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LIST OF ABBREVIATED TERMS

(1)	Reference
ANSI	American National Standards Institute
Calveno	California Vehicle Noise
CEQA	California Environmental Quality Act
CNEL	Community Noise Equivalent Level
dBA	A-weighted decibels
EPA	Environmental Protection Agency
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
INCE	Institute of Noise Control Engineering
L_{eq}	Equivalent continuous (average) sound level
L_{max}	Maximum level measured over the time interval
mph	Miles per hour
PPV	Peak Particle Velocity
Project	Murrieta Canyon Academy
REMEL	Reference Energy Mean Emission Level
RMS	Root-mean-square
VdB	Vibration Decibels

EXECUTIVE SUMMARY

Urban Crossroads, Inc. has prepared this noise study to determine the noise exposure and the necessary noise mitigation measures for the proposed Murrieta Canyon Academy development ("Project"). The Project site is located northeast corner of Hayes Avenue and Fullerton Road in the City of Murrieta. The proposed Project includes the construction of a new campus with approximately 41,500 square feet of classrooms and administrative offices, an associated parking lot, and other site improvements, to replace an existing campus of 22,500 square feet of portable classrooms. This noise study has been prepared to satisfy applicable City of Murrieta noise standards and significance criteria based on Appendix G of the California Environmental Quality Act (CEQA) Guidelines. (1)

ON-SITE TRAFFIC NOISE ANALYSIS

The results of this analysis indicate that future vehicle noise from Hayes Avenue represents the principal source of community noise that will impact the Project site. The Project will also experience some background traffic noise impacts from the Project's internal local streets, however due to the distance, topography and low traffic volume/speeds, traffic noise from these roads will not make a significant contribution to the noise environment. With the following recommended noise mitigation measures, the on-site noise impacts will be *less than significant*.

EXTERIOR NOISE ANALYSIS

No exterior noise mitigation is required to satisfy the City of Murrieta General Plan Noise Element exterior land use/noise level compatibility criteria for the planned school use. The Murrieta Canyon Academy classrooms and labs facing Hayes will experience *normally acceptable* exterior noise levels of less than 70.0 dBA CNEL. Therefore, because of the future unmitigated exterior traffic noise levels at the Project site, additional interior noise analysis is required to satisfy the General Plan Noise Element *normally acceptable* land use compatibility requirements. (2)

INTERIOR NOISE ANALYSIS

This noise study evaluates the interior noise levels at the Project buildings based on the City of Murrieta 45 dBA CNEL residential interior noise level standard. The Project buildings are shown to require a Noise Reduction (NR) of up to 19.2 dBA and a windows-closed condition requiring a means of mechanical ventilation (e.g. air conditioning). The first and second floor interior noise level analysis shows that the City of Murrieta 45 dBA CNEL interior noise level standards can be satisfied using standard building construction providing windows and sliding glass doors with minimum STC ratings of 27. To meet the City of Murrieta 45 dBA CNEL interior noise standards the following on-site mitigation measures are required:

- Windows: All buildings require standards windows and sliding glass doors with a minimum STC rating of 27 (all windows/glass doors, all floors), and a means of mechanical ventilation (e.g., air conditioning).

- Exterior Doors (Non-Glass): All residential building exterior doors shall be well weather-stripped and have minimum STC ratings of 27. Well-sealed perimeter gaps around the doors are essential to achieve the optimal STC rating. (3)
- Walls: At any penetrations of exterior walls by pipes, ducts, or conduits, the space between the wall and pipes, ducts, or conduits shall be caulked or filled with mortar to form an airtight seal.
- Residential Roofs: Roof sheathing of wood construction shall be per manufacturer's specification or caulked plywood of at least one-half inch thick. Ceilings shall be per manufacturer's specification or well-sealed gypsum board of at least one-half inch thick. Insulation with at least a rating of R-19 shall be used in the attic space.
- Ventilation: Arrangements for any habitable room shall be such that any exterior door or window can be kept closed when the room is in use and still receive circulated air. A forced air circulation system (e.g. air conditioning) or active ventilation system (e.g. fresh air supply) shall be provided, which satisfies the requirements of the Uniform Building Code.

OPERATIONAL NOISE ANALYSIS

Using reference noise levels to represent the expected noise sources from the Murrieta Canyon Academy site, the operational analysis estimates the Project-related stationary-source noise hourly average L_{eq} levels at nearby sensitive receiver locations. The typical activities associated with the proposed Murrieta Canyon Academy are anticipated to include roof-top air conditioning units, outdoor student activity, basketball court activity and parking lot vehicle movements activity. The operational noise analysis shows that the Project will satisfy the City of Murrieta stationary-source exterior hourly average L_{eq} noise levels of 50 dBA L_{eq} daytime at all nearby receiver locations. No Project activities are expected during the nighttime hours from 10:00 p.m. to 7:00 a.m. Therefore, the Project-related operational noise level impacts are considered *less than significant*.

CONSTRUCTION NOISE ANALYSIS

Construction noise levels are expected to create temporary and intermittent high-level noise conditions at receivers surrounding the Project site when certain activities occur at the closest point to the nearby receiver locations from the edge of primary Project construction activity. Using sample reference noise levels to represent the construction activities at the Murrieta Canyon Academy site, this analysis estimates the Project-related construction noise levels at nearby sensitive receiver locations. The analysis shows that the Project related construction equipment noise levels will satisfy the City of Murrieta Municipal Code construction noise level standards of 75 dBA L_{max} for mobile equipment and the 60 dBA L_{max} standards for stationary equipment at all receiver locations. Therefore, the noise impacts due to unmitigated Project construction noise levels are considered *less than significant.*

Though construction is temporary, intermittent and of short duration, and will not present any long-term impacts, the following noise abatement measures would reduce the noise level impacts due to Project construction activities at the nearby noise-sensitive residential land uses:

CONSTRUCTION NOISE ABATEMENT MEASURES

- Prior to approval of grading plans and/or issuance of building permits, plans shall include a note indicating that noise-generating Project construction activities shall only occur between the hours of 7:00 a.m. to 8:00 p.m. daily, with no activity allowed on Sundays or holidays (City of Murrieta Municipal Code, Section 16.30.130(A)(2)(a)(1)). The Project construction supervisor shall ensure compliance with the note and the City shall conduct periodic inspection at its discretion.
- During all Project site construction, the construction contractors shall equip all construction equipment, fixed or mobile, with properly operating and maintained mufflers, consistent with manufacturers' standards. The construction contractor shall place all stationary construction equipment so that emitted noise is directed away from the noise sensitive receivers nearest the Project site.
- The construction contractor shall locate equipment staging in areas that will create the greatest distance between construction-related noise sources and noise-sensitive receivers nearest the Project site during all Project construction activities (i.e., to the center).
- The construction contractor shall limit haul truck deliveries to the same hours specified for construction equipment (between the hours of 7:00 a.m. to 8:00 p.m. daily, with no activity allowed on Sundays or holidays). The contractor shall design delivery routes to minimize the exposure of sensitive land uses or residential dwellings to delivery truck-related noise.

CONSTRUCTION VIBRATION ANALYSIS

Construction activity can result in varying degrees of ground vibration, depending on the equipment and methods used, distance to the affected structures and soil type. It is expected that ground-borne vibration from Project construction activities would cause only intermittent, localized intrusion. At distances ranging from 125 to 656 feet from the Project construction activities, construction vibration velocity levels are estimated to range from 0.000 to 0.006 in/sec RMS and will remain below the threshold of 0.01 in/sec RMS at all receiver locations. Therefore, the Project-related vibration impacts are considered *less than significant* during the construction activities at the Project site.

SUMMARY OF CEQA SIGNIFICANCE FINDINGS

The results of this Murrieta Canyon Academy Noise Impact Analysis are summarized below based on the significance criteria in Section 4 of this report consistent with Appendix G of the California Environmental Quality Act (CEQA) Guidelines. (1) Table ES-1 shows the findings of significance for each potential noise and/or vibration impact under CEQA before and after any required mitigation measures.

TABLE ES-1: SUMMARY OF CEQA SIGNIFICANCE FINDINGS

Analysis	Report Section	Significance Findings	
		Unmitigated	Mitigated
Off-Site Traffic Noise	7	*Less Than Significant*	-
On-Site Traffic Noise	8	*Less Than Significant*	-
Operational Noise	10	*Less Than Significant*	-
Construction Noise	11	*Less Than Significant*	-
Construction Vibration		*Less Than Significant*	-

1 INTRODUCTION

This noise analysis has been completed to determine the noise impacts associated with the development of the proposed Murrieta Canyon Academy ("Project"). This noise study briefly describes the proposed Project, provides information regarding noise fundamentals, sets out the local regulatory setting, presents the study methods and procedures for transportation related CNEL traffic noise analysis, and evaluates the future exterior noise environment. In addition, this study includes an analysis of the potential Project-related long-term stationary-source operational noise and short-term construction noise and vibration impacts.

1.1 SITE LOCATION

The proposed Murrieta Canyon Academy Project is located on the northeast corner of Hayes Avenue and Fullerton Road in the City of Murrieta, as shown on Exhibit 1-A. The area surrounding the Project Site includes residential to the east and south; Thompson Middle School field and Thompson Middle School to the west; and Murrieta Valley High School to the north.

1.2 PROJECT DESCRIPTION

Murrieta Valley Unified School District (MVUSD) proposes to construct new buildings and associated infrastructure at the Murrieta Canyon Academy (MCA). MCA is an existing school campus consisting of portable structures that provides alternative high school programs including, independent study, alternative high school, and adult education. MVUSD proposes to construct a new campus with permanent single and two-story buildings and associated infrastructure and demolish the existing MCA buildings (Project). The site plan for the proposed Project is shown on Exhibit 1-B.

The proposed Project includes the construction of a new campus with approximately 41,500 square feet of classrooms and administrative offices, an associated parking lot, and other site improvements, to replace an existing campus of 22,500 square feet of portable classrooms. More specifically, the new campus will include construction of single and two-story buildings with 22 classroom, student pavilion, library, restrooms, storage rooms, administration office, and various academic and activity courts with additional parking and landscaping. The proposed buildings are designed as single and two-story structures. All utilities exist to the Project site. The proposed Project will increase current enrollment capacity from 234 students to 594 students.

The Project is proposed to be constructed in the general location of the existing softball fields associated with Thompson Middle School, located immediately north-west of the existing MCA campus and south of the adjacent Thompson Middle School buildings. While the construction of the new buildings occur, the existing buildings will remain in operation. Following the completion of the new buildings, anticipated to be during summer recess from school, the original buildings and parking lot will be demolished, and the new parking and associated landscape will be constructed.

EXHIBIT 1-A: LOCATION MAP

LEGEND:

Site Boundary

EXHIBIT 1-B: SITE PLAN

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2 FUNDAMENTALS

Noise is simply defined as "unwanted sound." Sound becomes unwanted when it interferes with normal activities, when it causes actual physical harm or when it has adverse effects on health. Noise is measured on a logarithmic scale of sound pressure level known as a decibel (dB). A-weighted decibels (dBA) approximate the subjective response of the human ear to broad frequency noise source by discriminating against very low and very high frequencies of the audible spectrum. They are adjusted to reflect only those frequencies which are audible to the human ear. Exhibit 2-A presents a summary of the typical noise levels and their subjective loudness and effects that are described in more detail below.

EXHIBIT 2-A: TYPICAL NOISE LEVELS

COMMON OUTDOOR ACTIVITIES	COMMON INDOOR ACTIVITIES	A - WEIGHTED SOUND LEVEL dBA	SUBJECTIVE LOUDNESS	EFFECTS OF NOISE
THRESHOLD OF PAIN		140	INTOLERABLE OR DEAFENING	HEARING LOSS
NEAR JET ENGINE		130		
		120		
JET FLY-OVER AT 300m (1000 ft)	ROCK BAND	110		
LOUD AUTO HORN		100	VERY NOISY	
GAS LAWN MOWER AT 1m (3 ft)		90		
DIESEL TRUCK AT 15m (50 ft), at 80 km/hr (50 mph)	FOOD BLENDER AT 1m (3 ft)	80		SPEECH INTERFERENCE
NOISY URBAN AREA, DAYTIME	VACUUM CLEANER AT 3m (10 ft)	70	LOUD	
HEAVY TRAFFIC AT 90m (300 ft)	NORMAL SPEECH AT 1m (3 ft)	60		
QUIET URBAN DAYTIME	LARGE BUSINESS OFFICE	50	MODERATE	SLEEP DISTURBANCE
QUIET URBAN NIGHTTIME	THEATER, LARGE CONFERENCE ROOM (BACKGROUND)	40		
QUIET SUBURBAN NIGHTTIME	LIBRARY	30	FAINT	NO EFFECT
QUIET RURAL NIGHTTIME	BEDROOM AT NIGHT, CONCERT HALL (BACKGROUND)	20		
	BROADCAST/RECORDING STUDIO	10	VERY FAINT	
LOWEST THRESHOLD OF HUMAN HEARING	LOWEST THRESHOLD OF HUMAN HEARING	0		

Source: Environmental Protection Agency Office of Noise Abatement and Control, Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety (EPA/ONAC 550/9-74-004) March 1974.

2.1 RANGE OF NOISE

Since the range of intensities that the human ear can detect is so large, the scale frequently used to measure intensity is a scale based on multiples of 10, the logarithmic scale. The scale for measuring intensity is the decibel scale. Each interval of 10 decibels indicates a sound energy ten times greater than before, which is perceived by the human ear as being roughly twice as loud. (4) The most common sounds vary between 40 dBA (very quiet) to 100 dBA (very loud). Normal conversation at three feet is roughly at 60 dBA, while loud jet engine noises equate to 110 dBA

at approximately 100 feet, which can cause serious discomfort. (5) Another important aspect of noise is the duration of the sound and the way it is described and distributed in time.

2.2 NOISE DESCRIPTORS

Environmental noise descriptors are generally based on averages, rather than instantaneous, noise levels. The most used figure is the equivalent level (L_{eq}). Equivalent sound levels are not measured directly but are calculated from sound pressure levels typically measured in A-weighted decibels (dBA). The equivalent sound level (L_{eq}) represents a steady state sound level containing the same total energy as a time varying signal over a given sample period and is commonly used to describe the "average" noise levels within the environment.

Peak hour or average noise levels, while useful, do not completely describe a given noise environment. Noise levels lower than peak hour may be disturbing if they occur during times when quiet is most desirable, namely evening and nighttime (sleeping) hours. To account for this, the Community Noise Equivalent Level (CNEL), representing a composite 24-hour noise level is utilized. The CNEL is the weighted average of the intensity of a sound, with corrections for time of day, and averaged over 24 hours. The time of day corrections require the addition of 5 decibels to dBA L_{eq} sound levels in the evening from 7:00 p.m. to 10:00 p.m., and the addition of 10 decibels to dBA L_{eq} sound levels at night between 10:00 p.m. and 7:00 a.m. These additions are made to account for the noise sensitive time periods during the evening and night hours when sound appears louder. CNEL does not represent the actual sound level heard at any time, but rather represents the total sound exposure. The City of Murrieta relies on the 24-hour CNEL level to assess land use compatibility with transportation related noise sources.

2.3 SOUND PROPAGATION

When sound propagates over a distance, it changes in level and frequency content. The way noise reduces with distance depends on the following factors.

2.3.1 GEOMETRIC SPREADING

Sound from a localized source (i.e., a stationary point source) propagates uniformly outward in a spherical pattern. The sound level attenuates (or decreases) at a rate of 6 dB for each doubling of distance from a point source. Highways consist of several localized noise sources on a defined path and hence can be treated as a line source, which approximates the effect of several point sources. Noise from a line source propagates outward in a cylindrical pattern, often referred to as cylindrical spreading. Sound levels attenuate at a rate of 3 dB for each doubling of distance from a line source. (4)

2.3.2 GROUND ABSORPTION

The propagation path of noise from a highway to a receiver is usually very close to the ground. Noise attenuation from ground absorption and reflective wave canceling adds to the attenuation associated with geometric spreading. Traditionally, the excess attenuation has also been expressed in terms of attenuation per doubling of distance. This approximation is usually

sufficiently accurate for distances of less than 200 ft. For acoustically hard sites (i.e., sites with a reflective surface between the source and the receiver, such as a parking lot or body of water), no excess ground attenuation is assumed. For acoustically absorptive or soft sites (i.e., those sites with an absorptive ground surface between the source and the receiver such as soft dirt, grass, or scattered bushes and trees), an excess ground attenuation value of 1.5 dB per doubling of distance is normally assumed. When added to the cylindrical spreading, the excess ground attenuation results in an overall drop-off rate of 4.5 dB per doubling of distance from a line source. (6)

2.3.3 ATMOSPHERIC EFFECTS

Receivers located downwind from a source can be exposed to increased noise levels relative to calm conditions, whereas locations upwind can have lowered noise levels. Sound levels can be increased at large distances (e.g., more than 500 feet) due to atmospheric temperature inversion (i.e., increasing temperature with elevation). Other factors such as air temperature, humidity, and turbulence can also have significant effects. (4)

2.3.4 SHIELDING

A large object or barrier in the path between a noise source and a receiver can substantially attenuate noise levels at the receiver. The amount of attenuation provided by shielding depends on the size of the object and the frequency content of the noise source. Shielding by trees and other such vegetation typically only has an "out of sight, out of mind" effect. That is, the perception of noise impact tends to decrease when vegetation blocks the line-of-sight to nearby residents. However, for vegetation to provide a substantial, or even noticeable, noise reduction, the vegetation area must be at least 15 feet in height, 100 feet wide and dense enough to completely obstruct the line-of sight between the source and the receiver. This size of vegetation may provide up to 5 dBA of noise reduction. The FHWA does not consider the planting of vegetation to be a noise abatement measure.

2.4 NOISE CONTROL

Noise control is the process of obtaining an acceptable noise environment for an observation point or receiver by controlling the noise source, transmission path, receiver, or all three. This concept is known as the source-path-receiver concept. In general, noise control measures can be applied to these three elements.

2.5 NOISE BARRIER ATTENUATION

Effective noise barriers can reduce noise levels by 10 to 15 dBA, cutting the loudness of traffic noise in half. A noise barrier is most effective when placed close to the noise source or receiver. Noise barriers, however, do have limitations. For a noise barrier to work, it must be high enough and long enough to block the path of the noise source. (6)

2.6 LAND USE COMPATIBILITY WITH NOISE

Some land uses are more tolerant of noise than others. For example, schools, hospitals, churches, and residences are more sensitive to noise intrusion than are commercial or industrial developments and related activities. As ambient noise levels affect the perceived amenity or livability of a development, so too can the mismanagement of noise impacts impair the economic health and growth potential of a community by reducing the area's desirability as a place to live, shop and work. For this reason, land use compatibility with the noise environment is an important consideration in the planning and design process. The FHWA encourages State and Local government to regulate land development in such a way that noise-sensitive land uses are either prohibited from being located adjacent to a highway, or that the developments are planned, designed, and constructed in such a way that noise impacts are minimized. (7)

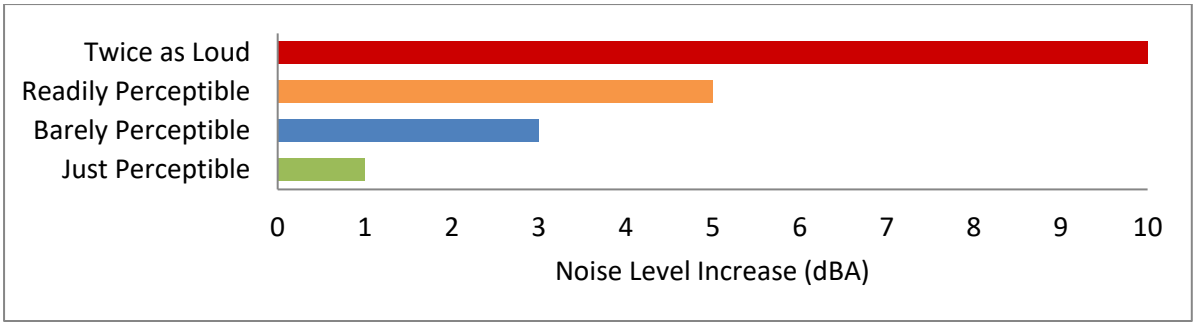
2.7 COMMUNITY RESPONSE TO NOISE

Community responses to noise may range from registering a complaint by telephone or letter, to initiating court action, depending upon everyone's susceptibility to noise and personal attitudes about noise. Several factors are related to the level of community annoyance including:

- Fear associated with noise producing activities;
- Socio-economic status and educational level;
- Perception that those affected are being unfairly treated;
- Attitudes regarding the usefulness of the noise-producing activity;
- Belief that the noise source can be controlled.

Approximately ten percent of the population has a very low tolerance for noise and will object to any noise not of their making. Consequently, even in the quietest environment, some complaints will occur. Twenty-five percent of the population will not complain even in very severe noise environments. Thus, a variety of reactions can be expected from people exposed to any given noise environment. (8) Surveys have shown that about ten percent of the people exposed to traffic noise of 60 dBA will report being highly annoyed with the noise, and each increase of one dBA is associated with approximately two percent more people being highly annoyed. When traffic noise exceeds 60 dBA or aircraft noise exceeds 55 dBA, people may begin to complain. (8) Despite this variability in behavior on an individual level, the population can be expected to exhibit the following responses to changes in noise levels as shown on Exhibit 2-B. A change of 3 dBA are considered *barely perceptible*, and changes of 5 dBA are considered *readily perceptible*. (6)

EXHIBIT 2-B: NOISE LEVEL INCREASE PERCEPTION



2.8 EXPOSURE TO HIGH NOISE LEVELS

The Occupational Safety and Health Administration (OSHA) sets legal limits on noise exposure in the workplace. The permissible exposure limit (PEL) for a worker over an eight-hour day is 90 dBA. The OSHA standard uses a 5 dBA exchange rate. This means that when the noise level is increased by 5 dBA, the amount of time a person can be exposed to a certain noise level to receive the same dose is cut in half. The National Institute for Occupational Safety and Health (NIOSH) has recommended that all worker exposures to noise should be controlled below a level equivalent to 85 dBA for eight hours to minimize occupational noise induced hearing loss. NIOSH also recommends a 3 dBA exchange rate so that every increase by 3 dBA doubles the amount of the noise and halves the recommended amount of exposure time. (9)

OSHA has implemented requirements to protect all workers in general industry (e.g. the manufacturing and the service sectors) for employers to implement a Hearing Conservation Program where workers are exposed to a time weighted average noise level of 85 dBA or higher over an eight-hour work shift. Hearing Conservation Programs require employers to measure noise levels, provide free annual hearing exams and free hearing protection, provide training, and conduct evaluations of the adequacy of the hearing protectors in use unless changes to tools, equipment and schedules are made so that they are less noisy and worker exposure to noise is less than the 85 dBA. This noise study does not evaluate the noise exposure of workers within a project or construction site based on CEQA requirements, and instead, evaluates Project-related operational and construction noise levels at the nearby sensitive receiver locations in the Project study area.

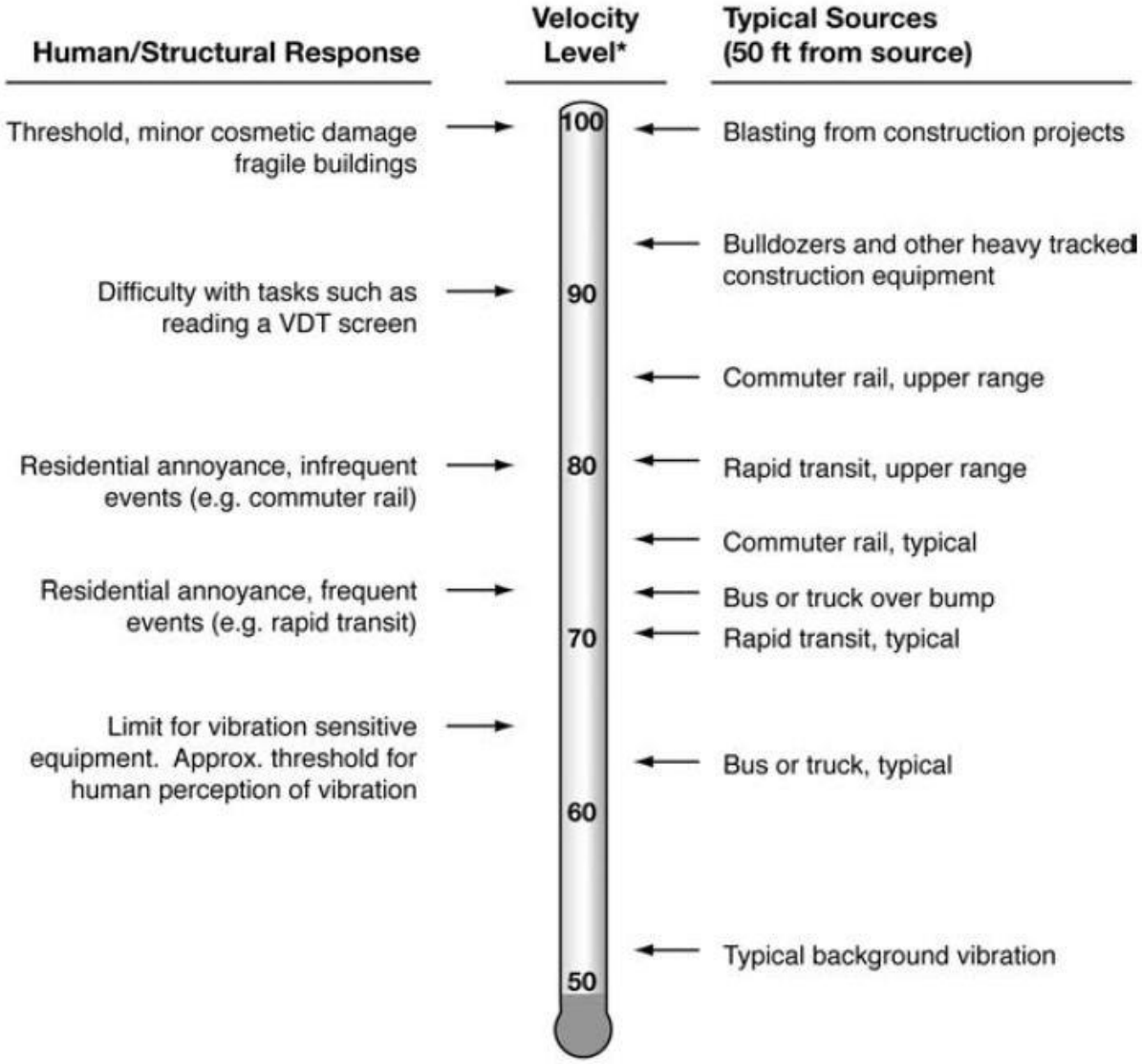
2.9 VIBRATION

Per the Federal Transit Administration (FTA) *Transit Noise Impact and Vibration Assessment* (10), vibration is the periodic oscillation of a medium or object. The rumbling sound caused by the vibration of room surfaces is called structure-borne noise. Sources of ground-borne vibrations include natural phenomena (e.g., earthquakes, volcanic eruptions, sea waves, landslides) or human-made causes (e.g., explosions, machinery, traffic, trains, construction equipment). Vibration sources may be continuous, such as factory machinery, or transient, such as explosions. As is the case with airborne sound, ground-borne vibrations may be described by amplitude and frequency.

There are several different methods that are used to quantify vibration. The peak particle velocity (PPV) is defined as the maximum instantaneous peak of the vibration signal. The PPV is most frequently used to describe vibration impacts to buildings but is not always suitable for evaluating human response (annoyance) because it takes some time for the human body to respond to vibration signals. Instead, the human body responds to average vibration amplitude often described as the root mean square (RMS). The RMS amplitude is defined as the average of the squared amplitude of the signal and is most frequently used to describe the effect of vibration on the human body. Decibel notation (VdB) is commonly used to measure RMS. Decibel notation (VdB) serves to reduce the range of numbers used to describe human response to vibration. Typically, ground-borne vibration generated by man-made activities attenuates rapidly with distance from the source of the vibration. Sensitive receivers for vibration include structures (especially older masonry structures), people (especially residents, the elderly, and sick), and vibration-sensitive equipment and/or activities

The background vibration-velocity level in residential areas is generally 50 VdB. Ground-borne vibration is normally perceptible to humans at approximately 65 VdB. For most people, a vibration-velocity level of 75 VdB is the approximate dividing line between barely perceptible and distinctly perceptible levels. Typical outdoor sources of perceptible ground-borne vibration are construction equipment, steel-wheeled trains, and traffic on rough roads. If a roadway is smooth, the ground-borne vibration is rarely perceptible. The range of interest is from approximately 50 VdB, which is the typical background vibration-velocity level, to 100 VdB, which is the general threshold where minor damage can occur in fragile buildings. Exhibit 2-C illustrates common vibration sources and the human and structural response to ground-borne vibration.

EXHIBIT 2-C: TYPICAL LEVELS OF GROUND-BORNE VIBRATION



* *RMS Vibration Velocity Level in VdB relative to 10^{-6} inches/second*

Source: Federal Transit Administration (FTA) Transit Noise Impact and Vibration Assessment.

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3 REGULATORY SETTING

To limit population exposure to physically and/or psychologically damaging as well as intrusive noise levels, the federal government, the State of California, various county governments, and most municipalities in the state have established standards and ordinances to control noise. In most areas, automobile and truck traffic is the major source of environmental noise. Traffic activity generally produces an average sound level that remains constant with time. Air and rail traffic, and commercial and industrial activities are also major sources of noise in some areas. Federal, state, and local agencies regulate different aspects of environmental noise. Federal and state agencies generally set noise standards for mobile sources such as aircraft and motor vehicles, while regulation of stationary sources is left to local agencies.

3.1 STATE OF CALIFORNIA NOISE REQUIREMENTS

The State of California regulates freeway noise, sets standards for sound transmission, provides occupational noise control criteria, identifies noise standards and provides guidance for local land use compatibility. State law requires that each county and city adopt a General Plan that includes a Noise Element which is to be prepared per guidelines adopted by the Governor's Office of Planning and Research (OPR). (11) The purpose of the Noise Element is to *limit the exposure of the community to excessive noise levels*. In addition, the California Environmental Quality Act (CEQA) requires that all known environmental effects of a project be analyzed, including environmental noise impacts.

3.2 STATE OF CALIFORNIA BUILDING CODE

The State of California's noise insulation standards are codified in the California Code of Regulations, Title 24, Building Standards Administrative Code, Part 2, and the California Building Code. These noise standards are applied to new construction in California for controlling interior noise levels resulting from exterior noise sources. The regulations specify that acoustical studies must be prepared when noise-sensitive structures, such as residential buildings, schools, or hospitals, are developed near major transportation noise sources, and where such noise sources create an exterior noise level of 60 dBA CNEL or higher. Acoustical studies that accompany building plans for noise-sensitive land uses must demonstrate that the structure has been designed to limit interior noise in habitable rooms to acceptable noise levels. For new residential buildings, schools, and hospitals, the acceptable interior noise limit for new construction is 45 dBA CNEL.

3.3 CITY OF MURRIETA GENERAL PLAN NOISE ELEMENT

The City of Murrieta has adopted a Noise Element of the General Plan to control and abate environmental noise, and to protect the citizens of the City of Murrieta from excessive exposure to noise. (2) The Noise Element specifies the exterior noise levels allowable for new developments impacted by transportation noise sources such as arterial roads, freeways, airports and railroads. In addition, the Noise Element identifies noise polices designed to protect, create, and maintain an environment free from noise that may jeopardize the health or welfare of

sensitive receivers, or degrade quality of life. To protect City of Murrieta residents from excessive noise, the Noise Element contains the following three goals related to the Project:

N-1 Noise sensitive land uses are properly and effectively protected from excessive noise generators.

N-2 A comprehensive and effective land use planning and development review process that ensures noise impacts are adequately addressed.

N-3 Noise from mobile noise sources is minimized.

The noise policies specified in the City of Murrieta Noise Element provide the guidelines necessary to satisfy these three goals. To protect noise sensitive land uses from excessive noise generators (N-1), Table 11-2 of the City of Murrieta General Plan Noise Element, shown on Exhibit 3-A, identifies a maximum allowable exterior *normally acceptable* noise level of 60 dBA CNEL and an interior noise level limit of 45 dBA CNEL for residential homes impacted by transportation noise sources such as arterial roads, freeways, airports and railroads. The Noise Element also provides several policies to reduce noise impacts to new developments (N-2) that include integrating noise considerations into planning decisions, noise mitigation measures as development requirements, and compliance with the standards of the Noise Element and Noise Ordinance. To ensure noise from mobile sources is minimized (N-3), noise mitigation measures must be considered in the design of all future streets and highways.

The policies included in the General Plan Noise Element consider land use compatibility and identify exterior noise level compatibility standards for transportation related noise. The *Land Use Compatibility for Community Noise Environments* matrix shown on Exhibit 3-A provides the City with a planning tool to gauge the compatibility of land uses relative to existing and future exterior noise levels.

According to the City's *Land Use Compatibility for Community Noise Environments* (Table 11-2), schools land uses such as the Murrieta Canyon Academy Project are considered *normally acceptable and conditionally acceptable* with exterior noise levels below 70 dBA CNEL. For land uses within the *normally unacceptable* category, where exterior noise levels range from 70 to 80 dBA CNEL, *new construction or development should be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise-insulation features must be included in the design*.

EXHIBIT 3-A: LAND USE COMPATIBILITY FOR COMMUNITY NOISE ENVIRONMENTS

Land Use Category	Community Noise Exposure (CNEL)			
	Normally Acceptable	Conditionally Acceptable	Normally Unacceptable	Clearly Unacceptable
Residential-Low Density, Single-Family, Duplex, Mobile Homes	50 - 60	55 – 70	70 – 75	75 – 85
Residential – Multiple Family	50 – 65	60 – 70	70 – 75	70 – 85
Transient Lodging – Motel, Hotels	50 – 65	60 – 70	70 – 80	80 – 85
Schools, Libraries, Churches, Hospitals, Nursing Homes	50 – 70	60 – 70	70 – 80	80 – 85
Auditoriums, Concert Halls, Amphitheaters	NA	50 – 70	NA	65 – 85
Sports Arenas, Outdoor Spectator Sports	NA	50 – 75	NA	70 – 85
Playgrounds, Neighborhood Parks	50 – 70	NA	67.5 – 77.5	72.5 – 85
Golf Courses, Riding Stables, Water Recreation, Cemeteries	50 – 70	NA	70 – 80	80 – 85
Office Buildings, Business Commercial and Professional	50 – 70	67.5 – 77.5	75 – 85	NA
Industrial, Manufacturing, Utilities, Agriculture	50 – 75	70 – 80	75 – 85	NA

CNEL = community noise equivalent level; NA = not applicable

NORMALLY ACCEPTABLE: Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements.
CONDITIONALLY ACCEPTABLE: New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features have been included in the design. Conventional construction, but with closed windows and fresh air supply systems or air conditioning, will normally suffice.
NORMALLY UNACCEPTABLE: New construction or development should be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise-insulation features must be included in the design.
CLEARLY UNACCEPTABLE: New construction or development should generally not be undertaken.

Source: Office of Planning and Research, California, *General Plan Guidelines*, October 2003.

Within the City of Murrieta, the *Noise Ordinance* governs operational noise generated between two properties and does not regulate noise from transportation sources, such as traffic, aircraft, and railways. Section 16.30.090 of the *Noise Ordinance* establishes the exterior noise standards.

3.4 OPERATIONAL NOISE STANDARDS

To analyze noise impacts originating from a designated fixed location or private property such as Murrieta Canyon Academy Project, stationary-source (operational) noise such as the expected roof-top air conditioning units, outdoor student activity, basketball court activity and parking lot vehicle movements activity are typically evaluated against standards established under a jurisdiction's Municipal Code. Section 16.30.090 of the City of Murrieta Municipal Code contains the exterior noise level standards for nearby noise sensitive residential land uses as shown on Table 3-1.

TABLE 3-1: OPERATIONAL NOISE STANDARDS

City	Receiving Land Use	Noise Level Standards (dBA Leq)[1]	
		Daytime	Nighttime
Murrieta	Residential	50	45

[1] City of Murrieta Municipal Code, Section 16.30.090 Exterior Noise Standards (Appendix 3.1). Leq represents a steady state sound level containing the same total energy as a time varying signal over a given period. "Daytime" = 7:00 a.m. to 10:00 p.m.; "Nighttime" = 10:00 p.m. to 7:00 a.m.

For the noise sensitive residential land uses, the Municipal Code identifies a noise level standard of 55 dBA L_{eq}, during the daytime hours of 7:00 a.m. to 10:00 p.m. and 45 dBA L_{eq} during the nighttime hour of 10:00 p.m. to 7:00 a.m. (12) The City of Murrieta Municipal Code Performance Standards for noise are included in Appendix 3.1.

3.5 CONSTRUCTION NOISE STANDARDS

To analyze noise impacts originating from the construction of the Murrieta Canyon Academy Project, noise from construction activities are typically limited to the hours of operation established under the Municipal Code. The Municipal Code noise standards for construction are described below for the City of Murrieta to determine the potential noise impacts at the nearby sensitive receiver locations. The construction-related noise standards are summarized on Table 3-2. The City of Murrieta has established maximum noise levels for mobile and stationary construction equipment. Section 16.30.130 of the Municipal Code identifies limits on noise levels from construction activities for mobile and stationary equipment, respectively.

For single-family residential development, mobile equipment noise levels may not exceed 75 dBA L_{max} and stationary equipment noise levels may not exceed 60 dBA L_{max} during the daytime hours. (12) In addition, the Municipal Code identifies hours during which mobile and stationary equipment may operate, between 7:00 a.m. to 8:00 p.m. daily, with no activity allowed on Sundays or holidays (City of Murrieta Municipal Code, Section 16.30.130(A)(2)(a)(1)). The City of Murrieta Municipal Code is included in Appendix 3.1.

TABLE 3-2: CONSTRUCTION NOISE STANDARDS

Construction Source	Receiving Land Use	Noise Level Standards (dBA Lmax)[3]	
		Daytime	Nighttime
Mobile Equipment[1]	Residential	75	60
Stationary[2]	Residential	50	45

[1] Nonscheduled, intermittent, short-term operation (less than ten days) of mobile equipment.
[2] Repetitively scheduled and relatively long-term operation periods (three days or more) of stationary equipment.
[3] City of Murrieta Municipal Code, Section 16.30.130(A)(Appendix 3.1).
"Daytime" = 7:00 a.m. to 10:00 p.m.; "Nighttime" = 10:00 p.m. to 7:00 a.m.

3.6 CONSTRUCTION VIBRATION STANDARDS

The City of Murrieta Municipal Code, Section 16.30.130 (K), states that *operating or permitting the operation of any device that creates a vibration that is above the vibration perception threshold of an individual at or beyond the property boundary of the source if on private property or at one hundred fifty feet from the source if on public space or public right-of-way* is prohibited. The Municipal Code defines the vibration perception threshold to be a motion velocity of 0.01 in/sec over the range of one to 100 Hz. (12)

4 SIGNIFICANCE CRITERIA

The following significance criteria are based on currently adopted guidance provided by Appendix G of the California Environmental Quality Act (CEQA) Guidelines. (1) For the purposes of this report, impacts would be potentially significant if the Project results in or causes:

A. 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?

B. Generation of excessive ground-borne vibration or ground-borne 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?

While the City of Murrieta General Plan Guidelines provide direction on noise compatibility and establish noise standards by land use type that are sufficient to assess the significance of noise impacts, they do not define the levels at which increases are considered substantial for use under Guideline A. CEQA Appendix G Guideline C applies to nearby public and private airports, if any, and the Project's land use compatibility.

4.1 NOISE-SENSITIVE RECEIVERS

Noise level increases resulting from the Project are evaluated based on the Appendix G CEQA Guidelines described above at the closest sensitive receiver locations. Under CEQA, consideration must be given to the magnitude of the increase, the existing ambient noise levels, and the location of noise-sensitive receivers to determine if a noise increase represents a significant adverse environmental impact. This approach recognizes *that there is no single noise increase that renders the noise impact significant.* (13) Unfortunately, there is no completely satisfactory way to measure the subjective effects of noise or of the corresponding human reactions of annoyance and dissatisfaction. This is primarily because of the wide variation in individual thresholds of annoyance and differing individual experiences with noise. Thus, an important way of determining a person's subjective reaction to a new noise is the comparison of it to the existing environment to which one has adapted—the so-called *ambient* environment.

In general, the more a new noise exceeds the previously existing ambient noise level, the less acceptable the new noise will typically be judged. The Federal Interagency Committee on Noise (FICON) (14) developed guidance to be used for the assessment of project-generated increases in noise levels that consider the ambient noise level. The FICON recommendations are based on studies that relate aircraft noise levels to the percentage of persons highly annoyed by aircraft noise. Although the FICON recommendations were specifically developed to assess aircraft noise impacts, these recommendations are often used in environmental noise impact assessments involving the use of cumulative noise exposure metrics, such as the average-daily noise level (CNEL) and equivalent continuous noise level (L_{eq}).

As previously stated, the approach used in this noise study recognizes *that there is no single noise increase that renders the noise impact significant*, based on a 2008 California Court of Appeal ruling on Gray v. County of Madera. (13) For example, if the ambient noise environment is quiet (<60 dBA) and the new noise source greatly increases the noise levels, an impact may occur if the noise criteria may be exceeded. Therefore, for this analysis, FICON identifies a *readily perceptible* 5 dBA or greater project-related noise level increase is considered a significant impact when the noise criteria for a given land use is exceeded. Per the FICON, in areas where the without project noise levels range from 60 to 65 dBA, a 3 dBA *barely perceptible* noise level increase appears to be appropriate for most people. When the without project noise levels already exceed 65 dBA, any increase in community noise louder than 1.5 dBA or greater is considered a significant impact if the noise criteria for a given land use is exceeded, since it likely contributes to an existing noise exposure exceedance.

4.2 SIGNIFICANCE CRITERIA SUMMARY

Noise impacts shall be considered significant if any of the following occur as a direct result of the proposed development. Table 4-1 shows the significance criteria summary matrix.

OFF-SITE TRAFFIC NOISE

- When the noise levels at existing and future noise-sensitive land uses (e.g. residential, etc.):
    1. are less than 60 dBA CNEL and the Project creates a *readily perceptible* 5 dBA CNEL or greater Project-related noise level increase; or
    2. range from 60 to 65 dBA CNEL and the Project creates a *barely perceptible* 3 dBA CNEL or greater Project-related noise level increase; or
    3. already exceed 65 dBA CNEL, and the Project creates a community noise level increase of greater than 1.5 dBA CNEL (FICON, 1992).

ON-SITE TRAFFIC NOISE

- If the on-site noise levels:
    1. exceed the exterior land use compatibility criteria of the City of Murrieta General Plan Noise Element, Table 11-2, for Project land uses; and
    2. exceed an interior noise level of 45 dBA CNEL for residential uses within the Project site (California Code of Regulations, Title 24, Building Standards Administrative Code, Part 2 as discussed in Section 3.2).

OPERATIONAL NOISE

- If Project-related operational (stationary-source) noise levels exceed an exterior noise level standard of 55 dBA L_{eq}, during the daytime hours of 7:00 a.m. to 10:00 p.m. and 45 dBA L_{eq} during the nighttime hour of 10:00 p.m. to 7:00 a.m. (City of Murrieta Municipal Code Section 16.30.090).

CONSTRUCTION NOISE AND VIBRATION

- If Project-related construction activities:
    1. occur anytime other than between the permitted hours of 7:00 a.m. to 8:00 p.m. daily, with no activity allowed on Sundays or holidays (City of Murrieta Municipal Code, Section 16.30.130(A)(2)(a)(1)); or
    2. create noise levels which exceed the mobile 75 dBA L_{max} or stationary 60 dBA L_{max} equipment noise level limits at the nearby sensitive residential land uses (City of Murrieta Municipal Code, Section 16.30.130 (A)).
- If short-term Project generated construction vibration levels could exceed the City of Murrieta maximum acceptable vibration standard of 0.01 in/sec RMS at sensitive receiver locations (City of Murrieta Municipal Code, Section 16.30.130 (K)).

TABLE 4-1: SIGNIFICANCE CRITERIA SUMMARY

Analysis	Land Use	Condition(s)	Significance Criteria	
			Daytime	Nighttime
Off-Site Traffic	Noise-Sensitive[1]	If ambient is < 60 dBA CNEL	≥ 5 dBA CNEL Project increase	
		If ambient is 60 - 65 dBA CNEL	≥ 3 dBA CNEL Project increase	
		If ambient is > 65 dBA CNEL	≥ 1.5 dBA CNEL Project increase	
On-Site Traffic	Residential	Exterior Noise Level Criteria[2]	See Exhibit 3-A	
		Interior Noise Level Standard[3]	45 dBA CNEL	
Operational		Exterior Noise Level Standards[4]	50 dBA L_{eq}	45 dBA L_{eq}
Construction		Mobile Equipment Noise Level Threshold[5]	75 dBA L_{max}	
		Stationary Equipment Noise Level Threshold[5]	60 dBA L_{max}	
		Vibration Level Threshold[6]	0.01 in/sec RMS	

[1] FICON, 1992.
[2] City of Murrieta General Plan Noise Element, Table 11-2.
[3] California Code of Regulations, Title 24, Building Standards Administrative Code, Part 2.
[4] City of Murrieta Municipal Code, Section 16.30.090 Exterior Noise Standards (Appendix 3.1).
[5] City of Murrieta Municipal Code, Section 16.30.130 (A) (Appendix 3.1).
[6] City of Murrieta Municipal Code, Section 16.30.130 (K) (Appendix 3.1).
"Daytime" = 7:00 a.m. to 10:00 p.m.; "Nighttime" = 10:00 p.m. to 7:00 a.m.

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5 EXISTING NOISE LEVEL MEASUREMENTS

To assess the existing noise level environment, 24-hour noise level measurements were taken at five locations in the Project study area. The receiver locations were selected to describe and document the existing noise environment within the Project study area. Exhibit 5-A provides the boundaries of the Project study area and the noise level measurement locations. To fully describe the existing noise conditions, noise level measurements were collected by Urban Crossroads, Inc. on Wednesday, September 18th, 2019. Appendix 5.1 includes study area photos.

5.1 MEASUREMENT PROCEDURE AND CRITERIA

To describe the existing noise environment, the hourly noise levels were measured during typical weekday conditions over a 24-hour period. By collecting individual hourly noise level measurements, it is possible to describe the daytime and nighttime hourly noise levels and calculate the 24-hour CNEL. The long-term noise readings were recorded using Piccolo Type 2 integrating sound level meter and dataloggers. The Piccolo sound level meters were calibrated using a Larson-Davis calibrator, Model CAL 150. All noise meters were programmed in "slow" mode to record noise levels in "A" weighted form. The sound level meters and microphones were equipped with a windscreen during all measurements. All noise level measurement equipment satisfies the American National Standards Institute (ANSI) standard specifications for sound level meters ANSI S1.4-2014/IEC 61672-1:2013. (15)

5.2 NOISE MEASUREMENT LOCATIONS

The long-term noise level measurements were positioned as close to the nearest sensitive receiver locations as possible to assess the existing ambient hourly noise levels surrounding the Project site. Both Caltrans and the FTA recognize that it is not reasonable to collect noise level measurements that can fully represent every part of a private yard, patio, deck, or balcony normally used for human activity when estimating impacts for new development projects. This is demonstrated in the Caltrans general site location guidelines which indicate that, *sites must be free of noise contamination by sources other than sources of interest. Avoid sites located near sources such as barking dogs, lawnmowers, pool pumps, and air conditioners unless it is the express intent of the analyst to measure these sources*. (4) Further, FTA guidance states, t*hat it is not necessary nor recommended that existing noise exposure be determined by measuring at every noise-sensitive location in the project area. Rather, the recommended approach is to characterize the noise environment for clusters of sites based on measurements or estimates at representative locations in the community*. (10)

Based on recommendations of Caltrans and the FTA, it is not necessary to collect measurements at each individual building or residence, because each receiver measurement represents a group of buildings that share acoustical equivalence. (10) In other words, the area represented by the receiver shares similar shielding, terrain, and geometric relationship to the reference noise source. Receivers represent a location of noise sensitive areas and are used to estimate the future noise level impacts. Collecting reference ambient noise level measurements at the nearby sensitive receiver locations allows for a comparison of the before and after Project noise levels

and is necessary to assess potential noise impacts due to the Project's contribution to the ambient noise levels.

5.3 NOISE MEASUREMENT RESULTS

The noise measurements presented below focus on the average or equivalent sound levels (L_{eq}). The equivalent sound level (L_{eq}) represents a steady state sound level containing the same total energy as a time varying signal over a given sample period. Table 5-1 identifies the hourly daytime (7:00 a.m. to 10:00 p.m.) and nighttime (10:00 p.m. to 7:00 a.m.) noise levels at each noise level measurement location. Appendix 5.2 provides a summary of the existing hourly ambient noise levels described below:

- Location L1 represents the noise levels northeast of project side on dirt road adjacent to Douglas Avenue and Fullerton Road. The noise levels at this location consist primarily of traffic noise from Fullerton Road and Douglas Avenue as well as parking lot movements from Murrieta Valley High School. The noise level measurements collected show an overall 24-hour exterior noise level of 50.3 dBA CNEL. The energy (logarithmic) average daytime noise level was calculated at 47.6 dBA L_{eq} with an average nighttime noise level of 42.5 dBA L_{eq}.
- Location L2 represents the noise levels south of the Project site on Hayes Avenue near existing residential homes. The noise levels at this location consist primarily of traffic noise from Hayes Avenue. The noise level measurements collected show an overall 24-hour exterior noise level of 64.6 dBA CNEL. The energy (logarithmic) average daytime noise level was calculated at 61.1 dBA L_{eq} with an average nighttime noise level of 57.2 dBA L_{eq}.
- Location L3 represents the noise levels southwest of Project site on Hayes Avenue near existing residential homes. The noise level measurements collected show an overall 24-hour exterior noise level of 62.1 dBA CNEL. The energy (logarithmic) average daytime noise level was calculated at 60.0 dBA L_{eq} with an average nighttime noise level of 53.9 dBA L_{eq}. The noise levels at this location consist primarily of traffic noise from Hayes Avenue and Sherry Lane.
- Location L4 represents the noise levels west of the Project site on Hayes Avenue near existing residential homes and Thompson Middle School. The noise level measurements collected show an overall 24-hour exterior noise level of 64.1 dBA CNEL. The energy (logarithmic) average daytime noise level was calculated at 61.8 dBA L_{eq} with an average nighttime noise level of 56.2 dBA L_{eq}. The noise levels at this location consist primarily of traffic noise from Hayes Avenue and Semillon Lane.
- Location L5 represents the noise levels northwest of the Project site on Nighthawk Way near existing residential homes. The 24-hour CNEL indicates that the overall exterior noise level is 63.1 dBA CNEL. The energy (logarithmic) average daytime noise level was calculated at 60.3 dBA L_{eq} with an average nighttime noise level of 55.6 dBA L_{eq}. Traffic on Nighthawk Way represents the primary source of noise at this location.

Table 5-1 provides the (energy average) noise levels used to describe the daytime and nighttime ambient conditions. These daytime and nighttime energy average noise levels represent the average of all hourly noise levels observed during these time periods expressed as a single number. Appendix 5.2 provides summary worksheets of the noise levels for each hour as well as the minimum, maximum, L_1, L_2, L_5, L_8, L_{25}, L_{50}, L_{90}, L_{95}, and L_{99} percentile noise levels observed during the daytime and nighttime periods.

The background ambient noise levels in the Project study area are dominated by the transportation-related noise associated with surface streets Hayes Avenue and Nighthawk Way. The 24-hour existing noise level measurement results are shown on Table 5-1.

TABLE 5-1: 24-HOUR AMBIENT NOISE LEVEL MEASUREMENTS

Location[1]	Description	Energy Average Noise Level (dBA L_{eq})[2]		CNEL
		Daytime	Nighttime	
L1	Located northeast of project side on dirt road adjacent to Douglas Avenue and Fullerton Road.	47.6	42.5	50.3
L2	Located south of the Project site on Hayes Avenue near existing residential homes.	61.1	57.2	64.6
L3	Located southwest of Project site on Hayes Avenue near existing residential homes.	60.0	53.9	62.1
L4	Located west of the Project site on Hayes Avenue near existing residential homes and Thompson Middle School.	61.8	56.2	64.1
L5	Located northwest of the Project site on Nighthawk Way near existing residential homes.	60.3	55.6	63.1

[1] See Exhibit 5-A for the noise level measurement locations.
[2] Energy (logarithmic) average levels. The long-term 24-hour measurement worksheets are included in Appendix 5.2.
"Daytime" = 7:00 a.m. to 10:00 p.m.; "Nighttime" = 10:00 p.m. to 7:00 a.m.

EXHIBIT 5-A: NOISE MEASUREMENT LOCATIONS

6 METHODS AND PROCEDURES

The following section outlines the methods and procedures used to model and analyze the future traffic noise environment. Consistent with the City of Murrieta General Plan *Land Use Compatibility for Community Noise Exposure* matrix, all transportation related noise levels are presented in terms of the 24-hour CNEL's.

6.1 FHWA TRAFFIC NOISE PREDICTION MODEL

The expected roadway noise level increases from vehicular traffic were calculated by Urban Crossroads, Inc. using a computer program that replicates the Federal Highway Administration (FHWA) Traffic Noise Prediction Model- FHWA-RD-77-108. (16) The FHWA Model arrives at a predicted noise level through a series of adjustments to the Reference Energy Mean Emission Level (REMEL). In California the national REMELs are substituted with the California Vehicle Noise (Calveno) Emission Levels. (17) Adjustments are then made to the REMEL to account for: the roadway classification (e.g., collector, secondary, major or arterial), the roadway active width (i.e., the distance between the center of the outermost travel lanes on each side of the roadway), the total average daily traffic (ADT), the travel speed, the percentages of automobiles, medium trucks, and heavy trucks in the traffic volume, the roadway grade, the angle of view (e.g., whether the roadway view is blocked), the site conditions ("hard" or "soft" relates to the absorption of the ground, pavement, or landscaping), and the percentage of total ADT which flows each hour throughout a 24-hour period. Research conducted by Caltrans has shown that the use of soft site conditions is appropriate for the application of the FHWA traffic noise prediction model used in this analysis. (18)

6.1.1 OFF-SITE TRAFFIC NOISE PREDICTION MODEL INPUTS

Table 6-1 presents the roadway parameters used to assess the Project's off-site transportation noise impacts. Table 6-1 identifies the 3 off-site study area roadway segments, the distance from the centerline to adjacent land use based on the functional roadway classifications per the City of Murrieta General Plan Circulation Element, and the posted vehicle speeds. Consistent with *Murrieta Canyon Academy Expansion Traffic Impact Study* prepared by RK Engineering Group (19) the off-site traffic noise analysis includes the following traffic scenarios.

- Existing (2019)
- Existing Plus Project (E+P)
- Project Buildout Year Plus Ambient Growth
- Project Buildout Year Plus Ambient Growth Plus Project
- Project Buildout Year Plus Ambient Growth Plus Cumulative Projects
- Project Buildout Year Plus Ambient Growth Plus Cumulative Projects Plus Project

The average daily traffic (ADT) volumes used for this study are presented on Table 6-2. Table 6-3 provides the time of day (daytime, evening, and nighttime) vehicle splits and Table 6-4 presents the traffic flow distributions (vehicle mix) used for this analysis. The vehicle mix provides the hourly distribution percentages of automobile, medium trucks, and heavy trucks for input into the FHWA noise prediction model.

TABLE 6-1: OFF-SITE ROADWAY PARAMETERS

ID	Roadway	Segment	Receiving Land Use[1]	Classification[1]	Centerline Distance to Receiving Land Use (Feet)[2]	Vehicle Speed (mph)
1	Hayes Av.	s/o Nighthawk Wy.	SFR/P-OS	Collector	33'	30
2	Hayes Av.	s/o Sherry Ln.	SFR	Collector	33'	30
3	Hayes Av.	s/o Fullerton Rd.	SFR	Collector	33'	30

[1] Sources: City of Murrieta General Plan Land Use Map.
[2] Based upon the right-of-way distances for each roadway classification provided in the General Plan Circulation Element.
"SFR"= Single-Family Residential; "P-OS"= Parks and Open Space.

TABLE 6-2: AVERAGE DAILY TRAFFIC VOLUMES

ID	Roadway	Segment	Average Daily Traffic Volumes[1]					
			Existing		Project Buildout Year + Ambient Growth		Project Buildout Growth + Ambient Growth + Cumulative	
			Without Project	With Project	Without Project	With Project	Without Project	With Project
1	Hayes Av.	s/o Nighthawk Wy.	2,222	2,566	2,405	2,749	2,405	2,749
2	Hayes Av.	s/o Sherry Ln.	2,344	2,751	2,537	2,944	2,537	2,944
3	Hayes Av.	s/o Fullerton Rd.	2,683	3,589	2,904	3,810	2,904	3,810

[1] Source: Murrieta Canyon Academy Expansion Traffic Impact Study, RK Engineering Group, Inc.

TABLE 6-3: TIME OF DAY VEHICLE SPLITS

Vehicle Type	Time of Day Splits[1]			Total of Time of Day Splits
	Daytime	Evening	Nighttime	
Autos	75.55%	13.96%	10.49%	100.00%
Medium Trucks	48.92%	2.17%	48.91%	100.00%
Heavy Trucks	47.30%	5.40%	47.30%	100.00%

[1] Source: County of Riverside Office of Industrial Hygiene, 2017.
"Daytime" = 7:00 a.m. to 7:00 p.m.; "Evening" = 7:00 p.m. to 10:00 p.m.; "Nighttime" = 10:00 p.m. to 7:00 a.m.

TABLE 6-4: TRAFFIC FLOW BY VEHICLE TYPE (VEHICLE MIX)

Roadway	Total % Traffic Flow			Total
	Autos	Medium Trucks	Heavy Trucks	
Secondary, Collector[1]	97.42%	1.84%	0.74%	100.00%

[1] Source: County of Riverside Office of Industrial Hygiene, 2017.

The ADT volumes vary for each roadway segment based on the existing and future horizon year traffic volumes plus the project traffic volumes for each traffic scenario. The future on-site traffic noise impacts are assessed using the maximum capacity design standard for highways and major roads. However, this analysis relies on a comparative analysis of the off-site traffic noise impacts, without and with project ADT traffic volumes from the Project traffic study. The use of the maximum capacity design standards is typically reserved for determining the future long-range on-site traffic noise impacts, not the comparative contributions associated with the off-site Project traffic noise level impacts.

6.1.2 ON-SITE TRAFFIC NOISE PREDICTION MODEL INPUTS

The on-site roadway parameters including the ADT volumes used for this analysis are presented on Table 6-1. Based on the City of Murrieta General Plan Circulation Element, Exhibit 5-10, Hayes Avenue is classified as 2-lane Collector Roadways. (20) To predict the future on-site noise environment at the Project site, the City of Murrieta General Plan Circulation Element Table 5-2 *Daily Roadway Capacity Values* were used. The traffic volumes shown on Table 6-5 reflect future long-range traffic conditions needed to assess the future on-site traffic noise environment and to identify potential mitigation measures (if any) that address the worst-case future conditions. For the purposes of this analysis, soft site conditions were used to analyze the on-site traffic noise impacts for the Project study area. Soft site conditions account for the sound propagation loss over natural surfaces such as normal earth and ground vegetation. Research conducted by Caltrans has shown that the use of soft site conditions is appropriate for the application of the FHWA traffic noise prediction model used in this analysis. (18)

Table 6-5 presents the on-site roadway parameters including the ADT volumes used for this study. The on-site roadway parameters are based on the City of Murrieta General Plan Circulation Element roadway classifications. The maximum two-way traffic volumes at a level of service C, were obtained from Table 5-2 of the City of Murrieta General Plan Circulation Element (20) and reflect future long-range traffic conditions needed to assess the on-site traffic noise environment and to identify the appropriate noise mitigation measures that address the worst-case future noise conditions.

TABLE 6-5: ON-SITE ROADWAY PARAMETERS

Roadway	Lanes	Classification[1]	Average Daily Traffic Volume[2]	Posted Speed Limits (mph)	Site Conditions
Hayes Ave.	2	Collector	10,400	30	Soft

[1] Road classifications based upon the City of Murrieta General Plan Circulation Element, Exhibit 5-10.
[2] Level of Service C maximum two-way volumes from the City of Murrieta General Plan Circulation Element, Table 5-2.

6.2 VIBRATION ASSESSMENT

This analysis focuses on the potential ground-borne vibration associated with vehicular traffic and construction activities. Ground-borne vibration levels from automobile traffic are generally overshadowed by vibration generated by heavy trucks that roll over the same uneven roadway surfaces. However, due to the rapid drop-off rate of ground-borne vibration and the short duration of the associated events, vehicular traffic-induced ground-borne vibration is rarely perceptible beyond the roadway right-of-way, and rarely results in vibration levels that cause damage to buildings in the vicinity.

However, while vehicular traffic is rarely perceptible, construction has the potential to result in varying degrees of temporary ground vibration, depending on the specific construction activities and equipment used. Ground vibration levels associated with various types of construction equipment are summarized on Table 6-6. Based on the representative vibration levels presented for various construction equipment types, it is possible to estimate the potential Project construction vibration levels using the following vibration assessment methods defined by the FTA. The FTA provides the following equation: $PPV_{equip} = PPV_{ref} \times (25/D)^{1.5}$

TABLE 6-6: VIBRATION SOURCE LEVELS FOR CONSTRUCTION EQUIPMENT

Equipment	PPV (in/sec) at 25 feet
Small bulldozer	0.003
Jackhammer	0.035
Loaded Trucks	0.076
Large bulldozer	0.089

Source: Federal Transit Administration, Transit Noise and Vibration Impact Assessment

7 OFF-SITE TRAFFIC NOISE ANALYSIS

To assess the off-site transportation CNEL noise level impacts associated with development of the proposed Project, noise contours were developed based on *Murrieta Canyon Academy Expansion Traffic Impact Study*. (19) Noise contour boundaries represent the equal levels of noise exposure and are measured in CNEL from the center of the roadway. Noise contours were developed for the following traffic scenarios:

- Existing Without / With Project: This scenario refers to the existing present-day noise conditions, without and with the development of the full Project. The existing with Project scenario will not actually occur since the Project would not be fully constructed and operational until Project Buildout Year 2023 conditions.
- Project Buildout plus Ambient 2023 Without / With Project: This scenario refers to the existing noise conditions plus the estimated 3 years of background growth in ambient traffic conditions without and with the development of the full Project.
- Project Buildout Plus Ambient Plus Cumulative 2023 Without / With Project: This scenario refers to the existing plus ambient plus cumulative noise conditions at 2023 without and with the proposed Project.

7.1 TRAFFIC NOISE CONTOURS

Noise contours were used to assess the Project's incremental traffic-related noise impacts at land uses adjacent to roadways conveying Project traffic. The noise contours represent the distance to noise levels of a constant value and are measured from the center of the roadway for the 70, 65, and 60 dBA noise levels. The noise contours do not consider the effect of any existing noise barriers or topography that may attenuate ambient noise levels. In addition, because the noise contours reflect modeling of vehicular noise on area roadways, they appropriately do not reflect noise contributions from the surrounding stationary noise sources within the Project study area. Tables 7-1 and 7-6 present a summary of the exterior traffic noise levels for each traffic condition. Appendix 7.1 includes the traffic noise level contours worksheets for each traffic condition.

TABLE 7-1: EXISTING WITHOUT PROJECT CONTOURS

ID	Road	Segment	Receiving Land Use[1]	CNEL at Nearest Receiving Land Use (dBA)[2]	Distance to Contour from Centerline (Feet)		
					70 dBA CNEL	65 dBA CNEL	60 dBA CNEL
1	Hayes Av.	s/o Nighthawk Wy.	SFR/P-OS	60.8	RW	RW	37
2	Hayes Av.	s/o Sherry Ln.	SFR	61.0	RW	RW	39
3	Hayes Av.	s/o Fullerton Rd.	SFR	61.6	RW	RW	42

[1] Sources: City of Murrieta General Plan Land Use Map.
[2] The CNEL is calculated at the boundary of the right-of-way of each roadway and the property line of the nearest receiving land use. "RW" = Location of the respective noise contour falls within the right-of-way of the road. "SFR"= Single-Family Residential; "P-OS"= Parks and Open Space.

TABLE 7-2: EXISTING WITH PROJECT CONTOURS

ID	Road	Segment	Receiving Land Use[1]	CNEL at Nearest Receiving Land Use (dBA)[2]	Distance to Contour from Centerline (Feet)		
					70 dBA CNEL	65 dBA CNEL	60 dBA CNEL
1	Hayes Av.	s/o Nighthawk Wy.	SFR/P-OS	61.4	RW	RW	41
2	Hayes Av.	s/o Sherry Ln.	SFR	61.7	RW	RW	43
3	Hayes Av.	s/o Fullerton Rd.	SFR	62.9	RW	RW	51

[1] Sources: City of Murrieta General Plan Land Use Map.
[2] The CNEL is calculated at the boundary of the right-of-way of each roadway and the property line of the nearest receiving land use. "RW" = Location of the respective noise contour falls within the right-of-way of the road. "SFR"= Single-Family Residential; "P-OS"= Parks and Open Space.

TABLE 7-3: PROJECT BUILDOUT PLUS AMBIENT WITHOUT PROJECT CONTOURS

ID	Road	Segment	Receiving Land Use[1]	CNEL at Nearest Receiving Land Use (dBA)[2]	Distance to Contour from Centerline (Feet)		
					70 dBA CNEL	65 dBA CNEL	60 dBA CNEL
1	Hayes Av.	s/o Nighthawk Wy.	SFR/P-OS	61.1	RW	RW	39
2	Hayes Av.	s/o Sherry Ln.	SFR	61.4	RW	RW	41
3	Hayes Av.	s/o Fullerton Rd.	SFR	62.0	RW	RW	45

[1] Sources: City of Murrieta General Plan Land Use Map.
[2] The CNEL is calculated at the boundary of the right-of-way of each roadway and the property line of the nearest receiving land use. "RW" = Location of the respective noise contour falls within the right-of-way of the road. "SFR"= Single-Family Residential; "P-OS"= Parks and Open Space.

TABLE 7-4: PROJECT BUILDOUT PLUS AMBIENT WITH PROJECT CONTOURS

ID	Road	Segment	Receiving Land Use[1]	CNEL at Nearest Receiving Land Use (dBA)[2]	Distance to Contour from Centerline (Feet)		
					70 dBA CNEL	65 dBA CNEL	60 dBA CNEL
1	Hayes Av.	s/o Nighthawk Wy.	SFR/P-OS	61.7	RW	RW	43
2	Hayes Av.	s/o Sherry Ln.	SFR	62.0	RW	RW	45
3	Hayes Av.	s/o Fullerton Rd.	SFR	63.1	RW	RW	53

[1] Sources: City of Murrieta General Plan Land Use Map.
[2] The CNEL is calculated at the boundary of the right-of-way of each roadway and the property line of the nearest receiving land use. "RW" = Location of the respective noise contour falls within the right-of-way of the road. "SFR"= Single-Family Residential; "P-OS"= Parks and Open Space.

TABLE 7-5: PROJECT BUILDOUT PLUS AMBIENT PLUS CUMULATIVE WITHOUT PROJECT CONTOURS

ID	Road	Segment	Receiving Land Use[1]	CNEL at Nearest Receiving Land Use (dBA)[2]	Distance to Contour from Centerline (Feet)		
					70 dBA CNEL	65 dBA CNEL	60 dBA CNEL
1	Hayes Av.	s/o Nighthawk Wy.	SFR/P-OS	61.1	RW	RW	39
2	Hayes Av.	s/o Sherry Ln.	SFR	61.4	RW	RW	41
3	Hayes Av.	s/o Fullerton Rd.	SFR	62.0	RW	RW	45

[1] Sources: City of Murrieta General Plan Land Use Map.
[2] The CNEL is calculated at the boundary of the right-of-way of each roadway and the property line of the nearest receiving land use. "RW" = Location of the respective noise contour falls within the right-of-way of the road. "SFR"= Single-Family Residential; "P-OS"= Parks and Open Space.

TABLE 7-6: PROJECT BUILDOUT PLUS AMBIENT PLUS CUMULATIVE WITH PROJECT CONTOURS

ID	Road	Segment	Receiving Land Use[1]	CNEL at Nearest Receiving Land Use (dBA)[2]	Distance to Contour from Centerline (Feet)		
					70 dBA CNEL	65 dBA CNEL	60 dBA CNEL
1	Hayes Av.	s/o Nighthawk Wy.	SFR/P-OS	61.7	RW	RW	43
2	Hayes Av.	s/o Sherry Ln.	SFR	62.0	RW	RW	45
3	Hayes Av.	s/o Fullerton Rd.	SFR	63.1	RW	RW	53

[1] Sources: City of Murrieta General Plan Land Use Map.
[2] The CNEL is calculated at the boundary of the right-of-way of each roadway and the property line of the nearest receiving land use. "RW" = Location of the respective noise contour falls within the right-of-way of the road. "SFR"= Single-Family Residential; "P-OS"= Parks and Open Space.

7.2 EXISTING PROJECT TRAFFIC NOISE LEVEL INCREASES

An analysis of existing traffic noise levels plus traffic noise generated by the proposed Project has been included in this report for informational purposes and to fully analyze all the existing traffic scenarios identified in the *Murrieta Canyon Academy Traffic Impact ExpansionStudy* prepared by Urban Crossroads, Inc. However, the analysis of existing off-site traffic noise levels plus traffic noise generated by the proposed Project scenario will not actually occur since the Project would not be fully constructed and operational until future year 2023 plus cumulative conditions. Table 7-1 shows the Existing without Project conditions CNEL noise levels. The Existing 2019 without Project exterior noise levels are expected to range from 60.8 to 61.6 dBA CNEL, without accounting for any noise attenuation features such as noise barriers or topography. Table 7-2 shows the Existing 2019 with Project conditions range from 61.4 to 62.9 dBA CNEL. Table 7-7 shows that the Project off-site traffic noise level increases range from 0.6 to 1.3 dBA CNEL on the study area roadway segments.

7.3 PROJECT BUILDOUT PLUS AMBIENT TRAFFIC NOISE LEVEL INCREASES

Table 7-3 presents the Project Buildout Plus Ambient 2023 without Project conditions CNEL noise levels. The Project Buildout Plus Ambient 2023 without Project exterior noise levels are expected to range from 61.1 to 62.0 dBA CNEL, without accounting for any noise attenuation features such as noise barriers or topography. Table 7-4 shows the Project Buildout Plus Ambient 2023 with Project conditions range from 61.7 to 63.1 dBA CNEL. Table 7-8 shows that the Project off-site traffic noise level increases range from 0.6 to 1.1 dBA CNEL.

7.4 PROJECT BUILDOUT PLUS AMBIENT PLUS CUMULATIVE TRAFFIC NOISE LEVEL INCREASES

Table 7-5 presents the Project Buildout Plus Ambient Plus Cumulative 2023 without Project conditions CNEL noise levels. The Project Buildout Plus Ambient Plus Cumulative 2023 without Project exterior noise levels are expected to range from 61.1 to 62.0 dBA CNEL, without accounting for any noise attenuation features such as noise barriers or topography. Table 7-6 shows the Project Buildout Plus Ambient Plus Cumulative 2023 with Project conditions range from 61.7 to 63.1 dBA CNEL. Table 7-9 shows that the Project off-site traffic noise level increases range from 0.6 to 1.1 dBA CNEL. Based on the significance criteria for off-site traffic noise presented in Table 4-1, land uses adjacent to the study area roadway segments would experience *less than significant* noise level impacts due to unmitigated Project-related traffic noise levels.

TABLE 7-7: EXISTING WITH PROJECT TRAFFIC NOISE LEVEL INCREASES

ID	Road	Segment	Receiving Land Use[1]	Noise-Sensitive Land Use?	CNEL at Receiving Land Use (dBA)[1]			Incremental Noise Level Increase Threshold[2]	
					No Project	With Project	Project Addition	Limit	Exceeded?
1	Hayes Av.	s/o Nighthawk Wy.	SFR/P-OS	Yes	60.8	61.4	0.6	3.0	No
2	Hayes Av.	s/o Sherry Ln.	SFR	Yes	61.0	61.7	0.7	3.0	No
3	Hayes Av.	s/o Fullerton Rd.	SFR	Yes	61.6	62.9	1.3	3.0	No

[1] The CNEL is calculated at the boundary of the right-of-way of each roadway and the property line of the receiving land use.
[2] Does the Project create an incremental noise level increase exceeding the significance criteria (Table 4-1)?
"SFR"= Single-Family Residential; "P-OS"= Parks and Open Space.

TABLE 7-8: PROJECT BUILDOUT PLUS AMBIENT WITH PROJECT TRAFFIC NOISE INCREASES

ID	Road	Segment	Receiving Land Use[1]	Noise-Sensitive Land Use?	CNEL at Receiving Land Use (dBA)[1]			Incremental Noise Level Increase Threshold[2]	
					No Project	With Project	Project Addition	Limit	Exceeded?
1	Hayes Av.	s/o Nighthawk Wy.	SFR/P-OS	Yes	61.1	61.7	0.6	3.0	No
2	Hayes Av.	s/o Sherry Ln.	SFR	Yes	61.4	62.0	0.6	3.0	No
3	Hayes Av.	s/o Fullerton Rd.	SFR	Yes	62.0	63.1	1.1	3.0	No

[1] The CNEL is calculated at the boundary of the right-of-way of each roadway and the property line of the receiving land use.
[2] Does the Project create an incremental noise level increase exceeding the significance criteria (Table 4-1)?
"SFR"= Single-Family Residential; "P-OS"= Parks and Open Space.

TABLE 7-9: PROJECT BUILDOUT PLUS AMBIENT PLUS CUMULATIVE TRAFFIC NOISE LEVEL INCREASES

ID	Road	Segment	Receiving Land Use[1]	Noise-Sensitive Land Use?	CNEL at Receiving Land Use (dBA)[1]			Incremental Noise Level Increase Threshold[2]	
					No Project	With Project	Project Addition	Limit	Exceeded?
1	Hayes Av.	s/o Nighthawk Wy.	SFR/P-OS	Yes	61.1	61.7	0.6	3.0	No
2	Hayes Av.	s/o Sherry Ln.	SFR	Yes	61.4	62.0	0.6	3.0	No
3	Hayes Av.	s/o Fullerton Rd.	SFR	Yes	62.0	63.1	1.1	3.0	No

[1] The CNEL is calculated at the boundary of the right-of-way of each roadway and the property line of the receiving land use.
[2] Does the Project create an incremental noise level increase exceeding the significance criteria (Table 4-1)?
"SFR"= Single-Family Residential; "P-OS"= Parks and Open Space.

8 ON-SITE TRAFFIC NOISE IMPACTS

An on-site exterior noise impact analysis has been completed to determine the noise exposure levels that would result from adjacent traffic noise sources in the Project study area, and to identify potential noise mitigation measures that would achieve acceptable Project exterior and interior noise levels. The primary source of traffic noise affecting the Project site is anticipated to be from Haynes Avenue. The Project would also be exposed to nominal traffic noise from the Project's internal local streets. However, due to the distance, topography and low traffic volume/speed, traffic noise from these roads will not make a substantive contribution to ambient noise conditions. This section analyzes on-site exterior and interior noise levels at the Project buildings.

8.1 EXTERIOR NOISE ANALYSIS

Using the FHWA traffic noise prediction model, and the parameters outlined in Section 6, the expected future exterior noise levels at the first-floor building façades were calculated. Table 8-1 presents a summary of future exterior noise level impacts at the first-floor receiver locations. The on-site transportation noise level impacts indicate that the unmitigated exterior noise levels will range from 63.5 to 64.2 dBA CNEL. The on-site traffic noise analysis calculations are provided in Appendix 8.1.

No exterior noise mitigation is required to satisfy the City of Murrieta General Plan Noise Element exterior land use/noise level compatibility criteria for the planned school use. As shown on Table 8-1, the classrooms and labs facing Hayes will experience *normally acceptable* exterior noise levels of less than 70.0 dBA CNEL. Therefore, because of the future unmitigated exterior traffic noise levels at the Project site, additional interior noise analysis is required to satisfy the General Plan Noise Element *normally acceptable* land use compatibility requirements. (2)

TABLE 8-1: UNMITIGATED EXTERIOR TRAFFIC NOISE LEVELS

Receiver Location	Roadway	First-Floor Unmitigated Noise Level (dBA CNEL)	Noise Element Land Use Compatibility[1]	Resulting Requirements[1]
Classroom	Hayes Ave.	63.5	*Normally Acceptable*	Interior Analysis
Lab	Hayes Ave.	64.2	*Normally Acceptable*	Interior Analysis

[1] Based on the Table 11-2 land use compatibility criteria for Schools (City of Murrieta General Plan Noise Element as shown on Exhibit 3-A).

8.2 INTERIOR NOISE ANALYSIS

To ensure that the interior noise levels comply with the City of Murrieta interior noise level standards, future noise levels were calculated at the first and second-floor building façades.

8.2.1 NOISE REDUCTION METHODOLOGY

The interior noise level is the difference between the predicted exterior noise level at the building façade and the noise reduction of the structure. Typical building construction will provide a Noise Reduction (NR) of approximately 12 dBA with "windows open" and a minimum 25 dBA noise reduction with "windows closed." (6) (21) However, sound leaks, cracks and openings within the window assembly can greatly diminish its effectiveness in reducing noise. Several methods are used to improve interior noise reduction, including: [1] weather-stripped solid core exterior doors; [2] upgraded dual glazed windows; [3] mechanical ventilation/air conditioning; and [4] exterior wall/roof assembles free of cut outs or openings.

8.2.2 INTERIOR NOISE LEVEL ASSESSMENT

Tables 8-2 and 8-3 show that the buildings within the Project will require a windows-closed condition and a means of mechanical ventilation (e.g. air conditioning). Table 8-2 shows that the future exterior noise levels at the first-floor building façades are expected to range from 63.5 to 64.2 dBA CNEL. The first-floor interior noise level analysis shows that the City of Murrieta 45 dBA CNEL interior noise level standard can be satisfied using standard building construction providing windows and sliding glass doors with minimum STC ratings of 27. Table 8-3 shows the future unmitigated noise levels at the second-floor building façades are expected to range from 63.3 to 64.0 dBA CNEL. The second-floor interior noise level analysis shows that the City of Murrieta 45 dBA CNEL interior noise level standard can be satisfied using standard building construction providing windows and sliding glass doors with minimum STC ratings of 27.

TABLE 8-2: FIRST-FLOOR INTERIOR NOISE IMPACTS (CNEL)

Receiver Location	Noise Level at Façade[1]	Required Interior Noise Reduction[2]	Estimated Interior Noise Reduction[3]	Upgraded Windows[4]	Interior Noise Level[5]
Classroom	63.5	18.5	25.0	No	38.5
Lab	64.2	19.2	25.0	No	39.2

[1] Exterior noise level at the façade with a windows closed condition requiring a means of mechanical ventilation (e.g. air conditioning).
[2] Noise reduction required to satisfy the 45 dBA CNEL interior noise standards.
[3] A minimum of 25 dBA noise reduction is assumed with standard building construction.
[4] Does the required interior noise reduction trigger upgraded windows with a minimum STC rating of greater than 27?
[5] Estimated interior noise level with minimum STC rating for all windows.

TABLE 8-3: SECOND-FLOOR INTERIOR NOISE IMPACTS (CNEL)

Receiver Location	Noise Level at Façade[1]	Required Interior Noise Reduction[2]	Estimated Interior Noise Reduction[3]	Upgraded Windows[4]	Interior Noise Level[5]
Classroom	63.3	18.3	25.0	No	38.3
Lab	64.0	19.0	25.0	No	39.0

[1] Exterior noise level at the façade with a windows closed condition requiring a means of mechanical ventilation (e.g. air conditioning).
[2] Noise reduction required to satisfy the 45 dBA CNEL interior noise standards.
[3] A minimum of 25 dBA noise reduction is assumed with standard building construction.
[4] Does the required interior noise reduction trigger upgraded windows with a minimum STC rating of greater than 27?
[5] Estimated interior noise level with minimum STC rating for all windows.

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9 SENSITIVE RECEIVER LOCATIONS

To assess the potential for long-term operational and short-term construction noise impacts, the following sensitive receiver locations, as shown on Exhibit 9-A, were identified as representative locations for analysis. Sensitive receivers are generally defined as locations where people reside or where the presence of unwanted sound could otherwise adversely affect the use of the land. Noise-sensitive land uses are generally considered to include schools, hospitals, single-family dwellings, mobile home parks, churches, libraries, and recreation areas. Moderately noise-sensitive land uses typically include multi-family dwellings, hotels, motels, dormitories, out-patient clinics, cemeteries, golf courses, country clubs, athletic/tennis clubs, and equestrian clubs. Land uses that are considered relatively insensitive to noise include business, commercial, and professional developments. Land uses that are typically not affected by noise include: industrial, manufacturing, utilities, agriculture, undeveloped land, parking lots, warehousing, liquid and solid waste facilities, salvage yards, and transit terminals.

To describe the potential off-site Project noise levels, eight receiver locations in the vicinity of the Project site were identified. All distances are measured from the Project site boundary to the outdoor living areas (e.g., private backyards) or at the building façade, whichever is closer to the Project site. The selection of receiver locations is based on FHWA guidelines and is consistent with additional guidance provided by Caltrans and the FTA, as previously described in Section 5.2. Other sensitive land uses in the Project study area that are located at greater distances than those identified in this noise study will experience lower noise levels than those presented in this report due to the additional attenuation from distance and the shielding of intervening structures. Distance is measured in a straight line from the project boundary to each receiver location.

R1: Location R1 represents the existing noise sensitive Murrieta Valley High, approximately 526 feet northeast of the Project site. A 24-hour noise measurement was taken near this location, L1, to describe the existing ambient noise environment.

R2: Location R2 represents the existing noise sensitive residence at 24200 Hayes Avenue, approximately 142 feet east of the Project site. Receiver R2 is placed at the residential building façade. A 24-hour noise measurement was taken near this location, L2, to describe the existing ambient noise environment.

R3: Location R3 represents the existing noise sensitive residence at 24104 Golden Mist Drive, approximately 156 feet south of the Project site. Receiver R3 is placed behind the existing 6-foot high noise barrier in the private outdoor living area (backyard). A 24-hour noise measurement near this location, L2, is used to describe the existing ambient noise environment.

R4: Location R4 represents the existing noise sensitive residence at 42512 Sherry Lane, approximately 85 feet southwest of the Project site. Receiver R4 is placed behind the existing 6-foot high noise barrier in the private outdoor living area (backyard). A 24-hour noise measurement near this location, L2, is used to describe the existing ambient noise environment.

R5: Location R5 represents the existing noise sensitive residence at 42515 Sherry Lane, approximately 91 feet west of the Project site. Receiver R5 is placed behind the existing

6-foot high noise barrier in the private outdoor living area (backyard). A 24-hour noise measurement near this location, L3, is used to describe the existing ambient noise environment.

R6: Location R6 represents the existing noise sensitive residence at 24112 Semillon Lane, approximately 86 feet west of the Project site. Receiver R6 is placed behind the existing 6-foot high noise barrier in the private outdoor living area (backyard). A 24-hour noise measurement near this location, L4, is used to describe the existing ambient noise environment.

R7: Location R7 represents the existing noise sensitive residence at 42491 Dusty Trail, approximately 641 feet northwest of the Project site. Receiver R7 is placed behind the existing 6-foot high noise barrier in the private outdoor living area (backyard). A 24-hour noise measurement near this location, L5, is used to describe the existing ambient noise environment.

R8: Location R8 represents the existing noise sensitive Thompson Middle School, approximately 239 feet north of the Project site. A 24-hour noise measurement was taken near this location, L4, to describe the existing ambient noise environment.

EXHIBIT 9-A: RECEIVER LOCATIONS

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10 OPERATIONAL NOISE IMPACTS

This section analyzes the potential stationary-source operational noise impacts at the nearby receiver locations, identified in Section 9, resulting from the operation of the proposed Murrieta Canyon Academy Project. Exhibit 10-A identifies the representative noise source locations used to assess the operational noise levels.

10.1 OPERATIONAL NOISE SOURCES

This operational noise analysis is intended to describe noise level impacts associated with the expected typical daytime school activities at the Project site. The on-site Project-related noise sources are expected to include: roof-top air conditioning units, outdoor student activity, basketball court activity and parking lot vehicle movements activity.

10.2 REFERENCE NOISE LEVELS

To estimate the Project operational noise impacts, reference noise level measurements were collected from similar types of activities to represent the noise levels expected with the development of the proposed Project. This section provides a detailed description of the reference noise level measurements shown on Table 10-1 used to estimate the Project operational noise impacts. It is important to note that the following projected noise levels assume the worst-case noise environment with the roof-top air conditioning units, outdoor student activity, basketball court activity and parking lot vehicle movements activity all operating at the same time. These sources of noise activity will likely vary throughout the day.

10.2.1 MEASUREMENT PROCEDURES

The reference noise level measurements presented in this section were collected using a Larson Davis LxT Type 1 precisions sound level meter (serial number 01146). The LxT sound level meter was calibrated using a Larson-Davis calibrator, Model CAL 200, was programmed in "slow" mode to record noise levels in "A" weighted form and was located at approximately five feet above the ground elevation for each measurement. The sound level meters and microphones were equipped with a windscreen during all measurements. All noise level measurement equipment satisfies the American National Standards Institute (ANSI) standard specifications for sound level meters ANSI S1.4-2014/IEC 61672-1:2013. (15)

TABLE 10-1: REFERENCE NOISE LEVEL MEASUREMENTS

Noise Source[1]	Duration (hh:mm:ss)	Ref. Distance (Feet)	Noise Source Height (Feet)	Min./Hour[2]		Reference Noise Level (dBA L_{eq})		Sound Power Level (dBA)[3]
				Day	Night	@ Ref. Dist.	@ 50 Feet	
Roof-Top Air Conditioning Units	96:00:00	5'	5'	39	0	77.2	57.2	88.9
Outdoor Student Activity	00:04:24	25'	6'	60	0	66.5	60.5	92.2
Basketball Court Activity	00:03:07	20'	5'	60	0	60.0	52.0	83.7
Parking Lot Vehicle Movements	01:00:00	10'	5'	60	0	52.2	41.7	73.4

[1] As measured by Urban Crossroads, Inc.
[2] Anticipated duration (minutes within the hour) of noise activity during typical hourly conditions expected at the Project site. "Day" = 7:00 a.m. to 10:00 p.m.; "Night" = 10:00 p.m. to 7:00 a.m.
[3] Sound power level represents the total amount of acoustical energy (noise level) produced by a sound source independent of distance or surroundings. Sound power levels calculated using the CadnaA noise model at the reference distance to the noise source.

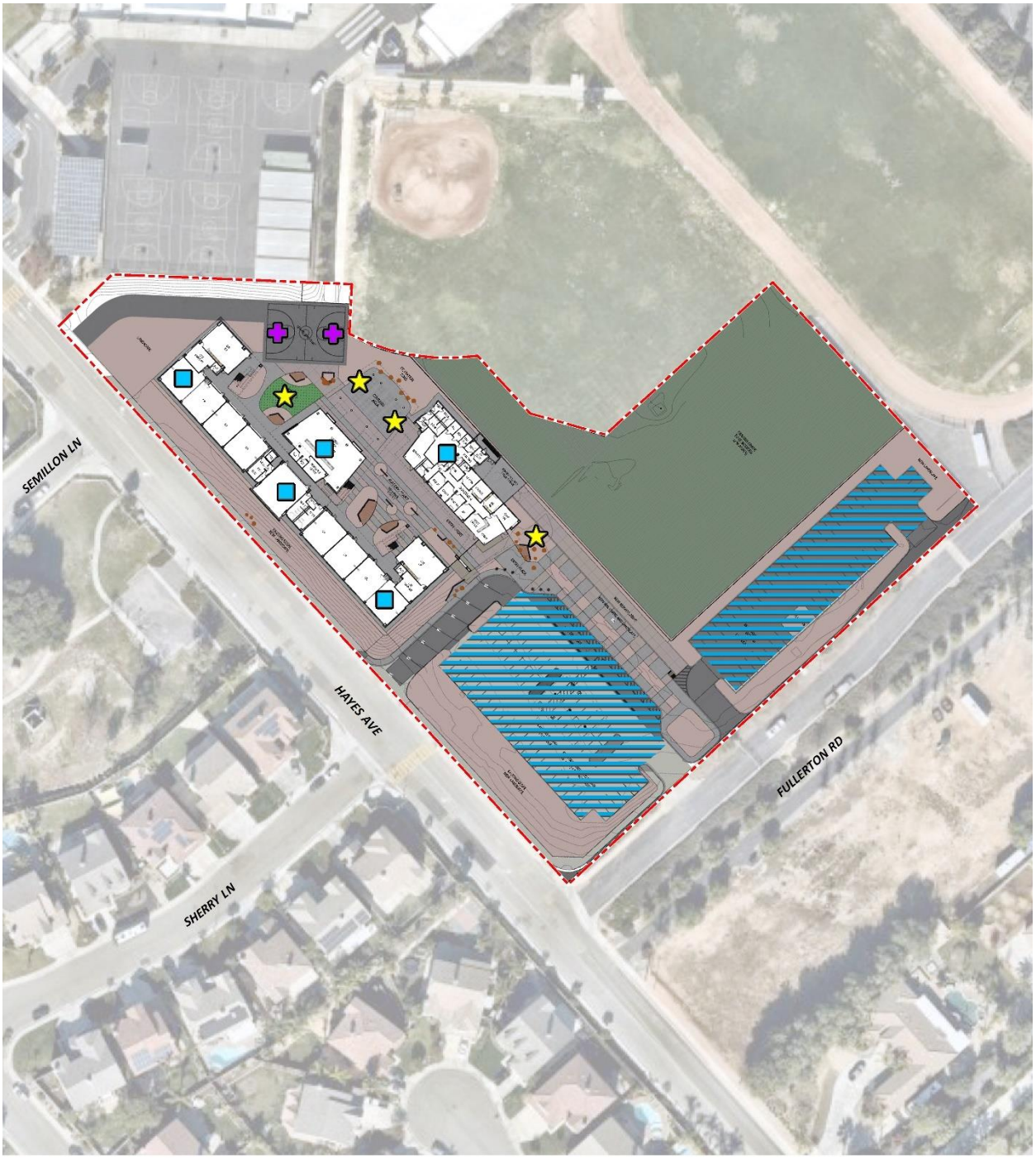
10.2.2 ROOF-TOP AIR CONDITIONING UNITS

To assess the noise levels created by the roof-top air conditioning units within the planned commercial retail land uses within the Project site, reference noise levels measurements were taken at the Santee Walmart. Located at 170 Town Center Parkway in the City of Santee, the noise level measurements describe a single mechanical roof-top air conditioning unit on the roof of the existing Walmart store. The reference noise level represents a Lennox SCA120 series 10-ton model packaged air conditioning unit. At 5 feet from the roof-top air conditioning unit, the exterior noise levels were measured at 77.2 dBA L_{eq}. At the uniform reference distance of 50 feet, the reference noise levels are 57.2 dBA L_{eq}. Based on the typical operating conditions observed over a four-day measurement period, the roof-top air conditioning units are estimated to operate for and average 39 minutes per hour during the daytime hours. These operating conditions reflect peak summer cooling requirements with measured temperatures approaching 96 degrees Fahrenheit (°F) with average daytime temperatures of 82°F. For this noise analysis, the air conditioning units are expected to be located on the roof of the Project buildings.

10.2.3 OUTDOOR STUDENT ACTIVITY

To describe the potential noise levels associated with the outdoor student activity, a reference noise level measurement was collected by Urban Crossroads, Inc. The reference noise levels include children and adults talking, and children playing on swings, slides, and other playground equipment. Using a uniform reference distance of 50 feet, the reference play area activity noise level is 60.5 dBA Leq. Noise associated with outdoor student activity is expected for 60 minutes per hour during all daytime hours from 7:00 a.m. to 10:00 p.m.

EXHIBIT 10-A: OPERATIONAL NOISE SOURCE LOCATIONS



10.2.4 BASKETBALL COURT ACTIVITY

To describe the potential noise levels associated with the Project's basketball courts, a reference noise level measurement was collected by Urban Crossroads, Inc. The reference noise level measurement includes children playing on one half of a full basketball court, and adults playing basketball on the other half. Using a uniform reference distance of 50 feet, the reference basketball court activity noise level is 52.0 dBA Leq. Noise associated with basketball court activity is expected for 60 minutes per hour during all daytime hours from 7:00 a.m. to 10:00 p.m.

10.2.5 PARKING LOT VEHICLE MOVEMENTS

To determine the noise levels associated with parking lot vehicle movements, Urban Crossroads collected reference noise level measurements over a 24-hour period at the parking lot. During the peak hour of activity, parking lot vehicle movements were measured at 41.7 dBA L_{eq} at 50 feet. Noise associated with parking lot vehicle movements is expected for 60 minutes per hour during all daytime hours from 7:00 a.m. to 10:00 p.m.

10.3 CADNAA NOISE PREDICTION MODEL

To fully describe the exterior operational noise levels from the Project, Urban Crossroads, Inc. developed a noise prediction model using the CadnaA (Computer Aided Noise Abatement) computer program. CadnaA can analyze multiple types of noise sources using the spatially accurate Project site plan, georeferenced Nearmap aerial imagery, topography, buildings, and barriers in its calculations to predict outdoor noise levels.

Using the ISO 9613 protocol, CadnaA will calculate the distance from each noise source to the noise receiver locations, using the ground absorption, distance, and barrier/building attenuation inputs to provide a summary of noise level at each receiver and the partial noise level contributions by noise source. Consistent with the ISO 9613 protocol, the CadnaA noise prediction model relies on the reference sound power level (PWL) to describe individual noise sources. While sound pressure levels (e.g. L_{eq}) quantify in decibels the intensity of given sound sources at a reference distance, sound power levels (PWL) are connected to the sound source and are independent of distance. Sound pressure levels vary substantially with distance from the source and diminish as a result of intervening obstacles and barriers, air absorption, wind, and other factors. Sound power is the acoustical energy emitted by the sound source and is an absolute value that is not affected by the environment.

The operational noise level calculations provided in this noise study account for the distance attenuation provided due to geometric spreading, when sound from a localized stationary source (i.e., a point source) propagates uniformly outward in a spherical pattern. Hard site conditions are used in the operational noise analysis which result in noise levels that attenuate (or decrease) at a rate of 6 dBA for each doubling of distance from a point source. A default ground attenuation factor of 1.0 was used in the CadnaA noise analysis to account for hard site conditions. Appendix 10.1 includes the detailed noise model inputs used to estimate the Project operational noise levels presented in this section.

10.4 PROJECT OPERATIONAL NOISE LEVELS

Using the reference noise levels to represent the proposed Project operations that include roof-top air conditioning units, outdoor student activity, basketball court activity and parking lot vehicle movements activity, Urban Crossroads, Inc. calculated the operational source noise levels that are expected to be generated at the Project site and the Project-related noise level increases that would be experienced at each of the sensitive receiver locations. Tables 10-2 shows the Project operational noise levels during the daytime hours of 7:00 a.m. to 10:00 p.m. The daytime hourly noise levels at the off-site receiver locations are expected to range from 32.9 to 49.7 dBA L_{eq}. No Project activities are expected during the nighttime hours from 10:00 p.m. to 7:00 a.m.

TABLE 10-2: DAYTIME PROJECT OPERATIONAL NOISE LEVELS

Noise Source[1]	Operational Noise Levels by Receiver Location (dBA Leq)							
	R1	R2	R3	R4	R5	R6	R7	R8
Roof-Top Air Conditioning Units	36.0	38.3	40.4	42.1	46.2	44.1	30.6	44.5
Outdoor Student Activity	44.2	37.7	36.4	40.9	37.7	29.5	28.7	48.0
Basketball Court Activity	31.0	29.1	22.4	18.4	18.9	18.2	19.0	34.8
Parking Lot Vehicle Movements	18.5	23.7	24.6	25.5	26.6	12.5	4.2	18.3
Total (All Noise Sources)	**45.0**	**41.4**	**42.0**	**44.6**	**46.8**	**44.3**	**32.9**	**49.7**

[1] See Exhibit 10-A for the noise source locations. CadnaA noise model calculations are included in Appendix 10.1.

10.5 PROJECT OPERATIONAL NOISE LEVEL COMPLIANCE

To demonstrate compliance with local noise regulations, the Project-only operational noise levels are evaluated against exterior noise level thresholds based on the City of Murrieta exterior noise level standards at nearby noise-sensitive receiver locations. Table 10-3 shows the operational noise levels associated with Murrieta Canyon Academy Project will satisfy the City of Murrieta 50 dBA L_{eq} daytime exterior noise level standards at all nearby receiver locations. Therefore, the operational noise impacts are considered *less than significant*.

TABLE 10-3: OPERATIONAL NOISE LEVEL COMPLIANCE

Receiver Location[1]	Receiving Land Use	Project Operational Noise Levels (dBA Leq)[2]	Noise Level Standards (dBA Leq)[3]	Noise Level Standards Exceeded?[4]
R1	School	45.0	50	No
R2	Residential	41.4	50	No
R3	Residential	42.0	50	No
R4	Residential	44.6	50	No
R5	Residential	46.8	50	No
R6	Residential	44.3	50	No
R7	Residential	32.9	50	No
R8	School	49.7	50	No

[1] See Exhibit 9-A for the receiver locations.
[2] Proposed Project daytime operational noise levels as shown on Tables 10-2.
[3] Exterior noise level standards by land use, as shown on Table 4-1.
[4] Do the estimated Project operational noise source activities exceed the noise level standards?
"Daytime" = 7:00 a.m. to 10:00 p.m.

10.6 PROJECT OPERATIONAL NOISE LEVEL INCREASES

To describe the Project operational noise level increases, the Project operational noise levels are combined with the existing ambient noise levels measurements for the nearby receiver locations potentially impacted by Project operational noise sources. Since the units used to measure noise, decibels (dB), are logarithmic units, the Project-operational and existing ambient noise levels cannot be combined using standard arithmetic equations. (4) Instead, they must be logarithmically added using the following base equation:

$$SPL_{Total} = 10\log_{10}[10^{SPL1/10} + 10^{SPL2/10} + \ldots 10^{SPLn/10}]$$

Where "SPL1," "SPL2," etc. are equal to the sound pressure levels being combined, or in this case, the Project-operational and existing ambient noise levels. The difference between the combined Project and ambient noise levels describe the Project noise level increases to the existing ambient noise environment. Noise levels that would be experienced at receiver locations when Project-source noise is added to the daytime ambient conditions are presented on Table 10-4. As indicated on Table 10-4, the Project will generate a daytime operational noise level increases ranging from 0.0 to 1.9 dBA L_{eq} at the nearby receiver locations. Project-related operational noise level increases will satisfy the operational noise level increase significance criteria presented in Table 4-1. Therefore, the incremental Project operational noise level increases are considered *less than significant* at all receiver locations.

.

TABLE 10-4: DAYTIME PROJECT OPERATIONAL NOISE LEVEL INCREASES

Receiver Location[1]	Total Project Operational Noise Level[2]	Measurement Location[3]	Reference Ambient Noise Levels[4]	Combined Project and Ambient[5]	Project Increase[6]	Noise Sensitive Land Use?	Increase Criteria[7]	Increase Criteria Exceeded?[7]
R1	45.0	L1	47.6	49.5	1.9	No	5.0	No
R2	41.4	L2	61.1	61.1	0.0	No	5.0	No
R3	42.0	L2	61.1	61.2	0.1	No	5.0	No
R4	44.6	L2	61.1	61.2	0.1	No	5.0	No
R5	46.8	L3	60.0	60.2	0.2	No	5.0	No
R6	44.3	L4	61.8	61.9	0.1	No	5.0	No
R7	32.9	L5	60.3	60.3	0.0	No	5.0	No
R8	49.7	L4	61.8	62.1	0.3	No	5.0	No

[1] See Exhibit 9-A for the receiver locations.
[2] Total Project daytime operational noise levels as shown on Table 10-2.
[3] Reference noise level measurement locations as shown on Exhibit 5-A.
[4] Observed daytime ambient noise levels as shown on Table 5-1.
[5] Represents the combined ambient conditions plus the Project activities.
[6] The noise level increase expected with the addition of the proposed Project activities.
[7] Significance increase criteria as shown on Table 4-1.

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11 CONSTRUCTION IMPACTS

This section analyzes potential impacts resulting from the short-term construction activities associated with the development of the Project. Exhibit 11-A shows the mobile equipment construction noise source locations in relation to the nearby sensitive receiver locations previously described in Section 9. Exhibit 11-B presents the stationary equipment noise source locations.

11.1 CONSTRUCTION NOISE LEVELS

Noise generated by the Project construction equipment will include a combination of trucks, power tools, concrete mixers, and portable generators that when combined can reach high levels. The number and mix of construction equipment is expected to occur in the following stages:

- Demolition
- Site Preparation
- Grading
- Building Construction
- Paving
- Architectural Coating

This construction noise analysis was prepared using reference noise level measurements taken by Urban Crossroads, Inc. to describe the typical construction activity noise levels for each stage of Project construction. The construction reference noise level measurements represent a list of typical construction activity noise levels. Noise levels generated by heavy construction equipment can range from approximately 68 dBA to more than 80 dBA when measured at 50 feet. However, these noise levels diminish with distance from the construction site at a rate of 6 dBA per doubling of distance. For example, a noise level of 80 dBA measured at 50 feet from the noise source to the receiver would be reduced to 74 dBA at 100 feet from the source to the receiver, and would be further reduced to 68 dBA at 200 feet from the source to the receiver.

11.2 CONSTRUCTION REFERENCE NOISE LEVELS

To describe the Project construction noise levels, measurements were collected for similar activities at several construction sites. Table 11-1 provides a summary of the construction reference noise level measurements. Since the reference noise levels were collected at varying distances of 30 feet and 50 feet, all construction noise level measurements presented on Table 11-1 have been adjusted for consistency to describe a uniform reference distance of 50 feet.

EXHIBIT 11-A: MOBILE EQUIPMENT CONSTRUCTION NOISE SOURCE LOCATIONS

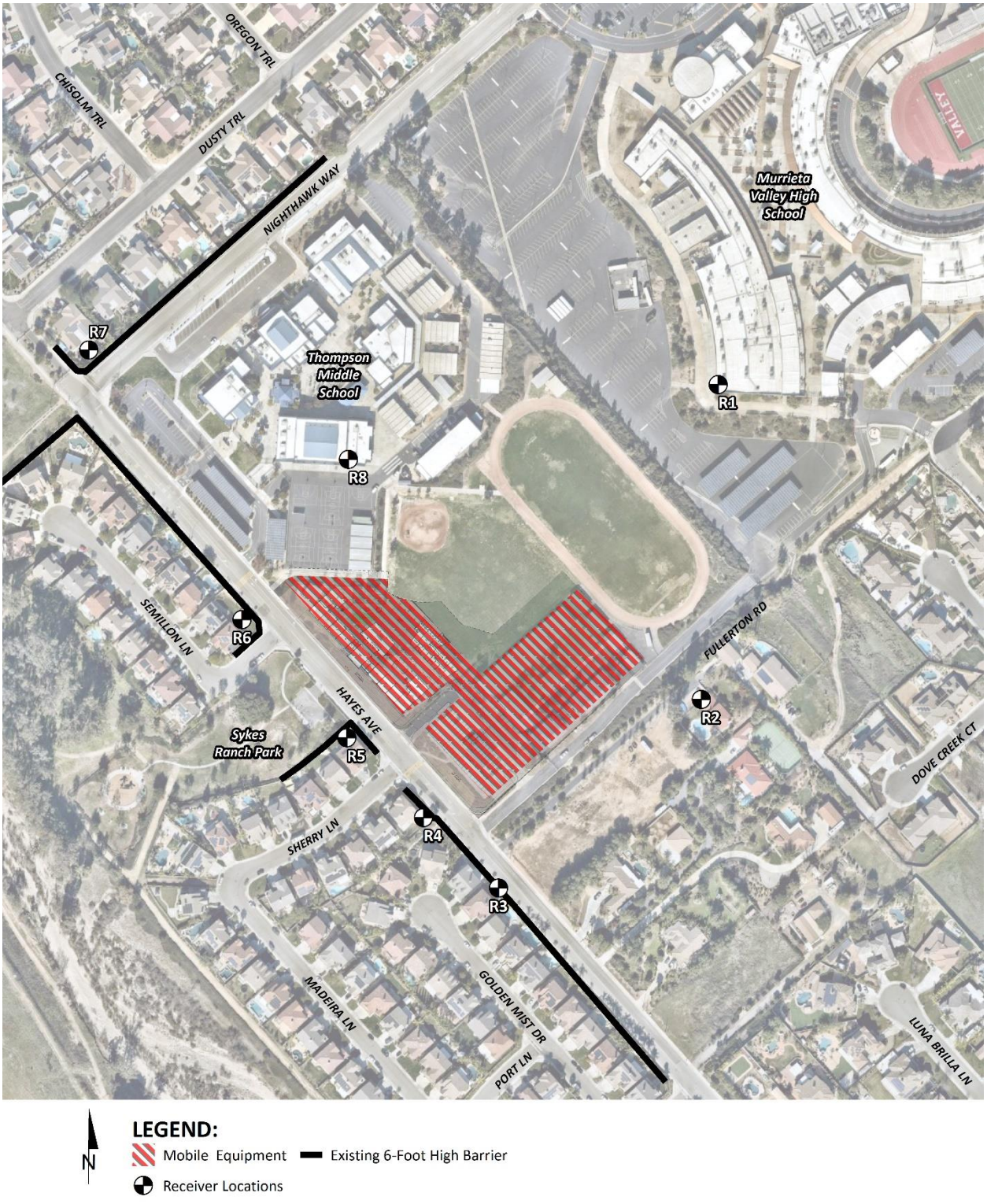

EXHIBIT 11-B: STATIONARY EQUIPMENT CONSTRUCTION NOISE SOURCE LOCATIONS

TABLE 11-1: CONSTRUCTION REFERENCE NOISE LEVELS

Source	Construction Stage	Reference Construction Activity[1]	Reference Noise Level @ 50 Feet (dBA L_{max})	Highest Reference Noise Level (dBA L_{max})
Mobile Equipment	Demolition	Demolition Activity	81.6	81.6
		Backhoe	72.0	
		Water Truck Pass-By & Backup Alarm	77.9	
	Site Preparation	Scraper, Water Truck, & Dozer Activity	83.3	83.3
		Backhoe	72.0	
		Water Truck Pass-By & Backup Alarm	77.9	
	Grading	Rough Grading Activities	80.4	80.4
		Water Truck Pass-By & Backup Alarm	77.9	
		Construction Vehicle Maintenance Activities	70.4	
	Paving	Concrete Mixer Backup Alarms & Air Brakes	78.8	78.8
		Concrete Mixer Truck Movements	73.1	
		Concrete Mixer Pour & Paving Activities	71.9	
Stationary Equipment	Building Construction	Foundation Trenching	70.5	72.3
		Framing	72.3	
		Crane	65.2	
	Architectural Coating	Air Compressors	67.0	67.0
		Generator	67.0	
		Crane	65.2	

[1] Reference construction noise level measurements taken by Urban Crossroads, Inc.

11.3 CONSTRUCTION NOISE ANALYSIS

Using the reference construction equipment noise levels and the CadnaA noise prediction model, calculations of the Project construction mobile and stationary equipment noise level impacts at the nearby sensitive receiver locations were completed. To assess the worst-case construction noise levels, the Project construction noise analysis relies on the highest noise level impacts when the equipment with the highest reference noise level is operating at the closest point from the edge of primary construction activity (Project site boundary) to each receiver location. As shown on Table 11-2, the construction noise levels are expected to range from 56.0 to 75.0 dBA L_{max} at the nearby receiver locations. Appendix 11.1 includes the detailed CadnaA construction noise model inputs.

TABLE 11-2: CONSTRUCTION EQUIPMENT NOISE LEVEL SUMMARY

Receiver Location[1]	Construction Noise Levels (dBA L_{eq})						
	Mobile Equipment				Stationary Equipment		Highest Levels[2]
	Demolition	Site Preparation	Grading	Paving	Building Construction	Architectural Coating	
R1	67.4	69.1	66.2	64.6	49.6	44.3	69.1
R2	69.5	71.2	68.3	66.7	47.5	42.2	71.2
R3	69.6	71.3	68.4	66.8	49.8	44.5	71.3
R4	70.6	72.3	69.4	67.8	52.2	46.9	72.3
R5	73.3	75.0	72.1	70.5	59.1	53.8	75.0
R6	68.1	69.8	66.9	65.3	52.8	47.5	69.8
R7	54.3	56.0	53.1	51.5	37.1	31.8	56.0
R8	70.9	72.6	69.7	68.1	54.6	49.3	72.6

[1] Noise receiver locations are shown on Exhibit 11-A.

[2] Construction noise level calculations based on distance from the primary construction activity area to nearby receiver locations. CadnaA construction noise model inputs are included in Appendix 11.1.

11.4 CONSTRUCTION NOISE LEVEL COMPLIANCE

Table 11-3 shows the highest construction noise levels at the potentially impacted receiver locations are expected to range from 56.0 to 75.0 dBA L_{max} from mobile equipment as shown on Exhibit 11-A, and 37.1 to 59.1 dBA L_{max} for stationary equipment as shown on Exhibit 11-B. The analysis shows that the Project related construction equipment noise levels will satisfy the City of Murrieta Municipal Code construction noise level standards of 75 dBA L_{max} for mobile equipment and the 60 dBA L_{max} standards for stationary equipment at all receiver locations. Therefore, the noise impacts due to unmitigated Project construction noise levels is considered a *less than significant.*

The construction noise analysis presents a conservative approach with the highest noise-level-producing equipment for each stage of Project construction operating at the closest point from primary construction activity to the nearby sensitive receiver locations. This scenario is unlikely to occur during typical construction activities and likely overstates the construction noise levels which will be experienced at each receiver location. With the construction noise abatement measures identified in the executive summary of this noise study, the worst-case construction noise level increases at the nearby residential receivers would be reduced.

TABLE 11-3: CONSTRUCTION NOISE LEVEL COMPLIANCE

Receiver Location[1]	Land Use Category	Highest Construction Activity Noise Levels[2]		Noise Level Threshold[3]		Threshold Exceeded?[4]	
		Mobile Equipment	Stationary Equipment	Mobile Equipment	Stationary Equipment	Mobile Equipment	Stationary Equipment
R1	School	69.1	49.6	75	60	No	No
R2	Residential	71.2	47.5	75	60	No	No
R3	Residential	71.3	49.8	75	60	No	No
R4	Residential	72.3	52.2	75	60	No	No
R5	Residential	75.0	59.1	75	60	No	No
R6	Residential	69.8	52.8	75	60	No	No
R7	Residential	56.0	37.1	75	60	No	No
R8	School	72.6	54.6	75	60	No	No

[1] Noise receiver locations are shown on Exhibit 11-A.
[2] Highest construction noise levels dBA L_{max} of mobile and stationary equipment, as shown on Table 11-2.
[3] Construction noise standards as shown on Table 3-2.
[4] Do the estimated Project construction noise levels exceed the construction noise level thresholds?

11.5 CONSTRUCTION VIBRATION IMPACTS

Construction activity can result in varying degrees of ground vibration, depending on the equipment and methods used, distance to the affected structures and soil type. It is expected that ground-borne vibration from Project construction activities would cause only intermittent, localized intrusion. The proposed Project's construction activities most likely to cause vibration impacts are:

- Heavy Construction Equipment: Although all heavy mobile construction equipment has the potential of causing at least some perceptible vibration while operating close to buildings, the vibration is usually short-term and is not of sufficient magnitude to cause building damage.
- Trucks: Trucks hauling building materials to construction sites can be sources of vibration intrusion if the haul routes pass through residential neighborhoods on streets with bumps or potholes. Repairing the bumps and potholes generally eliminates the problem.

Ground-borne vibration levels resulting from construction activities occurring within the Project site were estimated by data published by the Federal Transit Administration. Construction activities that would have the potential to generate low levels of ground-borne vibration within the Project site include grading. Using the vibration source level of construction equipment provided on Table 6-6 and the construction vibration assessment methodology published by the FTA, it is possible to estimate the Project vibration impacts. To assess the human perception of vibration levels in PPV, as previously discussed in Section 3, the velocities are converted to RMS vibration levels based on the Caltrans *Transportation and Construction Vibration Guidance Manual* (22) conversion factor of 0.71.

At distances ranging from 125 to 656 feet from the Project construction activities, construction vibration velocity levels are estimated to range from 0.000 to 0.006 in/sec RMS and will remain below the threshold of 0.01 in/sec RMS at all receiver locations, as shown on Table 11-4. Therefore, the Project-related vibration impacts are considered *less than significant* during the construction activities at the Project site. Moreover, the impacts at the site of the closest sensitive receivers are unlikely to be sustained during the entire construction period but will occur rather only during the times that heavy construction equipment is operating adjacent to the Project site perimeter.

TABLE 11-4: CONSTRUCTION VIBRATION LEVELS

Receiver[1]	Distance to Const. Activity (Feet)	Receiver Levels (in/sec) RMS[2]					Threshold (in/sec) RMS[3]	Threshold Exceeded?[4]
		Small Bulldozer (< 80k lbs)	Jack-hammer	Loaded Trucks	Large Bulldozer (> 80k lbs)	Highest Vibration Level		
R1	534'	0.000	0.000	0.001	0.001	0.001	0.01	No
R2	154'	0.000	0.002	0.004	0.004	0.004	0.01	No
R3	197'	0.000	0.001	0.002	0.003	0.003	0.01	No
R4	133'	0.000	0.002	0.004	0.005	0.005	0.01	No
R5	125'	0.000	0.002	0.005	0.006	0.006	0.01	No
R6	125'	0.000	0.002	0.005	0.006	0.006	0.01	No
R7	656'	0.000	0.000	0.000	0.000	0.000	0.01	No
R8	256'	0.000	0.001	0.002	0.002	0.002	0.01	No

[1] Receiver locations are shown on Exhibit 11-A.
[2] Based on the Vibration Source Levels of Construction Equipment included on Table 6-6. Vibration levels in PPV are converted to RMS velocity using a 0.71 conversion factor identified in the Caltrans Transportation and Construction Vibration Guidance Manual.
[3] City of Murrieta Municipal Code, Section 16.30.130 (K) (Appendix 3.1).
[4] Does the vibration level exceed the maximum acceptable vibration threshold?

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12 REFERENCES

1. **State of California.** *California Environmental Quality Act, Appendix G.* 2018.
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16. **U.S. Department of Transportation, Federal Highway Administration.** *FHWA Highway Traffic Noise Prediction Model.* December 1978. FHWA-RD-77-108.
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18. **California Department of Transportation.** *Traffic Noise Attenuation as a Function of Ground and Vegetation Final Report.* June 1995. FHWA/CA/TL-95/23.
19. **RK Engineering Group, Inc.** *Murrieta Canyon Academy Expansion Traffic Impact Study.* March 2020.
20. **City of Murrieta.** *General Plan Circulation Element.* July 2011.
21. **California Department of Transportation.** *Traffic Noise Analysis Protocol.* May 2011.
22. —. *Transportation and Construction Vibration Guidance Manual.* April 2020.

13 CERTIFICATION

The contents of this noise study report represent an accurate depiction of the noise environment and impacts associated with the proposed Murrieta Canyon Academy Project. The information contained in this noise study report is based on the best available data at the time of preparation. If you have any questions, please contact me directly at (949) 336-5979.

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EDUCATION

Master of Science in Civil and Environmental Engineering
California Polytechnic State University, San Luis Obispo • December, 1993

Bachelor of Science in City and Regional Planning
California Polytechnic State University, San Luis Obispo • June, 1992

PROFESSIONAL REGISTRATIONS

PE – Registered Professional Traffic Engineer – TR 2537 • January, 2009
AICP – American Institute of Certified Planners – 013011 • June, 1997–January 1, 2012
PTP – Professional Transportation Planner • May, 2007 – May, 2013
INCE – Institute of Noise Control Engineering • March, 2004

PROFESSIONAL AFFILIATIONS

ASA – Acoustical Society of America
ITE – Institute of Transportation Engineers

PROFESSIONAL CERTIFICATIONS

Certified Acoustical Consultant – County of Orange • February, 2011
FHWA-NHI-142051 Highway Traffic Noise Certificate of Training • February, 2013

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APPENDIX 3.1:

CITY OF MURRIETA MUNICIPAL CODE

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16.30 Noise

Sections:

16.30.010 Purpose.
16.30.020 Declaration of Policy.
16.30.030 Definitions.
16.30.040 Enforcement of Regulations.
16.30.050 Initial Violations.
16.30.060 Activities Exempt from Regulations.
16.30.070 Decibel Measurement.
16.30.080 Noise Zones Designated.
16.30.090 Exterior Noise Standards.
16.30.100 Interior Noise Standards for Multi-family Residential.
16.30.110 Correction for Certain Types of Sounds.
16.30.120 Measurement Methods.
16.30.130 Acts Deemed Violations of Chapter.
16.30.140 Modification of Standards.

16.30.010 Purpose.

The purpose of this chapter is to establish standards to protect the health, safety, and welfare of those living and working in the city and to implement policies of the general plan noise element. (Ord. 182 § 2 (part), 1997)

16.30.020 Declaration of Policy.

Excessive noise levels are detrimental to the health and safety of individuals. Noise is considered a public nuisance and the city discourages unnecessary, excessive or annoying noises from all sources. Creating, maintaining, causing or allowing to be created. caused or maintained any noise or vibration in a manner prohibited by the provisions of this chapter is a public nuisance and shall be punishable as a misdemeanor.
(Ord. 182 § 2 (part), 1997)

16.30.030 Definitions.

The following words. terms and phrases. when used in this chapter, shall have the meanings ascribed to them in this chapter, except where the context clearly indicates a different meaning:
A-Weighted Sound Level. The sound level in decibels as measured on a sound level meter using the A-weighting network. The level so read is designated dB(A) or dBA.
Ambient Noise Histogram. The composite of all noise from sources near and far, excluding the alleged intrusive noise source. In this context, the ambient noise histogram shall constitute the normal or existing level of environmental noise at a given location.
Cumulative Period. An additive period of time composed of individual time segments which may be continuous or interrupted.
Decibel. A unit for measuring the amplitude of a sound, equal to twenty (20) times the logarithm to the base of ten of the ratio of the pressure of the sound measured to the reference pressure, which is twenty (20) micropascals.
Emergency Machinery, Vehicle or Alarm. Any machinery, vehicle or alarm used, employed, performed or operated in an effort to protect, provide or restore safe conditions in the community, or work by private or public utilities when restoring utility service.
Emergency Work. Work performed for the purpose of preventing or alleviating the physical trauma or property damage threatened or caused by an emergency.
Fixed Noise Source. A stationary device which creates sounds while fixed or motionless, including, but not limited to, residential, agricultural, industrial and commercial machinery and equipment, pumps, fans, compressors, air conditioners and refrigeration equipment.
Impulsive Noise. A sound of short duration, usually less than one second and of high intensity, with an abrupt onset and rapid decay.
Intrusive Noise. The alleged offensive noise that intrudes over and above the existing ambient noise at the receptor property.

Mobile Noise Source. A noise source other than a fixed noise source.
Noise Disturbance. An alleged intrusive noise that violates an applicable noise standard of this chapter. Noise Histogram. A graphical representation of the distribution of frequency of occurrence of all noise levels near and far measured over a given period of time.
Noise Level (L_N). The noise level expressed in decibels that exceeds the specified (L,) value a percentage of total time measured. For example, an L25 noise level means that noise level that is exceeded twenty-five (25) percent of the time measured.
Noise-Sensitive Area. An area designated for the purpose of ensuring exceptional quiet (e.g.. around hospitals, nursing homes, libraries, and similar uses).
NoiseZone. A defined area of a generally consistent land use.
Pure Tone Noise. A sound that can be judged as audible as a single pitch or a set of single pitches by the code enforcement officer. For the purposes of this chapter, a pure tone shall exist if the one-third octave band sound pressure level in the band with the tone exceeds the arithmetic average of the sound-pressure levels of the two contiguous one-third octave bands by five dB for center frequencies of five hundred (500) Hertz and above, and by eight dB for center frequencies between one hundred sixty (160) and four hundred (400) Hertz, and by fifteen (15) dB for center frequencies less than or equal to one hundred twenty-five (125) Hertz.
Sound Level Meter. An instrument, including a microphone, an amplifier, an output meter and frequency weighting network, for the measurement of sound levels, that satisfies the requirements pertinent for Type S2A meters in American National Standards Institute specifications for sound level meters.
Vibration. The minimum ground or structure-borne vibrational motion necessary to cause a normal person to be aware of the vibration including, but not limited to, sensation by touch or visual observations of moving objects. The perception threshold shall be presumed to be a motion velocity of 0.01 in/sec over the range of one to one hundred (100) Hertz.
Weekday. Any day. Monday through Friday, that is not a legal holiday.
(Ord. 182 § 2 (part), 1997)

16.30.040 Enforcement of Regulations.

The code enforcement officer shall have primary responsibility for the enforcement of the noise regulations contained in this chapter. The code enforcement officer shall make all noise-level measurements required for the enforcement of this chapter.
(Ord. 182 § 2 (part), 1997)

16.30.050 Initial Violations.

In the event of an initial violation of the provisions of this chapter, a written notice of violation shall be given the alleged violator. specifying the time by which the condition shall be corrected or an application for a permit or variance shall be filed. No further action shall be taken if the cause of the violation has been removed, the condition abated, or fully corrected within the time period specified in the written notice.
(Ord. 182 § 2 (part), 1997)

16.30.060 Activities Exempt from Regulations.

The following activities shall be exempt from the provisions of this chapter:

A. Emergency Exemption. The emission of sound for the purpose of alerting persons to the existence of an emergency, or the emission of sound in the performance of emergency work.

B. Warning Device. Warning devices necessary for the protection of public safety, (e.g., police, tire and ambulance sirens, and train horns).

C. Outdoor Activities. Activities conducted on public playgrounds and public or private school grounds. including, but not limited to, school athletic and school entertainment events.

D. Motion Picture Production and Related Activities. Activities in connection to production of motion pictures.

E. Railroad Activities. All locomotives and rail cars operated by any railroad which is regulated by the state Public Utilities Commission.

F. Federal or State Pre-Exempted Activities. Any activity, to the extent regulation thereof has been pre-empted by state or federal law,

G. Public Health and Safety Activities. All transportation, flood control, and utility company

maintenance and construction operations at any time on public right-of-way, and those situations that may occur on private real property deemed necessary to serve the best interest of the public and to protect the public's health and well being, including, but not limited to, street sweeping, debris and limb removal, removal of downed wires, restoring electrical service, repairing traffic signals, unplugging sewers, house moving, vacuuming catchbasins, removal of damaged poles and vehicles, repair of water hydrants and mains, gas lines, oil lines, sewers, etc.

H. Motor, Vehicles on Public Right-of-Way and Private Property. Except as provided in this chapter, all vehicles operating in a legal manner in compliance with local, state, and federal vehicle noise regulations within the public right-of-way or on private property.

1. Minor Maintenance to Residential Real Property. Noise sources associated with the minor maintenance of residential real property, provided the activities take place between the hours of seven a.m. and eight p.m. on any day except Sunday, or between the hours of nine a.m. and eight p.m. on Sunday.

(Ord. 182 § 2 (part), 1997)

16.30.070 Decibel Measurement.

Decibel measurements made in compliance with the provisions of this chapter shall be based on a reference sound-pressure of twenty (20) micropascals, as measured with a sound level meter using the A-weighted network (scale) at slow response, or at the fast response when measuring impulsive sound levels and vibrations.

(Ord. 182 § 2 (part). 1997)

16.30.080 Noise Zones Designated.

Receptor properties described in this chapter are hereby assigned to the following noise zones:

A. Noise zone I, noise-sensitive area:
B. Noise zone II, residential properties;
C. Noise zone Ill, commercial properties: and
D. Noise zone IV, industrial properties.

(Ord. 182 § 2 (part), 1997)

16.30.090 Exterior Noise Standards.

A. Standards for Noise Zones. Unless otherwise provided in this chapter, the following exterior noise levels shall apply to all receptor properties within a designated noise zone:

TABLE 3-6
EXTERIOR NOISE STANDARDS

Noise Zone	Designated Noise Zone Land Use (Receptor Property)	Time Interval	Allowed Exterior Noise Level (dB)
I	Noise-sensitive area	Anytime	45
II	Residential properties Residential properties within five hundred (500) feet of a kennel(s)	10:00 p.m. to 7:00 a.m. (nighttime) 7:00 a.m. to 10:00 p.m. (daytime) 7:00 a.m. to 10:00 p.m.	45 50 70
III	Commercial properties	10:00 p.m. to 7:00 a.m. (nighttime) 7:00 a.m. to 10:00 p.m. (daytime)	55 60
IV	Industrial properties	Anytime	70

B. Noise Standards. No person shall operate or cause to be operated. any source of sound at any location within the city or allow the creation of any noise on property owned, leased, occupied or otherwise controlled by a person that causes the noise level, when measured on any other property to exceed the following exterior noise standards:

1. Standard No.1. Standard No. 1 shall be the exterior noise level which shall not be exceeded for a cumulative period of more than thirty (30) minutes in any hour. Standard No. 1 may be the applicable noise level from Table 3-6 above.

2. Standard No. 2. Standard No. 2 shall be the exterior noise level which shall not be exceeded for a cumulative period of more than fifteen (15) minutes in any hour. Standard No. 2 shall be the applicable noise level from Table 3-6 above, plus five dB.

3. Standard No.3. Standard No. 3 shall be the exterior noise level which shall not be exceeded for a cumulative period of more than five minutes in any hour. Standard No. 3 shall be the applicable noise level from Table 3-6 above plus ten dB.

4. Standard No.4. Standard No. 4 shall be the exterior noise level which shall not be exceeded for a cumulative period of more than one minute in any hour. Standard No. 4 shall be the applicable noise level from Table 3-6 above plus fifteen (15) dB.

5. Standard No. 5. Standard No. 5 shall be the exterior noise level which shall not be exceeded for any period of time. Standard No. 5 shall be the applicable noise level from Table 3-6 above plus twenty (20) dB.

C. Noise at Zone Boundaries. If the measurement location is on a boundary property between two different zoning districts, the exterior noise level utilized in subsection B of this chapter to determine the exterior standard shall be the arithmetic mean of the exterior noise levels. as specified in Table 3-6, of the subject zones.

D. Measurement of Ambient Noise Histogram. The ambient noise histogram shall be measured at the same location along the property line utilized in subsection B. above, with the alleged intruding noise source inoperative. If the alleged intruding noise source cannot be turned off, the ambient noise histogram shall be estimated by performing a measurement in the same general area of the alleged intruding noise source but at a sufficient distance so that the noise from the alleged intruding noise source is at least ten dB below the ambient noise histogram.

E. Abatement Notice in Lieu of Citation. If the intrusive noise exceeds the exterior noise standards provided in subsections A and B above, at a specific receptor property and the code enforcement officer has reason to believe that this violation was unanticipated and due to abnormal conditions, the code enforcement officer shall issue an abatement notice in lieu of a citation. lithe specific violation is abated, no citation shall be is-sued. If the specific violation is not abated, the code enforcement officer shall issue a citation.

(Ord. 182 § 2 (part), 1997)

16.30.100 Interior Noise Standards for Multi-Family Residential.

A. Noise Standards for Residential Units. No person shall operate or cause to be operated within a residential unit. any source of sound, or allow the creation of any noise, that causes the noise level when measured inside a neighboring receiving residential unit to exceed the following standards:

1. Standard No.1. The applicable interior noise level for cumulative period of more than five minutes in any hour;

2. Standard No.2. The applicable interior noise level plus five dB for a cumulative period of more than one minute in any hour; or

3. Standard No.3. The applicable interior noise level plus ten dB for any period of time.

B. Interior Noise Levels for Multi-Family Residential. The following interior noise levels shall apply within multi-family dwellings with windows in their normal seasonal configuration.

Noise Zone	Designated Land Use	Time Interval	Allowable Interior Noise Level(dBl
All	Multi-family Residential	10:00 p.m.—7:00 a.m. 7:00 a.m.—10:00 p.m.	40 45

If the measured ambient noise level reflected by the L_{50} exceeds that permissible within the interior noise standards in subsection A above. the allowable interior noise level shall be increased in five dB increments to reflect the ambient noise level (L5„).
(Ord. 182 § 2 (part), 1997)

16.30.110 Correction for Certain Types of Sounds.

For any source of sound that emits a pure tone or impulsive noise, the allowed noise levels provided in Sections 1 6.30.090 (Exterior Noise Standards) and 16.30.100 (Interior Noise Standards for Multi-family Residential) shall be reduced by five decibels.
(Ord. 182 § 2 (part). 1997)

16.30.120 Measurement Methods.

A. A-weighting Scale. The noise level shall be measured at a position(s) at any point on the receiver's property utilizing the A-weighting scale of the sound-level meter and the slow meter response (use fast response for impulsive type sounds). Calibration of the measurement equipment, utilizing an acoustic calibrator, shall be performed immediately prior to recording any noise data.

B. Microphone Location. The microphone shall be located four to five feet above the ground and ten feet or more from the nearest reflective surface except in those cases where another elevation is deemed appropriate.

C. Interior Noise. Interior noise measurements shall be made within the affected residential unit. The measurements shall be made at a point at least four feet from the wall, ceiling or floor nearest the noise source, with windows in the normal seasonal configuration.
(Ord. 182 § 2 (part), 1997)

16.30.130 Acts Deemed Violations of Chapter.

The following acts are a violation of this chapter.

A. Construction Noise.

1. Operating or causing the operation of tools or equipment used in construction, drilling, repair, alteration, or demolition work between weekday hours of eight p.m. and seven a.m., or at any time on Sundays or holidays so that the sound creates a noise disturbance across a residential or commercial property line, except for emergency work of public service utilities.

2. Construction activities shall be conducted in a manner that the maximum noise levels at the affected structures will not exceed those listed in the following schedule:

a. Residential Structures:

1) Mobile Equipment. Maximum noise levels for nonscheduled, intermittent, short-term operation (less than ten days) of mobile equipment:

	Single-family Residential	Multi-family Residential	Commercial
Daily, except Sundays and legal holidays, 7:00 a.m. to 8:00 p.m.	75 dBA	80 dBA	85 dBA
Daily, 8:00 p.m. to 7:00 a.m. and all day Sunday and legal holidays	60 dBA	64 dBA	70 dBA

2) Stationary Equipment. Maximum noise level for repetitively scheduled and relatively long-term operation periods (three days or more) of stationary equipment:

	Single-family Residential	Multi-family Residential	Commercial
Daily, except Sundays and legal holidays, 7:00 a.m. to 8:00 p.m.	60 dBA	65 dBA	70 dBA
Daily, 8:00 p.m. to 7:00 a.m. and all day Sunday and legal holidays	50 dBA	55 dBA	60 dBA

b. Business Structures. Maximum noise levels for nonscheduled, intermittent, short-term operation of mobile equipment: daily. including Sundays and legal holidays, all hours: maximum of eighty-five (85) dBA.

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

B. Loading and Unloading Operations. Loading, unloading, opening, closing or other handling of boxes. crates, containers, building materials, garbage cans or similar objects between the hours of ten p.m. and six am. in a manner to cause a noise disturbance is prohibited.

C. Noise Disturbances in Noise-Sensitive Zones. Creating or causing the creation of a noise disturbance within a noise-sensitive zone is prohibited, provided that conspicuous signs are displayed indicating the presence of the zone. Noise-sensitive zones shall be indicated by the display of conspicuous signs in at least three separate locations within five hundred (500) feet of the institution or facility (e.g., health care facility)

D. Places of Public Entertainment. Operating, playing, or permitting the operation or playing of a radio, television. phonograph, drum, musical instrument, sound amplifier or similar device that produces, reproduces, or amplifies sound in a place of public entertainment at a sound level greater than ninety-five (95) dBA, (read by the slow response on a sound level meter) at any point that is normally occupied by a customer is prohibited, unless conspicuous signs are located near each public entrance stating, "Warning: Sound Levels Within May Cause Hearing Impairment."

E. Emergency Signaling Devices.

1. The intentional sounding or permitting the sounding outdoors of an emergency signaling device, including fire, burglar or civil defense alarm, siren, whistle, or similar stationary emergency signaling device, except for emergency purposes or for testing is prohibited.

2. Testing of a stationary emergency signaling device shall not occur before seven a.m. or after seven p.m. Testing shall use only the minimum cycle test time. Test time shall not exceed sixty (60) seconds. Testing of the complete emergency signaling system, including the functioning of the signaling device, and the personnel response to the signaling device, shall not occur more than once in each calendar month. Testing shall not occur before seven a.m. or after ten p.m.

3. Sounding or permitting the sounding of an exterior burglar or fire alarm, or motor vehicle burglar alarm
is prohibited, unless the alarm is terminated within fifteen (15) minutes of activation.

F. Stationary Nonemergency Signaling Devices. Sounding or permitting the sounding of an electronically amplified signal from a stationary bell, chime, siren. whistle, or similar device intended primarily for nonemergency purposes, from any place, for more than ten consecutive seconds in any hourly period is prohibited.

G. Refuse Collection Vehicles.

1. Operating or permitting the operation of the compacting mechanism of any motor vehicle that compacts refuse and that creates, during the compacting cycle, a sound level in excess of eighty-six (86) dBA when measured at fifty (50) feet from any point of the vehicle is prohibited.

2. Collecting refuse, or operating or permitting the operation of the compacting mechanism of any motor vehicle that compacts refuse between the hours often p.m. and six a.m. the following day in a residential area or noise-sensitive zone is prohibited.

H. Sweepers and Associated Equipment. Operating or permitting the operation of sweepers or associated sweeping equipment (i.e., blowers) between the hours often p.m. and six a.m. the following day in, or adjacent to, a residential area or noise-sensitive area is prohibited.

I. Residential Air Conditioning or Refrigeration Equipment. Operating or permitting the operation of air conditioning or refrigeration equipment in a manner that exceeds the following sound levels is prohibited:

Measurement Location	Maximum Noise level
Any point on neighboring property line, five feet above grade level, no closer than three feet from any wall.	55
Center of neighboring patio, five feet above grade level, no closer than three feet from any wall.	50

Outside the neighboring living area window nearest the equipment location, not more than three feet from the window opening, but at least three feet from any other surface.	50

J. Vehicle or Motorboat Repairs and Testing. Repairing, rebuilding, modifying or testing any motor vehicle, motorcycle or motorboat in a manner as to cause a noise disturbance across property lines or within a noise-sensitive zone is prohibited.

K. Vibration. Operating or permitting the operation of any device that creates vibration that is above the vibration perception threshold of an individual at or beyond the property boundary of the source if on private property, or at one hundred fifty (150) feet from the source if on a public space or public right-of-way is prohibited. The perception threshold shall be a motion velocity of 0.01 in/sec over the range of 1 to 100 Hertz.

(Ord. 544 § 3, 2019; Ord. 182 §2 (part), 1997)

16.30.140 Modification of Standards.

Modifications to the requirements of this chapter may be granted by the director for a period of up to two years, subject to any terms, conditions, or requirements to minimize adverse effects on the surrounding neighborhood reasonable. Modifications may be granted only if one of the following findings can be made:

A. Additional time is necessary for the applicant to alter or modify the activity, operation, or noise source to comply with this chapter: or

B. The activity, operation, or noise source cannot feasibly be done in a manner that would comply with the provisions of this chapter. and no other reasonable alternative is available to the applicant.

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APPENDIX 5.1:

STUDY AREA PHOTOS

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JN: 12532 Study Area Photos

L1_E
33, 33' 43.280000", 117, 13' 46.200000"

L1_N
33, 33' 43.740000", 117, 13' 46.310000"

L1_S
33, 33' 43.280000", 117, 13' 46.200000"

L1_W
33, 33' 43.150000", 117, 13' 46.140000"

L2_E
33, 33' 33.370000", 117, 13' 55.840000"

L2_N
33, 34' 3.760000", 117, 12' 57.500000"

JN: 12532 Study Area Photos

L2_S
33, 33' 33.290000", 117, 13' 55.920000"

L2_W
33, 33' 33.370000", 117, 13' 55.840000"

L3_E
33, 33' 36.600000", 117, 13' 59.030000"

L3_N
33, 33' 36.690000", 117, 13' 58.860000"

L3_S
33, 33' 36.610000", 117, 13' 58.940000"

L3_W
33, 33' 36.600000", 117, 13' 59.030000"

JN: 12532 Study Area Photos

L4_E
33, 33' 39.200000", 117, 14' 2.350000"

L4_N
33, 33' 39.250000", 117, 14' 2.380000"

L4_S
33, 33' 39.250000", 117, 14' 2.380000"

L4_W
33, 33' 39.200000", 117, 14' 2.350000"

L5_E
33, 33' 46.210000", 117, 14' 4.880000"

L5_N
33, 33' 43.970000", 117, 14' 6.550000"

JN: 12532 Study Area Photos

L5_S
33, 33' 46.210000", 117, 14' 4.820000"

L5_W
33, 33' 46.190000", 117, 14' 4.930000"

APPENDIX 5.2:

NOISE LEVEL MEASUREMENT WORKSHEETS

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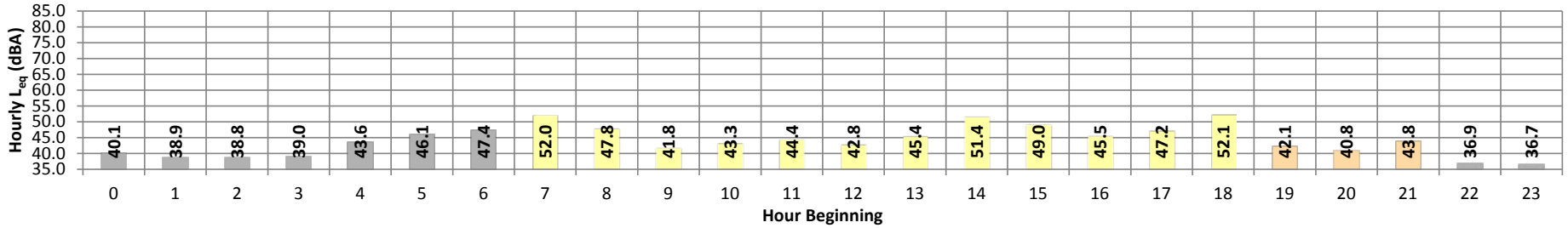
24-Hour Noise Level Measurement Summary

Date: Wednesday, September 18, 2019 *Location:* L1 - Located northeast of project side on dirt road adjacent to Douglas Avenue and Fullerton Road. *Meter:* Piccolo II *JN:* 12532

Project: Murrieta Canyon Academy *Analyst:* P. Mara

Hourly L_{eq} dBA Readings (unadjusted)



Timeframe	*Hour*	L_{eq}	L_{max}	L_{min}	*L1%*	*L2%*	*L5%*	*L8%*	*L25%*	*L50%*	*L90%*	*L95%*	*L99%*	L_{eq}	*Adj.*	*Adj.* L_{eq}
Night	0	40.1	48.2	37.5	47.6	46.8	44.3	42.5	39.7	38.9	38.0	37.8	37.6	40.1	10.0	50.1
	1	38.9	41.2	37.4	41.0	40.8	40.4	40.2	39.2	38.6	37.9	37.7	37.5	38.9	10.0	48.9
	2	38.8	41.4	37.2	41.1	40.9	40.5	40.2	39.3	38.5	37.6	37.5	37.3	38.8	10.0	48.8
	3	39.0	41.3	37.6	41.0	40.8	40.4	40.1	39.4	38.8	38.1	37.9	37.7	39.0	10.0	49.0
	4	43.6	46.7	41.7	46.4	46.2	45.6	45.3	44.1	43.4	42.2	42.0	41.8	43.6	10.0	53.6
	5	46.1	49.4	44.2	49.1	48.9	48.3	47.9	46.3	45.6	44.7	44.6	44.3	46.1	10.0	56.1
	6	47.4	51.9	45.6	51.4	51.0	49.9	49.2	47.6	46.8	46.0	45.8	45.6	47.4	10.0	57.4
Day	7	52.0	61.3	47.0	61.0	60.3	57.9	56.0	50.8	49.1	47.7	47.5	47.2	52.0	0.0	52.0
	8	47.8	56.4	42.3	56.1	55.7	54.2	52.2	47.1	44.9	43.0	42.7	42.4	47.8	0.0	47.8
	9	41.8	46.7	38.5	46.3	45.9	45.0	44.5	42.4	40.9	39.2	39.0	38.7	41.8	0.0	41.8
	10	43.3	50.1	39.0	49.7	49.3	47.9	46.0	43.6	42.0	39.6	39.4	39.1	43.3	0.0	43.3
	11	44.4	50.4	40.2	49.8	49.3	48.2	47.5	45.6	43.2	40.9	40.7	40.4	44.4	0.0	44.4
	12	42.8	50.4	39.9	49.3	48.2	46.0	45.0	43.1	41.9	40.5	40.3	40.0	42.8	0.0	42.8
	13	45.4	50.9	40.7	50.5	50.1	49.0	48.5	46.3	44.5	41.6	41.2	40.8	45.4	0.0	45.4
	14	51.4	61.6	44.0	60.8	60.0	57.7	55.8	51.0	48.1	45.2	44.7	44.2	51.4	0.0	51.4
	15	49.0	57.1	44.0	56.5	55.8	53.9	52.5	49.3	47.2	44.7	44.4	44.1	49.0	0.0	49.0
	16	45.5	52.2	40.7	51.7	51.2	49.9	48.9	46.2	44.1	41.6	41.2	40.8	45.5	0.0	45.5
	17	47.2	54.7	41.2	54.1	53.3	51.8	50.4	48.1	45.9	42.4	41.8	41.3	47.2	0.0	47.2
	18	52.1	61.6	37.6	60.9	60.4	59.4	58.3	52.4	42.5	38.4	38.1	37.7	52.1	0.0	52.1
Evening	19	42.1	51.2	37.7	50.5	49.7	47.4	44.7	41.8	40.2	38.4	38.2	37.8	42.1	5.0	47.1
	20	40.8	45.9	37.6	45.4	45.0	44.0	43.4	41.5	40.1	38.3	38.0	37.7	40.8	5.0	45.8
	21	43.8	49.5	36.8	49.2	49.0	48.3	47.8	45.5	42.5	37.7	37.3	36.9	43.8	5.0	48.8
Night	22	36.9	42.5	34.3	42.1	41.5	40.3	39.6	37.2	36.0	34.9	34.7	34.4	36.9	10.0	46.9
	23	36.7	40.7	34.9	40.3	40.0	39.1	38.5	37.0	36.2	35.4	35.2	35.0	36.7	10.0	46.7

Timeframe	*Hour*	L_{eq}	L_{max}	L_{min}	*L1%*	*L2%*	*L5%*	*L8%*	*L25%*	*L50%*	*L90%*	*L95%*	*L99%*
Day	Min	41.8	46.7	37.6	46.3	45.9	45.0	44.5	42.4	40.9	38.4	38.1	37.7
	Max	52.1	61.6	47.0	61.0	60.4	59.4	58.3	52.4	49.1	47.7	47.5	47.2
Energy Average		48.3	Average:		53.9	53.3	51.7	50.5	47.2	44.5	42.1	41.7	41.4
Evening	Min	40.8	45.9	36.8	45.4	45.0	44.0	43.4	41.5	40.1	37.7	37.3	36.9
	Max	43.8	51.2	37.7	50.5	49.7	48.3	47.8	45.5	42.5	38.4	38.2	37.8
Energy Average		42.4	Average:		48.4	47.9	46.6	45.3	42.9	40.9	38.1	37.8	37.5
Night	Min	36.7	40.7	34.3	40.3	40.0	39.1	38.5	37.0	36.0	34.9	34.7	34.4
	Max	47.4	51.9	45.6	51.4	51.0	49.9	49.2	47.6	46.8	46.0	45.8	45.6
Energy Average		42.5	Average:		44.4	44.1	43.2	42.6	41.1	40.3	39.4	39.2	39.0

L_{eq} *(dBA)*		
24-Hour	*Daytime*	*Nighttime*
46.3	**47.6**	**42.5**

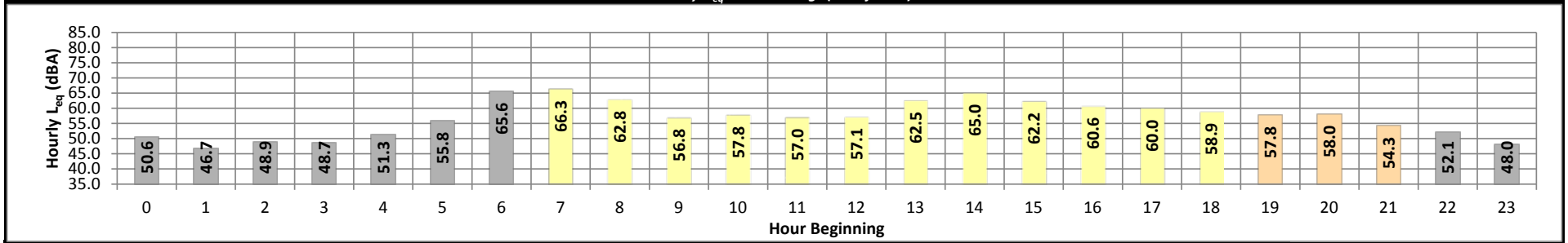
24-Hour CNEL (dBA)
50.3

24-Hour Noise Level Measurement Summary

Date: Wednesday, September 18, 2019 *Location:* L2 - Located south of the Project site on Hayes Avenue near existing residential homes. *Meter:* Piccolo I *JN:* 12532

Project: Murietta Canyon Academy *Analyst:* P. Mara

Hourly L_{eq} dBA Readings (unadjusted)



Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%	L_{eq}	Adj.	Adj. L_{eq}
Night	0	50.6	77.2	37.8	63.0	55.0	45.0	43.0	42.0	40.0	39.0	39.0	39.0	50.6	10.0	60.6
	1	46.7	75.4	39.5	48.0	47.0	46.0	45.0	44.0	42.0	40.0	40.0	39.0	46.7	10.0	56.7
	2	48.9	73.8	38.2	57.0	50.0	47.0	46.0	42.0	40.0	39.0	39.0	39.0	48.9	10.0	58.9
	3	48.7	71.9	40.7	57.0	51.0	47.0	47.0	46.0	45.0	43.0	42.0	41.0	48.7	10.0	58.7
	4	51.3	77.2	44.3	59.0	54.0	50.0	49.0	48.0	47.0	45.0	45.0	45.0	51.3	10.0	61.3
	5	55.8	82.4	45.3	68.0	64.0	54.0	51.0	49.0	48.0	47.0	46.0	46.0	55.8	10.0	65.8
	6	65.6	83.7	46.8	73.0	72.0	71.0	70.0	66.0	61.0	49.0	48.0	48.0	65.6	10.0	75.6
Day	7	66.3	79.8	44.8	74.0	73.0	71.0	70.0	67.0	63.0	50.0	47.0	45.0	66.3	0.0	66.3
	8	62.8	83.6	39.4	72.0	71.0	69.0	68.0	61.0	50.0	40.0	39.0	39.0	62.8	0.0	62.8
	9	56.8	74.6	39.2	69.0	66.0	64.0	61.0	51.0	44.0	40.0	39.0	39.0	56.8	0.0	56.8
	10	57.8	79.5	37.8	70.0	68.0	64.0	61.0	49.0	43.0	39.0	39.0	39.0	57.8	0.0	57.8
	11	57.0	75.9	37.8	69.0	68.0	64.0	61.0	49.0	43.0	39.0	39.0	38.0	57.0	0.0	57.0
	12	57.1	74.5	38.8	69.0	68.0	64.0	62.0	49.0	44.0	41.0	40.0	39.0	57.1	0.0	57.1
	13	62.5	83.2	40.6	72.0	70.0	68.0	67.0	62.0	53.0	43.0	42.0	41.0	62.5	0.0	62.5
	14	65.0	85.5	42.5	74.0	72.0	69.0	68.0	64.0	62.0	49.0	47.0	43.0	65.0	0.0	65.0
	15	62.2	85.2	42.5	73.0	71.0	69.0	67.0	56.0	48.0	44.0	44.0	43.0	62.2	0.0	62.2
	16	60.6	79.9	42.5	73.0	71.0	67.0	65.0	54.0	48.0	44.0	44.0	43.0	60.6	0.0	60.6
	17	60.0	76.7	40.8	72.0	70.0	68.0	65.0	54.0	46.0	42.0	42.0	41.0	60.0	0.0	60.0
	18	58.9	80.9	39.5	71.0	69.0	66.0	63.0	50.0	43.0	41.0	41.0	40.0	58.9	0.0	58.9
Evening	19	57.8	79.0	39.4	71.0	69.0	64.0	60.0	48.0	43.0	40.0	40.0	39.0	57.8	5.0	62.8
	20	58.0	77.7	37.8	71.0	69.0	65.0	61.0	44.0	41.0	39.0	39.0	39.0	58.0	5.0	63.0
	21	54.3	77.1	37.8	68.0	65.0	56.0	49.0	41.0	40.0	38.0	37.0	37.0	54.3	5.0	59.3
Night	22	52.1	77.5	37.7	65.0	59.0	48.0	43.0	40.0	39.0	37.0	37.0	37.0	52.1	10.0	62.1
	23	48.0	73.7	37.7	56.0	46.0	42.0	41.0	40.0	39.0	37.0	37.0	37.0	48.0	10.0	58.0

Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%
Day	Min	56.8	74.5	37.8	69.0	66.0	64.0	61.0	49.0	43.0	39.0	39.0	38.0
	Max	66.3	85.5	44.8	74.0	73.0	71.0	70.0	67.0	63.0	50.0	47.0	45.0
Energy Average		61.7	Average:		71.5	69.8	66.9	64.8	55.5	48.9	42.7	41.9	40.8
Evening	Min	54.3	77.1	37.8	68.0	65.0	56.0	49.0	41.0	40.0	38.0	37.0	37.0
	Max	58.0	79.0	39.4	71.0	69.0	65.0	61.0	48.0	43.0	40.0	40.0	39.0
Energy Average		57.0	Average:		70.0	67.7	61.7	56.7	44.3	41.3	39.0	38.7	38.3
Night	Min	46.7	71.9	37.7	48.0	46.0	42.0	41.0	40.0	39.0	37.0	37.0	37.0
	Max	65.6	83.7	46.8	73.0	72.0	71.0	70.0	66.0	61.0	49.0	48.0	48.0
Energy Average		57.2	Average:		60.7	55.3	50.0	48.3	46.3	44.6	41.8	41.4	41.2

L_{eq} (dBA)		
24-Hour	Daytime	Nighttime
60.0	61.1	57.2

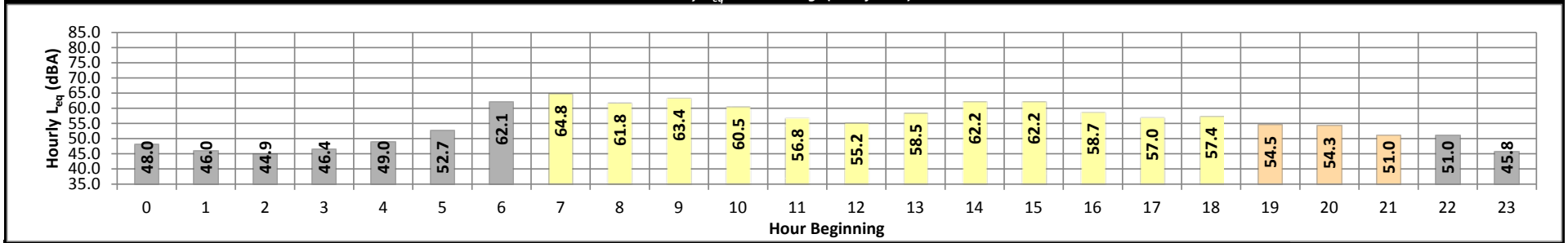
24-Hour CNEL (dBA)
64.6

24-Hour Noise Level Measurement Summary

Date: Wednesday, September 18, 2019 *Location:* L3 - Located southwest of Project site on Hayes Avenue near existing residential homes. *Meter:* Piccolo I *JN:* 12532

Project: Murietta Canyon Academy *Analyst:* P. Mara

Hourly L_{eq} dBA Readings (unadjusted)



Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%	L_{eq}	Adj.	Adj. L_{eq}
Night	0	48.0	75.4	38.9	59.0	53.0	45.0	43.0	42.0	41.0	39.0	39.0	39.0	48.0	10.0	58.0
	1	46.0	73.3	39.1	53.0	49.0	45.0	45.0	43.0	42.0	40.0	39.0	39.0	46.0	10.0	56.0
	2	44.9	69.7	36.2	53.0	50.0	46.0	45.0	42.0	41.0	39.0	39.0	38.0	44.9	10.0	54.9
	3	46.4	68.2	39.7	54.0	49.0	46.0	46.0	45.0	44.0	42.0	41.0	40.0	46.4	10.0	56.4
	4	49.0	73.8	44.0	54.0	51.0	49.0	48.0	47.0	46.0	45.0	45.0	44.0	49.0	10.0	59.0
	5	52.7	71.5	45.2	65.0	61.0	55.0	53.0	50.0	48.0	47.0	46.0	46.0	52.7	10.0	62.7
	6	62.1	82.3	48.0	71.0	70.0	68.0	66.0	61.0	55.0	50.0	49.0	49.0	62.1	10.0	72.1
Day	7	64.8	88.0	47.3	73.0	71.0	69.0	68.0	64.0	60.0	52.0	50.0	48.0	64.8	0.0	64.8
	8	61.8	81.2	40.4	70.0	69.0	67.0	66.0	61.0	58.0	42.0	41.0	41.0	61.8	0.0	61.8
	9	63.4	80.7	39.2	76.0	74.0	70.0	68.0	54.0	47.0	42.0	41.0	41.0	63.4	0.0	63.4
	10	60.5	80.4	36.6	72.0	71.0	68.0	64.0	52.0	46.0	40.0	39.0	39.0	60.5	0.0	60.5
	11	56.8	82.6	36.2	67.0	65.0	61.0	58.0	50.0	45.0	39.0	39.0	37.0	56.8	0.0	56.8
	12	55.2	79.6	36.9	67.0	65.0	61.0	58.0	50.0	45.0	41.0	40.0	39.0	55.2	0.0	55.2
	13	58.5	81.8	39.1	69.0	67.0	64.0	62.0	56.0	50.0	43.0	42.0	40.0	58.5	0.0	58.5
	14	62.2	89.3	41.3	72.0	70.0	67.0	65.0	60.0	56.0	49.0	47.0	43.0	62.2	0.0	62.2
	15	62.2	91.7	39.2	71.0	69.0	66.0	63.0	55.0	47.0	42.0	42.0	40.0	62.2	0.0	62.2
	16	58.7	78.9	40.8	71.0	68.0	64.0	62.0	55.0	49.0	43.0	43.0	42.0	58.7	0.0	58.7
	17	57.0	80.2	39.2	68.0	66.0	63.0	61.0	53.0	48.0	43.0	42.0	41.0	57.0	0.0	57.0
	18	57.4	79.2	37.5	69.0	67.0	63.0	60.0	52.0	46.0	41.0	40.0	39.0	57.4	0.0	57.4
Evening	19	54.5	74.0	36.2	67.0	65.0	60.0	57.0	48.0	42.0	39.0	39.0	37.0	54.5	5.0	59.5
	20	54.3	77.6	36.2	68.0	64.0	58.0	55.0	46.0	40.0	39.0	38.0	36.0	54.3	5.0	59.3
	21	51.0	72.4	36.2	65.0	61.0	53.0	48.0	40.0	39.0	36.0	36.0	36.0	51.0	5.0	56.0
Night	22	51.0	80.4	36.2	63.0	58.0	47.0	42.0	39.0	38.0	36.0	36.0	36.0	51.0	10.0	61.0
	23	45.8	71.9	36.2	55.0	48.0	42.0	41.0	39.0	39.0	36.0	36.0	36.0	45.8	10.0	55.8

Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%
Day	Min	55.2	78.9	36.2	67.0	65.0	61.0	58.0	50.0	45.0	39.0	39.0	37.0
	Max	64.8	91.7	47.3	76.0	74.0	70.0	68.0	64.0	60.0	52.0	50.0	48.0
Energy Average		60.8	Average:		70.4	68.5	65.3	62.9	55.2	49.8	43.1	42.2	40.8
Evening	Min	51.0	72.4	36.2	65.0	61.0	53.0	48.0	40.0	39.0	36.0	36.0	36.0
	Max	54.5	77.6	36.2	68.0	65.0	60.0	57.0	48.0	42.0	39.0	39.0	37.0
Energy Average		53.5	Average:		66.7	63.3	57.0	53.3	44.7	40.3	38.0	37.7	36.3
Night	Min	44.9	68.2	36.2	53.0	48.0	42.0	41.0	39.0	38.0	36.0	36.0	36.0
	Max	62.1	82.3	48.0	71.0	70.0	68.0	66.0	61.0	55.0	50.0	49.0	49.0
Energy Average		53.9	Average:		58.6	54.3	49.2	47.7	45.3	43.8	41.6	41.1	40.8

L_{eq} (dBA)		
24-Hour	Daytime	Nighttime
58.6	60.0	53.9

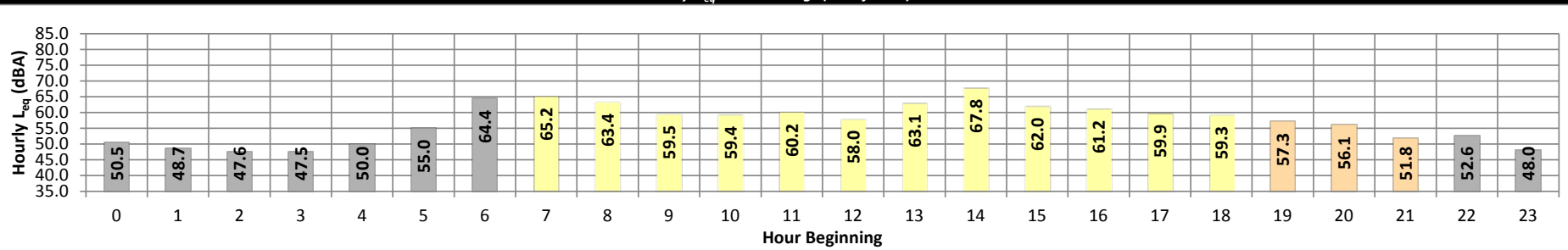
24-Hour CNEL (dBA)
62.1

24-Hour Noise Level Measurement Summary

Date: Wednesday, September 18, 2019 *Location:* L4 - Located west of the Project site on Hayes Avenue near existing residential homes and Thompson Middle School. *Meter:* Piccolo I *JN:* 12532

Project: Murietta Canyon Academy *Analyst:* P. Mara

Hourly L_{eq} dBA Readings (unadjusted)



Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%	L_{eq}	Adj.	Adj. L_{eq}
Night	0	50.5	77.8	38.8	63.0	56.0	46.0	44.0	41.0	40.0	39.0	39.0	39.0	50.5	10.0	60.5
	1	48.7	76.5	39.1	49.0	47.0	46.0	45.0	43.0	42.0	40.0	39.0	39.0	48.7	10.0	58.7
	2	47.6	75.6	36.1	55.0	51.0	47.0	45.0	43.0	40.0	39.0	39.0	37.0	47.6	10.0	57.6
	3	47.5	72.1	39.1	53.0	49.0	47.0	46.0	45.0	44.0	41.0	40.0	39.0	47.5	10.0	57.5
	4	50.0	76.0	44.1	56.0	52.0	50.0	49.0	48.0	46.0	45.0	45.0	44.0	50.0	10.0	60.0
	5	55.0	73.9	45.0	68.0	65.0	58.0	55.0	50.0	48.0	46.0	46.0	45.0	55.0	10.0	65.0
	6	64.4	87.6	48.1	73.0	72.0	70.0	69.0	64.0	59.0	50.0	50.0	49.0	64.4	10.0	74.4
Day	7	65.2	82.1	47.9	74.0	72.0	70.0	69.0	65.0	61.0	53.0	52.0	49.0	65.2	0.0	65.2
	8	63.4	78.3	40.8	72.0	71.0	69.0	68.0	64.0	59.0	43.0	42.0	41.0	63.4	0.0	63.4
	9	59.5	85.8	41.8	71.0	69.0	65.0	62.0	55.0	49.0	44.0	43.0	42.0	59.5	0.0	59.5
	10	59.4	81.6	39.1	71.0	69.0	66.0	62.0	51.0	46.0	41.0	40.0	39.0	59.4	0.0	59.4
	11	60.2	87.8	39.0	71.0	69.0	65.0	62.0	53.0	48.0	41.0	40.0	39.0	60.2	0.0	60.2
	12	58.0	75.8	39.1	70.0	68.0	65.0	62.0	53.0	48.0	43.0	42.0	40.0	58.0	0.0	58.0
	13	63.1	91.1	40.6	73.0	71.0	68.0	66.0	58.0	50.0	43.0	42.0	41.0	63.1	0.0	63.1
	14	67.8	96.3	43.6	75.0	72.0	69.0	67.0	63.0	62.0	51.0	49.0	45.0	67.8	0.0	67.8
	15	62.0	85.2	40.9	73.0	71.0	68.0	66.0	57.0	49.0	44.0	43.0	42.0	62.0	0.0	62.0
	16	61.2	82.1	40.9	73.0	71.0	67.0	65.0	55.0	49.0	44.0	43.0	42.0	61.2	0.0	61.2
	17	59.9	77.0	40.9	71.0	70.0	67.0	65.0	55.0	49.0	44.0	43.0	42.0	59.9	0.0	59.9
	18	59.3	79.6	40.6	71.0	69.0	66.0	63.0	54.0	49.0	44.0	43.0	41.0	59.3	0.0	59.3
Evening	19	57.3	77.2	39.1	70.0	68.0	63.0	59.0	48.0	43.0	40.0	40.0	39.0	57.3	5.0	62.3
	20	56.1	78.1	38.9	70.0	67.0	60.0	56.0	45.0	41.0	39.0	39.0	39.0	56.1	5.0	61.1
	21	51.8	74.3	36.1	65.0	62.0	54.0	49.0	42.0	40.0	37.0	36.0	36.0	51.8	5.0	56.8
Night	22	52.6	78.9	36.1	65.0	60.0	52.0	45.0	40.0	39.0	36.0	36.0	36.0	52.6	10.0	62.6
	23	48.0	74.1	36.1	58.0	50.0	43.0	42.0	40.0	39.0	38.0	36.0	36.0	48.0	10.0	58.0

Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%
Day	Min	58.0	75.8	39.0	70.0	68.0	65.0	62.0	51.0	46.0	41.0	40.0	39.0
	Max	67.8	96.3	47.9	75.0	72.0	70.0	69.0	65.0	62.0	53.0	52.0	49.0
Energy Average		62.6	Average:		72.1	70.2	67.1	64.8	56.9	51.6	44.6	43.5	41.9
Evening	Min	51.8	74.3	36.1	65.0	62.0	54.0	49.0	42.0	40.0	37.0	36.0	36.0
	Max	57.3	78.1	39.1	70.0	68.0	63.0	59.0	48.0	43.0	40.0	40.0	39.0
Energy Average		55.6	Average:		68.3	65.7	59.0	54.7	45.0	41.3	38.7	38.3	38.0
Night	Min	47.5	72.1	36.1	49.0	47.0	43.0	42.0	40.0	39.0	36.0	36.0	36.0
	Max	64.4	87.6	48.1	73.0	72.0	70.0	69.0	64.0	59.0	50.0	50.0	49.0
Energy Average		56.2	Average:		60.0	55.8	51.0	48.9	46.0	44.1	41.6	41.1	40.4

L_{eq} (dBA)		
24-Hour	Daytime	Nighttime
60.4	61.8	56.2

24-Hour CNEL (dBA)

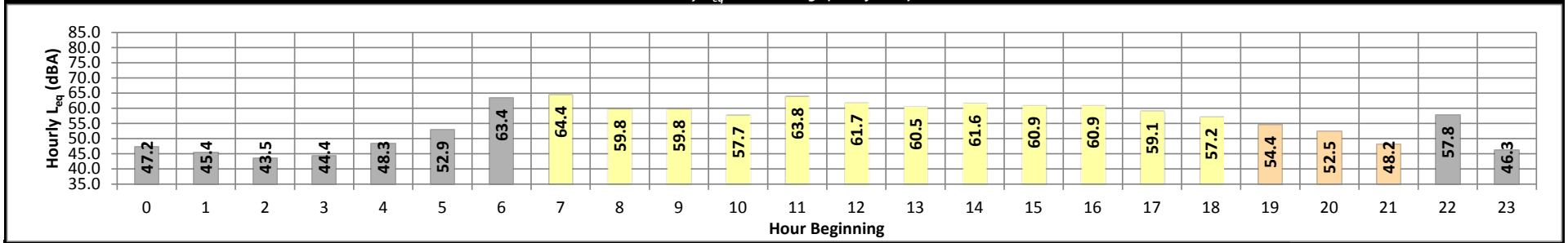
64.1

24-Hour Noise Level Measurement Summary

Date: Wednesday, September 18, 2019 *Location:* L5 - Located northwest of the Project site on Nighthawk Way near existing residential homes. *Meter:* Piccolo I *JN:* 12532

Project: Murietta Canyon Academy *Analyst:* P. Mara

Hourly L_{eq} dBA Readings (unadjusted)



Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%	L_{eq}	Adj.	Adj. L_{eq}
Night	0	47.2	73.8	38.9	57.0	49.0	43.0	42.0	40.0	40.0	39.0	39.0	39.0	47.2	10.0	57.2
	1	45.4	72.5	38.9	49.0	45.0	44.0	43.0	43.0	42.0	40.0	39.0	39.0	45.4	10.0	55.4
	2	43.5	67.9	38.9	48.0	45.0	43.0	43.0	42.0	40.0	39.0	39.0	39.0	43.5	10.0	53.5
	3	44.4	64.1	38.9	49.0	47.0	46.0	45.0	44.0	43.0	40.0	40.0	39.0	44.4	10.0	54.4
	4	48.3	71.6	43.6	56.0	53.0	50.0	48.0	47.0	46.0	45.0	44.0	44.0	48.3	10.0	58.3
	5	52.9	74.8	44.9	64.0	61.0	56.0	52.0	49.0	48.0	46.0	46.0	46.0	52.9	10.0	62.9
	6	63.4	85.5	46.7	73.0	71.0	68.0	67.0	63.0	57.0	50.0	50.0	48.0	63.4	10.0	73.4
Day	7	64.4	83.8	45.7	73.0	72.0	69.0	68.0	64.0	60.0	51.0	50.0	48.0	64.4	0.0	64.4
	8	59.8	79.1	42.8	69.0	68.0	66.0	65.0	59.0	49.0	44.0	44.0	43.0	59.8	0.0	59.8
	9	59.8	87.4	42.5	70.0	69.0	64.0	61.0	52.0	47.0	44.0	43.0	43.0	59.8	0.0	59.8
	10	57.7	79.0	40.7	69.0	67.0	63.0	60.0	51.0	47.0	44.0	43.0	42.0	57.7	0.0	57.7
	11	63.8	80.4	41.5	73.0	72.0	71.0	70.0	63.0	49.0	44.0	43.0	42.0	63.8	0.0	63.8
	12	61.7	79.6	44.9	71.0	70.0	69.0	67.0	60.0	53.0	48.0	47.0	46.0	61.7	0.0	61.7
	13	60.5	80.0	45.8	71.0	69.0	67.0	65.0	58.0	51.0	47.0	47.0	46.0	60.5	0.0	60.5
	14	61.6	77.9	47.3	70.0	68.0	66.0	64.0	61.0	59.0	53.0	50.0	48.0	61.6	0.0	61.6
	15	60.9	84.8	44.4	71.0	69.0	66.0	63.0	56.0	50.0	46.0	46.0	45.0	60.9	0.0	60.9
	16	60.9	87.0	41.9	71.0	69.0	66.0	64.0	56.0	50.0	44.0	44.0	42.0	60.9	0.0	60.9
	17	59.1	82.8	39.0	70.0	69.0	66.0	63.0	53.0	46.0	42.0	41.0	40.0	59.1	0.0	59.1
	18	57.2	79.4	38.9	69.0	67.0	63.0	60.0	48.0	44.0	40.0	40.0	39.0	57.2	0.0	57.2
Evening	19	54.4	75.5	36.0	68.0	65.0	59.0	55.0	45.0	42.0	39.0	39.0	38.0	54.4	5.0	59.4
	20	52.5	73.4	36.0	66.0	63.0	56.0	51.0	43.0	42.0	39.0	39.0	37.0	52.5	5.0	57.5
	21	48.2	71.5	36.0	61.0	57.0	50.0	46.0	43.0	39.0	36.0	36.0	36.0	48.2	5.0	53.2
Night	22	57.8	89.4	36.0	64.0	58.0	48.0	45.0	43.0	41.0	39.0	36.0	36.0	57.8	10.0	67.8
	23	46.3	71.9	36.0	54.0	46.0	44.0	43.0	42.0	39.0	39.0	38.0	37.0	46.3	10.0	56.3

Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%
Day	Min	57.2	77.9	38.9	69.0	67.0	63.0	60.0	48.0	44.0	40.0	40.0	39.0
	Max	64.4	87.4	47.3	73.0	72.0	71.0	70.0	64.0	60.0	53.0	50.0	48.0
Energy Average		61.1	Average:		70.6	69.1	66.3	64.2	56.8	50.4	45.6	44.8	43.7
Evening	Min	48.2	71.5	36.0	61.0	57.0	50.0	46.0	43.0	39.0	36.0	36.0	36.0
	Max	54.4	75.5	36.0	68.0	65.0	59.0	55.0	45.0	42.0	39.0	39.0	38.0
Energy Average		52.4	Average:		65.0	61.7	55.0	50.7	43.7	41.0	38.0	38.0	37.0
Night	Min	43.5	64.1	36.0	48.0	45.0	43.0	42.0	40.0	39.0	39.0	36.0	36.0
	Max	63.4	89.4	46.7	73.0	71.0	68.0	67.0	63.0	57.0	50.0	50.0	48.0
Energy Average		55.6	Average:		57.1	52.8	49.1	47.6	45.9	44.0	41.9	41.2	40.8

L_{eq} (dBA)		
24-Hour	Daytime	Nighttime
59.0	60.3	55.6

24-Hour CNEL (dBA)
63.1

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APPENDIX 7.1:

OFF-SITE TRAFFIC NOISE LEVEL CALCULATIONS

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing
Road Name: Hayes Av.
Road Segment: s/o Nighthawk Wy.
Project Name: Murrieta Canyon Academy
Job Number: 12532

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	2222 vehicles
Peak Hour Percentage:	10.00%
Peak Hour Volume:	222 vehicles
Vehicle Speed:	30 mph
Near/Far Lane Distance:	12 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	33.0 feet
Centerline Dist. to Observer:	33.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	75.5%	14.0%	10.5%	97.42%
Medium Trucks:	48.9%	2.2%	48.9%	1.84%
Heavy Trucks:	47.3%	5.4%	47.3%	0.74%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.006	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	32.833
Medium Trucks:	32.562
Heavy Trucks:	32.589

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	61.75	-6.72	2.64	-1.20	-4.52	0.000	0.000
Medium Trucks:	73.48	-23.96	2.69	-1.20	-4.86	0.000	0.000
Heavy Trucks:	79.92	-27.92	2.69	-1.20	-5.69	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	56.5	54.5	53.1	47.1	55.6	56.2
Medium Trucks:	51.0	47.1	39.6	48.4	54.5	54.6
Heavy Trucks:	53.5	49.4	46.0	50.7	56.9	57.0
Vehicle Noise:	59.0	56.2	54.1	53.8	60.5	60.8

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	8	17	36	77
CNEL:	8	17	37	80

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing
Road Name: Hayes Av.
Road Segment: s/o Sherry Ln.
Project Name: Murrieta Canyon Academy
Job Number: 12532

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	2344 vehicles
Peak Hour Percentage:	10.00%
Peak Hour Volume:	234 vehicles
Vehicle Speed:	30 mph
Near/Far Lane Distance:	12 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	33.0 feet
Centerline Dist. to Observer:	33.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	75.5%	14.0%	10.5%	97.42%
Medium Trucks:	48.9%	2.2%	48.9%	1.84%
Heavy Trucks:	47.3%	5.4%	47.3%	0.74%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.006	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	32.833
Medium Trucks:	32.562
Heavy Trucks:	32.589

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	61.75	-6.49	2.64	-1.20	-4.52	0.000	0.000
Medium Trucks:	73.48	-23.73	2.69	-1.20	-4.86	0.000	0.000
Heavy Trucks:	79.92	-27.68	2.69	-1.20	-5.69	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	56.7	54.7	53.4	47.4	55.8	56.4
Medium Trucks:	51.2	47.3	39.8	48.6	54.8	54.8
Heavy Trucks:	53.7	49.7	46.3	50.9	57.1	57.2
Vehicle Noise:	59.2	56.4	54.3	54.0	60.8	61.0

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	8	17	37	80
CNEL:	8	18	39	83

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing
Road Name: Hayes Av.
Road Segment: s/o Fullerton Rd.
Project Name: Murrieta Canyon Academy
Job Number: 12532

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	2683 vehicles
Peak Hour Percentage:	10.00%
Peak Hour Volume:	268 vehicles
Vehicle Speed:	30 mph
Near/Far Lane Distance:	12 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	33.0 feet
Centerline Dist. to Observer:	33.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	75.5%	14.0%	10.5%	97.42%
Medium Trucks:	48.9%	2.2%	48.9%	1.84%
Heavy Trucks:	47.3%	5.4%	47.3%	0.74%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.006	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	32.833
Medium Trucks:	32.562
Heavy Trucks:	32.589

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	61.75	-5.90	2.64	-1.20	-4.52	0.000	0.000
Medium Trucks:	73.48	-23.14	2.69	-1.20	-4.86	0.000	0.000
Heavy Trucks:	79.92	-27.10	2.69	-1.20	-5.69	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	57.3	55.3	54.0	47.9	56.4	57.0
Medium Trucks:	51.8	47.9	40.4	49.2	55.4	55.4
Heavy Trucks:	54.3	50.3	46.9	51.5	57.7	57.8
Vehicle Noise:	59.8	57.0	54.9	54.6	61.4	61.6

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	9	19	41	88
CNEL:	9	20	42	91

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: E+P
Road Name: Hayes Av.
Road Segment: s/o Nighthawk Wy.
Project Name: Murrieta Canyon Academy
Job Number: 12532

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	2566 vehicles
Peak Hour Percentage:	10.00%
Peak Hour Volume:	257 vehicles
Vehicle Speed:	30 mph
Near/Far Lane Distance:	12 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	33.0 feet
Centerline Dist. to Observer:	33.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	75.5%	14.0%	10.5%	97.42%
Medium Trucks:	48.9%	2.2%	48.9%	1.84%
Heavy Trucks:	47.3%	5.4%	47.3%	0.74%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.006	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	32.833
Medium Trucks:	32.562
Heavy Trucks:	32.589

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	61.75	-6.10	2.64	-1.20	-4.52	0.000	0.000
Medium Trucks:	73.48	-23.34	2.69	-1.20	-4.86	0.000	0.000
Heavy Trucks:	79.92	-27.29	2.69	-1.20	-5.69	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	57.1	55.1	53.8	47.8	56.2	56.8
Medium Trucks:	51.6	47.7	40.2	49.0	55.2	55.2
Heavy Trucks:	54.1	50.1	46.7	51.3	57.5	57.6
Vehicle Noise:	59.6	56.8	54.7	54.4	61.2	61.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	9	18	39	85
CNEL:	9	19	41	88

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: E+P | Project Name: Murrieta Canyon Academy
Road Name: Hayes Av. | Job Number: 12532
Road Segment: s/o Sherry Ln.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	2751 vehicles
Peak Hour Percentage:	10.00%
Peak Hour Volume:	275 vehicles
Vehicle Speed:	30 mph
Near/Far Lane Distance:	12 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	33.0 feet
Centerline Dist. to Observer:	33.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	75.5%	14.0%	10.5%	97.42%
Medium Trucks:	48.9%	2.2%	48.9%	1.84%
Heavy Trucks:	47.3%	5.4%	47.3%	0.74%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.006	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	32.833
Medium Trucks:	32.562
Heavy Trucks:	32.589

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	61.75	-5.80	2.64	-1.20	-4.52	0.000	0.000
Medium Trucks:	73.48	-23.03	2.69	-1.20	-4.86	0.000	0.000
Heavy Trucks:	79.92	-26.99	2.69	-1.20	-5.69	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	57.4	55.4	54.1	48.1	56.5	57.1
Medium Trucks:	51.9	48.0	40.5	49.3	55.5	55.5
Heavy Trucks:	54.4	50.4	47.0	51.6	57.8	57.9
Vehicle Noise:	59.9	57.1	55.0	54.7	61.5	61.7

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	9	19	41	89
CNEL:	9	20	43	93

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: E+P | Project Name: Murrieta Canyon Academy
Road Name: Hayes Av. | Job Number: 12532
Road Segment: s/o Fullerton Rd.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	3589 vehicles
Peak Hour Percentage:	10.00%
Peak Hour Volume:	359 vehicles
Vehicle Speed:	30 mph
Near/Far Lane Distance:	12 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	33.0 feet
Centerline Dist. to Observer:	33.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	75.5%	14.0%	10.5%	97.42%
Medium Trucks:	48.9%	2.2%	48.9%	1.84%
Heavy Trucks:	47.3%	5.4%	47.3%	0.74%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.006	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	32.833
Medium Trucks:	32.562
Heavy Trucks:	32.589

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	61.75	-4.64	2.64	-1.20	-4.52	0.000	0.000
Medium Trucks:	73.48	-21.88	2.69	-1.20	-4.86	0.000	0.000
Heavy Trucks:	79.92	-25.83	2.69	-1.20	-5.69	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	58.5	56.5	55.2	49.2	57.6	58.3
Medium Trucks:	53.1	49.2	41.7	50.4	56.6	56.7
Heavy Trucks:	55.6	51.5	48.1	52.8	59.0	59.1
Vehicle Noise:	61.1	58.3	56.2	55.8	62.6	62.9

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	11	23	49	106
CNEL:	11	24	51	111

Monday, April 20, 2020

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Buildout+Ambient | Project Name: Murrieta Canyon Academy
Road Name: Hayes Av. | Job Number: 12532
Road Segment: s/o Nighthawk Wy.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	2405 vehicles
Peak Hour Percentage:	10.00%
Peak Hour Volume:	241 vehicles
Vehicle Speed:	30 mph
Near/Far Lane Distance:	12 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	33.0 feet
Centerline Dist. to Observer:	33.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	75.5%	14.0%	10.5%	97.42%
Medium Trucks:	48.9%	2.2%	48.9%	1.84%
Heavy Trucks:	47.3%	5.4%	47.3%	0.74%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.006	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	32.833
Medium Trucks:	32.562
Heavy Trucks:	32.589

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	61.75	-6.38	2.64	-1.20	-4.52	0.000	0.000
Medium Trucks:	73.48	-23.62	2.69	-1.20	-4.86	0.000	0.000
Heavy Trucks:	79.92	-27.57	2.69	-1.20	-5.69	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	56.8	54.8	53.5	47.5	55.9	56.5
Medium Trucks:	51.4	47.5	40.0	48.7	54.9	54.9
Heavy Trucks:	53.8	49.8	46.4	51.0	57.2	57.3
Vehicle Noise:	59.3	56.6	54.4	54.1	60.9	61.1

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	8	18	38	81
CNEL:	8	18	39	85

Monday, April 20, 2020

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Buildout+Ambient | Project Name: Murrieta Canyon Academy
Road Name: Hayes Av. | Job Number: 12532
Road Segment: s/o Sherry Ln.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	2537 vehicles
Peak Hour Percentage:	10.00%
Peak Hour Volume:	254 vehicles
Vehicle Speed:	30 mph
Near/Far Lane Distance:	12 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	33.0 feet
Centerline Dist. to Observer:	33.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	75.5%	14.0%	10.5%	97.42%
Medium Trucks:	48.9%	2.2%	48.9%	1.84%
Heavy Trucks:	47.3%	5.4%	47.3%	0.74%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.006	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	32.833
Medium Trucks:	32.562
Heavy Trucks:	32.589

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	61.75	-6.15	2.64	-1.20	-4.52	0.000	0.000
Medium Trucks:	73.48	-23.39	2.69	-1.20	-4.86	0.000	0.000
Heavy Trucks:	79.92	-27.34	2.69	-1.20	-5.69	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	57.0	55.0	53.7	47.7	56.1	56.8
Medium Trucks:	51.6	47.7	40.2	48.9	55.1	55.1
Heavy Trucks:	54.1	50.0	46.6	51.3	57.5	57.6
Vehicle Noise:	59.6	56.8	54.7	54.3	61.1	61.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	8	18	39	84
CNEL:	9	19	41	88

Monday, April 20, 2020

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Buildout+Ambient | Project Name: Murrieta Canyon Academy
Road Name: Hayes Av. | Job Number: 12532
Road Segment: s/o Fullerton Rd.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	2904 vehicles
Peak Hour Percentage:	10.00%
Peak Hour Volume:	290 vehicles
Vehicle Speed:	30 mph
Near/Far Lane Distance:	12 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	33.0 feet
Centerline Dist. to Observer:	33.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	75.5%	14.0%	10.5%	97.42%
Medium Trucks:	48.9%	2.2%	48.9%	1.84%
Heavy Trucks:	47.3%	5.4%	47.3%	0.74%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.006	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	32.833
Medium Trucks:	32.562
Heavy Trucks:	32.589

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	61.75	-5.56	2.64	-1.20	-4.52	0.000	0.000
Medium Trucks:	73.48	-22.80	2.69	-1.20	-4.86	0.000	0.000
Heavy Trucks:	79.92	-26.75	2.69	-1.20	-5.69	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	57.6	55.6	54.3	48.3	56.7	57.3
Medium Trucks:	52.2	48.3	40.8	49.5	55.7	55.7
Heavy Trucks:	54.7	50.6	47.2	51.9	58.1	58.2
Vehicle Noise:	60.2	57.4	55.2	54.9	61.7	62.0

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	9	20	43	92
CNEL:	10	21	45	96

Monday, April 20, 2020

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Buildout+Ambient+Project | Project Name: Murrieta Canyon Academy
Road Name: Hayes Av. | Job Number: 12532
Road Segment: s/o Nighthawk Wy.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	2749 vehicles
Peak Hour Percentage:	10.00%
Peak Hour Volume:	275 vehicles
Vehicle Speed:	30 mph
Near/Far Lane Distance:	12 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	33.0 feet
Centerline Dist. to Observer:	33.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	75.5%	14.0%	10.5%	97.42%
Medium Trucks:	48.9%	2.2%	48.9%	1.84%
Heavy Trucks:	47.3%	5.4%	47.3%	0.74%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.006	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	32.833
Medium Trucks:	32.562
Heavy Trucks:	32.589

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	61.75	-5.80	2.64	-1.20	-4.52	0.000	0.000
Medium Trucks:	73.48	-23.04	2.69	-1.20	-4.86	0.000	0.000
Heavy Trucks:	79.92	-26.99	2.69	-1.20	-5.69	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	57.4	55.4	54.1	48.1	56.5	57.1
Medium Trucks:	51.9	48.0	40.5	49.3	55.5	55.5
Heavy Trucks:	54.4	50.4	47.0	51.6	57.8	57.9
Vehicle Noise:	59.9	57.1	55.0	54.7	61.5	61.7

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	9	19	41	89
CNEL:	9	20	43	93

Monday, April 20, 2020

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Buildout+Ambient+Project | Project Name: Murrieta Canyon Academy
Road Name: Hayes Av. | Job Number: 12532
Road Segment: s/o Sherry Ln.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	2944 vehicles
Peak Hour Percentage:	10.00%
Peak Hour Volume:	294 vehicles
Vehicle Speed:	30 mph
Near/Far Lane Distance:	12 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	33.0 feet
Centerline Dist. to Observer:	33.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	75.5%	14.0%	10.5%	97.42%
Medium Trucks:	48.9%	2.2%	48.9%	1.84%
Heavy Trucks:	47.3%	5.4%	47.3%	0.74%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.006	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	32.833
Medium Trucks:	32.562
Heavy Trucks:	32.589

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	61.75	-5.50	2.64	-1.20	-4.52	0.000	0.000
Medium Trucks:	73.48	-22.74	2.69	-1.20	-4.86	0.000	0.000
Heavy Trucks:	79.92	-26.69	2.69	-1.20	-5.69	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	57.7	55.7	54.4	48.4	56.8	57.4
Medium Trucks:	52.2	48.3	40.8	49.6	55.8	55.8
Heavy Trucks:	54.7	50.7	47.3	51.9	58.1	58.2
Vehicle Noise:	60.2	57.4	55.3	55.0	61.8	62.0

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	9	20	43	93
CNEL:	10	21	45	97

Monday, April 20, 2020

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Buildout+Ambient+Project | Project Name: Murrieta Canyon Academy
Road Name: Hayes Av. | Job Number: 12532
Road Segment: s/o Fullerton Rd.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	3810 vehicles
Peak Hour Percentage:	10.00%
Peak Hour Volume:	381 vehicles
Vehicle Speed:	30 mph
Near/Far Lane Distance:	12 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	33.0 feet
Centerline Dist. to Observer:	33.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	75.5%	14.0%	10.5%	97.42%
Medium Trucks:	48.9%	2.2%	48.9%	1.84%
Heavy Trucks:	47.3%	5.4%	47.3%	0.74%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.006	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	32.833
Medium Trucks:	32.562
Heavy Trucks:	32.589

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	61.75	-4.38	2.64	-1.20	-4.52	0.000	0.000
Medium Trucks:	73.48	-21.62	2.69	-1.20	-4.86	0.000	0.000
Heavy Trucks:	79.92	-25.58	2.69	-1.20	-5.69	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	58.8	56.8	55.5	49.5	57.9	58.5
Medium Trucks:	53.4	49.5	42.0	50.7	56.9	56.9
Heavy Trucks:	55.8	51.8	48.4	53.0	59.2	59.3
Vehicle Noise:	61.3	58.6	56.4	56.1	62.9	63.1

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	11	24	51	111
CNEL:	12	25	53	115

Monday, April 20, 2020

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Buildout+Ambient+Cumulative
Road Name: Hayes Av.
Road Segment: s/o Nighthawk Wy.
Project Name: Murrieta Canyon Academy
Job Number: 12532

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	2405 vehicles
Peak Hour Percentage:	10.00%
Peak Hour Volume:	241 vehicles
Vehicle Speed:	30 mph
Near/Far Lane Distance:	12 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	33.0 feet
Centerline Dist. to Observer:	33.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	75.5%	14.0%	10.5%	97.42%
Medium Trucks:	48.9%	2.2%	48.9%	1.84%
Heavy Trucks:	47.3%	5.4%	47.3%	0.74%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.006	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	32.833
Medium Trucks:	32.562
Heavy Trucks:	32.589

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	61.75	-6.38	2.64	-1.20	-4.52	0.000	0.000
Medium Trucks:	73.48	-23.62	2.69	-1.20	-4.86	0.000	0.000
Heavy Trucks:	79.92	-27.57	2.69	-1.20	-5.69	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	56.8	54.8	53.5	47.5	55.9	56.5
Medium Trucks:	51.4	47.5	40.0	48.7	54.9	54.9
Heavy Trucks:	53.8	49.8	46.4	51.0	57.2	57.3
Vehicle Noise:	59.3	56.6	54.4	54.1	60.9	61.1

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	8	18	38	81
CNEL:	8	18	39	85

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Buildout+Ambient+Cumulative
Road Name: Hayes Av.
Road Segment: s/o Sherry Ln.
Project Name: Murrieta Canyon Academy
Job Number: 12532

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	2537 vehicles
Peak Hour Percentage:	10.00%
Peak Hour Volume:	254 vehicles
Vehicle Speed:	30 mph
Near/Far Lane Distance:	12 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	33.0 feet
Centerline Dist. to Observer:	33.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	75.5%	14.0%	10.5%	97.42%
Medium Trucks:	48.9%	2.2%	48.9%	1.84%
Heavy Trucks:	47.3%	5.4%	47.3%	0.74%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.006	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	32.833
Medium Trucks:	32.562
Heavy Trucks:	32.589

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	61.75	-6.15	2.64	-1.20	-4.52	0.000	0.000
Medium Trucks:	73.48	-23.39	2.69	-1.20	-4.86	0.000	0.000
Heavy Trucks:	79.92	-27.34	2.69	-1.20	-5.69	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	57.0	55.0	53.7	47.7	56.1	56.8
Medium Trucks:	51.6	47.7	40.2	48.9	55.1	55.1
Heavy Trucks:	54.1	50.0	46.6	51.3	57.5	57.6
Vehicle Noise:	59.6	56.8	54.7	54.3	61.1	61.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	8	18	39	84
CNEL:	9	19	41	88

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Buildout+Ambient+Cumulative
Road Name: Hayes Av.
Road Segment: s/o Fullerton Rd.
Project Name: Murrieta Canyon Academy
Job Number: 12532

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	2904 vehicles
Peak Hour Percentage:	10.00%
Peak Hour Volume:	290 vehicles
Vehicle Speed:	30 mph
Near/Far Lane Distance:	12 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	33.0 feet
Centerline Dist. to Observer:	33.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	75.5%	14.0%	10.5%	97.42%
Medium Trucks:	48.9%	2.2%	48.9%	1.84%
Heavy Trucks:	47.3%	5.4%	47.3%	0.74%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.006	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	32.833
Medium Trucks:	32.562
Heavy Trucks:	32.589

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	61.75	-5.56	2.64	-1.20	-4.52	0.000	0.000
Medium Trucks:	73.48	-22.80	2.69	-1.20	-4.86	0.000	0.000
Heavy Trucks:	79.92	-26.75	2.69	-1.20	-5.69	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	57.6	55.6	54.3	48.3	56.7	57.3
Medium Trucks:	52.2	48.3	40.8	49.5	55.7	55.7
Heavy Trucks:	54.7	50.6	47.2	51.9	58.1	58.2
Vehicle Noise:	60.2	57.4	55.2	54.9	61.7	62.0

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	9	20	43	92
CNEL:	10	21	45	96

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Buildout+Ambient+Cumulative+Pr
Road Name: Hayes Av.
Road Segment: s/o Nighthawk Wy.
Project Name: Murrieta Canyon Academy
Job Number: 12532

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	2749 vehicles
Peak Hour Percentage:	10.00%
Peak Hour Volume:	275 vehicles
Vehicle Speed:	30 mph
Near/Far Lane Distance:	12 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	33.0 feet
Centerline Dist. to Observer:	33.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	75.5%	14.0%	10.5%	97.42%
Medium Trucks:	48.9%	2.2%	48.9%	1.84%
Heavy Trucks:	47.3%	5.4%	47.3%	0.74%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.006	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	32.833
Medium Trucks:	32.562
Heavy Trucks:	32.589

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	61.75	-5.80	2.64	-1.20	-4.52	0.000	0.000
Medium Trucks:	73.48	-23.04	2.69	-1.20	-4.86	0.000	0.000
Heavy Trucks:	79.92	-26.99	2.69	-1.20	-5.69	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	57.4	55.4	54.1	48.1	56.5	57.1
Medium Trucks:	51.9	48.0	40.5	49.3	55.5	55.5
Heavy Trucks:	54.4	50.4	47.0	51.6	57.8	57.9
Vehicle Noise:	59.9	57.1	55.0	54.7	61.5	61.7

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	9	19	41	89
CNEL:	9	20	43	93

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Buildout+Ambient+Cumulative+Pr
Road Name: Hayes Av.
Road Segment: s/o Sherry Ln.
Project Name: Murrieta Canyon Academy
Job Number: 12532

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	2944	vehicles
Peak Hour Percentage:	10.00%	
Peak Hour Volume:	294	vehicles
Vehicle Speed:	30	mph
Near/Far Lane Distance:	12	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	33.0	feet
Centerline Dist. to Observer:	33.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Road Grade:	0.0%	
Left View:	-90.0	degrees
Right View:	90.0	degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	75.5%	14.0%	10.5%	97.42%
Medium Trucks:	48.9%	2.2%	48.9%	1.84%
Heavy Trucks:	47.3%	5.4%	47.3%	0.74%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.006	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	32.833
Medium Trucks:	32.562
Heavy Trucks:	32.589

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	61.75	-5.50	2.64	-1.20	*-4.52*	0.000	0.000
Medium Trucks:	73.48	-22.74	2.69	-1.20	*-4.86*	0.000	0.000
Heavy Trucks:	79.92	-26.69	2.69	-1.20	*-5.69*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	57.7	55.7	54.4	48.4	56.8	57.4
Medium Trucks:	52.2	48.3	40.8	49.6	55.8	55.8
Heavy Trucks:	54.7	50.7	47.3	51.9	58.1	58.2
Vehicle Noise:	60.2	57.4	55.3	55.0	61.8	62.0

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	9	20	43	93
CNEL:	10	21	45	97

Monday, April 20, 2020

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Buildout+Ambient+Cumulative+Pr
Road Name: Hayes Av.
Road Segment: s/o Fullerton Rd.
Project Name: Murrieta Canyon Academy
Job Number: 12532

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	3810	vehicles
Peak Hour Percentage:	10.00%	
Peak Hour Volume:	381	vehicles
Vehicle Speed:	30	mph
Near/Far Lane Distance:	12	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	33.0	feet
Centerline Dist. to Observer:	33.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Road Grade:	0.0%	
Left View:	-90.0	degrees
Right View:	90.0	degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	75.5%	14.0%	10.5%	97.42%
Medium Trucks:	48.9%	2.2%	48.9%	1.84%
Heavy Trucks:	47.3%	5.4%	47.3%	0.74%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.006	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	32.833
Medium Trucks:	32.562
Heavy Trucks:	32.589

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	61.75	-4.38	2.64	-1.20	*-4.52*	0.000	0.000
Medium Trucks:	73.48	-21.62	2.69	-1.20	*-4.86*	0.000	0.000
Heavy Trucks:	79.92	-25.58	2.69	-1.20	*-5.69*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	58.8	56.8	55.5	49.5	57.9	58.5
Medium Trucks:	53.4	49.5	42.0	50.7	56.9	56.9
Heavy Trucks:	55.8	51.8	48.4	53.0	59.2	59.3
Vehicle Noise:	61.3	58.6	56.4	56.1	62.9	63.1

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	11	24	51	111
CNEL:	12	25	53	115

Monday, April 20, 2020

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APPENDIX 8.1:

ON-SITE TRAFFIC NOISE LEVEL CALCULATIONS

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO) - 10/1/2012

Scenario: First Floor With Wall
Road Name: Hayes Ave.
Lot No: CR
Project Name: Murrieta Canyon Acaemy
Job Number: 12532
Analyst: B. Lawson

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	10,400 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,040 vehicles
Vehicle Speed:	30 mph
Near/Far Lane Distance:	12 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	58.0 feet
Centerline Dist. to Observer:	58.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	1,132.0 feet
Road Elevation:	1,127.0 feet
Barrier Elevation:	1,132.0 feet
Road Grade:	0.0%

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	75.5%	14.0%	10.5%	97.42%
Medium Trucks:	48.9%	2.2%	48.9%	1.84%
Heavy Trucks:	47.3%	5.4%	47.3%	0.74%

Noise Source Elevations (in feet)

Autos:	1,127.000		
Medium Trucks:	1,129.297		
Heavy Trucks:	1,135.006	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	58.549
Medium Trucks:	58.201
Heavy Trucks:	57.723

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	62.51	-0.02	-1.13	-1.20	-4.27	0.000	0.000
Medium Trucks:	73.11	-17.26	-1.09	-1.20	-4.46	0.000	0.000
Heavy Trucks:	78.76	-21.21	-1.04	-1.20	-4.93	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	60.2	58.2	56.8	50.8	59.2	59.9
Medium Trucks:	53.6	49.7	42.2	50.9	57.1	57.1
Heavy Trucks:	55.3	51.3	47.9	52.5	58.7	58.8
Vehicle Noise:	62.1	59.4	57.5	56.3	63.2	63.5

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	60.2	58.2	56.8	50.8	59.2	59.9
Medium Trucks:	53.6	49.7	42.2	50.9	57.1	57.1
Heavy Trucks:	55.3	51.3	47.9	52.5	58.7	58.8
Vehicle Noise:	62.1	59.4	57.5	56.3	63.2	63.5

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO) - 10/1/2012

Scenario: First Floor With Wall
Road Name: Hayes Ave.
Lot No: Lab
Project Name: Murrieta Canyon Acaemy
Job Number: 12532
Analyst: B. Lawson

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	10,400 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,040 vehicles
Vehicle Speed:	30 mph
Near/Far Lane Distance:	12 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	52.0 feet
Centerline Dist. to Observer:	52.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	1,132.0 feet
Road Elevation:	1,127.0 feet
Barrier Elevation:	1,148.6 feet
Road Grade:	0.0%

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	75.5%	14.0%	10.5%	97.42%
Medium Trucks:	48.9%	2.2%	48.9%	1.84%
Heavy Trucks:	47.3%	5.4%	47.3%	0.74%

Noise Source Elevations (in feet)

Autos:	1,127.000		
Medium Trucks:	1,129.297		
Heavy Trucks:	1,135.006	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	52.612
Medium Trucks:	52.224
Heavy Trucks:	51.691

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	62.51	-0.02	-0.44	-1.20	-14.63	0.000	0.000
Medium Trucks:	73.11	-17.26	-0.39	-1.20	-14.19	0.000	0.000
Heavy Trucks:	78.76	-21.21	-0.32	-1.20	-13.02	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	60.9	58.8	57.5	51.5	59.9	60.6
Medium Trucks:	54.3	50.4	42.9	51.6	57.8	57.8
Heavy Trucks:	56.0	52.0	48.6	53.2	59.4	59.5
Vehicle Noise:	62.8	60.1	58.2	57.0	63.9	64.2

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	60.9	58.8	57.5	51.5	59.9	60.6
Medium Trucks:	54.3	50.4	42.9	51.6	57.8	57.8
Heavy Trucks:	56.0	52.0	48.6	53.2	59.4	59.5
Vehicle Noise:	62.8	60.1	58.2	57.0	63.9	64.2

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO) - 10/1/2012

Scenario: Second Floor With Wall
Road Name: Hayes Ave.
Lot No: CR
Project Name: Murrieta Canyon Acaemy
Job Number: 12532
Analyst: B. Lawson

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	10,400 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,040 vehicles
Vehicle Speed:	30 mph
Near/Far Lane Distance:	12 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	58.0 feet
Centerline Dist. to Observer:	58.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	14.0 feet
Pad Elevation:	1,132.0 feet
Road Elevation:	1,127.0 feet
Barrier Elevation:	1,132.0 feet
Road Grade:	0.0%

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	75.5%	14.0%	10.5%	97.42%
Medium Trucks:	48.9%	2.2%	48.9%	1.84%
Heavy Trucks:	47.3%	5.4%	47.3%	0.74%

Noise Source Elevations (in feet)

Autos:	1,127.000		
Medium Trucks:	1,129.297		
Heavy Trucks:	1,135.006	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	60.737
Medium Trucks:	60.058
Heavy Trucks:	58.727

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	62.51	-0.02	-1.37	-1.20	-10.94	0.000	0.000
Medium Trucks:	73.11	-17.26	-1.30	-1.20	-11.45	0.000	0.000
Heavy Trucks:	78.76	-21.21	-1.15	-1.20	-12.76	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	59.9	57.9	56.6	50.6	59.0	59.6
Medium Trucks:	53.4	49.5	42.0	50.7	56.9	56.9
Heavy Trucks:	55.2	51.2	47.8	52.4	58.6	58.7
Vehicle Noise:	61.8	59.2	57.3	56.1	63.0	63.3

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	59.9	57.9	56.6	50.6	59.0	59.6
Medium Trucks:	53.4	49.5	42.0	50.7	56.9	56.9
Heavy Trucks:	55.2	51.2	47.8	52.4	58.6	58.7
Vehicle Noise:	61.8	59.2	57.3	56.1	63.0	63.3

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO) - 10/1/2012

Scenario: Second Floor With Wall
Road Name: Hayes Ave.
Lot No: Lab
Project Name: Murrieta Canyon Acaemy
Job Number: 12532
Analyst: B. Lawson

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	10,400 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,040 vehicles
Vehicle Speed:	30 mph
Near/Far Lane Distance:	12 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	52.0 feet
Centerline Dist. to Observer:	52.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	14.0 feet
Pad Elevation:	1,132.0 feet
Road Elevation:	1,127.0 feet
Barrier Elevation:	1,148.6 feet
Road Grade:	0.0%

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	75.5%	14.0%	10.5%	97.42%
Medium Trucks:	48.9%	2.2%	48.9%	1.84%
Heavy Trucks:	47.3%	5.4%	47.3%	0.74%

Noise Source Elevations (in feet)

Autos:	1,127.000		
Medium Trucks:	1,129.297		
Heavy Trucks:	1,135.006	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	55.036
Medium Trucks:	54.286
Heavy Trucks:	52.810

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	62.51	-0.02	-0.73	-1.20	-3.47	0.000	0.000
Medium Trucks:	73.11	-17.26	-0.64	-1.20	-3.38	0.000	0.000
Heavy Trucks:	78.76	-21.21	-0.46	-1.20	-3.13	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	60.6	58.6	57.2	51.2	59.6	60.3
Medium Trucks:	54.0	50.1	42.6	51.4	57.5	57.6
Heavy Trucks:	55.9	51.8	48.4	53.1	59.3	59.4
Vehicle Noise:	62.5	59.9	57.9	56.8	63.7	64.0

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	60.6	58.6	57.2	51.2	59.6	60.3
Medium Trucks:	54.0	50.1	42.6	51.4	57.5	57.6
Heavy Trucks:	55.9	51.8	48.4	53.1	59.3	59.4
Vehicle Noise:	62.5	59.9	57.9	56.8	63.7	64.0

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APPENDIX 10.1:

CADNAA OPERATIONAL NOISE MODEL INPUTS

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12532

CadnaA Noise Prediction Model: 12532.cna
Date: 04.05.20
Analyst: B. Lawson

Receiver Noise Levels

Name	M.	ID	Level Lr			Limit. Value			Land Use			Height		Coordinates		
			Day	Night	CNEL	Day	Night	CNEL	Type	Auto	Noise Type			X	Y	Z
			(dBA)	(dBA)	(dBA)	(dBA)	(dBA)	(dBA)				(ft)		(ft)	(ft)	(ft)
RECEIVERS		R1	45.0	18.5	42.1	50.0	45.0	0.0				5.00	r	6262895.13	2149632.20	1155.41
RECEIVERS		R2	41.4	23.7	38.9	50.0	45.0	0.0				5.00	r	6262858.67	2148949.91	1149.30
RECEIVERS		R3	42.0	24.6	39.6	50.0	45.0	0.0				5.00	r	6262419.50	2148541.61	1125.08
RECEIVERS		R4	44.6	25.5	42.0	50.0	45.0	0.0				5.00	r	6262257.09	2148693.91	1132.55
RECEIVERS		R5	46.8	26.6	44.1	50.0	45.0	0.0				5.00	r	6262090.86	2148866.96	1135.71
RECEIVERS		R6	44.3	12.5	41.3	50.0	45.0	0.0				5.00	r	6261864.26	2149122.78	1137.13
RECEIVERS		R7	32.9	4.2	30.0	50.0	45.0	0.0				5.00	r	6261532.43	2149706.78	1137.13
RECEIVERS		R8	49.8	18.3	46.8	50.0	45.0	0.0				5.00	r	6262094.56	2149469.87	1161.25

Point Source(s)

Name	M.	ID	Result. PWL			Lw / Li			Operating Time			K0	Height		Coordinates		
			Day	Evening	Night	Type	Value	norm.	Day	Special	Night				X	Y	Z
			(dBA)	(dBA)	(dBA)			dB(A)	(min)	(min)	(min)	(dB)	(ft)		(ft)	(ft)	(ft)
POINTSOURCE		AC01	88.9	88.9	88.9	Lw	88.9		585.00	0.00	0.00	0.0	5.00	g	6262031.30	2149143.01	1167.13
POINTSOURCE		AC02	88.9	88.9	88.9	Lw	88.9		585.00	0.00	0.00	0.0	5.00	g	6262211.14	2148945.18	1167.13
POINTSOURCE		AC03	88.9	88.9	88.9	Lw	88.9		585.00	0.00	0.00	0.0	5.00	g	6262122.86	2149041.64	1167.13
POINTSOURCE		AC04	88.9	88.9	88.9	Lw	88.9		585.00	0.00	0.00	0.0	5.00	g	6262157.19	2149080.06	1167.13
POINTSOURCE		AC05	88.9	88.9	88.9	Lw	88.9		585.00	0.00	0.00	0.0	5.00	g	6262266.73	2149075.98	1167.13
POINTSOURCE		BBALL01	83.7	83.7	83.7	Lw	83.7		900.00	0.00	0.00	0.0	5.00	r	6262115.50	2149183.88	1137.13
POINTSOURCE		BBALL02	83.7	83.7	83.7	Lw	83.7		900.00	0.00	0.00	0.0	5.00	r	6262165.37	2149183.06	1137.13
POINTSOURCE		PLAY03	92.2	92.2	92.2	Lw	92.2		900.00	0.00	0.00	0.0	5.00	r	6262122.04	2149127.47	1137.13
POINTSOURCE		PLAY04	92.2	92.2	92.2	Lw	92.2		900.00	0.00	0.00	0.0	5.00	r	6262346.84	2149002.40	1137.13
POINTSOURCE		PLAY05	92.2	92.2	92.2	Lw	92.2		900.00	0.00	0.00	0.0	5.00	r	6262188.82	2149140.40	1137.13
POINTSOURCE		PLAY06	92.2	92.2	92.2	Lw	92.2		900.00	0.00	0.00	0.0	5.00	r	6262220.55	2149104.61	1137.13

Area Source(s)

ID	Result. PWL			Result. PWL''			Lw / Li		Operating Time			Moving Pt. Src			Height
	Day	Evening	Night	Day	Evening	Night	Type	Value	Day	Special	Night	Number			
	(dBA)	(dBA)	(dBA)	(dBA)	(dBA)	(dBA)			(min)	(min)	(min)	Day	Evening	Night	(ft)
PARKING01	73.4	73.4	73.4	41.7	41.7	41.7	Lw	73.4							5
PARKING02	73.4	73.4	73.4	40.0	40.0	40.0	Lw	73.4							5

Name	Height			Coordinates			
	Begin		End	x	y	z	Ground
	(ft)		(ft)	(ft)	(ft)	(ft)	(ft)
AREASOURCE	5.00	r		6262482.99	2148908.11	1146.27	1141.27
				6262654.58	2149065.74	1138.25	1133.25
				6262667.50	2149052.31	1138.32	1133.32
				6262682.49	2149064.19	1146.27	1141.27
				6262700.84	2149044.55	1146.27	1141.27
				6262686.62	2149031.63	1139.63	1134.63
				6262697.48	2149019.23	1139.98	1134.98
				6262677.84	2149001.66	1137.13	1132.13
				6262663.88	2149016.13	1137.13	1132.13
				6262656.13	2149008.64	1146.27	1141.27
				6262669.05	2148995.71	1137.19	1132.19
				6262525.12	2148864.70	1146.27	1141.27
AREASOURCE	5.00	r		6262259.49	2148886.39	1129.79	1124.79
				6262334.25	2148954.07	1135.08	1130.08
				6262338.97	2148950.39	1134.91	1129.91
				6262364.16	2148948.82	1136.14	1131.14
				6262457.80	2148846.26	1136.02	1131.02
				6262457.54	2148822.91	1134.03	1129.03
				6262463.83	2148816.62	1133.74	1128.74
				6262444.16	2148799.57	1132.55	1127.55
				6262435.77	2148795.11	1132.55	1127.55
				6262447.05	2148782.52	1132.55	1127.55
				6262408.49	2148747.37	1132.55	1127.55
				6262396.94	2148758.91	1132.04	1127.04
				6262386.19	2148749.46	1131.08	1126.08

Barrier(s)

Name	M.	ID	Absorption		Z-Ext.	Cantilever		Height			Coordinates			
			left	right		horz.	vert.	Begin		End	x	y	z	Ground
					(ft)	(ft)	(ft)	(ft)		(ft)	(ft)	(ft)	(ft)	(ft)
BARRIERS		BARRIERS00001						6.00	r		6262507.24	2148440.40	1124.41	1118.41
											6262448.23	2148508.89	1124.41	1118.41

Name	M.	ID	Absorption		Z-Ext.	Cantilever		Height			Coordinates			
			left	right		horz.	vert.	Begin		End	x	y	z	Ground
					(ft)	(ft)	(ft)	(ft)		(ft)	(ft)	(ft)	(ft)	(ft)
											6262284.99	2148692.68	1128.98	1122.98
											6262277.00	2148693.82	1133.55	1127.55
											6262215.35	2148756.61	1130.72	1124.72
BARRIERS		BARRIERS00002						6.00	r		6262157.13	2148833.09	1128.98	1122.98
											6262098.91	2148899.31	1130.61	1124.61
											6262041.83	2148847.93	1133.55	1127.55
											6261990.46	2148806.84	1133.55	1127.55
											6261947.08	2148776.02	1133.41	1127.41
BARRIERS		BARRIERS00003						6.00	r		6261846.75	2149044.68	1137.24	1131.24
											6261901.58	2149094.11	1138.13	1132.13
											6261899.26	2149118.82	1140.33	1134.33
											6261506.93	2149560.58	1142.70	1136.70
											6261376.09	2149448.44	1138.13	1132.13
BARRIERS		BARRIERS00004						6.00	r		6261458.28	2149714.27	1142.70	1136.70
											6261506.16	2149661.76	1142.70	1136.70
											6261524.70	2149660.21	1142.70	1136.70
											6262045.23	2150124.37	1151.84	1145.84

Building(s)

Name	M.	ID	RB	Residents	Absorption	Height		Coordinates			
						Begin		x	y	z	Ground
						(ft)		(ft)	(ft)	(ft)	(ft)
BUILDING		BUILDING00001	x	0		30.00	r	6262092.17	2149165.41	1162.13	1132.13
								6262071.34	2149146.38	1162.13	1132.13
								6262066.97	2149149.98	1162.13	1132.13
								6262061.06	2149145.35	1162.13	1132.13
								6262053.35	2149154.87	1162.13	1132.13
								6262047.17	2149149.21	1162.13	1132.13
								6262220.99	2148957.40	1162.13	1132.13
								6262227.41	2148963.32	1162.13	1132.13
								6262219.44	2148973.09	1162.13	1132.13
								6262224.59	2148977.97	1162.13	1132.13
								6262220.99	2148983.11	1162.13	1132.13
								6262241.55	2149001.63	1162.13	1132.13
								6262268.04	2148973.34	1162.13	1132.13
								6262211.99	2148920.12	1162.13	1132.13
								6262135.37	2149004.20	1162.13	1132.13
								6262136.91	2149005.74	1162.13	1132.13
								6262121.74	2149021.68	1162.13	1132.13
								6262117.11	2149016.28	1162.13	1132.13
								6262091.66	2149043.28	1162.13	1132.13
								6262097.83	2149048.94	1162.13	1132.13
								6262087.29	2149060.25	1162.13	1132.13
								6262086.77	2149059.48	1162.13	1132.13
								6262009.12	2149143.30	1162.13	1131.55
								6262065.43	2149194.98	1162.13	1132.13
BUILDING		BUILDING00002	x	0		30.00	r	6262119.68	2149093.67	1162.13	1132.13
								6262153.62	2149116.30	1162.13	1132.13
								6262194.25	2149072.08	1162.13	1132.13
								6262168.79	2149040.19	1162.13	1132.13
								6262156.71	2149053.82	1162.13	1132.13
								6262149.51	2149049.96	1162.13	1132.13
								6262126.62	2149075.16	1162.13	1132.13
								6262131.51	2149080.30	1162.13	1132.13
BUILDING		BUILDING00003	x	0		30.00	r	6262259.04	2149122.99	1162.13	1132.13
								6262304.81	2149073.62	1162.13	1132.13
								6262290.41	2149060.76	1162.13	1132.13
								6262332.83	2149014.74	1162.13	1132.13
								6262324.86	2149007.28	1162.13	1132.13
								6262323.32	2149008.83	1162.13	1132.13
								6262300.43	2148994.68	1162.13	1132.13
								6262228.18	2149072.85	1162.13	1132.13
								6262244.38	2149095.22	1162.13	1132.13
								6262236.93	2149103.19	1162.13	1132.13

APPENDIX 11.1:

CADNAA CONSTRUCTION NOISE MODEL INPUTS

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12532

CadnaA Noise Prediction Model: 12532_MobileFinal.cna
Date: 01.05.20
Analyst: B. Lawson

Receiver Noise Levels

Name	M.	ID	Level Lr			Limit. Value			Land Use			Height		Coordinates		
			Day	Night	CNEL	Day	Night	CNEL	Type	Auto	Noise Type			X	Y	Z
			(dBA)	(dBA)	(dBA)	(dBA)	(dBA)	(dBA)				(ft)		(ft)	(ft)	(ft)
RECEIVERS		R1	69.1	69.1	75.8	75.0	60.0	0.0				5.00	r	6262895.13	2149632.20	1155.41
RECEIVERS		R2	71.2	71.2	77.9	75.0	60.0	0.0				5.00	r	6262858.67	2148949.91	1149.32
RECEIVERS		R3	71.3	71.3	78.0	75.0	60.0	0.0				5.00	r	6262419.50	2148541.61	1124.83
RECEIVERS		R4	72.3	72.3	79.0	75.0	60.0	0.0				5.00	r	6262257.09	2148693.91	1132.55
RECEIVERS		R5	75.0	75.0	81.6	75.0	60.0	0.0				5.00	r	6262090.86	2148866.96	1135.97
RECEIVERS		R6	69.8	69.8	76.4	75.0	60.0	0.0				5.00	r	6261864.26	2149122.78	1137.13
RECEIVERS		R7	56.0	56.0	62.6	75.0	60.0	0.0				5.00	r	6261532.43	2149706.78	1137.13
RECEIVERS		R8	72.5	72.5	79.2	75.0	60.0	0.0				5.00	r	6262094.56	2149469.87	1161.76

Area Source(s)

ID	Result. PWL			Result. PWL''			Lw / Li		Operating Time			Moving Pt. Src			Height
	Day	Evening	Night	Day	Evening	Night	Type	Value	Day	Special	Night	Number			
	(dBA)	(dBA)	(dBA)	(dBA)	(dBA)	(dBA)			(min)	(min)	(min)	Day	Evening	Night	(ft)
AREA SOURCE	125.6	125.6	125.6	83.3	83.3	83.3	Lw"	83.3							5

Name	Height			Coordinates			
	Begin		End	x	y	z	Ground
	(ft)		(ft)	(ft)	(ft)	(ft)	(ft)
MOBILE	5.00	r		6261969.24	2149191.00	1137.13	1132.13
				6261955.72	2149205.23	1137.13	1132.13
				6261964.26	2149212.35	1137.13	1132.13
				6261982.75	2149218.04	1138.57	1133.57
				6262180.53	2149210.92	1137.13	1132.13
				6262178.39	2149183.89	1137.13	1132.13
				6262181.95	2149181.04	1137.13	1132.13
				6262199.02	2149173.22	1137.13	1132.13
				6262215.39	2149166.82	1137.13	1132.13
				6262236.02	2149161.84	1137.13	1132.13
				6262381.15	2149004.61	1146.27	1141.27
				6262593.15	2149191.72	1138.34	1133.34
				6262732.59	2149038.76	1137.13	1132.13
				6262399.65	2148737.12	1131.74	1126.74
				6262257.36	2148885.09	1129.57	1124.57
				6262335.62	2148954.10	1135.32	1130.32
				6262305.74	2148981.85	1137.13	1132.13
				6262282.97	2148964.06	1137.13	1132.13
				6262211.83	2148917.82	1137.13	1132.13

Barrier(s)

Name	M.	ID	Absorption		Z-Ext.	Cantilever		Height				Coordinates			
			left	right		horz.	vert.	Begin		End		x	y	z	Ground
					(ft)	(ft)	(ft)	(ft)		(ft)		(ft)	(ft)	(ft)	(ft)
BARRIERS		BARRIERS00001						6.00	r			6262507.24	2148440.40	1124.41	1118.41
												6262448.23	2148508.89	1124.41	1118.41
												6262284.99	2148692.68	1128.98	1122.98
												6262277.00	2148693.82	1133.55	1127.55
												6262215.35	2148756.61	1130.64	1124.64
BARRIERS		BARRIERS00002										6262157.13	2148833.09	1133.55	1127.55
												6262098.91	2148899.31	1133.55	1127.55
												6262041.83	2148847.93	1133.55	1127.55
												6261990.46	2148806.84	1133.55	1127.55
												6261947.08	2148776.02	1133.40	1127.40
BARRIERS		BARRIERS00003						6.00	r			6261846.75	2149044.68	1137.39	1131.39
												6261901.58	2149094.11	1138.13	1132.13
												6261899.26	2149118.82	1140.33	1134.33
												6261506.93	2149560.58	1142.70	1136.70
												6261376.09	2149448.44	1138.13	1132.13
BARRIERS		BARRIERS00004						6.00	r			6261458.28	2149714.27	1142.70	1136.70
												6261506.16	2149661.76	1142.70	1136.70
												6261524.70	2149660.21	1142.70	1136.70
												6262045.23	2150124.37	1151.84	1145.84

12532

CadnaA Noise Prediction Model: 12532_StationaryFinal.cna
Date: 01.05.20
Analyst: B. Lawson

Receiver Noise Levels

Name	M.	ID	Level Lr			Limit. Value			Land Use			Height		Coordinates		
			Day	Night	CNEL	Day	Night	CNEL	Type	Auto	Noise Type			X	Y	Z
			(dBA)	(dBA)	(dBA)	(dBA)	(dBA)	(dBA)				(ft)		(ft)	(ft)	(ft)
RECEIVERS		R1	49.5	49.5	56.2	75.0	60.0	0.0				5.00	r	6262895.13	2149632.20	1155.41
RECEIVERS		R2	47.4	47.4	54.1	75.0	60.0	0.0				5.00	r	6262858.67	2148949.91	1149.32
RECEIVERS		R3	49.7	49.7	56.4	75.0	60.0	0.0				5.00	r	6262419.50	2148541.61	1124.83
RECEIVERS		R4	52.2	52.2	58.8	75.0	60.0	0.0				5.00	r	6262257.09	2148693.91	1132.55
RECEIVERS		R5	59.0	59.0	65.7	75.0	60.0	0.0				5.00	r	6262090.86	2148866.96	1135.97
RECEIVERS		R6	52.8	52.8	59.5	75.0	60.0	0.0				5.00	r	6261864.26	2149122.78	1137.13
RECEIVERS		R7	37.0	37.0	43.7	75.0	60.0	0.0				5.00	r	6261532.43	2149706.78	1137.13
RECEIVERS		R8	54.5	54.5	61.2	75.0	60.0	0.0				5.00	r	6262094.56	2149469.87	1161.76

Area Source(s)

ID	Result. PWL			Result. PWL''			Lw / Li		Operating Time			Moving Pt. Src			Height
	Day	Evening	Night	Day	Evening	Night	Type	Value	Day	Special	Night	Number			
	(dBA)	(dBA)	(dBA)	(dBA)	(dBA)	(dBA)			(min)	(min)	(min)	Day	Evening	Night	(ft)
SCHOOL	99.5	99.5	99.5	72.3	72.3	72.3	Lw''	72.3							5
SCHOOL	96.7	96.7	96.7	72.3	72.3	72.3	Lw''	72.3							5
SCHOOL	103.1	103.1	103.1	72.3	72.3	72.3	Lw''	72.3							5

Name	Height			Coordinates			
	Begin		End	x	y	z	Ground
	(ft)		(ft)	(ft)	(ft)	(ft)	(ft)
STATIONARY	5.00	r		6262228.18	2149072.85	1137.13	1132.13
				6262244.38	2149095.22	1137.13	1132.13
				6262236.93	2149103.19	1137.13	1132.13
				6262259.04	2149122.99	1137.13	1132.13
				6262304.81	2149073.62	1137.13	1132.13
				6262290.41	2149060.76	1137.13	1132.13
				6262332.83	2149014.74	1137.13	1132.13
				6262300.43	2148994.68	1137.13	1132.13
STATIONARY	5.00	r		6262119.68	2149093.67	1137.13	1132.13
				6262153.62	2149116.30	1137.13	1132.13
				6262194.25	2149072.08	1137.13	1132.13
				6262168.79	2149040.19	1137.13	1132.13
				6262156.71	2149053.82	1137.13	1132.13
				6262149.51	2149049.96	1137.13	1132.13
				6262126.62	2149075.16	1137.13	1132.13
				6262131.51	2149080.30	1137.13	1132.13
STATIONARY	5.00	r		6262065.43	2149194.98	1137.13	1132.13
				6262092.17	2149165.41	1137.13	1132.13
				6262071.34	2149146.38	1137.13	1132.13
				6262066.97	2149149.98	1137.13	1132.13
				6262061.06	2149145.35	1137.13	1132.13
				6262053.35	2149154.87	1137.13	1132.13
				6262047.17	2149149.21	1137.13	1132.13
				6262220.99	2148957.40	1137.13	1132.13
				6262227.41	2148963.32	1137.13	1132.13
				6262219.44	2148973.09	1137.13	1132.13
				6262224.59	2148977.97	1137.13	1132.13
				6262220.99	2148983.11	1137.13	1132.13
				6262241.55	2149001.63	1137.13	1132.13
				6262268.04	2148973.34	1137.13	1132.13
				6262211.83	2148917.82	1137.13	1132.13
				6262135.37	2149004.20	1137.13	1132.13
				6262136.91	2149005.74	1137.13	1132.13
				6262121.74	2149021.68	1137.13	1132.13
				6262117.11	2149016.28	1137.13	1132.13
				6262091.66	2149043.28	1137.13	1132.13
				6262097.83	2149048.94	1137.13	1132.13
				6262009.12	2149143.30	1136.55	1131.55

Barrier(s)

Name	M.	ID	Absorption		Z-Ext.	Cantilever		Height				Coordinates			
			left	right		horz.	vert.	Begin		End		x	y	z	Ground
					(ft)	(ft)	(ft)	(ft)		(ft)		(ft)	(ft)	(ft)	(ft)
BARRIERS		BARRIERS00001						6.00	r			6262507.24	2148440.40	1124.41	1118.41
												6262448.23	2148508.89	1124.41	1118.41
												6262284.99	2148692.68	1128.98	1122.98
												6262277.00	2148693.82	1133.55	1127.55
												6262215.35	2148756.61	1130.64	1124.64

Name	M.	ID	Absorption		Z-Ext.	Cantilever		Height			Coordinates			
			left	right		horz.	vert.	Begin		End	x	y	z	Ground
					(ft)	(ft)	(ft)	(ft)		(ft)	(ft)	(ft)	(ft)	(ft)
BARRIERS		BARRIERS00002									6262157.13	2148833.09	1133.55	1127.55
											6262098.91	2148899.31	1133.55	1127.55
											6262041.83	2148847.93	1133.55	1127.55
											6261990.46	2148806.84	1133.55	1127.55
											6261947.08	2148776.02	1133.40	1127.40
BARRIERS		BARRIERS00003						6.00	r		6261846.75	2149044.68	1137.39	1131.39
											6261901.58	2149094.11	1138.13	1132.13
											6261899.26	2149118.82	1140.33	1134.33
											6261506.93	2149560.58	1142.70	1136.70
											6261376.09	2149448.44	1138.13	1132.13
BARRIERS		BARRIERS00004						6.00	r		6261458.28	2149714.27	1142.70	1136.70
											6261506.16	2149661.76	1142.70	1136.70
											6261524.70	2149660.21	1142.70	1136.70
											6262045.23	2150124.37	1151.84	1145.84

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