Site: ST-3
Project: Sierra View Shopping Center
Location: Southeast of Project Site
Coordinates: (38.7639015, -121.3591510)
Meter: LDL 831-5
Calibrator: CAL200

Start: 2026-05-22 09:48:59
Stop: 2026-05-22 09:58:59
SLM: Model 831
Serial: 2658

Measurement Results, dBA			
Duration:	0:10		
L_{eq}:	58	L_{10}:	62
L_{max}:	67	L_{50}:	56
L_{min}:	40	L_{90}:	45

Notes

Primary noise source was traffic noise from Fiddyment Road. Secondary noise sources include natural sounds such as birds and wind.



Appendix C: Traffic Noise Calculation Inputs and Results

Appendix C-1

FHWA-RD-77-108 Highway Traffic Noise Prediction Model

Project #: 260506 Sierra View Shopping Center
Description: Existing Traffic
Ldn/CNEL: Ldn
Hard/Soft: Soft

Segment	Roadway	Segment	ADT	Day %	Eve %	Night %	% Med. Trucks	% Hvy. Trucks	Speed	Distance	Offset (dB)	Contours (ft.) - No Offset 60 dBA	65 dBA	70 dBA	Level, dBA
1	Fiddyment Road	North of Pleasant Grove	21,500	80	0	20	2.0%	1.0%	50	90	-5	339	157	73	63.6
2	Fiddyment Road	South of Pleasant Grove	21,500	80	0	20	2.0%	1.0%	50	90	-5	339	157	73	63.6
3	Pleasant Grove Blvd	East of Fiddyment	27,400	80	0	20	2.0%	1.0%	50	75	-5	398	185	86	65.9
4	Pleasant Grove Blvd	West of Fiddyment	7,400	80	0	20	2.0%	1.0%	50	75	-5	166	77	36	60.2
5	Upland Drive	South of Pleasant Grove	6,612	80	0	20	2.0%	1.0%	40	45	-5	107	50	23	60.7

SAXELBY ACOUSTICS
Acoustics • Noise • Vibration

Appendix C-2

FHWA-RD-77-108 Highway Traffic Noise Prediction Model

Project #: 260506 Sierra View Shopping Center
Description: Existing Plus Project Traffic
Ldn/CNEL: Ldn
Hard/Soft: Soft

Segment	Roadway	Segment	ADT	Day %	Eve %	Night %	% Med. Trucks	% Hvy. Trucks	Speed	Distance	Offset (dB)	Contours (ft.) - No Offset 60 dBA	65 dBA	70 dBA	Level, dBA
1	Fiddyment Road	North of Pleasant Grove	23,270	80	0	20	2.0%	1.0%	50	90	-5	357	166	77	64.0
2	Fiddyment Road	South of Pleasant Grove	23,270	80	0	20	2.0%	1.0%	50	90	-5	357	166	77	64.0
3	Pleasant Grove Blvd	East of Fiddyment	29,170	80	0	20	2.0%	1.0%	50	75	-5	415	193	89	66.1
4	Pleasant Grove Blvd	West of Fiddyment	9,170	80	0	20	2.0%	1.0%	50	75	-5	192	89	41	61.1
5	Upland Drive	South of Pleasant Grove	8,382	80	0	20	2.0%	1.0%	40	45	-5	125	58	27	61.7

Appendix C-3

FHWA-RD-77-108 Highway Traffic Noise Prediction Model

Project #: 260506 Sierra View Shopping Center
Description: Cumulative Traffic
Ldn/CNEL: Ldn
Hard/Soft: Soft

Segment	Roadway	Segment	ADT	Day %	Eve %	Night %	% Med. Trucks	% Hvy. Trucks	Speed	Distance	Offset (dB)	Contours (ft.) - No Offset 60 dBA	65 dBA	70 dBA	Level, dBA
1	Fiddyment Road	North of Pleasant Grove	30,930	80	0	20	2.0%	1.0%	50	90	-5	432	200	93	65.2
2	Fiddyment Road	South of Pleasant Grove	54,395	80	0	20	2.0%	1.0%	50	90	-5	629	292	135	67.7
3	Pleasant Grove Blvd	East of Fiddyment	32,190	80	0	20	2.0%	1.0%	50	75	-5	443	206	96	66.6
4	Pleasant Grove Blvd	West of Fiddyment	25,981	80	0	20	2.0%	1.0%	50	75	-5	384	178	83	65.6
5	Upland Drive	South of Pleasant Grove	6,612	80	0	20	2.0%	1.0%	40	45	-5	107	50	23	60.7

SAXELBY ACOUSTICS
Acoustics · Noise · Vibration

Appendix C-4
FHWA-RD-77-108 Highway Traffic Noise Prediction Model

Project #: 260506 Sierra View Shopping Center
Description: Cumulative Plus Project Traffic
Ldn/CNEL: Ldn
Hard/Soft: Soft

Segment	Roadway	Segment	ADT	Day %	Eve %	Night %	% Med. Trucks	% Hvy. Trucks	Speed	Distance	Offset (dB)	Contours (ft.) - No Offset 60 dBA	65 dBA	70 dBA	Level, dBA
1	Fiddyment Road	North of Pleasant Grove	32,700	80	0	20	2.0%	1.0%	50	90	-5	448	208	97	65.5
2	Fiddyment Road	South of Pleasant Grove	56,165	80	0	20	2.0%	1.0%	50	90	-5	642	298	138	67.8
3	Pleasant Grove Blvd	East of Fiddyment	33,960	80	0	20	2.0%	1.0%	50	75	-5	459	213	99	66.8
4	Pleasant Grove Blvd	West of Fiddyment	27,751	80	0	20	2.0%	1.0%	50	75	-5	402	186	87	65.9
5	Upland Drive	South of Pleasant Grove	8,382	80	0	20	2.0%	1.0%	40	45	-5	125	58	27	61.7