Alta Vista

NOISE IMPACT ANALYSIS

CITY OF PLACENTIA

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LIST OF ABBREVIATED TERMS

(1)	Reference
ADT	Average Daily Traffic
ANSI	American National Standards Institute
Calveno	California Vehicle Noise
CEQA	California Environmental Quality Act
CNEL	Community Noise Equivalent Level
dBA	A-weighted decibels
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
L_{min}	Minimum level measured over the time interval
mph	Miles per hour
PPV	Peak Particle Velocity
Project	Alta Vista
REMEL	Reference Energy Mean Emission Level
RMS	Root-mean-square
VdB	Vibration Decibels

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EXECUTIVE SUMMARY

Urban Crossroads, Inc. has prepared this noise study to determine the noise exposure and the necessary noise mitigation measures for the proposed Alta Vista development ("Project"). The Project site is located on the southeast corner of Rose Drive and Alta Vista Street in the City of Placentia. The Project is proposed to consist of 10,000 square feet of retail use and up to 54 single-family residential dwelling units. This study has been prepared consistent with applicable City of Placentia noise standards, and significance criteria based on guidance provided by Appendix G of the California Environmental Quality Act (CEQA) Guidelines. (1)

OFF-SITE TRAFFIC NOISE ANALYSIS

Traffic generated by the operation of the proposed Project will influence the traffic noise levels in surrounding off-site areas. To quantify the traffic noise increases on the surrounding off-site areas, the changes in traffic noise levels on 13 roadway segments surrounding the Project site were calculated based on the change in the average daily traffic (ADT) volumes. The traffic noise levels provided in this analysis are based on the traffic forecasts found in *Alta Vista Traffic Impact Analysis* prepared by EPD Solutions, Inc. (2) To assess the off-site noise level impacts associated with the proposed Project, noise contour boundaries were developed for Existing and Opening Year traffic conditions. The analysis shows that the unmitigated Project-related traffic noise level increases under all traffic scenarios will be *less than significant*.

ON-SITE NOISE ANALYSIS

An on-site exterior noise impact analysis has been completed to determine the traffic noise exposure and to identify potential necessary noise abatement measures for the proposed Alta Vista Project. It is expected that the primary source of noise impacts to the Project site will be traffic noise from Rose Drive and Alta Vista Street.

EXTERIOR NOISE LEVELS

To satisfy the City of Placentia 65 dBA CNEL exterior noise level standards for residential land use, the construction of 6-foot high noise barriers is required for the outdoor living areas (backyards) of single-family residential lots adjacent to Rose Drive and Alta Vista Street. With the recommended noise barriers shown on Exhibit ES-A, the mitigated future exterior noise levels at the outdoor living areas (backyards) of single-family residential lots will be reduced to range from 60.8 to 64.1 dBA CNEL. This noise analysis shows that the recommended noise barriers will satisfy the City of Placentia 65 dBA CNEL exterior noise level standards for single-family residential use. The recommendations identify the minimum required noise barrier height to satisfy the City of Placentia exterior noise level standards.

The results of the on-site traffic noise analysis also indicate that commercial uses adjacent to Rose Drive and Alta Vista Street will experience unmitigated exterior noise levels approaching 68.0 dBA CNEL, and an interior noise analysis is provided herein to demonstrate compliance with the 50 dBA CNEL interior noise level threshold for commercial uses.

The recommended noise control barriers shall be constructed so that the top of each wall and /or berm combination extends to the planned height above the pad elevation of the lot it is shielding. When the road is elevated above the pad elevation, the barrier shall extend to the recommended height above the highest point between the residential home and the road. The barrier shall provide a weight of at least 4 pounds per square foot of face area with no decorative cutouts or line-of-sight openings between shielded areas and the roadways, or a minimum transmission loss of 20 dBA. (3) The barrier shall consist of a solid face from top to bottom. Unnecessary openings or decorative cutouts shall not be made. All gaps (except for weep holes) should be filled with grout or caulking. The noise barrier shall be constructed using the following materials:

- Masonry block;
- Stucco veneer over wood framing (or foam core), or 1-inch-thick tongue and groove wood of sufficient weight per square foot;
- Glass (1/4-inch-thick), or other transparent material with sufficient weight per square foot capable of providing a minimum transmission loss of 20 dBA;
- Earthen berm;
- Any combination of these construction materials.

INTERIOR NOISE LEVELS

To satisfy the City of Placentia 45 dBA CNEL interior noise level standard for residential land use, and the 50 dBA CNEL interior noise level threshold for commercial uses, buildings adjacent to Rose Drive and Alta Vista Street will require a Noise Reduction (NR) of up to 24.2 dBA and a windows-closed condition requiring a means of mechanical ventilation (e.g. air conditioning). The following on-site mitigation measures are required:

Residential:

- Windows: All residential lots adjacent to Rose Drive and Alta Vista Street require first and second-floor windows and sliding glass doors that have well-fitted, well-weather-stripped assemblies, with minimum sound transmission class (STC) ratings of 27.
- Doors (Non-Glass): All exterior doors shall be well weather-stripped and have minimum STC ratings of 25. Well-sealed perimeter gaps around the doors are essential to achieve the optimal STC rating. (4)
- 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.
- Roof: 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.

Commercial:

- Windows: Retail buildings (Shops 1 and 2) require upgraded windows with a minimum STC rating of 32 and a means of mechanical ventilation (e.g., air conditioning);
- Doors (Non-Glass): All exterior doors shall be well weather-stripped and have minimum STC ratings of 25. Well-sealed perimeter gaps around the doors are essential to achieve the optimal STC rating. (4)
- 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.
- Roof: Roof sheathing shall be per manufacturer's specification. Ceilings shall be per manufacturer's specification. Ceiling/roof Insulation, if required under manufacturer's specification, shall have a minimum rating of R-19.
- Ventilation: Arrangements for any habitable room (e.g., office) 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.

With the interior noise mitigation measures provided in this study, the proposed Project is expected to satisfy the City of Placentia 45 dBA CNEL interior noise level standard for residential development, and the 50 dBA CNEL interior noise level threshold for commercial uses.

OPERATIONAL NOISE ANALYSIS

Using reference noise levels to represent the potential noise sources within Alta Vista site, this analysis estimates the Project-related operational (stationary-source) noise levels at the nearby noise-sensitive receiver locations. The Project-related operational noise sources are expected to include roof-top air conditioning units, a drive-thru speakerphone, entry gate activity, park activity, and parking lot vehicle movements.

The analysis shows that the unmitigated Project-related operational noise levels will satisfy the City of Placentia exterior noise level standards at all the off-site receiver locations in the Project study area. Further, this analysis demonstrates that the Project will contribute a *less than significant* operational noise level impact to the existing ambient noise environment at all the nearby sensitive receiver locations during the daytime and nighttime hours. Therefore, the operational noise level impacts associated with the proposed Project activities, such as the roof-top air conditioning units, a drive-thru speakerphone, entry gate activity, park activity, and parking lot vehicle movements will be *less than significant*.

CONSTRUCTION NOISE ANALYSIS

Construction noise represents a short-term increase on the ambient noise levels. Construction-related noise impacts are expected to create temporary and intermittent high-level noise conditions at receivers surrounding the Project site. Using sample reference noise levels to represent the planned construction activities of Alta Vista site, this analysis estimates the Project-related construction noise levels at nearby sensitive receiver locations. The Project-related short-term construction noise levels are expected to approach 73.3 dBA L_{eq} and will satisfy the 85 dBA

L_{eq} threshold identified by the National Institute for Occupational Safety and Health (NIOSH) at all receiver locations. The NIOSH 85 dBA L_{eq} threshold is used in this noise study to evaluate Project construction noise level compliance, since neither the City of Placentia General Plan or Municipal Code identify construction-specific noise level standards.

To describe the temporary Project construction noise level contributions to the existing ambient noise environment, the Project construction noise levels were combined with the existing ambient noise levels measurements at the off-site receiver locations. A temporary noise level increase of 12 dBA L_{eq} is considered a potentially significant impact based on the Caltrans substantial noise level increase criteria which is used to assess the Project-construction noise level increases. (5) The analysis shows that the Project will contribute unmitigated, worst-case construction noise level increases ranging from 0.3 to 19.6 dBA L_{eq} at the nearby sensitive receiver locations, during the daytime construction hours. This includes the barrier attenuation provided by the existing 6-foot high noise barriers for the neighboring homes represented at receiver locations R3 to R5 adjacent to the Project's eastern and southern site boundaries. Since the worst-case temporary noise level increase of up to 19.6 dBA L_{eq} during Project construction will exceed the 12 dBA L_{eq} significance threshold, the unmitigated construction noise level increases are considered *potentially significant* temporary noise impacts at receiver locations R3 and R4. Therefore, construction noise mitigation is required to reduce the short-term noise level increases at the potentially impacted receiver locations.

With a 100-foot buffer zone for large construction equipment (e.g., dozers, graders, scrapers, etc.) capable of generating noise levels greater than 79 dBA L_{eq} at 10 feet over a 10-minute period of activity, the mitigation measures identified in this noise study will reduce Project construction noise levels at all nearby sensitive receiver locations to *less than significant* impacts with mitigation during temporary Project construction activities. 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.

CONSTRUCTION VIBRATION ANALYSIS

Based on the reference vibration levels provided by the Federal Transit Administration (FTA), the potential Project construction vibration levels are evaluated at the nearby sensitive receiver locations. At distances ranging from 27 to 669 feet from Project construction activity, construction vibration velocity levels are expected to approach 86.0 VdB. The unmitigated Project construction vibration levels will exceed the 80 VdB human annoyance threshold for infrequent events at receiver locations R3 to R5. Therefore, the 100-foot buffer zone mitigation measure, previously identified to reduce construction noise levels, is required to reduce the vibration levels at receiver locations R3 to R5. With the 100-foot buffer zone for large construction equipment large construction equipment (e.g., dozers, graders, scrapers, etc.) capable of generating noise levels greater than 79 dBA L_{eq} at 10 feet over a 10-minute period of activity, the mitigated Project vibration levels will approach 68.9 VdB and will remain below the

FTA 80 VdB threshold. Therefore, the vibration impacts due to Project construction will be *less than significant* with mitigation.

Further, vibration levels at the site of the closest sensitive receiver are unlikely to be sustained during the entire construction period, but will occur rather only during the times that heavy construction equipment is operating simultaneously adjacent to the Project site perimeter. Moreover, construction at the Project site will be restricted to daytime hours consistent with City requirements thereby eliminating potential vibration impacts during the sensitive nighttime hours.

CONSTRUCTION NOISE AND VIBRATION MITIGATION MEASURES

Though construction noise is temporary, intermittent and of short duration, and will not present any long-term impacts, the following mitigation measures (in addition to the existing 6-foot high perimeter wall) would reduce the noise level increases produced by the construction equipment to the nearby noise-sensitive residential land uses:

- The use of large construction equipment (e.g., dozers, graders, scrapers) capable of generating noise levels in excess of 79 dBA L_{eq} (10-minute) at 10 feet and vibration levels of 80 VdB at sensitive receiver locations shall be prohibited within 100 feet of nearby occupied sensitive residential homes (represented by receiver locations R3 to R5) to reduce the noise and vibration levels for the entire duration of Project construction. If the contractor can demonstrate that specific pieces of large construction equipment satisfies the 79 dBA L_{eq} (10-minute) at 10 feet noise level criteria, and vibration levels of 80 VdB at sensitive receiver locations, then they shall be allowed to operate within the buffer zone shown on Exhibit 11-A.
- 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. and 7:00 p.m. Monday to Friday; 9:00 a.m. to 6:00 p.m. Saturday; with no activity on Sundays or holidays (City of Placentia Municipal Code, Section 23.81.170). (6) 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 receptors 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 (i.e., to the northwest and 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. and 7:00 p.m. Monday to Friday; 9:00 a.m. to 6:00 p.m. Saturday; with no activity 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.

SUMMARY OF CEQA SIGNIFICANCE FINDINGS

The results of this Alta Vista 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 described below.

TABLE ES-1: SUMMARY OF CEQA SIGNIFICANCE FINDINGS

Analysis	Report Section	Significance Findings	
		Unmitigated	Mitigated
Off-Site Traffic Noise	7	*Less Than Significant*	*n/a*
On-Site Traffic Noise	8	*Potentially Significant*	*Less Than Significant*
Operational Noise	10	*Less Than Significant*	*n/a*
Long-Term Operational Noise Level Increases		*Less Than Significant*	
Construction Noise Level Compliance	11	*Less Than Significant*	*n/a*
Temporary Construction Noise Level Increase		*Potentially Significant*	*Less Than Significant*
Construction Vibration		*Potentially Significant*	*Less Than Significant*

EXHIBIT ES-A: SUMMARY OF ON-SITE RECOMMENDATIONS

LEGEND:

6' Barrier Height (in feet) — Existing Barrier — Planned Noise Barrier — Recommended Noise Barrier

● Buildings requiring standard first and second-floor (if applicable) windows with a minimum STC rating of 27 and a means of mechanical ventilation (e.g. air conditioning).

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1 INTRODUCTION

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

1.1 SITE LOCATION

The proposed Alta Vista Project is located on the southeast corner of Rose Drive and Alta Vista Street in the City of Placentia, as shown on Exhibit 1-A. The proposed Project is located approximately two miles east of State Route 57, and roughly 7.5 miles east of the closest airport, Fullerton Municipal Airport.

The Project site is currently vacant. Existing single-family residential uses in the Project study area are located adjacent to the eastern and southern Project site boundaries, and west across Rose Drive. Existing commercial uses and Bridgemark Corporation oil drilling facilities are located north of the Project site across Alta Vista Street. The Placentia Champions Sports Complex and park is located east of the Project site on Alta Vista Street.

1.2 PROJECT DESCRIPTION

The Project is proposed to consist of 10,000 square feet of retail use and up to 54 single-family residential dwelling units, as shown on Exhibit 1-B. The on-site Project-only operational noise sources are expected to include: roof-top air conditioning units, a drive-thru speakerphone, entry gate activity, park activity, and parking lot vehicle movements.

EXHIBIT 1-A: LOCATION MAP

EXHIBIT 1-B: SITE PLAN

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2 FUNDAMENTALS

Noise has been 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. (7) 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. (8) 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 commonly 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 Placentia 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. (7)

2.3.2 GROUND ABSORPTION

The propagation path of noise from a highway to a receptor 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 receptor, 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 receptor 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. (9)

2.3.3 ATMOSPHERIC EFFECTS

Receptors 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. (7)

2.3.4 SHIELDING

A large object or barrier in the path between a noise source and a receptor can substantially attenuate noise levels at the receptor. 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 resident. 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. (9)

2.4 NOISE CONTROL

Noise control is the process of obtaining an acceptable noise environment for an observation point or receptor by controlling the noise source, transmission path, receptor, or all three. This concept is known as the source-path-receptor 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 receptor. 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. (9)

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. (10)

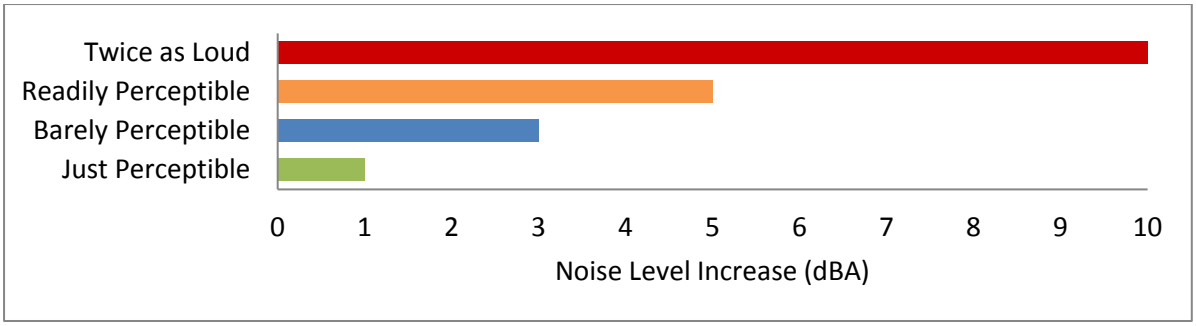
2.7 COMMUNITY RESPONSE TO NOISE

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. Another 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. (11) 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. (11) 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. An increase or decrease of 1 dBA cannot be perceived except in carefully controlled laboratory experiments, a change of 3 dBA are considered *barely perceptible*, and changes of 5 dBA are considered *readily perceptible*. (9)

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. (12)

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. Further, periodic exposure to high noise levels in short duration, such as Project construction, is typically considered an annoyance and not impactful to human health. It would take several years of exposure to high noise levels to result in hearing impairment. (13)

2.9 VIBRATION

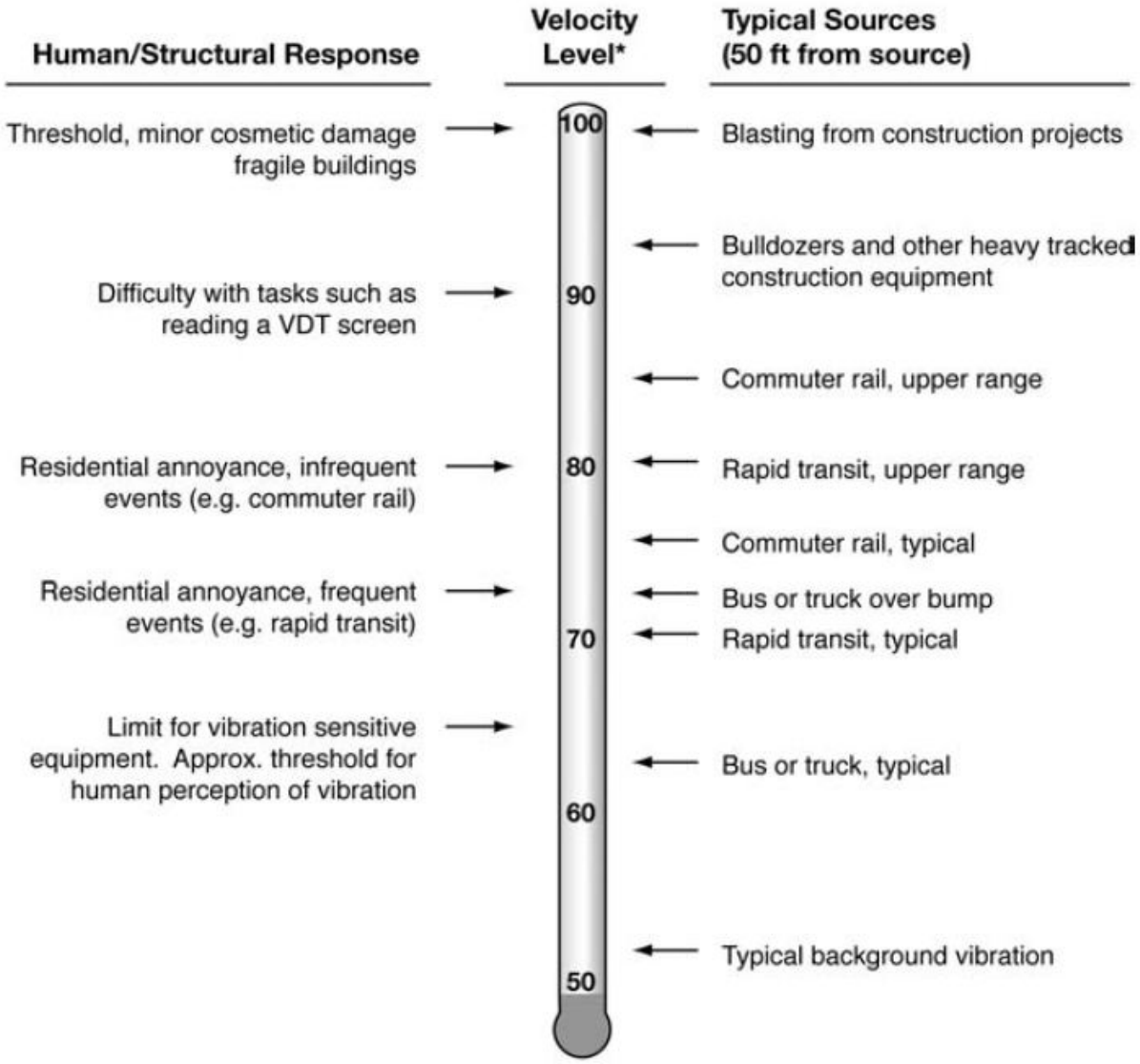
Per the Federal Transit Administration (FTA) *Transit Noise Impact and Vibration Assessment* (14), vibration is the periodic oscillation of a medium or object. The rumbling sound caused by the vibration of room surfaces is called structure-borne noise. Sources of ground-borne vibrations include natural 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.

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. (15) 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 STANDARDS

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.

The 2014 State of California's Green Building Standards Code contains mandatory measures for non-residential building construction in Section 5.507 on Environmental Comfort. (16) 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 non-residential structures are developed in areas where the exterior noise levels exceed 65 dBA CNEL, such as within a noise contour of an airport, freeway, railroad, and other areas where noise contours are not readily available. If the development falls within an airport or freeway 65 dBA CNEL noise contour, the combined sound transmission class (STC) rating of

the wall and roof-ceiling assemblies must be at least 50. For those developments in areas where noise contours are not readily available, and the noise level exceeds 65 dBA L_{eq} for any hour of operation, a wall and roof-ceiling combined STC rating of 45, and exterior windows with a minimum STC rating of 40 are required (Section 5.507.4.1).

3.3 TRANSPORTATION NOISE STANDARDS

The City of Placentia adopted a Noise Element of the General Plan in 1974 and is currently undergoing an update to the City's General Plan. The adopted 1974 General Plan Noise Element, however, does not contain specific noise level criteria needed to evaluate transportation noise levels for this noise study. As such, the County of Orange General Plan Noise Element is used to identify acceptable criteria for transportation noise analysis.

3.3.1 COUNTY OF ORANGE GENERAL PLAN NOISE ELEMENT

The County of Orange has adopted a Noise Element of the General Plan to control and abate environmental noise, and to protect the citizens of the County of Orange from excessive exposure to noise. (17) The County's Noise Element identifies several polices to minimize the impacts of excessive noise levels throughout the community, and establishes noise level requirements for all land uses. To protect residents from excessive noise, the Noise Element contains the following six policies:

1. *To cooperate with other County agencies and levels of government to bring about a comprehensive and coordinated effort to reduce noise levels.*
2. *To disseminate public information regarding noise and programs to reduce noise levels and their impacts.*
3. *To encourage the control of noise from transportation systems as the most efficient and effective means of reducing noise at the source.*
4. *To monitor noise levels and adopt and enforce noise abatement programs.*
5. *To fully integrate noise considerations in land use planning to prevent new noise/land use conflicts.*
6. *To identify and employ mitigation measures in order to reduce the impact of noise levels and attain the standards established by the Noise Element, for both interior areas and outdoor living areas for noise sensitive land uses.*

To promote cooperation with other agencies and levels of government (Policy 1), the County of Orange adopts policies to recommend changes to Federal and State legislation and ensure the regional aspects of noise-related issues are addressed. To provide information to the public concerning noise impacts (Policy 2), the County requires the notification of property owners and developers when property is located within an aircraft overflight area or noise contour of an airport. The County of Orange Noise Element identifies many policies to address transportation-related noise sources, such as requirements for new roadway developments to incorporate noise mitigation measures in their design (Policy 3). The County requires the implementation of noise monitoring and abatement strategies (Policy 4) to enforce the County's Noise Ordinance and prohibit or mitigate unnecessary noise sources. Further, the County identifies criteria for acceptable noise levels for various land uses in Tables VIII-2 and VIII-3 of the Noise Element to

prevent new noise and land use conflicts (Policy 5). To prevent and mitigate noise impacts for its residents (Policy 6), the County of Orange requires noise attenuation measures for sensitive residential land use exposed to exterior noise levels higher than 65 CNEL, and requires an interior noise level of 45 dBA CNEL. (17)

3.3.2 LAND USE COMPATIBILITY

The noise criteria identified in the County of Orange Noise Element (Table VIII-2), along with the definitions found in Table VIII-3, are guidelines to evaluate the land use compatibility of transportation related noise. The compatibility criteria, shown on Exhibit 3-A, provides the County with a planning tool to gauge the compatibility of land uses relative to existing and future exterior noise levels

The Compatibility Matrix for Land Use and Community Noise Equivalent Levels (CNEL) describes categories of compatibility and not specific noise standards. The proposed Alta Vista single-family residential land use is allowed when exterior noise levels range from 60 to 65 dBA CNEL if the noise levels can be mitigated below the 65 dBA CNEL exterior and 45 dBA CNEL interior criteria. For exterior noise levels exceeding 65 dBA CNEL, *new residential uses are prohibited in areas within the 65 dBA CNEL contour from any airport or air station*, and *allowed in other areas if interior and exterior community noise levels can be mitigated*. (17) Commercial (retail) uses within the Project site are *allowed if interior levels can be mitigated* in any noise environment.

EXHIBIT 3-A: COMPATIBILITY FOR LAND USE AND COMMUNITY NOISE EQUIVALENT LEVELS

COMPATIBILITY MATRIX FOR
LAND USE AND COMMUNITY NOISE EQUIVALENT LEVELS
(CNEL)

	65+ decibels CNEL	60 to 65 decibels CNEL
TYPE OF USE		
Residential	3a, b, e	2a, e
Commercial	2c	2c
Employment	2c	2c
Open Space		
Local	2c	2c
Community	2c	2c
Regional	2c	2c
Educational Facilities		
Schools (K through 12)	2c, d, e	2c, d, e
Preschool, college, other	2c, d, e	2c, d, e
Places of Worship	2c, d, e	2c, d, e
Hospitals		
General	2a, c, d, e	2a, c, d, e
Convalescent	2a, c, d, e	2a, c, d, e
Group Quarters	1a, b, c, e	2a, c, e
Hotel / Motels	2a, c	2a, c
Accessory Uses		
Executive Apartments	1a, b, e	2a, e
Caretakers	1a, b, c, e	2a, c, e

EXHIBIT 3-B: EXPLANATION AND DEFINITIONS

EXPLANATION AND DEFINITIONS ON TABLE VIII-2

ACTION REQUIRED TO ENSURE COMPATIBILITY
BETWEEN LAND USE AND NOISE FROM EXTERNAL SOURCES

1 = Allowed if interior and exterior community noise levels can be mitigated.
2 = Allowed if interior levels can be mitigated.
3 = New residential uses are prohibited in areas within the 65-decibel CNEL contour from any airport of air station; allowed in other areas if interior and exterior community noise levels can be mitigated. The prohibition against new residential development excludes limited "infill" development within an established neighborhood.

STANDARDS REQUIRED FOR COMPATIBILITY OF LAND USE AND NOISE

a = Interior Standard: CNEL of less than 45 decibels (habitable rooms only).
b = Exterior Standard: CNEL of less than 65 decibels in outdoor living areas.
c = Interior Standard: Leq (h)=45 to 65 decibels interior noise level, depending on interior use.
d = Exterior Standard: Leq (h) of less than 65 decibels in outdoor living areas.
e = Interior Standard: As approved by the Board of Supervisors for sound events of short duration such as aircraft flyovers or individual passing railroad trains.

KEY DEFINITIONS

Habitable Room – Any room meeting the requirements of the Uniform Building Code or other applicable regulations which is intended to be used for sleeping, living, cooking or dining purposes, excluding such enclosed spaces as closets, pantries, bath or toilet rooms, service rooms, connecting corridors, laundries, unfinished attics, foyers, storage spaces, cellars, utility rooms and similar spaces.

Interior – Spaces that are covered and largely enclosed by walls.

Leq (h) – The A-weighted equivalent sound level averaged over a period of "h" hours. An example would be Leq (12) where the equivalent sound level is the average over a specified 12-hour period (such as 7:00 a.m. to 7:00 p.m.). Typically, time period "h" is defined to match the hours of operation of a given type of use.

Outdoor Living Area – Outdoor living area is a term used by the County of Orange to define spaces that are associated with residential land uses typically used for passive private recreational activities or other noise-sensitive uses. Such spaces include patio areas, barbecue areas, jacuzzi areas, etc. associated with residential uses; outdoor patient recovery or resting areas associated with hospitals, convalescent hospitals, or rest homes; outdoor areas associated with places of worship which have a significant role in services or other noise-sensitive activities; and outdoor school facilities routinely used for educational purposes which may be adversely impacted by noise. Outdoor areas usually not included in this definition are: front yard areas, driveways, greenbelts, maintenance areas, and storage areas associated with residential land uses; exterior areas at hospitals that are not used for patient activities; outdoor areas associated with places of worship and principally used for short-term social gatherings; and outdoor areas associated with school facilities that are not typically associated with educational uses prone to adverse noise impacts (for example, school play yard areas).

Based on the noise criteria of the Noise Element, this noise study has been prepared to satisfy an exterior noise level of less than 65 dBA CNEL and an interior noise level of less than 45 dBA CNEL for residential uses. Interior noise levels for commercial uses shall be limited to a 50 dBA CNEL interior noise level threshold based on California Green Building Standards Code requirements. The 65 dBA CNEL residential exterior noise standards typically apply to outdoor living areas where people congregate. In the case of residential projects, the standards apply to private yards of

single-family homes and first floor patio areas for multi-family units, as defined by Table VIII-3 of the Noise Element.

3.4 OPERATIONAL NOISE STANDARDS

To analyze noise impacts originating from a designated fixed location or private property such as the Alta Vista Project, stationary-source (operational) noise such as the expected roof-top air conditioning units, a drive-thru speakerphone, entry gate activity, park activity, and parking lot vehicle movements are typically evaluated against standards established under a City's Municipal Code. The City of Placentia Municipal Code, Section 23.76.050 establishes the permissible noise level that may be received at nearby sensitive uses (e.g., residential). For noise-sensitive residential properties, the exterior noise level shall not exceed 55 dBA L_{50} during daytime hours (7:00 a.m. to 10:00 p.m.) and shall not exceed 50 dBA L_{50} during the nighttime hours (10:00 p.m. to 7:00 a.m.), as defined by the Municipal Code. (6) These standards shall apply for a cumulative period of 30 minutes in any hour (L_{50}), as well as plus 5 dBA cannot be exceeded for a cumulative period of more than 15 minutes in any hour (L_{25}), or the standard plus 10 dBA for a cumulative period of more than 5 minutes in any hour (L_8), or the standard plus 15 dBA for a cumulative period of more than 1 minute in any hour (L_2), or the standard plus 20 dBA for any period of time (L_{max}). The City of Placentia Municipal Code noise limits are shown on Table 3-1 and included in Appendix 3.1.

TABLE 3-1: OPERATIONAL NOISE STANDARDS

Jurisdiction	Land Use	Time Period	Exterior Noise Levels (dBA)[2]				
			L_{50} (30 Mins)	L_{25} (15 mins)	L_8 (5 mins)	L_2 (1 Min)	L_{max} (Anytime)
City of Placentia[1]	Residential (Noise Zone I)	Daytime	55	60	65	70	75
		Nighttime	50	55	60	65	70

[1] Source: Section 23.76.050 of the City of Placentia Municipal Code (Appendix 3.1).
[2] The noise level is the level exceeded "n" percent of the time during the measurement period. L_{25} is the noise level exceeded 25% of the time. "Daytime" = 7:00 a.m. to 10:00 p.m.; "Nighttime" = 10:00 p.m. to 7:00 a.m.

3.5 CONSTRUCTION NOISE STANDARDS

To analyze noise impacts originating from the construction of the Alta Vista, noise from construction activities are typically evaluated against standards established under a City's Municipal Code. The Municipal Code noise standards for construction are described below for the City of Placentia.

3.5.1 CITY OF PLACENTIA CONSTRUCTION NOISE STANDARDS

To control noise impacts associated with the construction of the proposed Project, the City has established limits to the hours of operation. Section 23.81.170 of the City's Municipal Code indicates that construction activity is limited to the hours of 7:00 a.m. and 7:00 p.m. Monday to Friday; 9:00 a.m. to 6:00 p.m. on Saturdays; with no activity allowed on Sundays or holidays. (6) However, the City's General Plan and Municipal Code do not establish numeric maximum

acceptable construction source noise levels at potentially affected receivers, which would allow for a quantified determination of what CEQA constitutes as the *generation of noise levels in excess of standards* or as a *substantial temporary or periodic noise increase*, the following construction noise level thresholds are used in this noise study.

3.5.2 CONSTRUCTION NOISE LEVEL COMPLIANCE THRESHOLD

To evaluate whether the Project will generate potentially significant temporary construction noise levels at off-site sensitive receiver locations, a construction-related noise level threshold is adopted from the *Criteria for Recommended Standard: Occupational Noise Exposure* prepared by the National Institute for Occupational Safety and Health (NIOSH). (18) A division of the U.S. Department of Health and Human Services, NIOSH identifies a noise level threshold based on the duration of exposure to the source. The construction related noise level threshold starts at 85 dBA for more than eight hours per day, and for every 3 dBA increase, the exposure time is cut in half. This results in noise level thresholds of 88 dBA for more than four hours per day, 92 dBA for more than one hour per day, 96 dBA for more than 30 minutes per day, and up to 100 dBA for more than 15 minutes per day. (18) For the purposes of this analysis, the lowest, more conservative construction noise level threshold of 85 dBA L_{eq} is used as an acceptable threshold for construction noise at the nearby sensitive receiver locations. Since this construction-related noise level threshold represents the energy average of the noise source over a given time, they are expressed as L_{eq} noise levels. Therefore, the noise level threshold of 85 dBA L_{eq} over a period of eight hours or more is used to evaluate the potential Project-related construction noise level impacts at the nearby sensitive receiver locations in the City of Placentia.

The 85 dBA L_{eq} threshold is also consistent with the FTA *Transit Noise and Vibration Impact Assessment* criteria for construction noise which identifies an hourly construction noise level threshold of 90 dBA L_{eq} during daytime hours, and 80 dBA L_{eq} during nighttime hours for construction for general assessment at residential uses. (14) Detailed assessment, according to the FTA, identifies an 8-hour dBA L_{eq} noise level threshold specific to residential uses of 80 dBA L_{eq}. Therefore, the Noise Study relies on the NIOSH 85 dBA L_{eq} threshold, consistent with FTA general and detailed assessment criteria for residential uses and represents an appropriate threshold for construction noise analysis.

3.5.3 CONSTRUCTION-RELATED HEARING CONSERVATION

The Occupational Safety and Health Administration (OSHA) requires hearing protection be provided by employers in workplaces where the noise levels may, over long periods of exposure to high noise levels, endanger the hearing of their employees. Standard 29 CFR, Part 1910 indicates the noise levels under which a hearing conservation program is required to be provided to workers exposed to high noise levels. (12) This analysis does not evaluate the noise exposure of construction workers within the Project site based on CEQA requirements, and instead, evaluates the Project-related construction noise levels at the nearby sensitive receiver locations in the Project study area. Further, periodic exposure to high noise levels in short duration, such as Project construction, is typically considered an annoyance and not impactful to human health. It would take several years of exposure to high noise levels to result in hearing impairment. (13)

3.6 CONSTRUCTION VIBRATION STANDARDS

The City of Placentia has not identified or adopted vibration standards. However, the United States Department of Transportation Federal Transit Administration (FTA) provides guidelines for maximum-acceptable vibration criteria for different land uses. These guidelines allow 80 VdB for residential uses and buildings where people normally sleep. (14)

Construction activity can result in varying degrees of ground-borne vibration, depending on the equipment and methods used, distance to the affected structures and soil type. Construction vibration is generally associated with pile driving and rock blasting. Other construction equipment such as air compressors, light trucks, hydraulic loaders, etc., generates little or no ground vibration. Occasionally large bulldozers and loaded trucks can cause perceptible vibration levels at when close to sensitive receiver locations. While not enforceable regulations within the City of Placentia, the FTA guidelines of 80 VdB for sensitive land uses provide the basis for determining the relative significance of potential Project-related vibration impacts.

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. Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies;

B. Exposure of persons to or generation of excessive ground-borne vibration or ground-borne noise levels.

C. A substantial permanent increase in ambient noise levels in the Project vicinity above existing levels without the proposed Project; or

D. A substantial temporary or periodic increase in ambient noise levels in the Project vicinity above noise levels existing without the proposed Project.

E. For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, expose people residing or working in the Project area to excessive noise levels.

F. For a project within the vicinity of a private airstrip, expose people residing or working in the Project area to excessive noise levels.

While the CEQA Guidelines and the City of Placentia 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 under CEQA Guideline A, they do not define the levels at which increases are considered substantial for use under Guidelines B, C, and D. CEQA Guidelines E and F apply to nearby public and private airports, if any, and the Project's land use compatibility. The Project site is not located within two miles of a public airport or within an airport land use plan; nor is the Project within the vicinity of a private airstrip. As such, the Project site would not be exposed to excessive noise levels from airport operations, and therefore, impacts are considered *less than significant,* and no further noise analysis is conducted in relation to Guidelines E and F.

4.1 NOISE-SENSITIVE RECEIVERS

Noise level increases resulting from the Project are evaluated based on the Appendix N 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.* (19) 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.

4.1.1 SUBSTANTIAL PERMANENT NOISE LEVEL INCREASES

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) (20) 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 (i.e., CNEL), energy average noise level (L_{eq}), and median noise level (L_{50}).

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 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. Table 4-1 below provides a summary of the potential noise impact significance criteria, based on guidance from FICON.

TABLE 4-1: SIGNIFICANCE OF NOISE IMPACTS AT NOISE-SENSITIVE RECEIVERS

Without Project Noise Level	Potential Significant Impact
< 60 dBA	5 dBA or more
60 - 65 dBA	3 dBA or more
> 65 dBA	1.5 dBA or more

Federal Interagency Committee on Noise (FICON), 1992.

4.1.2 SUBSTANTIAL TEMPORARY OF PERIODIC NOISE LEVEL INCREASES

Due to the temporary, short-term nature of noise-generating construction activities, the temporary or periodic noise level increases over the existing ambient conditions must be considered under CEQA Guideline D. Therefore, the Caltrans *Traffic Noise Analysis Protocol* 12 dBA L_{eq} *substantial* noise level increase threshold is used in this analysis to assess temporary noise level increases. (5) If the Project-related construction noise levels generate a temporary noise level increase above the existing ambient noise levels of up to 12 dBA L_{eq}, then the Project construction noise level increases will be considered a potentially significant impact. Although the Caltrans recommendations were specifically developed to assess traffic noise impacts, the 12 dBA L_{eq} substantial noise level increase threshold is used in California to address noise level increases with the potential to exceed existing conditions. (5)

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 4-2 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.):
  - are less than 60 dBA CNEL and the Project creates a *readily perceptible* 5 dBA CNEL or greater Project-related noise level increase; or
  - 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
  - already exceed 65 dBA CNEL, and the Project creates a community noise level impact of greater than 1.5 dBA CNEL (FICON, 1992).

ON-SITE TRAFFIC NOISE

- If the on-site noise levels exceed:
  - the exterior 65 dBA CNEL or interior 45 dBA CNEL noise level standards for residential development (Based on the County of Orange General Plan Noise Element); or
  - the interior 50 dBA CNEL noise level threshold for commercial uses (Based on the California Green Building Standards Code, Section 5.507.4.2).

OPERATIONAL NOISE

- If Project-related operational (stationary-source) noise levels exceed the exterior 55 dBA L_{50} during daytime hours (7:00 a.m. to 10:00 p.m.) and 50 dBA L_{50} during nighttime hours (10:00 p.m. to 7:00 a.m.). These standards shall apply for a cumulative period of 30 minutes in any hour (L_{50}), as well as plus 5 dBA cannot be exceeded for a cumulative period of more than 15 minutes in any hour (L_{25}), or the standard plus 10 dBA for a cumulative period of more than 5 minutes in any hour (L_8), or the standard plus 15 dBA for a cumulative period of more than 1 minute in any hour (L_2), or the standard plus 20 dBA for any period of time (L_{max}). (Section 23.76.050 of the City of Placentia Municipal Code).
- If the existing ambient noise levels at the nearby noise-sensitive receivers near the Project site:
  - are less than 60 dBA L_{50} and the Project creates a *readily perceptible* 5 dBA L_{50} or greater Project-related noise level increase; or
  - range from 60 to 65 dBA L_{50} and the Project creates a *barely perceptible* 3 dBA L_{50} or greater Project-related noise level increase; or
  - already exceed 65 dBA L_{50}, and the Project creates a community noise level impact of greater than 1.5 dBA L_{50} (FICON, 1992).

CONSTRUCTION NOISE AND VIBRATION

- If Project-related construction activities:
    - occur at any time other than the permitted hours of 7:00 a.m. and 7:00 p.m. Monday to Friday; 9:00 a.m. to 6:00 p.m. Saturdays; with no activity on Sundays and holidays (City of Placentia Municipal Code, Section 23.81.170);
    - create noise levels which exceed the 85 dBA L_{eq} acceptable noise level threshold at the nearby sensitive receiver locations in the City of Placentia (NIOSH, Criteria for Recommended Standard: Occupational Noise Exposure); or
    - generate temporary Project construction-related noise level increases which exceed the 12 dBA L_{eq} *substantial* noise level increase threshold at noise-sensitive receiver locations (Caltrans, Traffic Noise Analysis Protocol).
- If short-term Project generated construction vibration levels exceed the FTA annoyance level threshold of 80 VdB at sensitive receiver locations (FTA Transit Noise and Vibration Impact Assessment, May 2006).

TABLE 4-2: SIGNIFICANCE CRITERIA SUMMARY

Analysis	Land Use	Condition(s)	Significance Criteria	
			Daytime	Nighttime
Off-Site Traffic Noise	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 Noise	Residential[2]	Exterior Noise Level Criteria	65 dBA CNEL	
		Interior Noise Level Standard	45 dBA CNEL	
	Commercial[2]	Interior Noise Level Standard	50 dBA CNEL	
Operational Noise	Noise-Sensitive	Exterior Noise Level Standards[3]	See Table 3-1	
		if ambient is < 60 dBA[1]	≥ 5 dBA Project increase	
		if ambient is 60 - 65 dBA[1]	≥ 3 dBA Project increase	
		if ambient is > 65 dBA[1]	≥ 1.5 dBA Project increase	
Construction Noise & Vibration	Noise-Sensitive	Permitted hours of 7:00 a.m. and 7:00 p.m. Monday to Friday; 9:00 a.m. to 6:00 p.m. Saturday; with no activity on Sundays or holidays.[4]		
		Noise Level Threshold[5]	85 dBA L_{eq}	n/a
		Noise Level Increase[6]	12 dBA L_{eq}	n/a
		Vibration Level Threshold[7]	80 VdB	n/a

[1] Source: FICON, 1992.
[2] Sources: City of Placentia General Plan Noise Element, County of Orange General Plan Noise Element (Tables VIII-2 & VIII-3), and the California Green Building Standards Code (Section 5.507.4.2).
[3] Source: Section 23.76.050 of the City of Placentia Municipal Code (Appendix 3.1).
[4] Source: Section 23.81.170 of the City of Placentia Municipal Code.
[5] Source: NIOSH, Criteria for Recommended Standard: Occupational Noise Exposure.
[6] Source: Caltrans Traffic Noise Analysis Protocol, May 2011.
[7] Source: FTA Transit Noise and Vibration Impact Assessment, May 2006.
"Daytime" = 7:00 a.m. to 10:00 p.m.; "Nighttime" = 10:00 p.m. to 7:00 a.m.; "n/a" = No nighttime construction activity is permitted, so no nighttime construction noise level limits are identified.

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5 EXISTING NOISE LEVEL MEASUREMENTS

To assess the existing noise level environment, six 24-hour noise level measurements were taken at sensitive receiver 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, November 15th, 2017. 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. (21)

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 any 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*. (7) 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*. (14)

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. (14) 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 northwest of the Project site adjacent to the Emerald Isle Apartments on the northwest corner of Rose Drive and Alta Vista Street. The noise level measurements collected show an overall 24-hour exterior noise level of 71.2 dBA CNEL. The hourly noise levels measured at location L1 ranged from 64.7 to 70.2 dBA L_{eq} during the daytime hours and from 54.3 to 69.6 dBA L_{eq} during the nighttime hours. The energy (logarithmic) average daytime noise level was calculated at 67.9 dBA L_{eq} with an average nighttime noise level of 63.5 dBA L_{eq}.
- Location L2 represents the noise levels east of the Project site in the Placentia Champions Sports park on Blankenship Circle. The noise level measurements collected show an overall 24-hour exterior noise level of 60.8 dBA CNEL. The hourly noise levels measured at location L2 ranged from 49.9 to 59.9 dBA L_{eq} during the daytime hours and from 50.6 to 54.5 dBA L_{eq} during the nighttime hours. The energy (logarithmic) average daytime noise level was calculated at 56.5 dBA L_{eq} with an average nighttime noise level of 53.1 dBA L_{eq}.
- Location L3 represents the noise levels at the northeast corner of the Project site on Alta Vista Street adjacent to an existing 6-foot high barrier for residential homes. The 24-hour CNEL indicates that the overall exterior noise level is 64.2 dBA CNEL. At location L3 the background ambient noise levels ranged from 56.1 to 66.2 dBA L_{eq} during the daytime hours to levels of 50.2 to 62.4 dBA L_{eq} during the nighttime hours. The energy (logarithmic) average daytime noise level was calculated at 61.0 dBA L_{eq} with an average nighttime noise level of 56.5 dBA L_{eq}.
- Location L4 represents the noise levels at the eastern Project site boundary adjacent to an existing 6-foot high barrier for residential homes on Rodarte Place. The noise level measurements collected show an overall 24-hour exterior noise level of 57.5 dBA CNEL. The hourly noise levels measured at location L4 ranged from 49.1 to 53.2 dBA L_{eq} during the daytime hours and from 46.0 to 53.9 dBA L_{eq} during the nighttime hours. The energy (logarithmic) average daytime noise level was calculated at 51.5 dBA L_{eq} with an average nighttime noise level of 50.7 dBA L_{eq}.
- Location L5 represents the noise levels at the southwest corner of the Project site on Rose Drive near an existing 6-foot high barrier for residential homes on Babcock Circle. The noise level measurements collected show an overall 24-hour exterior noise level of 69.3 dBA CNEL. The hourly noise levels measured at location L5 ranged from 63.6 to 70.9 dBA L_{eq} during the daytime hours and from 53.5 to 66.1 dBA L_{eq} during the nighttime hours. The energy (logarithmic) average daytime noise level was calculated at 66.7 dBA L_{eq} with an average nighttime noise level of 61.0 dBA L_{eq}.
- Location L6 represents the noise levels west of the Project site across Rose Drive adjacent to existing residential homes on Underhill Drive. The noise level measurements collected show an

overall 24-hour exterior noise level of 76.2 dBA CNEL. The hourly noise levels measured at location L6 ranged from 66.5 to 73.7 dBA L_{eq} during the daytime hours and from 56.3 to 74.3 dBA L_{eq} during the nighttime hours. The energy (logarithmic) average daytime noise level was calculated at 71.2 dBA L_{eq} with an average nighttime noise level of 69.2 dBA L_{eq}.

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 the arterial roadway network. The 24-hour existing noise level measurements shown on Table 5-1 present the existing ambient noise conditions.

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

Location[1]	Distance to Project Boundary (Feet)	Description	Energy Average Hourly Noise Level (dBA L_{eq})[2]		Average Median Noise Level (dBA L_{50})[2]		CNEL
			Daytime	Nighttime	Daytime	Nighttime	
L1	270'	Located northwest of the Project site adjacent to the Emerald Isle Apartments on the northwest corner of Rose Drive and Alta Vista Street.	67.9	63.5	63.7	54.6	71.2
L2	800'	Located east of the Project site in the Placentia Champions Sports park on Blankenship Circle.	56.5	53.1	53.5	51.1	60.8
L3	0'	Located at the northeast corner of the Project site on Alta Vista Street adjacent to an existing 6-foot high barrier for residential homes.	61.0	56.5	56.1	51.3	64.2
L4	0'	Located at the eastern Project site boundary adjacent to an existing 6-foot high barrier for residential homes on Rodarte Place.	51.5	50.7	49.6	48.3	57.5
L5	0'	Located at the southwest corner of the Project site on Rose Drive near an existing 6-foot high barrier for residential homes on Babcock Circle.	66.7	61.0	63.5	53.1	69.3
L6	180'	Located west of the Project site across Rose Drive adjacent to existing residential homes on Underhill Drive.	71.2	69.2	64.9	57.3	76.2

[1] See Exhibit 5-A for the noise level measurement locations.
[2] Energy (logarithmic) average hourly 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.

6.1 FHWA TRAFFIC NOISE PREDICTION MODEL

The estimated roadway noise impacts from vehicular traffic were calculated using a computer program that replicates the Federal Highway Administration (FHWA) Traffic Noise Prediction Model- FHWA-RD-77-108. (22) 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. (23) 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.

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 13 study area roadway segments, the distance from the centerline to adjacent land use based on the functional roadway classifications per the City of Placentia General Plan Circulation Element, and the posted vehicle speeds. For this analysis, soft site conditions are used to analyze the traffic noise impacts within the Project study area. Soft site conditions account for the sound propagation loss over natural surfaces such as normal earth and ground vegetation. Caltrans' research has shown that the use of soft site conditions is appropriate for the application of the FHWA traffic noise prediction model as used in this off-site traffic noise analysis. (24)

The Existing and Opening Year average daily traffic volumes used for this study are presented on Table 6-2 and are provided by *Alta Vista Traffic Impact Analysis* prepared by EPD Solutions, Inc. (2) Table 6-3 presents the time of day 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	Adjacent Land Use[1]	Distance from Centerline to Nearest Adjacent Land Use (Feet)[2]	Vehicle Speed (mph)[3]
1	Rose Dr.	n/o Buena Vista Av.	Residential	60'	45
2	Rose Dr.	s/o Buena Vista Av.	Residential	60'	45
3	Rose Dr.	s/o Alta Vista St.	Residential	60'	45
4	Rose Dr.	s/o Del Cerro Dr.	Residential	60'	45
5	Jefferson St.	n/o Alta Vista St.	Residential/Park	40'	40
6	Jefferson St.	s/o Alta Vista St.	Residential	40'	40
7	Buena Vista Av.	e/o Rose Dr.	Residential	40'	45
8	Alta Vista St.	w/o Rose Dr.	Residential	40'	45
9	Alta Vista St.	e/o Rose Dr.	Residential	40'	45
10	Alta Vista St.	e/o Jefferson St.	Residential	40'	45
11	Del Cerro Dr.	e/o Rose Dr.	Residential	40'	45
12	Orangethorpe Av.	w/o Del Cerro Dr.	Residential	60'	50
13	Orangethorpe Av.	e/o Del Cerro Dr.	Residential	60'	50

[1] Source: City of Placentia General Plan Land Use Element, Exhibit 5.
[2] Distance to adjacent land use is based upon the right-of-way distances for each functional roadway classification provided in the City of Placentia Circulation Element.
[3] Posted speed limits in the Project study area.

TABLE 6-2: AVERAGE DAILY TRAFFIC VOLUMES

ID	Roadway	Segment	Average Daily Traffic Volumes (1,000's)[1]			
			Existing		Opening Year	
			Without Project	With Project	Without Project	With Project
1	Rose Dr.	n/o Buena Vista Av.	30.2	30.4	31.3	31.6
2	Rose Dr.	s/o Buena Vista Av.	30.8	31.1	32.0	32.3
3	Rose Dr.	s/o Alta Vista St.	25.4	26.1	26.5	27.2
4	Rose Dr.	s/o Del Cerro Dr.	25.6	26.3	26.5	27.2
5	Jefferson St.	n/o Alta Vista St.	2.2	2.2	2.2	2.2
6	Jefferson St.	s/o Alta Vista St.	4.2	4.2	4.3	4.3
7	Buena Vista Av.	e/o Rose Dr.	8.5	8.6	8.7	8.7
8	Alta Vista St.	w/o Rose Dr.	13.2	13.4	13.5	13.7
9	Alta Vista St.	e/o Rose Dr.	9.4	10.8	9.6	11.0
10	Alta Vista St.	e/o Jefferson St.	6.7	6.8	6.8	6.9

[1] Source: Alta Vista Traffic Impact Analysis, EPD Solutions, Inc., November 2017.

TABLE 6-3: TIME OF DAY VEHICLE SPLITS

Time Period	Vehicle Type		
	Autos	Medium Trucks	Heavy Trucks
Daytime (7:00 a.m. - 7:00 p.m.)	77.5%	84.8%	86.5%
Evening (7:00 p.m. - 10:00 p.m.)	12.9%	4.9%	2.7%
Nighttime (10:00 p.m. - 7:00 a.m.)	9.6%	10.3%	10.8%
Total:	100.0%	100.0%	100.0%

Source: Typical Southern California vehicle mix.

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

Roadway	Total % Traffic Flow			Total
	Autos	Medium Trucks	Heavy Trucks	
All Roadways	97.42%	1.84%	0.74%	100.00%

Source: Typical Southern California vehicle mix.

6.1.2 ON-SITE TRAFFIC NOISE PREDICTION MODEL INPUTS

The on-site roadway parameters including the average daily traffic (ADT) volumes used for this study are presented on Table 6-5. Based on the City of Placentia General Plan Circulation Element, Rose Drive is classified as 6-lane Major, and Alta Vista Street is classified as a 4-lane Secondary. (25) To predict the future on-site noise environment at the Project site, the City of Placentia General Plan Circulation Element future daily roadway capacity traffic volumes were used. The average daily 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 the appropriate noise mitigation measures that address the worst-case future noise conditions. Soft site conditions were used to analyze the traffic noise impacts within the Project study area which account for the sound propagation loss over natural surfaces such as normal earth and ground vegetation. Research by Caltrans shows that the use of soft site conditions is appropriate for the application of the FHWA traffic noise prediction model used in this analysis. (24)

As previously described, Table 6-3 presents the time of day 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 6-5: ON-SITE ROADWAY PARAMETERS

Roadway Segment	Lanes	Classification[1]	Roadway Capacity Volume[1]	Speed Limit (mph)[2]	Site Conditions
Rose Dr.	6	Major	45,000	45	Soft
Alta Vista St.	4	Secondary	20,000	45	Soft

[1] Source: City of Placentia General Plan Noise Element, roadway classifications and capacity volumes.
[2] Posted speed limits.

The site plan is used to identify the relationship between the roadway centerline elevation, the pad elevation and the centerline distance to the noise barrier, and the building façade. The exterior noise level impacts at the backyard receivers were placed five feet above the pad elevation and 10 feet from the proposed barrier location and at the proposed building façade for first-floor level analysis. All second-floor receivers were located fourteen feet above the proposed finished floor elevation.

6.2 CONSTRUCTION VIBRATION ASSESSMENT METHODOLOGY

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 human response (annoyance) using the following vibration assessment methods defined by the FTA. (14) To describe the human response (annoyance) associated with vibration impacts the FTA provides the following equation: $L_{VdB}(D) = L_{VdB}(25\ ft) - 30\log(D/25)$

TABLE 6-6: VIBRATION SOURCE LEVELS FOR CONSTRUCTION EQUIPMENT

Equipment	Vibration Decibels (VdB) at 25 feet
Small bulldozer	58
Jackhammer	79
Loaded Trucks	86
Large bulldozer	87

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

7 OFF-SITE TRANSPORTATION NOISE IMPACTS

To assess the off-site transportation CNEL noise level impacts associated with development of the proposed Project, noise contours were developed based on *Alta Vista Traffic Impact Analysis*. (2) 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 Conditions Without / With Project: This scenario refers to the existing present-day noise conditions without and with the proposed Project.
- Opening Year Without / With the Project: This scenario refers to Opening Year noise conditions without and with the proposed Project. This scenario includes all cumulative projects identified in the Traffic Impact Analysis.

7.1 TRAFFIC NOISE CONTOURS

To quantify the Project's traffic noise impacts on the surrounding areas, the changes in traffic noise levels on roadway segments surrounding the Project were calculated based on the changes in the average daily traffic volumes. Based on the noise impact significance criteria described in Section 4 and shown on Table 4-2, a significant off-site traffic noise level impact occurs:

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

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 7-4 present a summary of the exterior traffic noise levels, without barrier attenuation, for the 13 study area roadway segments analyzed from the without Project to the with Project conditions under Existing and Opening Year traffic conditions. Appendix 7.1 includes a summary of the traffic noise level contours for each of the traffic scenarios.

TABLE 7-1: EXISTING WITHOUT PROJECT CONDITIONS NOISE CONTOURS

ID	Road	Segment	Adjacent Land Use[1]	dBA CNEL			
				@ Adj. Land Use	70	65	60
					CL to Contour Distance (Feet)		
1	Rose Dr.	n/o Buena Vista Av.	Residential	71.5	76	163	351
2	Rose Dr.	s/o Buena Vista Av.	Residential	71.6	77	165	356
3	Rose Dr.	s/o Alta Vista St.	Residential	70.8	67	145	313
4	Rose Dr.	s/o Del Cerro Dr.	Residential	70.8	68	146	314
5	Jefferson St.	n/o Alta Vista St.	Residential/Park	61.5	RW	RW	50
6	Jefferson St.	s/o Alta Vista St.	Residential	64.3	RW	RW	77
7	Buena Vista Av.	e/o Rose Dr.	Residential	68.6	RW	70	150
8	Alta Vista St.	w/o Rose Dr.	Residential	70.5	43	93	201
9	Alta Vista St.	e/o Rose Dr.	Residential	69.0	RW	74	160
10	Alta Vista St.	e/o Jefferson St.	Residential	67.6	RW	59	128
11	Del Cerro Dr.	e/o Rose Dr.	Residential	66.4	RW	50	107
12	Orangethorpe Av.	w/o Del Cerro Dr.	Residential	70.5	65	139	300
13	Orangethorpe Av.	e/o Del Cerro Dr.	Residential	70.2	62	134	289

[1] Source: City of Placentia General Plan Land Use Element, Exhibit 5.
"CL" = Centerline; "RW" = Location of the respective noise contour falls within the right-of-way of the road.

TABLE 7-2: EXISTING WITH PROJECT CONDITIONS NOISE CONTOURS

ID	Road	Segment	Adjacent Land Use[1]	dBA CNEL			
				@ Adj. Land Use	70	65	60
					CL to Contour Distance (Feet)		
1	Rose Dr.	n/o Buena Vista Av.	Residential	71.5	76	164	353
2	Rose Dr.	s/o Buena Vista Av.	Residential	71.6	77	166	358
3	Rose Dr.	s/o Alta Vista St.	Residential	70.9	69	148	319
4	Rose Dr.	s/o Del Cerro Dr.	Residential	70.9	69	149	320
5	Jefferson St.	n/o Alta Vista St.	Residential/Park	61.5	RW	RW	50
6	Jefferson St.	s/o Alta Vista St.	Residential	64.3	RW	RW	77
7	Buena Vista Av.	e/o Rose Dr.	Residential	68.7	RW	70	151
8	Alta Vista St.	w/o Rose Dr.	Residential	70.6	44	94	203
9	Alta Vista St.	e/o Rose Dr.	Residential	69.7	RW	82	176
10	Alta Vista St.	e/o Jefferson St.	Residential	67.6	RW	60	129
11	Del Cerro Dr.	e/o Rose Dr.	Residential	66.7	RW	52	112
12	Orangethorpe Av.	w/o Del Cerro Dr.	Residential	70.5	65	140	302
13	Orangethorpe Av.	e/o Del Cerro Dr.	Residential	70.3	62	135	290

[1] Source: City of Placentia General Plan Land Use Element, Exhibit 5.
"CL" = Centerline; "RW" = Location of the respective noise contour falls within the right-of-way of the road.

TABLE 7-3: OPENING YEAR WITHOUT PROJECT CONDITIONS NOISE CONTOURS

ID	Road	Segment	Adjacent Land Use[1]	dBA CNEL			
				@ Adj. Land Use	70	65	60
					CL to Contour Distance (Feet)		
1	Rose Dr.	n/o Buena Vista Av.	Residential	71.7	77	167	360
2	Rose Dr.	s/o Buena Vista Av.	Residential	71.8	79	169	365
3	Rose Dr.	s/o Alta Vista St.	Residential	70.9	69	149	322
4	Rose Dr.	s/o Del Cerro Dr.	Residential	70.9	69	149	322
5	Jefferson St.	n/o Alta Vista St.	Residential/Park	61.5	RW	RW	50
6	Jefferson St.	s/o Alta Vista St.	Residential	64.4	RW	RW	78
7	Buena Vista Av.	e/o Rose Dr.	Residential	68.7	RW	71	152
8	Alta Vista St.	w/o Rose Dr.	Residential	70.6	44	95	204
9	Alta Vista St.	e/o Rose Dr.	Residential	69.1	RW	76	163
10	Alta Vista St.	e/o Jefferson St.	Residential	67.6	RW	60	129
11	Del Cerro Dr.	e/o Rose Dr.	Residential	66.6	RW	51	111
12	Orangethorpe Av.	w/o Del Cerro Dr.	Residential	70.7	67	144	310
13	Orangethorpe Av.	e/o Del Cerro Dr.	Residential	70.5	65	139	300

[1] Source: City of Placentia General Plan Land Use Element, Exhibit 5.
"CL" = Centerline; "RW" = Location of the respective noise contour falls within the right-of-way of the road.

TABLE 7-4: OPENING YEAR WITH PROJECT CONDITIONS NOISE CONTOURS

ID	Road	Segment	Adjacent Land Use[1]	dBA CNEL			
				@ Adj. Land Use	70	65	60
					CL to Contour Distance (Feet)		
1	Rose Dr.	n/o Buena Vista Av.	Residential	71.7	78	168	362
2	Rose Dr.	s/o Buena Vista Av.	Residential	71.8	79	170	367
3	Rose Dr.	s/o Alta Vista St.	Residential	71.1	71	152	327
4	Rose Dr.	s/o Del Cerro Dr.	Residential	71.1	71	152	327
5	Jefferson St.	n/o Alta Vista St.	Residential/Park	61.5	RW	RW	50
6	Jefferson St.	s/o Alta Vista St.	Residential	64.4	RW	RW	78
7	Buena Vista Av.	e/o Rose Dr.	Residential	68.7	RW	71	152
8	Alta Vista St.	w/o Rose Dr.	Residential	70.7	44	96	206
9	Alta Vista St.	e/o Rose Dr.	Residential	69.7	RW	83	178
10	Alta Vista St.	e/o Jefferson St.	Residential	67.7	RW	61	131
11	Del Cerro Dr.	e/o Rose Dr.	Residential	66.9	RW	53	115
12	Orangethorpe Av.	w/o Del Cerro Dr.	Residential	70.7	67	145	312
13	Orangethorpe Av.	e/o Del Cerro Dr.	Residential	70.5	65	140	301

[1] Source: City of Placentia General Plan Land Use Element, Exhibit 5.
"CL" = Centerline; "RW" = Location of the respective noise contour falls within the right-of-way of the road.

7.2 EXISTING CONDITION PROJECT TRAFFIC NOISE LEVEL CONTRIBUTIONS

Table 7-1 presents the Existing without Project conditions CNEL noise levels. The without Project exterior noise levels are expected to range from 61.5 to 71.6 dBA CNEL, without accounting for any noise attenuation features such as noise barriers or topography. Table 7-2 shows the Existing with Project conditions will range from 61.5 to 71.6 dBA CNEL. As shown on Table 7-5 the Project will generate a noise level increase of up to 0.7 dBA CNEL on the study area roadway segments. Based on the significance criteria in Section 4, the Project-related noise level increases are considered *less than significant* under Existing conditions at the land uses adjacent to roadways conveying Project traffic.

TABLE 7-5: EXISTING CONDITION OFF-SITE PROJECT-RELATED TRAFFIC NOISE IMPACTS

ID	Road	Segment	Adjacent Land Use[1]	CNEL at Adjacent Land Use (dBA)[2]			Threshold Exceeded?[3]
				No Project	With Project	Project Addition	
1	Rose Dr.	n/o Buena Vista Av.	Residential	71.5	71.5	0.0	No
2	Rose Dr.	s/o Buena Vista Av.	Residential	71.6	71.6	0.0	No
3	Rose Dr.	s/o Alta Vista St.	Residential	70.8	70.9	0.1	No
4	Rose Dr.	s/o Del Cerro Dr.	Residential	70.8	70.9	0.1	No
5	Jefferson St.	n/o Alta Vista St.	Residential/Park	61.5	61.5	0.0	No
6	Jefferson St.	s/o Alta Vista St.	Residential	64.3	64.3	0.0	No
7	Buena Vista Av.	e/o Rose Dr.	Residential	68.6	68.7	0.1	No
8	Alta Vista St.	w/o Rose Dr.	Residential	70.5	70.6	0.1	No
9	Alta Vista St.	e/o Rose Dr.	Residential	69.0	69.7	0.7	No
10	Alta Vista St.	e/o Jefferson St.	Residential	67.6	67.6	0.0	No
11	Del Cerro Dr.	e/o Rose Dr.	Residential	66.4	66.7	0.3	No
12	Orangethorpe Av.	w/o Del Cerro Dr.	Residential	70.5	70.5	0.0	No
13	Orangethorpe Av.	e/o Del Cerro Dr.	Residential	70.2	70.3	0.1	No

[1] Source: City of Placentia General Plan Land Use Element, Exhibit 5.
[2] The CNEL is calculated at the boundary of the right-of-way of each roadway and the property line of the nearest adjacent land use.
[3] Significance Criteria (Section 4).

7.3 OPENING YEAR PROJECT TRAFFIC NOISE LEVEL CONTRIBUTIONS

Table 7-3 presents the Opening Year without Project conditions CNEL noise levels. The without Project exterior noise levels are expected to range from 61.5 to 71.8 dBA CNEL, without accounting for any noise attenuation features such as noise barriers or topography. Table 7-4 shows the Opening Year with Project conditions will range from 61.5 to 71.8 dBA CNEL. As shown on Table 7-6 the Project will generate a noise level increase of up to 0.6 dBA CNEL on the study area roadway segments. Based on the significance criteria in Section 4, the Project-related noise level increases are considered *less than significant* under Opening Year conditions at the land uses adjacent to roadways conveying Project traffic.

TABLE 7-6: OPENING YEAR OFF-SITE PROJECT-RELATED TRAFFIC NOISE IMPACTS

ID	Road	Segment	Adjacent Land Use[1]	CNEL at Adjacent Land Use (dBA)[2]			Threshold Exceeded?[3]
				No Project	With Project	Project Addition	
1	Rose Dr.	n/o Buena Vista Av.	Residential	71.7	71.7	0.0	No
2	Rose Dr.	s/o Buena Vista Av.	Residential	71.8	71.8	0.0	No
3	Rose Dr.	s/o Alta Vista St.	Residential	70.9	71.1	0.2	No
4	Rose Dr.	s/o Del Cerro Dr.	Residential	70.9	71.1	0.2	No
5	Jefferson St.	n/o Alta Vista St.	Residential/Park	61.5	61.5	0.0	No
6	Jefferson St.	s/o Alta Vista St.	Residential	64.4	64.4	0.0	No
7	Buena Vista Av.	e/o Rose Dr.	Residential	68.7	68.7	0.0	No
8	Alta Vista St.	w/o Rose Dr.	Residential	70.6	70.7	0.1	No
9	Alta Vista St.	e/o Rose Dr.	Residential	69.1	69.7	0.6	No
10	Alta Vista St.	e/o Jefferson St.	Residential	67.6	67.7	0.1	No
11	Del Cerro Dr.	e/o Rose Dr.	Residential	66.6	66.9	0.3	No
12	Orangethorpe Av.	w/o Del Cerro Dr.	Residential	70.7	70.7	0.0	No
13	Orangethorpe Av.	e/o Del Cerro Dr.	Residential	70.5	70.5	0.0	No

[1] Source: City of Placentia General Plan Land Use Element, Exhibit 5.
[2] The CNEL is calculated at the boundary of the right-of-way of each roadway and the property line of the nearest adjacent land use.
[3] Significance Criteria (Section 4).

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8 ON-SITE NOISE IMPACTS

An on-site exterior noise impact analysis has been completed to determine the traffic noise exposure and to identify potential necessary noise abatement measures for the proposed Alta Vista Project. It is expected that the primary source of noise impacts to the Project site will be traffic noise from Rose Drive and Alta Vista Street. The Project will also experience some background traffic noise impacts from the Project's internal local streets, however, due to the low traffic volume/speeds, traffic noise from these roads will not make a significant contribution to the noise environment beyond of the right-of-way of the roadways.

8.1 ON-SITE EXTERIOR NOISE ANALYSIS

Using the FHWA traffic noise prediction model and the parameters outlined in Tables 6-3 to 6-5, the expected future exterior noise levels for the on-site buildings were calculated. Table 8-1 presents a summary of future exterior noise level impacts in the single-family residential outdoor living areas (backyards) and commercial building facades. The on-site traffic noise level impacts indicate that the outdoor living areas and building façades adjacent to Rose Drive and Alta Vista Street will experience unmitigated exterior noise levels ranging from 65.3 to 70.1 dBA CNEL. The on-site traffic noise analysis calculations are provided in Appendix 8.1.

To satisfy the City of Placentia 65 dBA CNEL exterior noise level standards for residential land use, the construction of 6-foot high noise barriers is required for the outdoor living areas (backyards) of single-family residential lots adjacent to Rose Drive and Alta Vista Street. With the recommended noise barriers shown on Exhibit ES-A, the mitigated future exterior noise levels at the outdoor living areas (backyards) of single-family residential lots will be reduced to range from 60.8 to 64.1 dBA CNEL. This noise analysis shows that the recommended noise barriers will satisfy the City of Placentia 65 dBA CNEL exterior noise level standards for single-family residential use. The recommendations identify the minimum required noise barrier height to satisfy the City of Placentia exterior noise level standards.

The results of the on-site traffic noise analysis also indicate that commercial uses adjacent to Rose Drive and Alta Vista Street will experience unmitigated exterior noise levels approaching 68.0 dBA CNEL, and an interior noise analysis is provided herein to demonstrate compliance with the 50 dBA CNEL interior noise level threshold for commercial uses.

TABLE 8-1: EXTERIOR TRANSPORTATION NOISE LEVELS

Lot/ Building	Roadway	Unmitigated Noise Level (dBA CNEL)	Mitigated Noise Level (dBA CNEL)	Barrier Height (Feet)
14	Rose Dr.	69.8	63.8	6.0
20	Rose Dr.	70.1	64.1	6.0
Shop 1	Rose Dr.	68.0	–[1]	–[1]
Shop 2	Alta Vista St.	65.3	–[1]	–[1]
3	Alta Vista St.	67.0	60.8	6.0

[1] The unmitigated exterior traffic noise levels at Shops 1 and 2 satisfy the Office of Planning and Research, Appendix C: Noise Element Guidelines, Figure 2, normally acceptable land use compatibility criteria for commercial uses. Therefore, no exterior noise mitigation is required.

8.2 ON-SITE INTERIOR NOISE ANALYSIS

To ensure that the interior noise levels comply with the City of Placentia 45 dBA CNEL interior noise standards for residential land use, and the interior noise level threshold of 50 dBA CNEL based on the California Green Building Standards Code for non-residential buildings (Section 5.507.4.2), 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 facade 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." 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

To provide the necessary interior noise level reduction, Tables 8-2 and 8-3 indicate that Project uses adjacent to Rose Drive and Alta Vista Street will require a windows-closed condition and a means of mechanical ventilation (e.g. air conditioning). Table 8-2 shows that the future noise levels at the first-floor building façade are expected to range from 59.7 to 68.0 dBA CNEL. The first-floor interior noise level analysis shows that the City of Placentia 45 dBA CNEL interior noise level standards for residential uses and the 50 dBA CNEL commercial interior noise level threshold can be satisfied using standard windows with a minimum STC rating of 27.

Table 8-3 shows that the future noise levels at the second-floor building façades are expected to range from 65.7 to 69.2 dBA CNEL, and standard windows with a minimum STC rating of 27 are required to satisfy the City of Placentia's 45 dBA CNEL interior noise level standards for residential uses. The interior noise analysis shows that with the recommended interior noise mitigation measures described in the Executive Summary the Project will satisfy the City of Placentia 45 dBA CNEL interior noise level standard for residential development, and the 50 dBA CNEL interior noise level threshold for commercial uses.

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

Lot/ Building	Noise Level at Façade[1]	Required Interior NR[2]	Estimated Minimum Interior NR[3]	Upgraded Windows[4]	Interior Noise Level[5]	Threshold	Threshold Exceeded?
14	63.4	18.4	25.0	No	38.4	45	No
20	63.4	18.4	25.0	No	38.4	45	No
Shop 1	68.0	18.0	25.0	No	43.0	50	No
Shop 2	65.3	15.3	25.0	No	40.3	50	No
3	59.7	14.7	25.0	No	34.7	45	No

[1] Exterior noise level at the facade 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] Noise reduction to satisfy the interior noise standards: 45 dBA CNEL for residential use (California Code of Regulations, Title 24, Building Standards Administrative Code), and 50 dBA CNEL for commercial uses (Based on the California Green Building Standards Code, Section 5.507.4.2).
[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.
"NR" = Noise reduction

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

Lot/ Building	Noise Level at Façade[1]	Required Interior NR[2]	Estimated Minimum Interior NR[3]	Upgraded Windows[4]	Interior Noise Level[5]	Threshold	Threshold Exceeded?
14	69.2	24.2	25.0	No	44.2	45	No
20	69.2	24.2	25.0	No	44.2	45	No
Shop 1	–[6]	–[6]	–[6]	–[6]	–[6]	–[6]	–[6]
Shop 2	–[6]	–[6]	–[6]	–[6]	–[6]	–[6]	–[6]
3	65.7	20.7	25.0	No	40.7	45	No

[1] Exterior noise level at the facade 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] Noise reduction to satisfy the interior noise standards: 45 dBA CNEL for residential use (California Code of Regulations, Title 24, Building Standards Administrative Code), and 50 dBA CNEL for commercial uses (Based on the California Green Building Standards Code, Section 5.507.4.2).
[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.
[6] No second floor commercial interior areas are planned as part of the Project.
"NR" = Noise reduction

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9 RECEIVER LOCATIONS

To assess the potential for long-term operational and short-term construction noise impacts, the following six receiver locations as shown on Exhibit 9-A were identified as representative locations for focused 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, natural open space, undeveloped land, parking lots, warehousing, liquid and solid waste facilities, salvage yards, and transit terminals.

Sensitive receivers near the Project site include existing residential homes and the Placentia Champions Sports Complex and park, as described below. The closest sensitive receiver locations are represented by R3 to R5 at approximately 10 feet east and south of the Project site boundary. 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.

R1: Located approximately 345 feet northwest of the Project site, R1 represents the existing Emerald Isle Apartments on the northwest corner of Rose Drive and Alta Vista Street. A 24-hour noise level measurement was taken near this location, L1, to describe the existing ambient noise environment.

R2: Location R2 represents existing Placentia Champions Sports Complex and park located approximately 646 feet northeast of the Project site on Blankenship Circle, behind an existing 10-foot high wall. A 24-hour noise level measurement was taken near this location, L2, to describe the existing ambient noise environment.

R3: Location R3 represents the existing outdoor living areas (backyards) of residential homes located roughly 10 feet east of the Project site on Runyon Place. A 24-hour noise level measurement was taken near this location, L3, to describe the existing ambient noise environment.

R4: Location R4 represents the existing outdoor living areas (backyards) of residential homes located roughly 10 feet east of the Project site on Rodarte Place. A 24-hour noise level measurement was taken near this location, L4, to describe the existing ambient noise environment.

R5: Location R5 represents the existing outdoor living areas (backyards) of residential homes located roughly 10 feet south of the Project site on Babcock Circle. A 24-hour noise level measurement was taken near this location, L5, to describe the existing ambient noise environment.

R6: Location R6 represents the existing residential homes located approximately 187 feet west of the Project site across Rose Drive. A 24-hour noise level measurement was taken near this location, L6, to describe the existing ambient noise environment.

EXHIBIT 9-A: RECEIVER LOCATIONS

10 OPERATIONAL IMPACTS

This section analyzes the potential operational noise impacts due to the Project's stationary noise sources on the off-site sensitive receiver locations identified in Section 9. Exhibit 10-A identifies the receiver locations and noise source locations used to assess the Project-related operational noise levels.

10.1 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, a drive-thru speakerphone, entry gate activity, park activity, and parking lot vehicle movements all operating continuously. These noise level impacts will likely vary throughout the day.

TABLE 10-1: REFERENCE NOISE LEVEL MEASUREMENTS

Noise Source	Duration (hh:mm:ss)	Dist. From Source (Feet)	Noise Source Height (Feet)	Hourly Activity (Mins)[1]	Median Noise Level (L_{50})	
					@ Ref. Distance	@ 50'
Air Conditioning Unit (Roof-Top)[2]	96:00:00	5'	5'	39	74.4	54.4
Drive-Thru Speakerphone[3]	2:00:00	15'	3'	60	60.9	50.4
Entry Gate Activity[4]	0:04:00	40'	5'	60	52.6	50.7
Park Activity[5]	0:15:00	5'	4'	60	61.7	41.7
Parking Lot Vehicle Movements[6]	0:15:00	5'	5'	60	56.7	41.7

[1] Anticipated duration (minutes within the hour) of noise activity during typical hourly conditions expected at the Project site based on the reference noise level measurement activity.
[2] As measured by Urban Crossroads, Inc. on 7/27/2015 at the Santee Walmart located at 170 Town Center Parkway.
[3] As measured by Urban Crossroads, Inc. on 12/19/2014 at a Panera Bread in Brea located at 423 South Associated Road.
[4] As measured by Urban Crossroads, Inc. on 11/29/2017 at the entry gate to the Oak Glen Apartment community in the City of Irvine.
[5] As measured by Urban Crossroads, Inc. on 10/8/2014 by Urban Crossroads, Inc. at the Founder's Park in the unincorporated community of Ladera Ranch in the County of Orange.
[6] As measured by Urban Crossroads, Inc. on 5/30/2012 by Urban Crossroads, Inc. at the Laguna Niguel Walmart at 27470 Alicia Parkway.

10.1.1 ROOF-TOP AIR CONDITIONING UNITS

To assess the impacts created by the roof-top air conditioning units at the Project buildings, reference noise levels measurements were taken at the Santee Walmart on July 27th, 2015. 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 an existing Walmart store. The reference noise level represents a Lennox SCA120 series 10-ton model packaged air conditioning unit. Using the uniform reference distance of 50 feet, the noise level is 54.4 dBA L_{50}. The operating conditions of the reference noise level measurement reflect peak summer cooling requirements with measured temperatures approaching 96 degrees Fahrenheit (°F) with average daytime temperatures of 82°F. The noise attenuation provided by a parapet wall is not reflected in this reference noise level measurement. The roof-top air condition units were observed to operate the most during the daytime hours for a total of 39 minutes per hour.

10.1.2 DRIVE-THRU SPEAKERPHONE

To describe the potential noise level impacts associated with potential drive-thru speakerphones and vehicle activities, a reference noise level measurement was collected on Friday, December 19th, 2014 at a Panera Bread restaurant located at 423 South Associated Road in the City of Brea. The reference noise levels collected at the Panera Bread restaurant are expected to reflect potential drive-thru speakerphone noise level activities at the Project site, since the reference measurement includes both drive-thru speakerphone and vehicle activity noise. The noise sources included in the reference noise level measurement consist of voices of the Panera Bread employees over the speakerphone, customers' voices ordering food, car engines idling, car radios playing music, and cars queuing in the drive-thru lane. At 50 feet from the speakerphone, a reference noise level of 50.4 dBA L_{50} was measured. This reference noise level measurement overstates the actual average noise levels since it represents the average of 28 speakerphone menu board ordering events observed over a two-hour period. In other words, the Panera Bread speakerphone menu board reference noise level describes continuous drive-thru operations and does not include any periods of inactivity.

10.1.3 ENTRY GATE ACTIVITY

A reference noise level measurement was collected on Wednesday, November 29th, 2017, by Urban Crossroads, Inc. at entry gate to the Oak Glen Apartments residential community in the City of Irvine. The reference noise level measurement represents multiple noise sources which produced a reference noise level of 50.7 dBA L_{50} at the uniform reference distance of 50 feet. The noise sources associated with the reference entry gate activity measurement include residential entry and exit gates opening and closing, cars and trucks driving over the metal gate tracks, keypad code entry, and phone ringing and people talking over the entrance intercom. Entry gate activities are conservatively anticipated to operate for 60 minutes per hour.

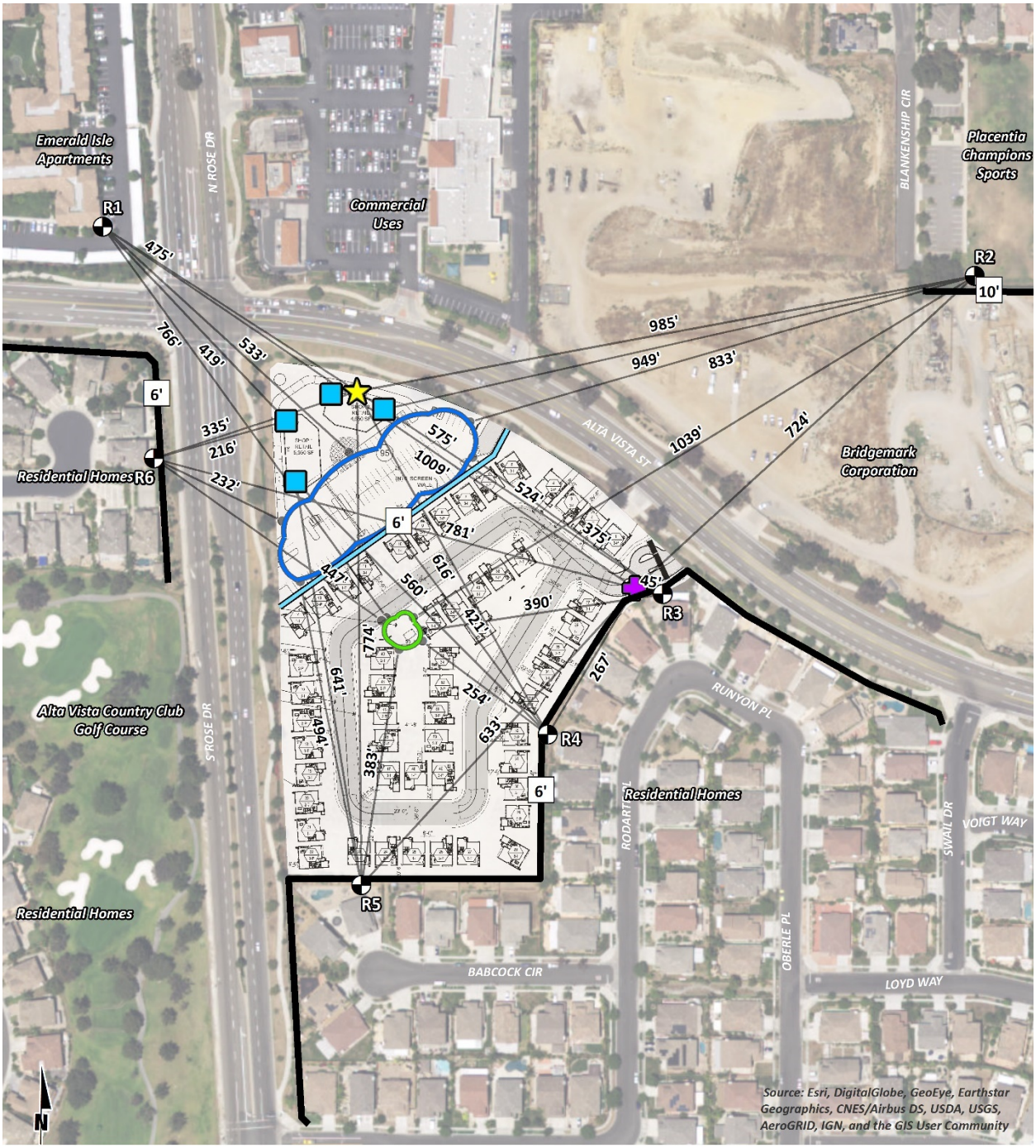
10.1.4 PARK (TOT LOT) ACTIVITIES

To represent the potential noise level impacts associated with the Project's park and tot lot (playground) activities, a reference noise level measurement was collected on Wednesday, October 8, 2014 at the Founders Park in the unincorporated community of Ladera Ranch in the County of Orange. The reference noise levels collected at the Founders Park are expected to reflect the noise level activities within the Project site, since the reference noise level measurement includes parents speaking on cell phones and noise levels from kids playing on swing sets. Using the uniform reference distance of 50 feet, the reference park activity noise level is 41.7 dBA L_{50}. The playground activities are estimated to occur for 60 minutes during the peak hour conditions.

10.1.5 PARKING LOT VEHICLE MOVEMENTS

To determine the noise levels associated with commercial parking lot vehicle movements, Urban Crossroads collected reference noise level measurements at the Laguna Niguel Walmart located at 27470 Alicia Parkway on May 30, 2012. The 15-minute noise level measurement indicates that the parking lot vehicle movements generates noise levels of 41.7 dBA L_{50} at a normalized distance of 50 feet. The parking lot noise levels are mainly due to cars pulling in and out of spaces, car alarms sounding, and customers moving shopping carts. Noise associated with parking lot vehicle movements is expected during the typical daytime, and nighttime conditions for the entire hour (60 minutes).

EXHIBIT 10-A: OPERATIONAL NOISE SOURCE AND RECEIVER LOCATIONS



LEGEND:

- Receiver Locations
- 10' Barrier Height (in feet)
- Existing Barrier
- Planned Noise Barrier
- Roof-Top Air Conditioning Unit
- Entry Gate
- Drive-Thru Speakerphone
- Parking Lot Vehicle Movements
- Park Activity
- Distance from receiver to center of noise source (in feet)

10.2 OPERATIONAL NOISE LEVELS

Based upon the reference noise levels, it is possible to estimate the Project operational stationary-source noise levels at each of the sensitive receiver locations. The operational noise level calculations shown on Table 10-2 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. The basic noise attenuation equation shown below is used to calculate the distance attenuation based on a reference noise level (SPL_1):

$$SPL_2 = SPL_1 - 20\log(D_2/D_1)$$

Where SPL_2 is the resulting noise level after attenuation, SPL_1 is the source noise level, D_2 is the distance to the reference sound pressure level (SPL_1), and D_1 is the distance to the receiver location. Table 10-2 indicates that the hourly noise levels associated with the roof-top air conditioning units, a drive-thru speakerphone, entry gate activity, park activity, and parking lot vehicle movements are expected to range from 28.7 to 46.1 dBA L_{50} at the sensitive off-site receiver locations. The operational noise level calculations include the additional barrier attenuation provided by the existing 6-foot high noise barriers adjacent to receiver locations R3 to R6; no barrier attenuation is accounted for in the analysis from the existing 10-foot high barrier at location R2. The operational noise level calculation worksheets are included in Appendix 10.1.

TABLE 10-2: UNMITIGATED PROJECT OPERATIONAL NOISE LEVELS

Receiver Location[1]	Noise Sources[2]	Project Operational Noise Levels (dBA)[3]				
		L_{50} (30 mins)	L_{25} (15 mins)	L_8 (5 mins)	L_2 (1 min)	L_{max} (Anytime)
R1	Air Conditioning Unit (Roof-Top)	34.0	35.7	37.0	37.3	37.8
	Drive-Thru Speakerphone	30.9	32.1	33.6	35.3	36.4
	Entry Gate Activity	24.6	27.3	32.7	35.7	37.6
	Park Activity	18.0	20.4	23.3	26.0	30.2
	Parking Lot Vehicle Movements	16.1	20.1	23.1	26.5	38.9
	Combined Noise Level:	36.2	37.8	39.8	41.2	44.0
R2	Air Conditioning Unit (Roof-Top)	26.9	28.6	29.9	30.2	30.7
	Drive-Thru Speakerphone	24.6	25.8	27.3	29.0	30.1
	Entry Gate Activity	27.4	30.1	35.5	38.5	40.4
	Park Activity	15.3	17.7	20.6	23.3	27.5
	Parking Lot Vehicle Movements	12.3	16.3	19.3	22.7	35.1
	Combined Noise Level:	31.4	33.5	37.2	39.7	42.3
R3	Air Conditioning Unit (Roof-Top)	26.9	28.6	29.9	30.2	30.7
	Drive-Thru Speakerphone	23.7	24.9	26.4	28.1	29.2
	Entry Gate Activity	46.0	48.7	54.1	57.1	59.0
	Park Activity	18.4	20.8	23.7	26.4	30.6
	Parking Lot Vehicle Movements	13.7	17.7	20.7	24.1	36.5
	Combined Noise Level:	46.1	48.8	54.1	57.1	59.0
R4	Air Conditioning Unit (Roof-Top)	26.3	28.0	29.3	29.6	30.1
	Drive-Thru Speakerphone	23.1	24.3	25.8	27.5	28.6
	Entry Gate Activity	30.6	33.3	38.7	41.7	43.6
	Park Activity	22.1	24.5	27.4	30.1	34.3
	Parking Lot Vehicle Movements	12.7	16.7	19.7	23.1	35.5
	Combined Noise Level:	32.9	35.3	39.7	42.4	44.9
R5	Air Conditioning Unit (Roof-Top)	25.1	26.8	28.1	28.4	28.9
	Drive-Thru Speakerphone	21.1	22.3	23.8	25.5	26.6
	Entry Gate Activity	23.1	25.8	31.2	34.2	36.1
	Park Activity	18.5	20.9	23.8	26.5	30.7
	Parking Lot Vehicle Movements	11.3	15.3	18.3	21.7	34.1
	Combined Noise Level:	28.7	30.7	34.0	36.3	39.6
R5	Air Conditioning Unit (Roof-Top)	34.9	36.6	37.9	38.2	38.7
	Drive-Thru Speakerphone	28.3	29.5	31.0	32.7	33.8
	Entry Gate Activity	21.3	24.0	29.4	32.4	34.3
	Park Activity	17.2	19.6	22.5	25.2	29.4
	Parking Lot Vehicle Movements	17.9	21.9	24.9	28.3	40.7
	Combined Noise Level:	36.0	37.8	39.4	40.5	44.0

[1] See Exhibit 10-A for the receiver and noise source locations.
[2] Reference noise sources as shown on Table 10-1.
[3] Operational noise level calculations are provided in Appendix 10.1.

10.3 OPERATIONAL NOISE LEVEL COMPLIANCE

To demonstrate compliance with local noise regulations, the Project-only operational noise levels are evaluated against exterior noise level threshold based on the City of Placentia exterior noise level standards. Table 10-3 shows the operational noise levels associated with Alta Vista Project will satisfy the City of Placentia Municipal Code exterior noise level standards at all receiver locations.

TABLE 10-3: UNMITIGATED OPERATIONAL NOISE LEVEL COMPLIANCE

Receiver Location[1]	Noise Level at Receiver Locations (dBA)[2]					Threshold Exceeded?[3]	
	L_{50} (30 mins)	L_{25} (15 mins)	L_8 (5 mins)	L_2 (1 min)	L_{max} (Anytime)	Daytime	Nighttime
Residential Standards	**55**	**60**	**65**	**70**	**75**	-	-
	50	**55**	**60**	**65**	**70**	-	-
R1	36.2	37.8	39.8	41.2	44.0	No	No
R2	31.4	33.5	37.2	39.7	42.3	No	No
R3	46.1	48.8	54.1	57.1	59.0	No	No
R4	32.9	35.3	39.7	42.4	44.9	No	No
R5	28.7	30.7	34.0	36.3	39.6	No	No
R5	36.0	37.8	39.4	40.5	44.0	No	No

[1] See Exhibit 10-A for the receiver and noise source locations.
[2] Estimated Project stationary source noise levels as shown on Table 10-2.
[3] Do the estimated Project stationary source noise levels exceed the exterior noise level standards?
"Daytime" = 7:00 a.m. to 10:00 p.m.; "Nighttime" = 10:00 p.m. to 7:00 a.m.

10.4 PROJECT OPERATIONAL NOISE CONTRIBUTION

To describe the Project operational noise level contributions, the Project operational noise levels were combined with the existing ambient noise levels measurements for the off-site 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. (7) 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 contributions. Noise levels that would be experienced at receiver locations when Project-source noise is added to the ambient daytime and nighttime conditions are presented on Tables 10-4 and 10-5, respectively.

As indicated on Tables 10-4 and 10-5, the Project will contribute an operational noise level increase during the daytime hours of up to 0.4 dBA L_{50} and during the nighttime hours of up to 1.1 dBA L_{50}. Based on the without Project (ambient) noise levels, the Project operational noise level increases will satisfy the significance criteria discussed in Section 4, and therefore, the increases at the sensitive receiver locations will be *less than significant*. On this basis, Project operational stationary-source noise would not result in a substantial temporary/periodic, or permanent increase in ambient noise levels in the Project vicinity above levels existing without the Project.

TABLE 10-4: DAYTIME OPERATIONAL NOISE LEVEL CONTRIBUTIONS

Receiver Location[1]	Total Project Operational Noise Level (dBA L_{50})[2]	Measurement Location[3]	Reference Ambient Noise Levels (dBA L_{50})[4]	Combined Project and Ambient (dBA L_{50})[5]	Project Contribution (dBA L_{50})[6]	Threshold Exceeded?[7]
R1	36.2	L1	63.7	63.7	0.0	No
R2	31.4	L2	53.5	53.6	0.0	No
R3	46.1	L3	56.1	56.5	0.4	No
R4	32.9	L4	49.6	49.7	0.1	No
R5	28.7	L5	63.5	63.5	0.0	No
R6	36.0	L6	64.9	64.9	0.0	No

[1] See Exhibit 10-A for the sensitive receiver locations.
[2] Total Project operational noise levels as shown on Table 10-3.
[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 Criteria as defined in Section 4.

TABLE 10-5: NIGHTTIME OPERATIONAL NOISE LEVEL CONTRIBUTIONS

Receiver Location[1]	Total Project Operational Noise Level (dBA L_{50})[2]	Measurement Location[3]	Reference Ambient Noise Levels (dBA L_{50})[4]	Combined Project and Ambient (dBA L_{50})[5]	Project Contribution (dBA L_{50})[6]	Threshold Exceeded?[7]
R1	36.2	L1	54.6	54.6	0.1	No
R2	31.4	L2	51.1	51.2	0.0	No
R3	46.1	L3	51.3	52.5	1.1	No
R4	32.9	L4	48.3	48.5	0.1	No
R5	28.7	L5	53.1	53.1	0.0	No
R6	36.0	L6	57.3	57.4	0.0	No

[1] See Exhibit 10-A for the sensitive receiver locations.
[2] Total Project operational noise levels as shown on Table 10-3.
[3] Reference noise level measurement locations as shown on Exhibit 5-A.
[4] Observed nighttime 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 Criteria as defined in Section 4.

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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 construction activity boundaries in relation to the nearby sensitive receiver 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:

- 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 in excess of 80 dBA when measured at 50 feet. Hard site conditions are used in the construction 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 (i.e. construction equipment). 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. The construction stages used in this analysis are consistent with the data used to support the construction emissions in *Alta Vista Air Quality Impact Analysis* prepared by Urban Crossroads, Inc. (26)

11.2 CONSTRUCTION REFERENCE NOISE LEVELS

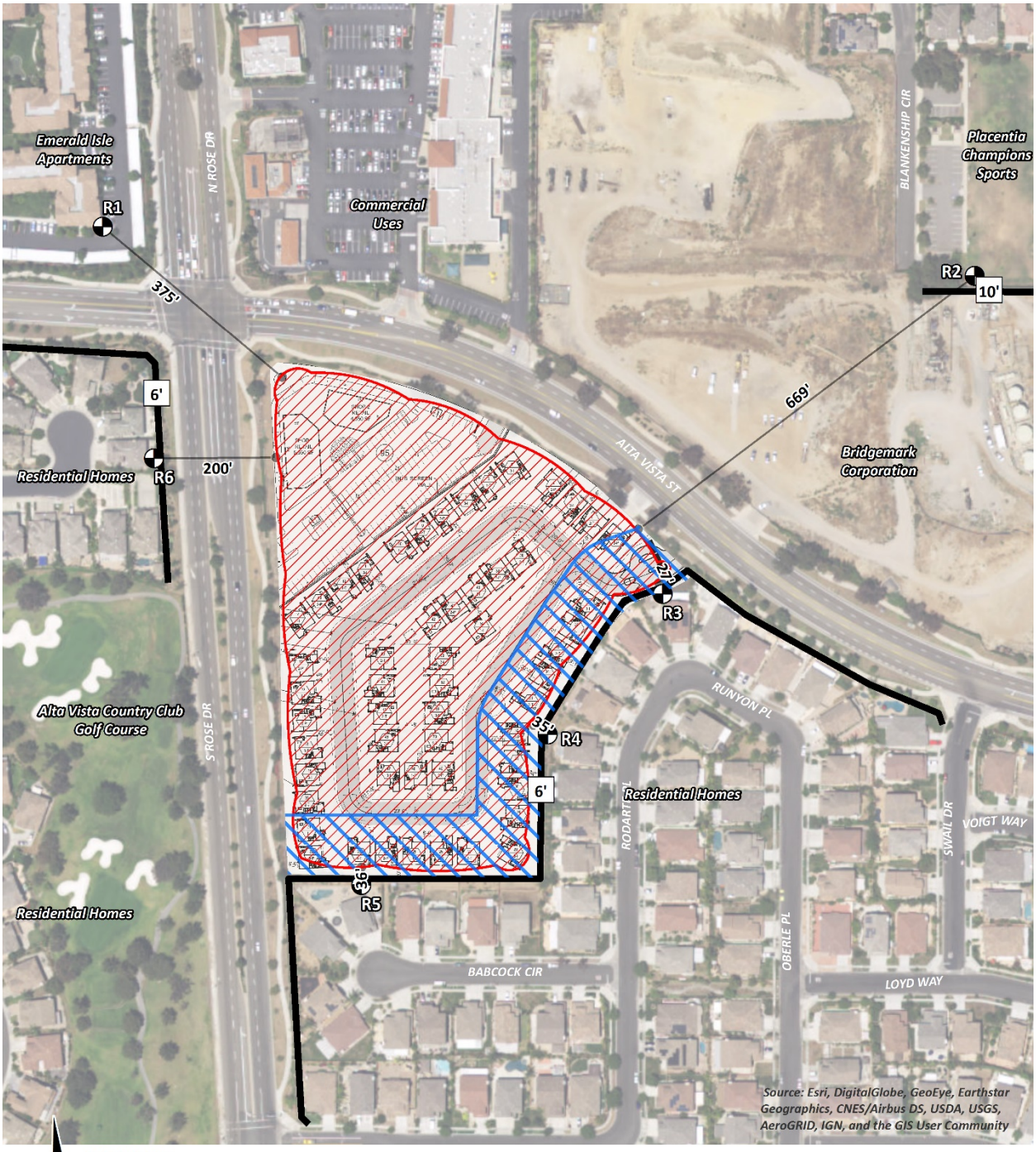
To describe the Project construction noise levels, measurements were collected for similar activities at several construction sites. Table 11-1 provides a summary of the 17-construction reference noise level measurements. Since the reference noise levels were collected at varying distances, all construction noise level measurements presented on Table 11-1 have been adjusted to describe a common reference distance of 50 feet.

TABLE 11-1: CONSTRUCTION REFERENCE NOISE LEVELS

ID	Noise Source	Reference Distance From Source (Feet)	Reference Noise Levels @ Reference Distance (dBA L_{eq})	Reference Noise Levels @ 50 Feet (dBA L_{eq})[7]
1	Truck Pass-Bys & Dozer Activity[1]	30'	63.6	59.2
2	Dozer Activity[1]	30'	68.6	64.2
3	Construction Vehicle Maintenance Activities[2]	30'	71.9	67.5
4	Foundation Trenching[2]	30'	72.6	68.2
5	Rough Grading Activities[2]	30'	77.9	73.5
6	Framing[3]	30'	66.7	62.3
7	Water Truck Pass-By & Backup Alarm[4]	30'	76.3	71.9
8	Dozer Pass-By[4]	30'	84.0	79.6
9	Two Scrapers & Water Truck Pass-By[4]	30'	83.4	79.0
10	Two Scrapers Pass-By[4]	30'	83.7	79.3
11	Scraper, Water Truck, & Dozer Activity[4]	30'	79.7	75.3
12	Concrete Mixer Truck Movements[5]	50'	71.2	71.2
13	Concrete Paver Activities[5]	30'	70.0	65.6
14	Concrete Mixer Pour & Paving Activities[5]	30'	70.3	65.9
15	Concrete Mixer Backup Alarms & Air Brakes[5]	50'	71.6	71.6
16	Concrete Mixer Pour Activities[5]	50'	67.7	67.7
17	Forklift, Jackhammer, & Metal Truck Bed Loading	50'	67.9	67.9

[1] As measured by Urban Crossroads, Inc. on 10/14/15 at a business park construction site located at the northwest corner of Barranca Parkway and Alton Parkway in the City of Irvine.
[2] As measured by Urban Crossroads, Inc. on 10/20/15 at a construction site located in Rancho Mission Viejo.
[3] As measured by Urban Crossroads, Inc. on 10/20/15 at a residential construction site located in Rancho Mission Viejo.
[4] As measured by Urban Crossroads, Inc. on 10/30/15 during grading operations within an industrial construction site located in the City of Ontario.
[5] Reference noise level measurements were collected from a nighttime concrete pour at an industrial construction site, located at 27334 San Bernardino Avenue in the City of Redlands, between 1:00 a.m. to 2:00 a.m. on 7/1/15.
[6] As measured by Urban Crossroads, Inc. on 9/9/16 during the demolition of an existing paved parking lot at 41 Corporate Park in Irvine.
[7] Reference noise levels are calculated at 50 feet using a drop off rate of 6 dBA per doubling of distance (point source).

EXHIBIT 11-A: CONSTRUCTION ACTIVITY AND RECEIVER LOCATIONS



11.3 CONSTRUCTION NOISE ANALYSIS

Tables 11-2 to 11-6 show the Project construction stages and the reference construction noise levels used for each stage. Table 11-7 provides a summary of the noise levels from each stage of construction at each of the sensitive receiver locations in the City of Placentia. Based on the reference construction noise levels, the Project-related construction noise levels when the highest reference noise level is operating at a single point nearest the sensitive receiver location will range from 50.9 to 73.3 dBA L_{eq} at the sensitive receiver locations in the City of Placentia, as shown on Table 11-7.

TABLE 11-2: SITE PREPARATION EQUIPMENT NOISE LEVELS

Reference Construction Activity[1]	Reference Noise Level @ 50 Feet (dBA L_{eq})
Truck Pass-Bys & Dozer Activity	59.2
Dozer Activity	64.2
Peak Reference Noise Level at 50 Feet (dBA L_{eq}):	64.2

Receiver Location	Distance to Construction Activity (Feet)[2]	Distance Attenuation (dBA L_{eq})[3]	Calculated Noise Barrier Attenuation (dBA L_{eq})[4]	Construction Noise Level (dBA L_{eq})
R1	375'	-17.5	0.0	46.7
R2	669'	-22.5	0.0	41.6
R3	27'	5.4	-5.5	64.0
R4	35'	3.1	-5.5	61.8
R5	36'	2.9	-5.5	61.5
R6	200'	-12.0	-5.5	46.6

[1] Reference construction noise level measurements taken by Urban Crossroads, Inc.
[2] Distance from the nearest point of construction activity to the nearest receiver.
[3] Point (stationary) source drop off rate of 6.0 dBA per doubling of distance.
[4] Calculated barrier attenuation from existing barriers in the Project study area (Appendix 10.1).

TABLE 11-3: GRADING EQUIPMENT NOISE LEVELS

Reference Construction Activity[1]	Reference Noise Level @ 50 Feet (dBA L_{eq})
Truck Pass-Bys & Dozer Activity	59.2
Dozer Activity	64.2
Rough Grading Activities	73.5
Peak Reference Noise Level at 50 Feet (dBA L_{eq}):	73.5

Receiver Location	Distance to Construction Activity (Feet)[2]	Distance Attenuation (dBA L_{eq})[3]	Calculated Noise Barrier Attenuation (dBA L_{eq})[4]	Construction Noise Level (dBA L_{eq})
R1	375'	-17.5	0.0	56.0
R2	669'	-22.5	0.0	50.9
R3	27'	5.4	-5.5	73.3
R4	35'	3.1	-5.5	71.1
R5	36'	2.9	-5.5	70.8
R6	200'	-12.0	-5.5	55.9

[1] Reference construction noise level measurements taken by Urban Crossroads, Inc.
[2] Distance from the nearest point of construction activity to the nearest receiver.
[3] Point (stationary) source drop off rate of 6.0 dBA per doubling of distance.
[4] Calculated barrier attenuation from existing barriers in the Project study area (Appendix 10.1).

TABLE 11-4: BUILDING CONSTRUCTION EQUIPMENT NOISE LEVELS

Reference Construction Activity[1]	Reference Noise Level @ 50 Feet (dBA L_{eq})
Construction Vehicle Maintenance Activities	67.5
Foundation Trenching	68.2
Framing	62.3
Peak Reference Noise Level at 50 Feet (dBA L_{eq}):	68.2

Receiver Location	Distance to Construction Activity (Feet)[2]	Distance Attenuation (dBA L_{eq})[3]	Calculated Noise Barrier Attenuation (dBA L_{eq})[4]	Construction Noise Level (dBA L_{eq})
R1	375'	-17.5	0.0	50.7
R2	669'	-22.5	0.0	45.6
R3	27'	5.4	-5.5	68.0
R4	35'	3.1	-5.5	65.8
R5	36'	2.9	-5.5	65.5
R6	200'	-12.0	-5.5	50.6

[1] Reference construction noise level measurements taken by Urban Crossroads, Inc.
[2] Distance from the nearest point of construction activity to the nearest receiver.
[3] Point (stationary) source drop off rate of 6.0 dBA per doubling of distance.
[4] Calculated barrier attenuation from existing barriers in the Project study area (Appendix 10.1).

TABLE 11-5: PAVING EQUIPMENT NOISE LEVELS

Reference Construction Activity[1]	Reference Noise Level @ 50 Feet (dBA L_{eq})
Concrete Mixer Truck Movements	71.2
Concrete Paver Activities	65.6
Concrete Mixer Pour & Paving Activities	65.9
Concrete Mixer Backup Alarms & Air Brakes	71.6
Concrete Mixer Pour Activities	67.7
Peak Reference Noise Level at 50 Feet (dBA L_{eq}):	71.6

Receiver Location	Distance to Construction Activity (Feet)[2]	Distance Attenuation (dBA L_{eq})[3]	Calculated Noise Barrier Attenuation (dBA L_{eq})[4]	Construction Noise Level (dBA L_{eq})
R1	375'	-17.5	0.0	54.1
R2	669'	-22.5	0.0	49.1
R3	27'	5.4	-5.5	71.5
R4	35'	3.1	-5.5	69.2
R5	36'	2.9	-5.5	69.0
R6	200'	-12.0	-5.5	54.1

[1] Reference construction noise level measurements taken by Urban Crossroads, Inc.
[2] Distance from the nearest point of construction activity to the nearest receiver.
[3] Point (stationary) source drop off rate of 6.0 dBA per doubling of distance.
[4] Calculated barrier attenuation from existing barriers in the Project study area (Appendix 10.1).

TABLE 11-6: ARCHITECTURAL COATING EQUIPMENT NOISE LEVELS

Reference Construction Activity[1]	Reference Noise Level @ 50 Feet (dBA L_{eq})
Construction Vehicle Maintenance Activities	67.5
Framing	62.3
Peak Reference Noise Level at 50 Feet (dBA L_{eq}):	67.5

Receiver Location	Distance to Construction Activity (Feet)[2]	Distance Attenuation (dBA L_{eq})[3]	Calculated Noise Barrier Attenuation (dBA L_{eq})[4]	Construction Noise Level (dBA L_{eq})
R1	375'	-17.5	0.0	50.0
R2	669'	-22.5	0.0	44.9
R3	27'	5.4	-5.5	67.3
R4	35'	3.1	-5.5	65.1
R5	36'	2.9	-5.5	64.8
R6	200'	-12.0	-5.5	49.9

[1] Reference construction noise level measurements taken by Urban Crossroads, Inc.
[2] Distance from the nearest point of construction activity to the nearest receiver.
[3] Point (stationary) source drop off rate of 6.0 dBA per doubling of distance.
[4] Calculated barrier attenuation from existing barriers in the Project study area (Appendix 10.1).

11.4 CONSTRUCTION NOISE THRESHOLDS OF SIGNIFICANCE

The construction noise analysis shows that the highest construction noise levels will occur when construction activities take place at the closest point from the edge of primary construction activity to each of the nearby receiver locations. As shown on Table 11-7, the unmitigated construction noise levels are expected to range from 50.9 to 73.3 dBA L_{eq} at the receiver locations in the City of Placentia. To evaluate whether the Project will generate potentially significant short-term noise levels at off-site sensitive receiver locations a construction-related the NIOSH noise level threshold of 85 dBA L_{eq}, previously described in Section 3, is used as acceptable thresholds for construction noise at the nearby sensitive receiver locations.

TABLE 11-7: UNMITIGATED CONSTRUCTION EQUIPMENT NOISE LEVEL SUMMARY

Receiver Location[1]	Construction Hourly Noise Levels (dBA L_{eq})					
	Site Preparation	Grading	Building Construction	Paving	Architectural Coating	Highest Construction Noise Levels[2]
R1	46.7	56.0	50.7	54.1	50.0	56.0
R2	41.6	50.9	45.6	49.1	44.9	50.9
R3	64.0	73.3	68.0	71.5	67.3	73.3
R4	61.8	71.1	65.8	69.2	65.1	71.1
R5	61.5	70.8	65.5	69.0	64.8	70.8
R6	46.6	55.9	50.6	54.1	49.9	55.9

[1] Noise receiver locations are shown on Exhibit 11-A.
[2] Estimated construction noise levels during peak operating conditions.

Table 11-8 shows the highest construction noise levels at the potentially impacted receiver locations are expected to approach 73.3 dBA L_{eq} and will satisfy the NIOSH 85 dBA L_{eq} significance threshold during temporary Project construction activities. The noise impact due to unmitigated Project construction noise levels is, therefore, considered a *less than significant* impact at all nearby sensitive receiver locations.

TABLE 11-8: CONSTRUCTION EQUIPMENT NOISE LEVEL COMPLIANCE (DBA L_{EQ})

Receiver Location[1]	Construction Noise Levels (dBA L_{eq})		
	Highest Construction Noise Level[2]	Threshold[3]	Threshold Exceeded?[4]
R1	56.0	85	No
R2	50.9	85	No
R3	73.3	85	No
R4	71.1	85	No
R5	70.8	85	No
R6	55.9	85	No

[1] Noise receiver locations are shown on Exhibit 11-A.
[2] Estimated construction noise levels during peak operating conditions, as shown on Table 11-7.
[3] Construction noise level threshold as shown on Table 4-2.
[4] Do the estimated Project construction noise levels exceed the construction noise level threshold?

11.5 CONSTRUCTION NOISE LEVEL INCREASES

To describe the temporary Project construction noise level contributions to the existing ambient noise environment, the Project construction noise levels were combined with the existing ambient noise levels measurements at the off-site receiver locations. The difference between the combined Project-construction and ambient noise levels are used to describe the construction noise level contributions. Temporary noise level increases that would be experienced at sensitive receiver locations when Project construction-source noise is added to the ambient daytime conditions are presented on Table 11-9. A temporary noise level increase of 12 dBA is considered a potentially significant impact based on the Caltrans substantial noise level increase criteria which is used to assess the Project-construction noise level increases. (5) No nighttime construction activity is permitted in the City of Placentia Municipal Code, and therefore, nighttime noise level increases are not analyzed in this noise study.

As indicated in Table 11-9, the Project will contribute unmitigated, worst-case construction noise level increases between 0.3 to 19.6 dBA L_{eq} at the adjacent sensitive receiver locations during the daytime hours. Since the worst-case temporary noise level increase of up to 19.6 dBA L_{eq} during Project construction will exceed the 12 dBA L_{eq} significance threshold at receiver locations R3 and R4, the unmitigated construction noise level increases are considered *potentially significant* temporary noise impacts.

TABLE 11-9: UNMITIGATED CONSTRUCTION-RELATED TEMPORARY NOISE LEVEL INCREASES

Receiver Location[1]	Highest Project Construction Noise Level[2]	Measurement Location[3]	Reference Ambient Noise Levels[4]	Combined Project and Ambient[5]	Temporary Worst-Case Project Contribution[6]	Threshold Exceeded?[7]
R1	56.0	L1	67.9	68.2	0.3	No
R2	50.9	L2	56.5	57.6	1.1	No
R3	73.3	L3	61.0	73.6	12.6	Yes
R4	71.1	L4	51.5	71.1	19.6	Yes
R5	70.8	L5	66.7	72.2	5.5	No
R6	55.9	L6	71.2	71.3	0.1	No

[1] Noise receiver locations are shown on Exhibit 11-A.
[2] Highest unmitigated Project construction noise levels as shown on Table 11-8.
[3] Ambient 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 construction activities.
[6] The temporary noise level increase expected with the addition of the proposed Project activities.
[7] Based on the 12 dBA temporary increase significance criteria as defined in Section 4.

Therefore, temporary construction noise mitigation measures are required to reduce these impacts at receiver locations R3 and R4. This includes mitigation in the form of a 100-foot buffer zone for large construction equipment (e.g. dozers, graders, scrapers, etc.) from the impacted receiver locations where Project construction noise levels could potentially exceed the noise level thresholds, as shown on Exhibit 11-A. 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 mitigation measures identified in this noise study, shown on Exhibit 11-A, the worst-case construction noise level increases at the nearby residential receivers would be reduced.

Table 11-10 shows the mitigated construction noise levels at the potentially impacted receiver locations will be reduced to 61.9 dBA L_{eq} with the attenuation provided by the 100-foot buffer zone for large construction equipment (e.g., dozers, graders, scrapers, etc.) capable of generating noise levels greater than 79 dBA L_{eq} at 10 feet over a 10-minute period of activity.

TABLE 11-10: MITIGATED CONSTRUCTION EQUIPMENT NOISE LEVELS

Receiver Location[1]	Highest Construction Activity Noise Levels (dBA L_{eq})[2]	Attenuation from 100-Foot Buffer Zone (dBA L_{eq})[3]	Mitigated Construction Activity Noise Levels (dBA L_{eq})
R1	56.0	0.0	56.0
R2	50.9	0.0	50.9
R3	73.3	-11.4	61.9
R4	71.1	-9.1	61.9
R5	70.8	-8.9	61.9
R6	55.9	0.0	55.9

[1] Noise receiver locations are shown on Exhibit 11-A.
[2] Highest construction noise levels as shown on Table 11-9.
[3] Additional distance attenuation provided by the buffer for large equipment, as shown on Exhibit 11-A.

As shown on Table 11-11, the temporary construction noise mitigation measures will reduce the construction noise level increases to range from 0.3 to 10.8 dBA L_{eq} at the impacted receiver locations to satisfy the 12 dBA L_{eq} temporary noise level increase threshold used in this analysis during temporary Project construction activities. Therefore, the noise impact due to Project construction is considered a *less than significant* impact with mitigation.

TABLE 11-10: MITIGATED CONSTRUCTION-RELATED TEMPORARY NOISE LEVEL INCREASES

Receiver Location[1]	Mitigated Construction Noise Level[2]	Measurement Location[3]	Reference Ambient Noise Levels[4]	Combined Project and Ambient[5]	Temporary Worst-Case Project Contribution[6]	Threshold Exceeded?[7]
R1	56.0	L1	67.9	68.2	0.3	No
R2	50.9	L2	56.5	57.6	1.1	No
R3	61.9	L3	61.0	64.5	3.5	No
R4	61.9	L4	51.5	62.3	10.8	No
R5	61.9	L5	66.7	68.0	1.3	No
R6	55.9	L6	71.2	71.3	0.1	No

[1] Noise receiver locations are shown on Exhibit 11-A.
[2] Mitigated Project construction noise levels as shown on Table 11-10.
[3] Ambient 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 construction activities.
[6] The temporary noise level increase expected with the addition of the proposed Project activities.
[7] Based on the 12 dBA temporary increase significance criteria as defined in Section 4.

11.6 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 building, the vibration is usually short-term and is not of sufficient magnitude to cause building damage. It is not expected that heavy equipment such as large bulldozers would operate close enough to any residences to cause a vibration impact.
- 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 (FTA). 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. Table 11-12 presents the expected Project related vibration levels at each of the sensitive receiver locations based on the FTA 80 VdB threshold for human annoyance.

At distances ranging from 27 to 669 feet from Project construction activity, construction vibration velocity levels are expected to approach 86.0 VdB, as shown on Table 11-12. Based on the FTA vibration standards, the unmitigated Project construction vibration levels will exceed the 80 VdB human annoyance threshold for infrequent events at receiver locations R3 to R5. Therefore, the 100-foot buffer zone mitigation measure, previously identified to reduce construction noise levels, is required to reduce the vibration levels at receiver locations R3 to R5. With the 100-foot buffer zone for large construction equipment large construction equipment (e.g., dozers, graders, scrapers, etc.) capable of generating noise levels greater than 79 dBA L_{eq} at 10 feet over a 10-minute period of activity, the mitigated Project vibration levels will approach 68.9 VdB and will remain below the FTA 80 VdB threshold, as shown on Table 11-13.

Further, vibration levels at the site of the closest sensitive receiver are unlikely to be sustained during the entire construction period, but will occur rather only during the times that heavy construction equipment is operating simultaneously adjacent to the Project site perimeter. Moreover, construction at the Project site will be restricted to daytime hours consistent with City requirements thereby eliminating potential vibration impacts during the sensitive nighttime hours.

TABLE 11-12: UNMITIGATED CONSTRUCTION EQUIPMENT VIBRATION LEVELS

Receiver Location[1]	Construction Equipment Vibration Levels (VdB)[2]					Highest Vibration Level (VdB)	Threshold Exceeded?[3]
	Distance to Construction Activity (Feet)	Small Bulldozer	Jack-hammer	Loaded Trucks	Large Bulldozer		
R1	375'	22.7	43.7	50.7	51.7	51.7	No
R2	669'	15.2	36.2	43.2	44.2	44.2	No
R3	27'	57.0	78.0	85.0	86.0	86.0	Yes
R4	35'	53.6	74.6	81.6	82.6	82.6	Yes
R5	36'	53.2	74.2	81.2	82.2	82.2	Yes
R6	200'	30.9	51.9	58.9	59.9	59.9	No

[1] Noise receiver locations are shown on Exhibit 11-A.
[2] Based on the Vibration Source Levels of Construction Equipment included on Table 6-6.
[3] Does the peak vibration exceed the FTA maximum acceptable vibration standard of 80 VdB?

TABLE 11-13: MITIGATED CONSTRUCTION EQUIPMENT VIBRATION LEVELS

Receiver Location[1]	Construction Equipment Vibration Levels (VdB)[2]					Highest Vibration Level (VdB)	Threshold Exceeded?[3]
	Distance to Construction Activity (Feet)	Small Bulldozer	Jack-hammer	Loaded Trucks	Large Bulldozer		
R3	100'	39.9	60.9	67.9	68.9	68.9	No
R4	100'	39.9	60.9	67.9	68.9	68.9	No
R5	100'	39.9	60.9	67.9	68.9	68.9	No

[1] Noise receiver locations are shown on Exhibit 11-A.
[2] Based on the Vibration Source Levels of Construction Equipment included on Table 6-6.
[3] Does the peak vibration exceed the FTA maximum acceptable vibration standard of 80 VdB?

SOIL IMPORT/EXPORT TRUCK HAUL TRIPS

The Project site will require up to 1,900 cubic yards of import to balance. To assess the potential vibration impacts from truck haul trips associated with import and export activities, the FTA 80 VdB threshold is used. Truck vibration levels are dependent on vehicle characteristics, load, speed, and pavement conditions. Typical vibration levels for the Alta Vista heavy truck activity at normal traffic speeds will approach 65 VdB, as previously shown on Exhibit 2-C, based on the FTA *Transit Noise Impact and Vibration Assessment.* Truck deliveries transiting on site will be travelling at very low speeds, so it is expected that delivery truck vibration impacts at nearby homes will remain below the vibration threshold of 80 VdB.

11.7 CONSTRUCTION NOISE AND VIBRATION MITIGATION MEASURES

Though construction noise is temporary, intermittent and of short duration, and will not present any long-term impacts, the following mitigation measures would reduce the noise level increases produced by the construction equipment to the nearby noise-sensitive residential land uses:

- The use of large construction equipment (e.g., dozers, graders, scrapers) capable of generating noise levels in excess of 79 dBA L_{eq} (10-minute) at 10 feet and vibration levels of 80 VdB at sensitive receiver locations shall be prohibited within 100 feet of nearby occupied sensitive residential homes (represented by receiver locations R3 to R5) to reduce the noise and vibration levels for the entire duration of Project construction. If the contractor can demonstrate that specific pieces of large construction equipment satisfies the 79 dBA L_{eq} (10-minute) at 10 feet noise level criteria, and vibration levels of 80 VdB at sensitive receiver locations, then they shall be allowed to operate within the buffer zone shown on Exhibit 11-A.
- 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. and 7:00 p.m. Monday to Friday; 9:00 a.m. to 6:00 p.m. Saturday; with no activity on Sundays or holidays (City of Placentia Municipal Code, Section 23.81.170). (6) 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 receptors 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 (i.e., to the northwest and 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. and 7:00 p.m. Monday to Friday; 9:00 a.m. to 6:00 p.m. Saturday; with no activity 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.

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12 REFERENCES

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3. **U.S. Department of Transportation Federal Highway Administration.** Acoustical Consideration. *Noise Barrier Design Handbook.* [Online] [Cited: November 28, 2016.] https://www.fhwa.dot.gov/environment/noise/noise_barriers/design_construction/design/design03.cfm.
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5. **California Department of Transportation.** *Traffic Noise Analysis Protocol for New Highway Construction, Reconstruction, and Retrofit Barrier Projects.* May 2011.
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24. **California Department of Transportation.** *Traffic Noise Attenuation as a Function of Ground and Vegetation Final Report.* June 1995. FHWA/CA/TL-95/23.

25. **City of Placentia.** *General Plan Circulation Element.* 1982.

26. **Urban Crossroads, Inc.** *Alta Vista Air Quality Impact Analysis.* November 2017.

13 CERTIFICATION

The contents of this noise study report represent an accurate depiction of the noise environment and impacts associated with the proposed Alta Vista 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.

Bill Lawson, P.E., INCE
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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 PLACENTIA MUNICIPAL CODE

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Chapter 23.76 NOISE CONTROL

Note

* For provisions regarding music and sound amplifying systems, see Ch. 10.32 of this code.

23.76.010 Declaration of policy.

In order to control unnecessary, excessive and annoying sounds emanating from incorporated areas of the city, it is declared to be the policy of the city to prohibit such sounds generated from all sources as specified in this chapter.

It is determined that certain noise levels are detrimental to the public health, welfare and safety and contrary to public interest, therefore, the city council declares that creating, maintaining, causing or allowing to create, maintain or cause any noise in a manner prohibited by or not in conformity with the provisions of this chapter is a public nuisance and shall be punishable as such. (Ord. 75-O-105 § 1, 1975)

23.76.020 Definitions.

The following words, phrases and terms as used in this chapter shall have the meaning as indicated below:

(1) "Ambient noise level" means the all-encompassing noise level associated with a given environment, being a composite of sounds from all sources, excluding the alleged offensive noise, at the location and approximate time at which a comparison with the alleged offensive noise is to be made.

(2) "Commercial property" means a parcel of real property which is zoned for or developed and used either in part or in whole for commercial purposes including but not limited to retail and wholesale businesses and professional offices.

(3) "Cumulative period" means an additive period of time composed of individual time segments which may be continuous or interrupted.

(4) "Decibel (dB)" means a unit which denotes the ratio between two (2) quantities which are proportional to power: The number of decibels corresponding to the ratio of two (2) amounts of power is ten (10) times the logarithm to the base ten (10) of this ratio.

(5) "Dwelling unit" means a single unit providing complete independent living facilities for one (1) or more persons including permanent provisions for living, sleeping, eating, cooking and sanitation.

(6) "Emergency machinery, vehicle or work" means any machinery, vehicle or work used, employed or performed in an effort to protect, provide or restore safe conditions in the community or for the citizenry, or work by private utilities when restoring utility service.

(7) "Fixed noise source" means a stationary device which creates sounds while fixed or motionless including but not limited to industrial and commercial machinery and equipment, pumps, fans, compressors, generators, air conditioners and refrigeration equipment.

(8) "Grading" means any excavating or filling of earth material, or any combination thereof, conducted at a site to prepare said site for construction or other improvements thereon.

(9) "Impact noise" means the noise produced by the collision of one (1) mass in motion with a second mass which may be either in motion or at rest.

(10) "Industrial property" means a parcel of real property which is zoned for or developed and used either in part or in whole for manufacturing purposes.

(11) "Mobile noise source" means any noise source other than a fixed noise source.

(12) "Noise level" means the "A" weighted sound pressure level in decibels obtained by using a sound level meter at slow response with a reference pressure of twenty (20) micronewtons per square meter. The unit of measurement shall be designated as dB(A).

(13) "Noise variance board" means an administrative board of five (5) members appointed by the city council of the city of Placentia.

(14) "Person" means a person, firm, association, copartnership, joint venture, corporation of any entity, public or private in nature.

(15) "Residential property" means a parcel of real property which is developed and used either in part or in whole for residential purposes, other than transient uses such as hotels and motels.

(16) "Simple tone noise" means a noise characterized by a predominant frequency or frequencies so that other frequencies cannot be readily distinguished.

(17) "Sound level meter" means an instrument meeting American National Standard Institute's Standard S1.4-1971 for Type 1 or Type 2 sound level meters or an instrument and the associated recording and analyzing equipment which will provide equivalent data.

(18) "Sound pressure level" of a sound, in decibels, means twenty (20) times the logarithm to the base ten (10) of the ratio of the pressure of the sound to a reference pressure, which reference pressure shall be explicitly stated. (Ord. 75-O-105 § 2, 1975)

23.76.030 Noise level measurement criteria.

Any noise level measurements made pursuant to the provisions of this chapter shall be performed using a sound level meter as defined in Section 23.76.020(17). (Ord. 75-O-105 § 3, 1975)

23.76.040 Designated noise zones.

The properties hereinafter described, whether incorporated or unincorporated, are assigned to the following noise zones:

Noise Zone 1	All residential property
Noise Zone 2	All commercial property
Noise Zone 3	All industrial property.

(Ord. 75-O-105 § 4, 1975)

23.76.050 Exterior noise standards.

(a) The following noise standards, unless otherwise specifically indicated, shall apply to all real property within a designated noise zone:

Noise Standards

Noise Zone	Noise Level	Time Period
1	55 dB(A)	7:00 a.m.—10:00 p.m.
	50 dB(A)	10:00 p.m.—7:00 a.m.
2	65 dB(A)	Anytime

Noise Zone	Noise Level	Time Period
3	70 dB(A)	Anytime

In the event the alleged offensive noise consists entirely of impact noise, simple tone noise, speech, music, or any combination thereof, each of the above noise levels shall be reduced by 5 dB(A).

(b) It is unlawful for any person at any location within the incorporated area of the city to create any noise, or to allow the creation of any noise on property owned, leased, occupied, or otherwise controlled by such person, when the foregoing causes the noise level, when measured on any other residential, commercial, or industrial property, either incorporated or unincorporated to exceed:

(1) The noise standards for a cumulative period of time more than thirty (30) minutes in any hour; or

(2) The noise standard plus five (5) dB(A) for a cumulative period of more than fifteen (15) minutes in any hour; or

(3) The noise standard plus ten (10) dB(A) for a cumulative period of more than five (5) minutes in any hour; or

(4) The noise standard plus fifteen (15) dB(A) for a cumulative period of more than one (1) minute in any hour; or

(5) The noise standard plus twenty (20) dB(A) for any period of time.

(c) In the event the ambient noise level exceeds any of the first four (4) noise limit categories above, the cumulative period applicable to said category shall be increased to reflect said ambient noise level. In the event the ambient noise level exceeds the fifth noise limit category, the maximum allowable noise level under said category shall be increased to reflect the maximum ambient noise level.

(d) In the event that the noise source and the affected property are within different noise zones, the noise standard applicable to the affected property shall apply. (Ord. 75-O-105 § 5, 1975)

23.76.060 Interior noise standards.

(a) The following interior noise standards, unless otherwise specifically indicated, shall apply to all residential property within a designated noise zone:

Interior Noise Standards

Noise Zone	Noise Level	Time Period
1	55 dB(A)	7:00 a.m.—10:00 p.m.
	45 dB(A)	10:00 p.m.—7:00 a.m.

In the event the alleged offensive noise consists entirely of impact noise, simple tone noise, speech, music, or any combination thereof, each of the above noise levels shall be reduced by 5 dB(A).

(b) It is unlawful for any person at any location within the incorporated area of the city to create any noise, or to allow the creation of any noise on property owned, leased, occupied, or otherwise controlled by such person, when the foregoing causes the noise level when measured within any other dwelling unit on any residential property, either incorporated or unincorporated, to exceed:

(1) The interior noise standard for a cumulative period of more than five (5) minutes in any hour; or

(2) The interior noise standard plus five (5) dB(A) for a cumulative period of more than one (1) minute in any hour; or

(3) The interior noise standard plus ten (10) dB(A) for any period of time.

(c) In the event the ambient noise level exceeds either of the first two (2) noise limit categories above, the cumulative period applicable to said category shall be increased to reflect said ambient noise level. In the event the ambient noise level exceeds the third noise limit category, the maximum allowable noise level under said category shall be increased to reflect the maximum ambient noise level. (Ord. 75-O-105 § 6, 1975)

23.76.070 Activities—Special provisions.

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

(1) Regularly scheduled school bands, school athletic and school entertainment events between the hours of seven a.m. and eleven p.m., provided a parade permit is also submitted from the police department for band activities on city streets, applying the standards of Sections 13.60.010 through 13.60.130 of this code;

(2) Outdoor gatherings, including outdoor public dances and outdoor entertainment events, provided said events are conducted pursuant to an activity permit issued by the city recreation division pursuant to Chapters 6.52 and 6.56 of this code and are limited to between the hours of nine-thirty a.m. and eleven p.m.;

(3) Regularly scheduled activities conducted on public parks, public playgrounds, and public or private school grounds. However, the use of public address or amplified music systems is not permitted to exceed the exterior noise standard of adjacent property at the property line;

(4) Any mechanical devices, apparatus or equipment used, related to or connected with emergency machinery, vehicle or work;

(5) All mechanical devices, apparatus or equipment which are utilized for the protection or salvage of agricultural crops during periods of potential or actual frost damage or other adverse weather conditions;

(6) Mobile noise sources associated with agricultural operations provided such operations do not take place between the hours of six p.m. and seven a.m. on weekdays, including Saturday, or at any time on Sunday or a federal holiday;

(7) Mobile noise sources associated with agricultural pest control through pesticide application; provided, that the application is made in accordance with restricted material permits issued by or regulations enforced by the agricultural commissioner;

(8) Noise sources associated with grading, construction and the maintenance of real property shall not be subject to the provisions of this chapter. However, grading, construction and maintenance activities are prohibited at all times other than the permitted hours indicated in Section 23.81.170 of this code;

(9) Any activity to the extent regulation thereof has been preempted by state or federal law. (Ord. 94-O-141 § 1, 1994; Ord. 94-O-119 § 1, 1994; Ord. 75-O-105 § 7, 1975)

23.76.080 Schools, hospitals and churches—Special provisions.

It is unlawful for any person to create any noise which causes the noise level at any school, hospital or church while the same is in use to exceed the noise limits as specified in Section 23.76.050 prescribed for the assigned noise zone in which the school, hospital or church is located, or which noise level unreasonably interferes with the use of such institutions or which unreasonably disturbs or annoys patients in the hospital; provided conspicuous signs are displayed in three (3) separate locations within one-tenth (1/10) of a mile of the institution indicating the presence of a school, church, or hospital. (Ord. 75-O-105 § 8, 1975)

23.76.085 Use of locomotive whistle.

Generally. The use of locomotive bell, air siren, steam or air whistle within the city at all gate-protected grade crossings shall be prohibited.

Exception. Any locomotive engineer shall be permitted to use his bell, air siren, steam or air whistle, if, in his opinion, it is necessary to avert an immediate threat to life or property. (Ord. 76-O-120 § 1, 1976)

23.76.090 Air conditioning and refrigeration—Special provisions.

Until January 19, 1979, the noise standards enumerated in Sections 23.76.050 and 23.76.060 shall be increased eight (8) dB(A) where the alleged offensive noise source is an air-conditioning or refrigeration system or associated equipment which was installed prior to the effective date of the ordinance codified in this chapter. (Ord. 75-O-105 § 9, 1975)

23.76.100 Noise level measurement.

The location selected for measuring exterior noise levels shall be at any point on the affected residential, commercial or industrial property. Interior noise measurements shall be made within the affected residential unit. The measurement shall be made at a point at least four (4) feet from the wall, ceiling or floor nearest the noise source and may be made with the windows of the affected dwelling unit open. (Ord. 75-O-105 § 10, 1975)

23.76.110 Manner of enforcement.

The city's authorized agent and his duly authorized representatives are directed to enforce the provisions of this chapter. The city's authorized agent and his duly authorized representatives are authorized, pursuant to Penal Code Section 836.5, to arrest any person without a warrant when they have reasonable cause to believe that such person has committed a misdemeanor in their presence.

No person shall interfere with, oppose or resist any authorized person charged with enforcement of this chapter while such person is engaged in the performance of his duty. (Ord. 75-O-105 § 11, 1975)

23.76.120 Variance procedure.

The owner or operator of a noise source which violates any of the provisions of this chapter may file an application with the city's authorized agent for a variance from the provisions thereof wherein said owner or operator shall set forth all actions taken to comply with said provisions, the reasons why immediate compliance cannot be achieved, a proposed method of achieving compliance, and a proposed time schedule for its accomplishment. Said application shall be accompanied by a fee in the amount of seventy-five dollars ($75.00). A separate application shall be filed for each noise source; provided, however, that several mobile sources under common ownership, or several fixed sources on a single property may be combined into one (1) application. Upon receipt of said application fee, the city's authorized agent shall refer it with his recommendation thereon within thirty (30) days to the noise variance board for action thereon in accordance with the provisions of this chapter.

An applicant for a variance shall remain subject to prosecution under the terms of this chapter until a variance is granted. (Ord. 75-O-105 § 12, 1975)

23.76.130 Noise variance board.

The noise variance board shall evaluate all applications for variance from the requirements of this chapter and may grant said variances with respect to time for compliance, subject to such terms, conditions and requirements as it may deem reasonable to achieve maximum compliance with the provisions of this chapter. Said terms, conditions and requirements may include, but shall not be limited to limitations on noise levels and operating hours. Each such variance shall set forth in detail the approved method of achieving maximum compliance and a time schedule for its accomplishment.

In its determinations, said board shall consider the magnitude of nuisance caused by the offensive noise; the uses of property within the area of impingement by the noise; the time factors related to study, design, financing and construction of remedial work; the economic factors related to age and useful life of equipment; and the general public interest and welfare. Any variance granted by said board shall be by resolution and shall be transmitted to the city's authorized agent for enforcement. Any violation of the terms of said variance shall be unlawful. (Ord. 75-O-105 § 13, 1975)

23.76.140 Appeals.

Within fifteen (15) calendar days following the decision of the variance board on an application, the applicant, the city's authorized agent, or any member of the city council, may appeal the decision to the city council, by filing a notice of appeal with the secretary of the variance board. In the case of an appeal by the applicant for a variance, the notice of appeal shall be accompanied by a fee to be computed by the secretary on the basis of the estimated cost of preparing the materials required to be forwarded to the city council as discussed hereafter. If the actual cost of such preparation differs from the estimated cost, appropriate payments shall be made either to or by the secretary.

Within fifteen (15) days following receipt of a notice of appeal and the appeal fee, the secretary of the variance board shall forward to the city council copies of the application for variance; the recommendation of the city's authorized agent; the notice of appeal; all evidence concerning said application received by the variance board and its decision thereon. In addition, any person may file with the city council written arguments supporting or attaching said decision and the city council may, in its discretion, hear oral arguments thereon. The city clerk shall mail to the applicant a notice of the date set for hearing of the appeal. The notice shall be mailed at least ten (10) days prior to the hearing date.

Within sixty (60) days following its receipt of the notice of the appeal, the city council shall either affirm, modify or reverse the decision of the variance board. Such decision shall be based upon the city council's evaluation of the matters submitted to the city council in light of the powers conferred on the variance board and the factors to be considered. Both as enumerated in Sections 23.76.120 and 23.76.130.

As part of its decision, the council may direct the variance board to conduct further proceedings on said application. Failure of the city council to affirm, modify or reverse the decision of the variance board within said sixty (60) day period shall constitute an affirmance of the decision. (Ord. 75-O-105 § 14, 1975)

23.76.150 Violations—Misdemeanors.

Any person violating any of the provisions of this chapter is guilty of a misdemeanor. Each day such violation is committed or permitted to continue shall constitute a separate offense and shall be punishable as such. The provisions of this chapter shall not be construed as permitting conduct not prescribed herein and shall not affect the enforcement of any other applicable provisions of law. (Ord. 75-O-105 § 15, 1975)

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APPENDIX 5.1:

STUDY AREA PHOTOS

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L1_E
33, 52' 33.500000", 117, 50' 37.030000"

L1_N
33, 52' 33.500000", 117, 50' 37.030000"

L1_S
33, 52' 33.500000", 117, 50' 37.030000"

L1_W
33, 52' 33.500000", 117, 50' 37.030000"

L2_E
33, 52' 34.220000", 117, 50' 19.260000"

L2_N
33, 52' 34.460000", 117, 50' 19.150000"

L2_S
33, 52' 34.220000", 117, 50' 19.260000"

L2_W
33, 52' 34.460000", 117, 50' 19.150000"

L3_J
33, 52' 28.900000", 117, 50' 26.980000"

L3_N
33, 52' 29.180000", 117, 50' 27.170000"

L3_S
33, 52' 28.940000", 117, 50' 26.930000"

L3_W
33, 52' 28.900000", 117, 50' 26.980000"

L4_E
33, 52' 26.290000", 117, 50' 28.990000"

L4_N
33, 52' 26.280000", 117, 50' 29.040000"

L4_S
33, 52' 26.420000", 117, 50' 28.790000"

L4_W
33, 52' 26.320000", 117, 50' 29.100000"

L5_E
33, 52' 24.470000", 117, 50' 34.310000"

L5_N
33, 52' 24.420000", 117, 50' 34.310000"

L5_S
33, 52' 24.250000", 117, 50' 34.370000"

L5_W
33, 52' 24.250000", 117, 50' 34.370000"

L6_E
33, 52' 30.160000", 117, 50' 36.480000"

L6_N
33, 52' 30.080000", 117, 50' 36.480000"

L6_S
33, 52' 30.160000", 117, 50' 36.480000"

L6_W
33, 52' 30.080000", 117, 50' 36.480000"

APPENDIX 5.2:

NOISE LEVEL MEASUREMENT WORKSHEETS

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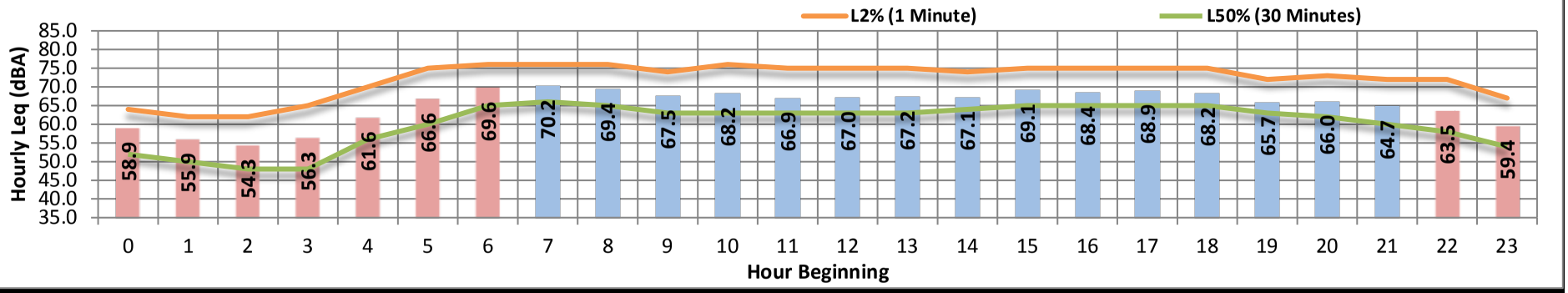
24-Hour Noise Level Measurement Summary

				Energy Average Leq		24-Hour
Project Name:	Alta Vista	*JN:*	11195	*Day*	*Night*	*CNEL*
Location:	L1 - Located northwest of the Project site adjacent to the Emerald Isle Apartments on the northwest corner of Rose Drive and Alta Vista Street.	*Analyst:*	A. Wolfe	67.9	63.5	71.2
		Date:	11/15/2017			

Hourly Leq dBA Readings (unadjusted)



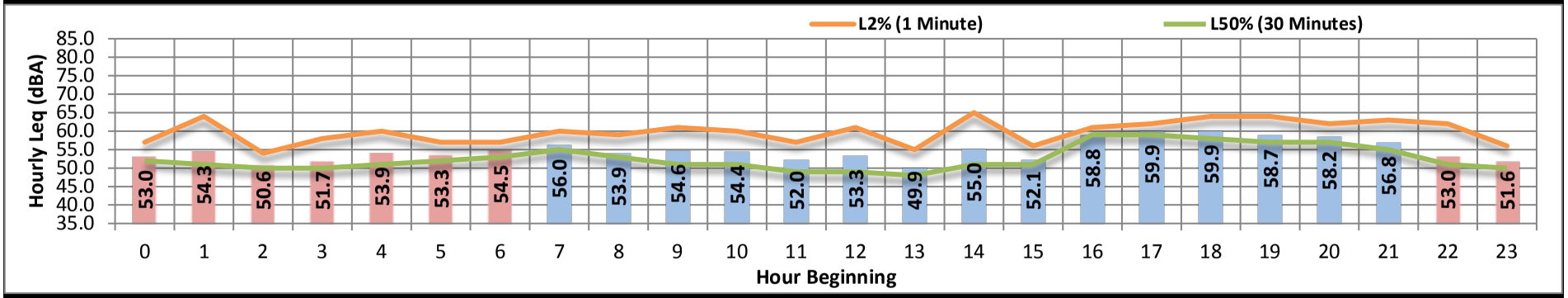
Time Period	*Hour*	*Leq*	*Lmax*	*Lmin*	*L1%*	*L2%*	*L5%*	*L8%*	*L25%*	*L50%*	*L90%*	*L95%*	*L99%*
Day	Min	64.7	82.9	49.5	73.0	72.0	69.0	68.0	63.0	60.0	54.0	53.0	50.0
	Max	70.2	93.8	58.0	78.0	76.0	74.0	73.0	70.0	66.0	62.0	61.0	59.0
Energy Average:		67.9	Average:		76.5	74.5	72.0	70.7	67.2	63.7	58.9	57.8	55.6
Night	Min	54.3	74.1	43.2	64.0	62.0	59.0	58.0	51.0	48.0	45.0	44.0	43.0
	Max	69.6	89.6	54.5	78.0	76.0	74.0	73.0	70.0	65.0	59.0	58.0	56.0
Energy Average:		63.5	Average:		70.6	68.1	65.4	64.0	58.8	54.6	49.3	48.3	47.2
Hourly Summary													
Night	0	58.9	85.5	44.2	67.0	64.0	62.0	60.0	56.0	52.0	46.0	45.0	45.0
	1	55.9	74.1	44.0	64.0	62.0	61.0	59.0	56.0	50.0	45.0	45.0	44.0
	2	54.3	75.8	43.2	64.0	62.0	59.0	58.0	51.0	48.0	45.0	44.0	43.0
	3	56.3	77.7	44.3	68.0	65.0	61.0	59.0	53.0	48.0	46.0	45.0	45.0
	4	61.6	81.4	45.6	72.0	70.0	68.0	66.0	59.0	56.0	48.0	47.0	46.0
	5	66.6	85.4	50.5	77.0	75.0	72.0	71.0	64.0	60.0	55.0	54.0	52.0
	6	69.6	89.6	54.5	78.0	76.0	74.0	73.0	70.0	65.0	59.0	58.0	56.0
Day	7	70.2	88.8	58.0	78.0	76.0	74.0	73.0	70.0	66.0	62.0	61.0	59.0
	8	69.4	89.4	55.7	78.0	76.0	73.0	72.0	70.0	65.0	61.0	60.0	58.0
	9	67.5	83.4	52.1	76.0	74.0	72.0	71.0	68.0	63.0	59.0	58.0	55.0
	10	68.2	86.0	53.4	78.0	76.0	73.0	72.0	68.0	63.0	58.0	57.0	55.0
	11	66.9	82.9	51.5	77.0	75.0	72.0	70.0	66.0	63.0	58.0	57.0	54.0
	12	67.0	84.0	52.5	77.0	75.0	72.0	70.0	66.0	63.0	58.0	57.0	55.0
	13	67.2	83.2	53.4	77.0	75.0	72.0	71.0	67.0	63.0	58.0	57.0	55.0
	14	67.1	84.2	54.2	76.0	74.0	72.0	70.0	67.0	64.0	59.0	58.0	56.0
	15	69.1	93.8	55.5	77.0	75.0	73.0	71.0	68.0	65.0	60.0	58.0	57.0
	16	68.4	86.8	53.9	77.0	75.0	73.0	72.0	68.0	65.0	60.0	60.0	58.0
	17	68.9	91.0	56.3	77.0	75.0	73.0	72.0	69.0	65.0	61.0	60.0	58.0
	18	68.2	86.7	55.4	77.0	75.0	72.0	71.0	68.0	65.0	60.0	59.0	57.0
	19	65.7	83.4	51.7	73.0	72.0	70.0	69.0	65.0	63.0	58.0	57.0	54.0
	20	66.0	86.1	50.5	75.0	73.0	70.0	68.0	65.0	62.0	57.0	55.0	53.0
	21	64.7	87.2	49.5	75.0	72.0	69.0	68.0	63.0	60.0	54.0	53.0	50.0
Night	22	63.5	81.8	47.4	75.0	72.0	68.0	67.0	62.0	58.0	52.0	50.0	48.0
	23	59.4	77.2	45.2	70.0	67.0	64.0	63.0	58.0	54.0	48.0	47.0	46.0

URBAN CROSSROADS

24-Hour Noise Level Measurement Summary

			Energy Average Leq		24-Hour
Project Name:	Alta Vista	*JN:* 11195	*Day*	*Night*	*CNEL*
Location:	L2 - Located east of the Project site in the Placentia Champions Sports park on Blankenship Circle.	*Analyst:* A. Wolfe			
		Date: 11/15/2017	56.5	53.1	60.8

Hourly Leq dBA Readings (unadjusted)



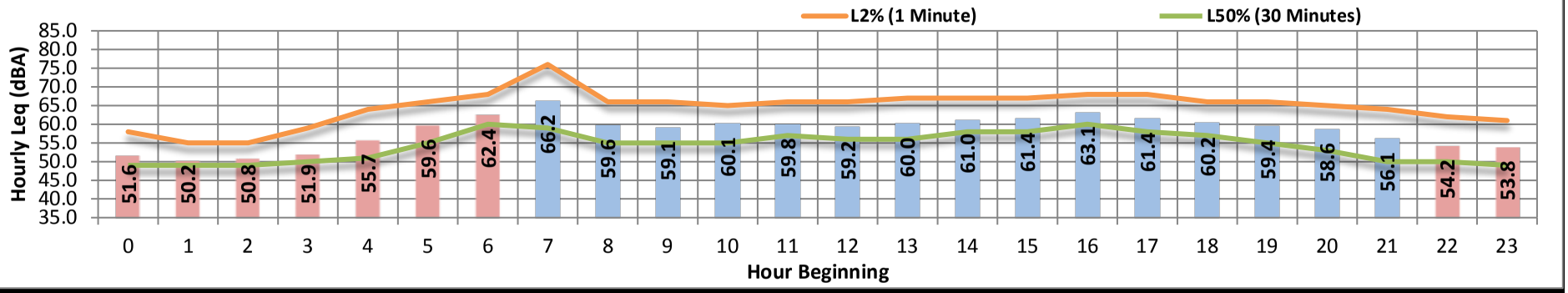
Time Period	*Hour*	*Leq*	*Lmax*	*Lmin*	*L1%*	*L2%*	*L5%*	*L8%*	*L25%*	*L50%*	*L90%*	*L95%*	*L99%*
Day	Min	49.9	63.3	46.6	57.0	55.0	53.0	51.0	49.0	48.0	47.0	47.0	47.0
	Max	59.9	80.1	57.7	66.0	65.0	62.0	61.0	60.0	59.0	58.0	58.0	58.0
Energy Average:		56.5	Average:		62.3	60.7	58.1	56.9	54.8	53.5	51.3	51.1	50.7
Night	Min	50.6	60.5	48.7	55.0	54.0	52.0	51.0	50.0	50.0	49.0	49.0	49.0
	Max	54.5	70.3	52.4	64.0	64.0	59.0	58.0	54.0	53.0	53.0	53.0	52.0
Energy Average:		53.1	Average:		59.4	58.3	55.4	54.3	51.8	51.1	50.1	49.9	49.7
Hourly Summary													
Night	0	53.0	61.7	50.3	58.0	57.0	55.0	55.0	53.0	52.0	51.0	50.0	50.0
	1	54.3	68.3	49.3	64.0	64.0	59.0	57.0	52.0	51.0	50.0	50.0	49.0
	2	50.6	60.5	49.0	55.0	54.0	52.0	51.0	50.0	50.0	49.0	49.0	49.0
	3	51.7	65.3	48.7	59.0	58.0	56.0	53.0	50.0	50.0	49.0	49.0	49.0
	4	53.9	70.3	48.9	61.0	60.0	59.0	58.0	52.0	51.0	50.0	49.0	49.0
	5	53.3	62.6	50.6	58.0	57.0	55.0	54.0	53.0	52.0	51.0	51.0	51.0
	6	54.5	68.3	52.4	59.0	57.0	55.0	55.0	54.0	53.0	53.0	53.0	52.0
Day	7	56.0	72.6	52.6	61.0	60.0	59.0	58.0	56.0	55.0	53.0	53.0	53.0
	8	53.9	63.3	48.7	59.0	59.0	57.0	56.0	54.0	53.0	51.0	50.0	49.0
	9	54.6	67.2	48.0	63.0	61.0	59.0	58.0	54.0	51.0	49.0	49.0	48.0
	10	54.4	78.6	48.7	62.0	60.0	57.0	55.0	52.0	51.0	49.0	49.0	49.0
	11	52.0	76.5	47.3	60.0	57.0	53.0	52.0	50.0	49.0	48.0	48.0	47.0
	12	53.3	80.1	46.8	65.0	61.0	54.0	53.0	50.0	49.0	48.0	47.0	47.0
	13	49.9	67.8	46.6	57.0	55.0	53.0	51.0	49.0	48.0	47.0	47.0	47.0
	14	55.0	76.5	47.1	66.0	65.0	59.0	56.0	52.0	51.0	48.0	48.0	47.0
	15	52.1	75.3	48.4	57.0	56.0	54.0	53.0	52.0	51.0	49.0	49.0	48.0
	16	58.8	65.0	49.0	61.0	61.0	61.0	60.0	60.0	59.0	51.0	50.0	50.0
	17	59.9	71.4	57.7	63.0	62.0	61.0	61.0	60.0	59.0	58.0	58.0	58.0
	18	59.9	75.2	56.4	66.0	64.0	62.0	61.0	60.0	58.0	57.0	57.0	56.0
	19	58.7	75.7	55.8	65.0	64.0	61.0	60.0	58.0	57.0	56.0	56.0	56.0
	20	58.2	73.1	54.9	64.0	62.0	60.0	60.0	58.0	57.0	56.0	55.0	55.0
	21	56.8	72.8	49.3	65.0	63.0	61.0	60.0	57.0	55.0	50.0	50.0	50.0
Night	22	53.0	70.2	48.9	64.0	62.0	54.0	53.0	51.0	51.0	49.0	49.0	49.0
	23	51.6	66.9	48.9	57.0	56.0	54.0	53.0	51.0	50.0	49.0	49.0	49.0

URBAN CROSSROADS

24-Hour Noise Level Measurement Summary

					Energy Average Leq	
Project Name:	Alta Vista	*JN:*	11195		*Day*	*Night*	*24-Hour CNEL*
Location:	L3 - Located at the northeast corner of the Project site on Alta Vista Street adjacent to an existing 6-foot high barrier for residential homes.	*Analyst:*	A. Wolfe				
		Date:	11/15/2017		61.0	56.5	64.2

Hourly Leq dBA Readings (unadjusted)



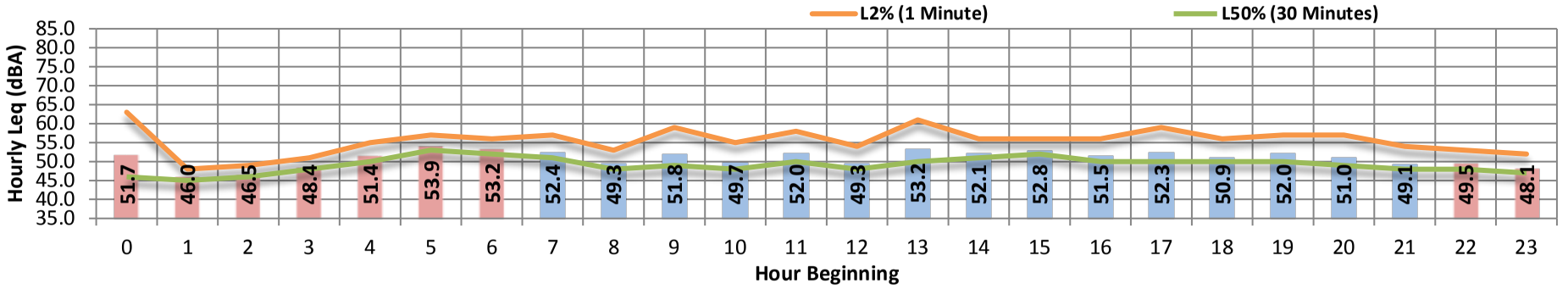
Time Period	*Hour*	*Leq*	*Lmax*	*Lmin*	*L1%*	*L2%*	*L5%*	*L8%*	*L25%*	*L50%*	*L90%*	*L95%*	*L99%*
Day	Min	56.1	69.9	46.2	65.0	64.0	62.0	60.0	53.0	50.0	49.0	48.0	47.0
	Max	66.2	86.9	51.0	78.0	76.0	70.0	67.0	64.0	60.0	53.0	52.0	52.0
Energy Average:		61.0	Average:		68.0	66.9	65.1	63.9	60.5	56.1	50.6	49.7	48.9
Night	Min	50.2	64.5	47.1	59.0	55.0	51.0	50.0	49.0	49.0	48.0	48.0	47.0
	Max	62.4	78.5	51.6	68.0	68.0	67.0	66.0	64.0	60.0	54.0	53.0	52.0
Energy Average:		56.5	Average:		62.8	60.9	58.2	56.8	53.3	51.3	49.4	49.1	48.7
Hourly Summary													
Night	0	51.6	66.4	47.9	60.0	58.0	55.0	54.0	50.0	49.0	48.0	48.0	48.0
	1	50.2	64.5	47.4	59.0	55.0	51.0	50.0	49.0	49.0	48.0	48.0	47.0
	2	50.8	65.3	48.0	59.0	55.0	52.0	51.0	50.0	49.0	48.0	48.0	48.0
	3	51.9	67.2	48.0	61.0	59.0	54.0	53.0	51.0	50.0	49.0	48.0	48.0
	4	55.7	69.6	48.6	65.0	64.0	62.0	60.0	54.0	51.0	50.0	50.0	49.0
	5	59.6	74.8	50.5	67.0	66.0	65.0	64.0	60.0	55.0	52.0	51.0	51.0
	6	62.4	71.5	51.6	68.0	68.0	67.0	66.0	64.0	60.0	54.0	53.0	52.0
Day	7	66.2	85.9	51.0	78.0	76.0	70.0	67.0	64.0	59.0	53.0	52.0	52.0
	8	59.6	74.6	49.4	67.0	66.0	65.0	64.0	60.0	55.0	50.0	50.0	50.0
	9	59.1	71.7	46.2	67.0	66.0	64.0	63.0	60.0	55.0	49.0	48.0	47.0
	10	60.1	86.9	46.3	67.0	65.0	64.0	63.0	60.0	55.0	49.0	48.0	47.0
	11	59.8	70.4	47.7	67.0	66.0	65.0	64.0	61.0	57.0	50.0	49.0	48.0
	12	59.2	69.9	46.9	66.0	66.0	64.0	63.0	60.0	56.0	50.0	49.0	48.0
	13	60.0	74.9	46.5	68.0	67.0	65.0	64.0	61.0	56.0	50.0	49.0	47.0
	14	61.0	79.7	48.5	68.0	67.0	65.0	65.0	62.0	58.0	51.0	50.0	49.0
	15	61.4	79.6	49.1	68.0	67.0	66.0	65.0	62.0	58.0	52.0	51.0	50.0
	16	63.1	84.2	50.5	70.0	68.0	67.0	66.0	63.0	60.0	53.0	52.0	51.0
	17	61.4	76.8	49.0	69.0	68.0	66.0	65.0	62.0	58.0	51.0	51.0	50.0
	18	60.2	70.1	48.9	67.0	66.0	65.0	64.0	61.0	57.0	51.0	50.0	49.0
	19	59.4	76.4	49.0	67.0	66.0	65.0	64.0	60.0	55.0	51.0	50.0	49.0
	20	58.6	83.1	48.9	66.0	65.0	63.0	62.0	58.0	53.0	50.0	49.0	49.0
	21	56.1	78.3	47.5	65.0	64.0	62.0	60.0	53.0	50.0	49.0	48.0	48.0
Night	22	54.2	72.4	47.9	63.0	62.0	60.0	58.0	52.0	50.0	48.0	48.0	48.0
	23	53.8	78.5	47.1	63.0	61.0	58.0	55.0	50.0	49.0	48.0	48.0	47.0

URBAN CROSSROADS

24-Hour Noise Level Measurement Summary

Project Name:	Alta Vista	*JN:*	11195	*Energy Average Leq*	*24-Hour*
		Analyst:	A. Wolfe	*Day* / *Night*	*CNEL*
Location:	L4 - Located at the eastern Project site boundary adjacent to an existing 6-foot high barrier for residential homes on Rodarte Place.	*Date:*	11/15/2017	51.5 / 50.7	57.5

Hourly Leq dBA Readings (unadjusted)



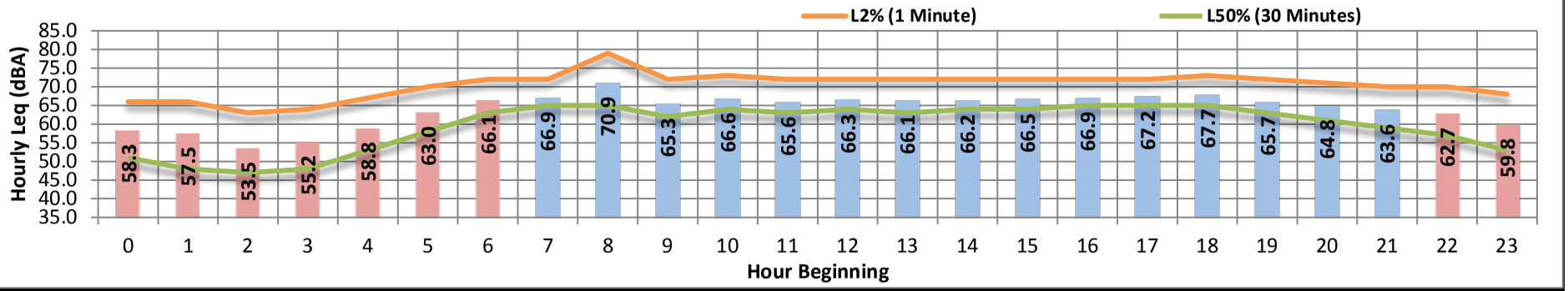
Time Period	*Hour*	*Leq*	*Lmax*	*Lmin*	*L1%*	*L2%*	*L5%*	*L8%*	*L25%*	*L50%*	*L90%*	*L95%*	*L99%*
Day	Min	49.1	60.6	42.5	55.0	53.0	51.0	50.0	49.0	48.0	45.0	45.0	44.0
	Max	53.2	70.7	47.7	64.0	61.0	56.0	55.0	53.0	52.0	49.0	49.0	48.0
Energy Average:		51.5	Average:		58.6	56.5	54.1	52.9	50.7	49.6	47.3	46.9	46.1
Night	Min	46.0	52.4	42.7	49.0	48.0	47.0	47.0	46.0	45.0	44.0	43.0	43.0
	Max	53.9	69.8	50.3	63.0	63.0	58.0	55.0	53.0	53.0	51.0	51.0	51.0
Energy Average:		50.7	Average:		55.0	53.8	52.1	51.1	49.2	48.3	46.6	46.3	46.0
Hourly Summary													
Night	0	51.7	66.1	43.6	63.0	63.0	58.0	53.0	47.0	46.0	45.0	45.0	44.0
	1	46.0	52.4	42.7	49.0	48.0	47.0	47.0	46.0	45.0	44.0	43.0	43.0
	2	46.5	58.7	43.6	50.0	49.0	48.0	48.0	46.0	46.0	44.0	44.0	44.0
	3	48.4	59.6	44.6	52.0	51.0	50.0	50.0	49.0	48.0	45.0	45.0	45.0
	4	51.4	61.3	46.4	56.0	55.0	54.0	53.0	52.0	50.0	47.0	47.0	47.0
	5	53.9	69.8	50.3	58.0	57.0	55.0	55.0	53.0	53.0	51.0	51.0	51.0
	6	53.2	63.5	48.9	58.0	56.0	55.0	54.0	53.0	52.0	51.0	51.0	50.0
Day	7	52.4	67.6	47.2	58.0	57.0	55.0	54.0	52.0	51.0	49.0	49.0	48.0
	8	49.3	63.9	44.8	55.0	53.0	51.0	50.0	49.0	48.0	46.0	46.0	45.0
	9	51.8	68.3	43.7	63.0	59.0	55.0	53.0	50.0	49.0	46.0	46.0	45.0
	10	49.7	61.6	42.5	56.0	55.0	53.0	51.0	50.0	48.0	46.0	45.0	44.0
	11	52.0	68.1	45.4	60.0	58.0	55.0	53.0	51.0	50.0	48.0	47.0	47.0
	12	49.3	60.6	43.4	56.0	54.0	52.0	51.0	49.0	48.0	46.0	45.0	44.0
	13	53.2	70.7	43.4	64.0	61.0	56.0	54.0	51.0	50.0	47.0	46.0	45.0
	14	52.1	63.0	45.9	58.0	56.0	55.0	54.0	52.0	51.0	48.0	48.0	47.0
	15	52.8	62.7	47.7	58.0	56.0	55.0	55.0	53.0	52.0	49.0	49.0	48.0
	16	51.5	66.9	46.1	58.0	56.0	54.0	53.0	51.0	50.0	48.0	48.0	47.0
	17	52.3	69.6	45.8	62.0	59.0	55.0	54.0	51.0	50.0	48.0	47.0	47.0
	18	50.9	61.5	46.4	57.0	56.0	54.0	53.0	51.0	50.0	48.0	47.0	47.0
	19	52.0	62.8	46.2	59.0	57.0	55.0	54.0	52.0	50.0	48.0	48.0	47.0
	20	51.0	68.0	45.8	59.0	57.0	55.0	53.0	50.0	49.0	47.0	47.0	46.0
	21	49.1	66.2	44.0	56.0	54.0	52.0	51.0	49.0	48.0	45.0	45.0	44.0
Night	22	49.5	65.0	45.3	55.0	53.0	52.0	51.0	49.0	48.0	47.0	46.0	46.0
	23	48.1	65.8	44.2	54.0	52.0	50.0	49.0	48.0	47.0	45.0	45.0	44.0

URBAN CROSSROADS

24-Hour Noise Level Measurement Summary

Project Name:	Alta Vista	*JN:*	11195	*Energy Average Leq*	*24-Hour*
		Analyst:	A. Wolfe	*Day* / *Night*	*CNEL*
Location:	L5 - Located at the southwest corner of the Project site on Rose Drive near an existing 6-foot high barrier for residential homes on Babcock Circle.	*Date:*	11/15/2017	66.7 / 61.0	69.3

Hourly Leq dBA Readings (unadjusted)



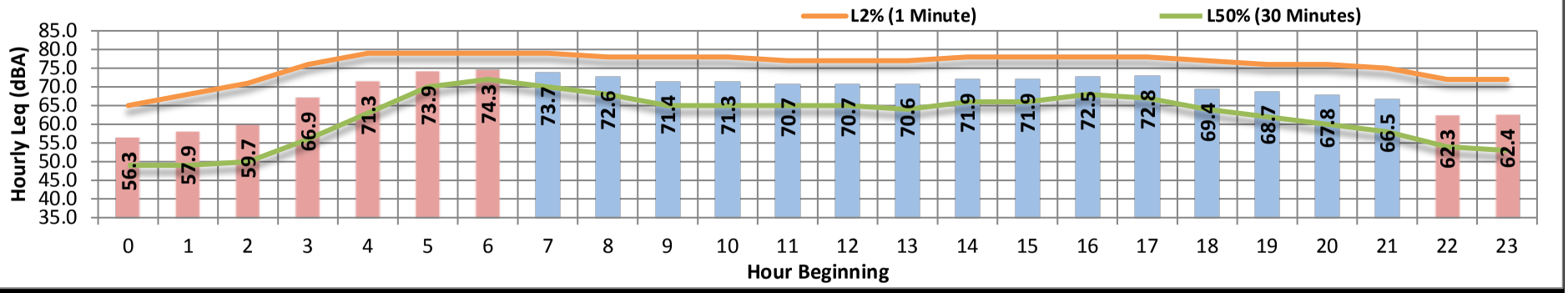
Time Period	*Hour*	*Leq*	*Lmax*	*Lmin*	*L1%*	*L2%*	*L5%*	*L8%*	*L25%*	*L50%*	*L90%*	*L95%*	*L99%*
Day	Min	63.6	79.9	42.2	71.0	70.0	69.0	68.0	64.0	59.0	50.0	48.0	44.0
	Max	70.9	92.8	52.4	82.0	79.0	74.0	71.0	68.0	65.0	57.0	55.0	53.0
Energy Average:		66.7	Average:		73.9	72.4	70.6	69.7	66.9	63.5	53.3	50.9	47.9
Night	Min	53.5	71.7	45.0	65.0	63.0	60.0	56.0	48.0	47.0	46.0	46.0	45.0
	Max	66.1	85.0	52.1	73.0	72.0	71.0	69.0	67.0	63.0	55.0	54.0	52.0
Energy Average:		61.0	Average:		68.7	67.3	65.1	63.0	57.8	53.1	48.7	48.2	47.2
Hourly Summary													
Night	0	58.3	85.0	46.1	68.0	66.0	64.0	62.0	55.0	51.0	47.0	47.0	46.0
	1	57.5	75.5	45.1	67.0	66.0	63.0	61.0	55.0	48.0	46.0	46.0	45.0
	2	53.5	71.7	45.0	65.0	63.0	60.0	56.0	48.0	47.0	46.0	46.0	45.0
	3	55.2	77.4	45.4	66.0	64.0	61.0	58.0	51.0	48.0	46.0	46.0	46.0
	4	58.8	73.3	46.6	68.0	67.0	65.0	63.0	58.0	53.0	48.0	47.0	47.0
	5	63.0	76.3	48.9	71.0	70.0	68.0	67.0	64.0	58.0	52.0	51.0	49.0
	6	66.1	80.6	52.1	73.0	72.0	71.0	69.0	67.0	63.0	55.0	54.0	52.0
Day	7	66.9	84.9	52.4	73.0	72.0	71.0	70.0	67.0	65.0	57.0	55.0	53.0
	8	70.9	92.8	47.6	82.0	79.0	74.0	71.0	68.0	65.0	55.0	52.0	49.0
	9	65.3	79.9	46.0	73.0	72.0	70.0	69.0	66.0	62.0	50.0	48.0	46.0
	10	66.6	82.3	44.6	76.0	73.0	71.0	70.0	67.0	64.0	52.0	49.0	46.0
	11	65.6	80.5	43.2	73.0	72.0	70.0	69.0	66.0	63.0	51.0	48.0	45.0
	12	66.3	82.6	45.3	73.0	72.0	70.0	70.0	67.0	64.0	55.0	53.0	47.0
	13	66.1	80.6	42.2	74.0	72.0	70.0	70.0	67.0	63.0	52.0	49.0	44.0
	14	66.2	85.0	44.1	72.0	72.0	70.0	70.0	67.0	64.0	53.0	50.0	47.0
	15	66.5	80.0	43.9	73.0	72.0	71.0	70.0	68.0	64.0	52.0	49.0	45.0
	16	66.9	81.7	48.1	73.0	72.0	71.0	70.0	68.0	65.0	56.0	53.0	50.0
	17	67.2	83.6	48.1	74.0	72.0	71.0	70.0	68.0	65.0	55.0	53.0	50.0
	18	67.7	89.2	48.6	75.0	73.0	71.0	70.0	68.0	65.0	56.0	53.0	50.0
	19	65.7	80.7	48.3	73.0	72.0	70.0	69.0	67.0	63.0	52.0	50.0	49.0
	20	64.8	80.1	47.6	73.0	71.0	70.0	69.0	65.0	61.0	52.0	51.0	49.0
	21	63.6	80.9	47.5	71.0	70.0	69.0	68.0	64.0	59.0	51.0	50.0	48.0
Night	22	62.7	77.8	47.6	71.0	70.0	68.0	67.0	63.0	57.0	50.0	49.0	48.0
	23	59.8	78.9	47.1	69.0	68.0	66.0	64.0	59.0	53.0	48.0	48.0	47.0

URBAN CROSSROADS

24-Hour Noise Level Measurement Summary

			Energy Average Leq		24-Hour
Project Name:	Alta Vista	*JN:* 11195	*Day*	*Night*	*CNEL*
Location:	L6 - Located west of the Project site across Rose Drive adjacent to existing residential homes on Underhill Drive.	*Analyst:* A. Wolfe			
		Date: 11/15/2017	71.2	69.2	76.2

Hourly Leq dBA Readings (unadjusted)



Time Period	*Hour*	*Leq*	*Lmax*	*Lmin*	*L1%*	*L2%*	*L5%*	*L8%*	*L25%*	*L50%*	*L90%*	*L95%*	*L99%*
Day	Min	66.5	84.3	45.2	77.0	75.0	73.0	71.0	64.0	58.0	51.0	50.0	48.0
	Max	73.7	96.2	52.7	81.0	79.0	78.0	77.0	75.0	70.0	59.0	57.0	55.0
Energy Average:		71.2	Average:		78.5	77.3	76.1	75.3	71.1	64.9	55.1	53.3	51.0
Night	Min	56.3	76.7	45.4	68.0	65.0	61.0	58.0	51.0	49.0	46.0	46.0	46.0
	Max	74.3	89.7	54.7	80.0	79.0	78.0	78.0	76.0	72.0	62.0	60.0	58.0
Energy Average:		69.2	Average:		75.2	73.4	70.4	68.3	62.2	57.3	51.2	50.1	49.3
Hourly Summary													
Night	0	56.3	76.7	45.4	68.0	65.0	62.0	59.0	52.0	49.0	46.0	46.0	46.0
	1	57.9	80.3	45.5	71.0	68.0	61.0	58.0	51.0	49.0	47.0	46.0	46.0
	2	59.7	77.8	46.4	73.0	71.0	65.0	62.0	54.0	50.0	48.0	47.0	47.0
	3	66.9	89.7	47.3	77.0	76.0	74.0	72.0	62.0	56.0	49.0	48.0	48.0
	4	71.3	86.8	49.6	80.0	79.0	78.0	76.0	71.0	63.0	53.0	52.0	51.0
	5	73.9	88.8	53.3	80.0	79.0	78.0	78.0	76.0	70.0	58.0	56.0	54.0
	6	74.3	85.9	54.7	80.0	79.0	78.0	78.0	76.0	72.0	62.0	60.0	58.0
Day	7	73.7	90.2	52.7	80.0	79.0	78.0	77.0	75.0	70.0	59.0	57.0	55.0
	8	72.6	96.2	49.3	78.0	78.0	77.0	77.0	74.0	68.0	55.0	53.0	51.0
	9	71.4	90.1	50.1	79.0	78.0	77.0	76.0	72.0	65.0	56.0	54.0	51.0
	10	71.3	91.1	45.8	79.0	78.0	76.0	76.0	72.0	65.0	54.0	52.0	49.0
	11	70.7	92.6	46.6	78.0	77.0	76.0	75.0	71.0	65.0	55.0	52.0	50.0
	12	70.7	87.8	45.8	78.0	77.0	76.0	75.0	71.0	65.0	54.0	52.0	50.0
	13	70.6	86.6	45.2	78.0	77.0	76.0	75.0	71.0	64.0	54.0	52.0	49.0
	14	71.9	93.8	48.8	79.0	78.0	77.0	76.0	73.0	66.0	55.0	54.0	51.0
	15	71.9	84.3	50.5	79.0	78.0	77.0	77.0	73.0	66.0	56.0	55.0	53.0
	16	72.5	91.1	51.7	79.0	78.0	77.0	77.0	74.0	68.0	57.0	55.0	53.0
	17	72.8	93.9	52.1	81.0	78.0	77.0	76.0	73.0	67.0	58.0	56.0	53.0
	18	69.4	85.1	48.7	77.0	77.0	75.0	74.0	69.0	64.0	55.0	53.0	51.0
	19	68.7	86.5	49.1	78.0	76.0	75.0	74.0	68.0	62.0	54.0	53.0	51.0
	20	67.8	86.1	49.1	77.0	76.0	74.0	73.0	67.0	60.0	53.0	52.0	50.0
	21	66.5	84.4	47.2	77.0	75.0	73.0	71.0	64.0	58.0	51.0	50.0	48.0
Night	22	62.3	80.1	46.4	73.0	72.0	69.0	66.0	59.0	54.0	49.0	48.0	47.0
	23	62.4	81.1	46.8	75.0	72.0	69.0	66.0	59.0	53.0	49.0	48.0	47.0

URBAN CROSSROADS

APPENDIX 7.1:

OFF-SITE TRAFFIC NOISE LEVEL CONTOURS

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing w/o Project
Road Name: Rose Dr.
Road Segment: n/o Buena Vista Av.

Project Name: Alta Vista
Job Number: 11195

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	30,200	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	3,020	vehicles
Vehicle Speed:	45	mph
Near/Far Lane Distance:	72	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	60.0	feet
Centerline Dist. to Observer:	60.0	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:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	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:	48.260
Medium Trucks:	48.076
Heavy Trucks:	48.094

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	2.85	0.13	-1.20	-4.69	0.000	0.000
Medium Trucks:	79.45	-14.39	0.15	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-18.35	0.15	-1.20	-5.34	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:	70.2	68.3	66.6	60.5	69.1	69.7
Medium Trucks:	64.0	62.5	56.1	54.6	63.1	63.3
Heavy Trucks:	64.9	63.4	54.4	55.6	64.0	64.1
Vehicle Noise:	72.1	70.3	67.2	62.5	71.1	71.5

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	71	152	327	705
CNEL:	76	163	351	756

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing w/o Project
Road Name: Rose Dr.
Road Segment: s/o Buena Vista Av.

Project Name: Alta Vista
Job Number: 11195

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	30,800	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	3,080	vehicles
Vehicle Speed:	45	mph
Near/Far Lane Distance:	72	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	60.0	feet
Centerline Dist. to Observer:	60.0	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:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	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:	48.260
Medium Trucks:	48.076
Heavy Trucks:	48.094

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	2.93	0.13	-1.20	-4.69	0.000	0.000
Medium Trucks:	79.45	-14.30	0.15	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-18.26	0.15	-1.20	-5.34	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:	70.3	68.4	66.7	60.6	69.2	69.8
Medium Trucks:	64.1	62.6	56.2	54.7	63.1	63.4
Heavy Trucks:	64.9	63.5	54.5	55.7	64.1	64.2
Vehicle Noise:	72.2	70.4	67.3	62.6	71.1	71.6

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	71	154	332	714
CNEL:	77	165	356	766

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing w/o Project
Road Name: Rose Dr.
Road Segment: s/o Alta Vista St.

Project Name: Alta Vista
Job Number: 11195

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	25,400	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	2,540	vehicles
Vehicle Speed:	45	mph
Near/Far Lane Distance:	72	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	60.0	feet
Centerline Dist. to Observer:	60.0	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:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	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:	48.260
Medium Trucks:	48.076
Heavy Trucks:	48.094

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	2.10	0.13	-1.20	-4.69	0.000	0.000
Medium Trucks:	79.45	-15.14	0.15	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-19.10	0.15	-1.20	-5.34	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:	69.5	67.6	65.8	59.8	68.4	69.0
Medium Trucks:	63.3	61.8	55.4	53.8	62.3	62.5
Heavy Trucks:	64.1	62.7	53.6	54.9	63.3	63.4
Vehicle Noise:	71.3	69.6	66.4	61.8	70.3	70.8

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	63	135	292	628
CNEL:	67	145	313	674

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing w/o Project
Road Name: Rose Dr.
Road Segment: s/o Del Cerro Dr.

Project Name: Alta Vista
Job Number: 11195

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	25,600	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	2,560	vehicles
Vehicle Speed:	45	mph
Near/Far Lane Distance:	72	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	60.0	feet
Centerline Dist. to Observer:	60.0	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:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	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:	48.260
Medium Trucks:	48.076
Heavy Trucks:	48.094

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	2.13	0.13	-1.20	-4.69	0.000	0.000
Medium Trucks:	79.45	-15.11	0.15	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-19.06	0.15	-1.20	-5.34	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:	69.5	67.6	65.9	59.8	68.4	69.0
Medium Trucks:	63.3	61.8	55.4	53.9	62.3	62.6
Heavy Trucks:	64.1	62.7	53.7	54.9	63.3	63.4
Vehicle Noise:	71.4	69.6	66.5	61.8	70.3	70.8

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	63	136	293	632
CNEL:	68	146	314	677

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing w/o Project
Road Name: Jefferson St.
Road Segment: n/o Alta Vista St.
Project Name: Alta Vista
Job Number: 11195

SITE SPECIFIC INPUT DATA		NOISE MODEL INPUTS	
Highway Data		**Site Conditions (Hard = 10, Soft = 15)**	
Average Daily Traffic (Adt):	2,200 vehicles	Autos:	15
Peak Hour Percentage:	10%	Medium Trucks (2 Axles):	15
Peak Hour Volume:	220 vehicles	Heavy Trucks (3+ Axles):	15
Vehicle Speed:	40 mph		
Near/Far Lane Distance:	48 feet		
Site Data		**Vehicle Mix**	
Barrier Height:	**0.0 feet**		
Barrier Type (0-Wall, 1-Berm):	0.0		
Centerline Dist. to Barrier:	40.0 feet		
Centerline Dist. to Observer:	40.0 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		

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	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:	32.388
Medium Trucks:	32.114
Heavy Trucks:	32.141

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	-8.02	2.73	-1.20	-4.59	0.000	0.000
Medium Trucks:	77.72	-25.25	2.78	-1.20	-4.87	0.000	0.000
Heavy Trucks:	82.99	-29.21	2.78	-1.20	-5.56	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:	60.0	58.1	56.4	50.3	58.9	59.5
Medium Trucks:	54.0	52.5	46.2	44.6	53.1	53.3
Heavy Trucks:	55.4	53.9	44.9	46.2	54.5	54.6
Vehicle Noise:	62.0	60.3	57.0	52.5	61.0	61.5

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	10	22	47	101
CNEL:	11	23	50	108

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing w/o Project
Road Name: Jefferson St.
Road Segment: s/o Alta Vista St.
Project Name: Alta Vista
Job Number: 11195

SITE SPECIFIC INPUT DATA		NOISE MODEL INPUTS	
Highway Data		**Site Conditions (Hard = 10, Soft = 15)**	
Average Daily Traffic (Adt):	4,200 vehicles	Autos:	15
Peak Hour Percentage:	10%	Medium Trucks (2 Axles):	15
Peak Hour Volume:	420 vehicles	Heavy Trucks (3+ Axles):	15
Vehicle Speed:	40 mph		
Near/Far Lane Distance:	48 feet		
Site Data		**Vehicle Mix**	
Barrier Height:	**0.0 feet**		
Barrier Type (0-Wall, 1-Berm):	0.0		
Centerline Dist. to Barrier:	40.0 feet		
Centerline Dist. to Observer:	40.0 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		

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	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:	32.388
Medium Trucks:	32.114
Heavy Trucks:	32.141

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	-5.21	2.73	-1.20	-4.59	0.000	0.000
Medium Trucks:	77.72	-22.45	2.78	-1.20	-4.87	0.000	0.000
Heavy Trucks:	82.99	-26.40	2.78	-1.20	-5.56	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:	62.8	60.9	59.2	53.1	61.7	62.3
Medium Trucks:	56.9	55.3	49.0	47.4	55.9	56.1
Heavy Trucks:	58.2	56.7	47.7	49.0	57.3	57.4
Vehicle Noise:	64.9	63.1	59.8	55.3	63.8	64.3

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	16	33	72	155
CNEL:	17	36	77	166

Monday, November 27, 2017

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing w/o Project
Road Name: Buena Vista Av.
Road Segment: e/o Rose Dr.
Project Name: Alta Vista
Job Number: 11195

SITE SPECIFIC INPUT DATA		NOISE MODEL INPUTS	
Highway Data		**Site Conditions (Hard = 10, Soft = 15)**	
Average Daily Traffic (Adt):	8,500 vehicles	Autos:	15
Peak Hour Percentage:	10%	Medium Trucks (2 Axles):	15
Peak Hour Volume:	850 vehicles	Heavy Trucks (3+ Axles):	15
Vehicle Speed:	45 mph		
Near/Far Lane Distance:	48 feet		
Site Data		**Vehicle Mix**	
Barrier Height:	**0.0 feet**		
Barrier Type (0-Wall, 1-Berm):	0.0		
Centerline Dist. to Barrier:	40.0 feet		
Centerline Dist. to Observer:	40.0 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		

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	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:	32.388
Medium Trucks:	32.114
Heavy Trucks:	32.141

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	-2.66	2.73	-1.20	-4.59	0.000	0.000
Medium Trucks:	79.45	-19.90	2.78	-1.20	-4.87	0.000	0.000
Heavy Trucks:	84.25	-23.85	2.78	-1.20	-5.56	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:	67.3	65.4	63.7	57.6	66.2	66.8
Medium Trucks:	61.1	59.6	53.3	51.7	60.2	60.4
Heavy Trucks:	62.0	60.6	51.5	52.8	61.1	61.3
Vehicle Noise:	69.2	67.4	64.3	59.6	68.2	68.6

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	30	65	140	301
CNEL:	32	70	150	323

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing w/o Project
Road Name: Alta Vista St.
Road Segment: w/o Rose Dr.
Project Name: Alta Vista
Job Number: 11195

SITE SPECIFIC INPUT DATA		NOISE MODEL INPUTS	
Highway Data		**Site Conditions (Hard = 10, Soft = 15)**	
Average Daily Traffic (Adt):	13,200 vehicles	Autos:	15
Peak Hour Percentage:	10%	Medium Trucks (2 Axles):	15
Peak Hour Volume:	1,320 vehicles	Heavy Trucks (3+ Axles):	15
Vehicle Speed:	45 mph		
Near/Far Lane Distance:	48 feet		
Site Data		**Vehicle Mix**	
Barrier Height:	**0.0 feet**		
Barrier Type (0-Wall, 1-Berm):	0.0		
Centerline Dist. to Barrier:	40.0 feet		
Centerline Dist. to Observer:	40.0 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		

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	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:	32.388
Medium Trucks:	32.114
Heavy Trucks:	32.141

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	-0.75	2.73	-1.20	-4.59	0.000	0.000
Medium Trucks:	79.45	-17.98	2.78	-1.20	-4.87	0.000	0.000
Heavy Trucks:	84.25	-21.94	2.78	-1.20	-5.56	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:	69.2	67.3	65.6	59.5	68.1	68.7
Medium Trucks:	63.0	61.5	55.2	53.6	62.1	62.3
Heavy Trucks:	63.9	62.5	53.4	54.7	63.0	63.2
Vehicle Noise:	71.1	69.4	66.2	61.5	70.1	70.5

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	40	87	188	404
CNEL:	43	93	201	433

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing w/o Project
Road Name: Alta Vista St.
Road Segment: e/o Rose Dr.
Project Name: Alta Vista
Job Number: 11195

SITE SPECIFIC INPUT DATA		NOISE MODEL INPUTS	
Highway Data		**Site Conditions (Hard = 10, Soft = 15)**	
Average Daily Traffic (Adt):	9,400 vehicles	Autos:	15
Peak Hour Percentage:	10%	Medium Trucks (2 Axles):	15
Peak Hour Volume:	940 vehicles	Heavy Trucks (3+ Axles):	15
Vehicle Speed:	45 mph		
Near/Far Lane Distance:	48 feet		
Site Data		**Vehicle Mix**	
Barrier Height:	**0.0 feet**		
Barrier Type (0-Wall, 1-Berm):	0.0		
Centerline Dist. to Barrier:	40.0 feet		
Centerline Dist. to Observer:	40.0 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		

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	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:	32.388
Medium Trucks:	32.114
Heavy Trucks:	32.141

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	-2.22	2.73	-1.20	-4.59	0.000	0.000
Medium Trucks:	79.45	-19.46	2.78	-1.20	-4.87	0.000	0.000
Heavy Trucks:	84.25	-23.41	2.78	-1.20	-5.56	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:	67.8	65.9	64.1	58.0	66.7	67.3
Medium Trucks:	61.6	60.1	53.7	52.2	60.6	60.9
Heavy Trucks:	62.4	61.0	52.0	53.2	61.6	61.7
Vehicle Noise:	69.6	67.9	64.7	60.0	68.6	69.0

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	32	69	150	322
CNEL:	35	74	160	346

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing w/o Project
Road Name: Alta Vista St.
Road Segment: e/o Jefferson St.
Project Name: Alta Vista
Job Number: 11195

SITE SPECIFIC INPUT DATA		NOISE MODEL INPUTS	
Highway Data		**Site Conditions (Hard = 10, Soft = 15)**	
Average Daily Traffic (Adt):	6,700 vehicles	Autos:	15
Peak Hour Percentage:	10%	Medium Trucks (2 Axles):	15
Peak Hour Volume:	670 vehicles	Heavy Trucks (3+ Axles):	15
Vehicle Speed:	45 mph		
Near/Far Lane Distance:	48 feet		
Site Data		**Vehicle Mix**	
Barrier Height:	**0.0 feet**		
Barrier Type (0-Wall, 1-Berm):	0.0		
Centerline Dist. to Barrier:	40.0 feet		
Centerline Dist. to Observer:	40.0 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		

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	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:	32.388
Medium Trucks:	32.114
Heavy Trucks:	32.141

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	-3.69	2.73	-1.20	-4.59	0.000	0.000
Medium Trucks:	79.45	-20.93	2.78	-1.20	-4.87	0.000	0.000
Heavy Trucks:	84.25	-24.88	2.78	-1.20	-5.56	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:	66.3	64.4	62.6	56.6	65.2	65.8
Medium Trucks:	60.1	58.6	52.2	50.7	59.1	59.4
Heavy Trucks:	60.9	59.5	50.5	51.7	60.1	60.2
Vehicle Noise:	68.1	66.4	63.2	58.6	67.1	67.6

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	26	55	119	257
CNEL:	28	59	128	276

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing w/o Project
Road Name: Del Cerro Dr.
Road Segment: e/o Rose Dr.
Project Name: Alta Vista
Job Number: 11195

SITE SPECIFIC INPUT DATA		NOISE MODEL INPUTS	
Highway Data		**Site Conditions (Hard = 10, Soft = 15)**	
Average Daily Traffic (Adt):	5,100 vehicles	Autos:	15
Peak Hour Percentage:	10%	Medium Trucks (2 Axles):	15
Peak Hour Volume:	510 vehicles	Heavy Trucks (3+ Axles):	15
Vehicle Speed:	45 mph		
Near/Far Lane Distance:	48 feet		
Site Data		**Vehicle Mix**	
Barrier Height:	**0.0 feet**		
Barrier Type (0-Wall, 1-Berm):	0.0		
Centerline Dist. to Barrier:	40.0 feet		
Centerline Dist. to Observer:	40.0 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		

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	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:	32.388
Medium Trucks:	32.114
Heavy Trucks:	32.141

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	-4.88	2.73	-1.20	-4.59	0.000	0.000
Medium Trucks:	79.45	-22.11	2.78	-1.20	-4.87	0.000	0.000
Heavy Trucks:	84.25	-26.07	2.78	-1.20	-5.56	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:	65.1	63.2	61.4	55.4	64.0	64.6
Medium Trucks:	58.9	57.4	51.0	49.5	58.0	58.2
Heavy Trucks:	59.8	58.3	49.3	50.6	58.9	59.0
Vehicle Noise:	67.0	65.2	62.1	57.4	65.9	66.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	21	46	99	214
CNEL:	23	50	107	230

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing w/o Project
Road Name: Orangethorpe Av.
Road Segment: w/o Del Cerro Dr.
Project Name: Alta Vista
Job Number: 11195

SITE SPECIFIC INPUT DATA		NOISE MODEL INPUTS	
Highway Data		**Site Conditions (Hard = 10, Soft = 15)**	
Average Daily Traffic (Adt):	18,300 vehicles	Autos:	15
Peak Hour Percentage:	10%	Medium Trucks (2 Axles):	15
Peak Hour Volume:	1,830 vehicles	Heavy Trucks (3+ Axles):	15
Vehicle Speed:	50 mph		
Near/Far Lane Distance:	72 feet		
Site Data		**Vehicle Mix**	
Barrier Height:	**0.0 feet**		
Barrier Type (0-Wall, 1-Berm):	0.0		
Centerline Dist. to Barrier:	60.0 feet		
Centerline Dist. to Observer:	60.0 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		

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	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:	48.260
Medium Trucks:	48.076
Heavy Trucks:	48.094

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	0.22	0.13	-1.20	-4.69	0.000	0.000
Medium Trucks:	81.00	-17.02	0.15	-1.20	-4.88	0.000	0.000
Heavy Trucks:	85.38	-20.98	0.15	-1.20	-5.34	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:	69.3	67.4	65.7	59.6	68.2	68.9
Medium Trucks:	62.9	61.4	55.1	53.5	62.0	62.2
Heavy Trucks:	63.3	61.9	52.9	54.1	62.5	62.6
Vehicle Noise:	71.0	69.3	66.2	61.5	70.0	70.5

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	60	130	279	601
CNEL:	65	139	300	646

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing w/o Project
Road Name: Orangethorpe Av.
Road Segment: e/o Del Cerro Dr.
Project Name: Alta Vista
Job Number: 11195

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	17,300 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,730 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	72 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 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:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	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:	48.260
Medium Trucks:	48.076
Heavy Trucks:	48.094

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	-0.03	0.13	-1.20	-4.69	0.000	0.000
Medium Trucks:	81.00	-17.27	0.15	-1.20	-4.88	0.000	0.000
Heavy Trucks:	85.38	-21.22	0.15	-1.20	-5.34	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:	69.1	67.2	65.4	59.4	68.0	68.6
Medium Trucks:	62.7	61.2	54.8	53.3	61.7	62.0
Heavy Trucks:	63.1	61.7	52.6	53.9	62.3	62.4
Vehicle Noise:	70.8	69.1	66.0	61.2	69.8	70.2

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	58	125	269	579
CNEL:	62	134	289	622

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing w/ Project
Road Name: Rose Dr.
Road Segment: n/o Buena Vista Av.
Project Name: Alta Vista
Job Number: 11195

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	30,400 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,040 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	72 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 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:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	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:	48.260
Medium Trucks:	48.076
Heavy Trucks:	48.094

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	2.88	0.13	-1.20	-4.69	0.000	0.000
Medium Trucks:	79.45	-14.36	0.15	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-18.32	0.15	-1.20	-5.34	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:	70.3	68.4	66.6	60.5	69.2	69.8
Medium Trucks:	64.0	62.5	56.2	54.6	63.1	63.3
Heavy Trucks:	64.9	63.5	54.4	55.7	64.0	64.2
Vehicle Noise:	72.1	70.4	67.2	62.5	71.1	71.5

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	71	153	329	708
CNEL:	76	164	353	760

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing w/ Project
Road Name: Rose Dr.
Road Segment: s/o Buena Vista Av.
Project Name: Alta Vista
Job Number: 11195

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	31,100 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,110 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	72 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 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:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	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:	48.260
Medium Trucks:	48.076
Heavy Trucks:	48.094

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	2.98	0.13	-1.20	-4.69	0.000	0.000
Medium Trucks:	79.45	-14.26	0.15	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-18.22	0.15	-1.20	-5.34	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:	70.4	68.5	66.7	60.6	69.3	69.9
Medium Trucks:	64.1	62.6	56.3	54.7	63.2	63.4
Heavy Trucks:	65.0	63.6	54.5	55.8	64.1	64.3
Vehicle Noise:	72.2	70.5	67.3	62.6	71.2	71.6

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	72	155	334	719
CNEL:	77	166	358	771

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing w/ Project
Road Name: Rose Dr.
Road Segment: s/o Alta Vista St.
Project Name: Alta Vista
Job Number: 11195

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	26,100 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,610 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	72 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 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:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	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:	48.260
Medium Trucks:	48.076
Heavy Trucks:	48.094

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	2.22	0.13	-1.20	-4.69	0.000	0.000
Medium Trucks:	79.45	-15.02	0.15	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-18.98	0.15	-1.20	-5.34	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:	69.6	67.7	65.9	59.9	68.5	69.1
Medium Trucks:	63.4	61.9	55.5	54.0	62.4	62.7
Heavy Trucks:	64.2	62.8	53.8	55.0	63.4	63.5
Vehicle Noise:	71.4	69.7	66.5	61.9	70.4	70.9

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	64	138	297	640
CNEL:	69	148	319	686

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing w/ Project
Road Name: Rose Dr.
Road Segment: s/o Del Cerro Dr.
Project Name: Alta Vista
Job Number: 11195

SITE SPECIFIC INPUT DATA		NOISE MODEL INPUTS	
Highway Data		**Site Conditions (Hard = 10, Soft = 15)**	
Average Daily Traffic (Adt):	26,300 vehicles	Autos:	15
Peak Hour Percentage:	10%	Medium Trucks (2 Axles):	15
Peak Hour Volume:	2,630 vehicles	Heavy Trucks (3+ Axles):	15
Vehicle Speed:	45 mph		
Near/Far Lane Distance:	72 feet		
Site Data		**Vehicle Mix**	
Barrier Height:	**0.0 feet**		
Barrier Type (0-Wall, 1-Berm):	0.0		
Centerline Dist. to Barrier:	60.0 feet		
Centerline Dist. to Observer:	60.0 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		

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	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:	48.260
Medium Trucks:	48.076
Heavy Trucks:	48.094

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	2.25	0.13	-1.20	-4.69	0.000	0.000
Medium Trucks:	79.45	-14.99	0.15	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-18.95	0.15	-1.20	-5.34	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:	69.6	67.7	66.0	59.9	68.5	69.1
Medium Trucks:	63.4	61.9	55.5	54.0	62.5	62.7
Heavy Trucks:	64.3	62.8	53.8	55.0	63.4	63.5
Vehicle Noise:	71.5	69.7	66.6	61.9	70.5	70.9

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	64	139	298	643
CNEL:	69	149	320	690

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing w/ Project
Road Name: Jefferson St.
Road Segment: n/o Alta Vista St.
Project Name: Alta Vista
Job Number: 11195

SITE SPECIFIC INPUT DATA		NOISE MODEL INPUTS	
Highway Data		**Site Conditions (Hard = 10, Soft = 15)**	
Average Daily Traffic (Adt):	2,200 vehicles	Autos:	15
Peak Hour Percentage:	10%	Medium Trucks (2 Axles):	15
Peak Hour Volume:	220 vehicles	Heavy Trucks (3+ Axles):	15
Vehicle Speed:	40 mph		
Near/Far Lane Distance:	48 feet		
Site Data		**Vehicle Mix**	
Barrier Height:	**0.0 feet**		
Barrier Type (0-Wall, 1-Berm):	0.0		
Centerline Dist. to Barrier:	40.0 feet		
Centerline Dist. to Observer:	40.0 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		

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	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:	32.388
Medium Trucks:	32.114
Heavy Trucks:	32.141

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	-8.02	2.73	-1.20	-4.59	0.000	0.000
Medium Trucks:	77.72	-25.25	2.78	-1.20	-4.87	0.000	0.000
Heavy Trucks:	82.99	-29.21	2.78	-1.20	-5.56	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:	60.0	58.1	56.4	50.3	58.9	59.5
Medium Trucks:	54.0	52.5	46.2	44.6	53.1	53.3
Heavy Trucks:	55.4	53.9	44.9	46.2	54.5	54.6
Vehicle Noise:	62.0	60.3	57.0	52.5	61.0	61.5

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	10	22	47	101
CNEL:	11	23	50	108

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing w/ Project
Road Name: Jefferson St.
Road Segment: s/o Alta Vista St.
Project Name: Alta Vista
Job Number: 11195

SITE SPECIFIC INPUT DATA		NOISE MODEL INPUTS	
Highway Data		**Site Conditions (Hard = 10, Soft = 15)**	
Average Daily Traffic (Adt):	4,200 vehicles	Autos:	15
Peak Hour Percentage:	10%	Medium Trucks (2 Axles):	15
Peak Hour Volume:	420 vehicles	Heavy Trucks (3+ Axles):	15
Vehicle Speed:	40 mph		
Near/Far Lane Distance:	48 feet		
Site Data		**Vehicle Mix**	
Barrier Height:	**0.0 feet**		
Barrier Type (0-Wall, 1-Berm):	0.0		
Centerline Dist. to Barrier:	40.0 feet		
Centerline Dist. to Observer:	40.0 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		

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	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:	32.388
Medium Trucks:	32.114
Heavy Trucks:	32.141

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	-5.21	2.73	-1.20	-4.59	0.000	0.000
Medium Trucks:	77.72	-22.45	2.78	-1.20	-4.87	0.000	0.000
Heavy Trucks:	82.99	-26.40	2.78	-1.20	-5.56	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:	62.8	60.9	59.2	53.1	61.7	62.3
Medium Trucks:	56.9	55.3	49.0	47.4	55.9	56.1
Heavy Trucks:	58.2	56.7	47.7	49.0	57.3	57.4
Vehicle Noise:	64.9	63.1	59.8	55.3	63.8	64.3

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	16	33	72	155
CNEL:	17	36	77	166

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing w/ Project
Road Name: Buena Vista Av.
Road Segment: e/o Rose Dr.
Project Name: Alta Vista
Job Number: 11195

SITE SPECIFIC INPUT DATA		NOISE MODEL INPUTS	
Highway Data		**Site Conditions (Hard = 10, Soft = 15)**	
Average Daily Traffic (Adt):	8,600 vehicles	Autos:	15
Peak Hour Percentage:	10%	Medium Trucks (2 Axles):	15
Peak Hour Volume:	860 vehicles	Heavy Trucks (3+ Axles):	15
Vehicle Speed:	45 mph		
Near/Far Lane Distance:	48 feet		
Site Data		**Vehicle Mix**	
Barrier Height:	**0.0 feet**		
Barrier Type (0-Wall, 1-Berm):	0.0		
Centerline Dist. to Barrier:	40.0 feet		
Centerline Dist. to Observer:	40.0 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		

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	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:	32.388
Medium Trucks:	32.114
Heavy Trucks:	32.141

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	-2.61	2.73	-1.20	-4.59	0.000	0.000
Medium Trucks:	79.45	-19.84	2.78	-1.20	-4.87	0.000	0.000
Heavy Trucks:	84.25	-23.80	2.78	-1.20	-5.56	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:	67.4	65.5	63.7	57.7	66.3	66.9
Medium Trucks:	61.2	59.7	53.3	51.8	60.2	60.5
Heavy Trucks:	62.0	60.6	51.6	52.8	61.2	61.3
Vehicle Noise:	69.2	67.5	64.3	59.7	68.2	68.7

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	30	65	141	304
CNEL:	33	70	151	326

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing w/ Project
Road Name: Alta Vista St.
Road Segment: w/o Rose Dr.
Project Name: Alta Vista
Job Number: 11195

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	13,400 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,340 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	48 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	40.0 feet
Centerline Dist. to Observer:	40.0 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:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	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:	32.388
Medium Trucks:	32.114
Heavy Trucks:	32.141

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	-0.68	2.73	-1.20	-4.59	0.000	0.000
Medium Trucks:	79.45	-17.92	2.78	-1.20	-4.87	0.000	0.000
Heavy Trucks:	84.25	-21.87	2.78	-1.20	-5.56	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:	69.3	67.4	65.6	59.6	68.2	68.8
Medium Trucks:	63.1	61.6	55.2	53.7	62.2	62.4
Heavy Trucks:	64.0	62.5	53.5	54.7	63.1	63.2
Vehicle Noise:	71.2	69.4	66.3	61.6	70.1	70.6

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	41	88	189	408
CNEL:	44	94	203	438

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing w/ Project
Road Name: Alta Vista St.
Road Segment: e/o Rose Dr.
Project Name: Alta Vista
Job Number: 11195

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	10,800 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,080 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	48 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	40.0 feet
Centerline Dist. to Observer:	40.0 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:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	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:	32.388
Medium Trucks:	32.114
Heavy Trucks:	32.141

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	-1.62	2.73	-1.20	-4.59	0.000	0.000
Medium Trucks:	79.45	-18.86	2.78	-1.20	-4.87	0.000	0.000
Heavy Trucks:	84.25	-22.81	2.78	-1.20	-5.56	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:	68.4	66.5	64.7	58.6	67.3	67.9
Medium Trucks:	62.2	60.7	54.3	52.8	61.2	61.5
Heavy Trucks:	63.0	61.6	52.6	53.8	62.2	62.3
Vehicle Noise:	70.2	68.5	65.3	60.7	69.2	69.7

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	35	76	164	353
CNEL:	38	82	176	379

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing w/ Project
Road Name: Alta Vista St.
Road Segment: e/o Jefferson St.
Project Name: Alta Vista
Job Number: 11195

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	6,800 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	680 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	48 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	40.0 feet
Centerline Dist. to Observer:	40.0 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:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	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:	32.388
Medium Trucks:	32.114
Heavy Trucks:	32.141

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	-3.63	2.73	-1.20	-4.59	0.000	0.000
Medium Trucks:	79.45	-20.86	2.78	-1.20	-4.87	0.000	0.000
Heavy Trucks:	84.25	-24.82	2.78	-1.20	-5.56	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:	66.4	64.5	62.7	56.6	65.3	65.9
Medium Trucks:	60.2	58.7	52.3	50.8	59.2	59.4
Heavy Trucks:	61.0	59.6	50.6	51.8	60.2	60.3
Vehicle Noise:	68.2	66.5	63.3	58.6	67.2	67.6

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	26	56	121	260
CNEL:	28	60	129	278

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing w/ Project
Road Name: Del Cerro Dr.
Road Segment: e/o Rose Dr.
Project Name: Alta Vista
Job Number: 11195

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	5,500 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	550 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	48 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	40.0 feet
Centerline Dist. to Observer:	40.0 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:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	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:	32.388
Medium Trucks:	32.114
Heavy Trucks:	32.141

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	-4.55	2.73	-1.20	-4.59	0.000	0.000
Medium Trucks:	79.45	-21.79	2.78	-1.20	-4.87	0.000	0.000
Heavy Trucks:	84.25	-25.74	2.78	-1.20	-5.56	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:	65.4	63.5	61.8	55.7	64.3	64.9
Medium Trucks:	59.2	57.7	51.4	49.8	58.3	58.5
Heavy Trucks:	60.1	58.7	49.6	50.9	59.2	59.4
Vehicle Noise:	67.3	65.5	62.4	57.7	66.3	66.7

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	23	49	105	225
CNEL:	24	52	112	242

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing w/ Project
Road Name: Orangethorpe Av.
Road Segment: w/o Del Cerro Dr.
Project Name: Alta Vista
Job Number: 11195

SITE SPECIFIC INPUT DATA		NOISE MODEL INPUTS	
Highway Data		**Site Conditions (Hard = 10, Soft = 15)**	
Average Daily Traffic (Adt):	18,500 vehicles	Autos:	15
Peak Hour Percentage:	10%	Medium Trucks (2 Axles):	15
Peak Hour Volume:	1,850 vehicles	Heavy Trucks (3+ Axles):	15
Vehicle Speed:	50 mph		
Near/Far Lane Distance:	72 feet		
Site Data		**Vehicle Mix**	
Barrier Height:	**0.0 feet**		
Barrier Type (0-Wall, 1-Berm):	0.0		
Centerline Dist. to Barrier:	60.0 feet		
Centerline Dist. to Observer:	60.0 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		

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	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:	48.260
Medium Trucks:	48.076
Heavy Trucks:	48.094

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	0.26	0.13	-1.20	-4.69	0.000	0.000
Medium Trucks:	81.00	-16.98	0.15	-1.20	-4.88	0.000	0.000
Heavy Trucks:	85.38	-20.93	0.15	-1.20	-5.34	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:	69.4	67.5	65.7	59.7	68.3	68.9
Medium Trucks:	63.0	61.5	55.1	53.6	62.0	62.3
Heavy Trucks:	63.4	62.0	52.9	54.2	62.5	62.7
Vehicle Noise:	71.1	69.3	66.3	61.5	70.1	70.5

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	61	131	281	606
CNEL:	65	140	302	651

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing w/ Project
Road Name: Orangethorpe Av.
Road Segment: e/o Del Cerro Dr.
Project Name: Alta Vista
Job Number: 11195

SITE SPECIFIC INPUT DATA		NOISE MODEL INPUTS	
Highway Data		**Site Conditions (Hard = 10, Soft = 15)**	
Average Daily Traffic (Adt):	17,400 vehicles	Autos:	15
Peak Hour Percentage:	10%	Medium Trucks (2 Axles):	15
Peak Hour Volume:	1,740 vehicles	Heavy Trucks (3+ Axles):	15
Vehicle Speed:	50 mph		
Near/Far Lane Distance:	72 feet		
Site Data		**Vehicle Mix**	
Barrier Height:	**0.0 feet**		
Barrier Type (0-Wall, 1-Berm):	0.0		
Centerline Dist. to Barrier:	60.0 feet		
Centerline Dist. to Observer:	60.0 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		

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	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:	48.260
Medium Trucks:	48.076
Heavy Trucks:	48.094

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	0.00	0.13	-1.20	-4.69	0.000	0.000
Medium Trucks:	81.00	-17.24	0.15	-1.20	-4.88	0.000	0.000
Heavy Trucks:	85.38	-21.20	0.15	-1.20	-5.34	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:	69.1	67.2	65.5	59.4	68.0	68.6
Medium Trucks:	62.7	61.2	54.8	53.3	61.8	62.0
Heavy Trucks:	63.1	61.7	52.7	53.9	62.3	62.4
Vehicle Noise:	70.8	69.1	66.0	61.2	69.8	70.3

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	58	125	270	582
CNEL:	62	135	290	625

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY w/o Project
Road Name: Rose Dr.
Road Segment: n/o Buena Vista Av.
Project Name: Alta Vista
Job Number: 11195

SITE SPECIFIC INPUT DATA		NOISE MODEL INPUTS	
Highway Data		**Site Conditions (Hard = 10, Soft = 15)**	
Average Daily Traffic (Adt):	31,300 vehicles	Autos:	15
Peak Hour Percentage:	10%	Medium Trucks (2 Axles):	15
Peak Hour Volume:	3,130 vehicles	Heavy Trucks (3+ Axles):	15
Vehicle Speed:	45 mph		
Near/Far Lane Distance:	72 feet		
Site Data		**Vehicle Mix**	
Barrier Height:	**0.0 feet**		
Barrier Type (0-Wall, 1-Berm):	0.0		
Centerline Dist. to Barrier:	60.0 feet		
Centerline Dist. to Observer:	60.0 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		

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	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:	48.260
Medium Trucks:	48.076
Heavy Trucks:	48.094

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	3.00	0.13	-1.20	-4.69	0.000	0.000
Medium Trucks:	79.45	-14.23	0.15	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-18.19	0.15	-1.20	-5.34	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:	70.4	68.5	66.7	60.7	69.3	69.9
Medium Trucks:	64.2	62.7	56.3	54.8	63.2	63.4
Heavy Trucks:	65.0	63.6	54.6	55.8	64.2	64.3
Vehicle Noise:	72.2	70.5	67.3	62.7	71.2	71.7

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	72	156	335	722
CNEL:	77	167	360	775

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY w/o Project
Road Name: Rose Dr.
Road Segment: s/o Buena Vista Av.
Project Name: Alta Vista
Job Number: 11195

SITE SPECIFIC INPUT DATA		NOISE MODEL INPUTS	
Highway Data		**Site Conditions (Hard = 10, Soft = 15)**	
Average Daily Traffic (Adt):	32,000 vehicles	Autos:	15
Peak Hour Percentage:	10%	Medium Trucks (2 Axles):	15
Peak Hour Volume:	3,200 vehicles	Heavy Trucks (3+ Axles):	15
Vehicle Speed:	45 mph		
Near/Far Lane Distance:	72 feet		
Site Data		**Vehicle Mix**	
Barrier Height:	**0.0 feet**		
Barrier Type (0-Wall, 1-Berm):	0.0		
Centerline Dist. to Barrier:	60.0 feet		
Centerline Dist. to Observer:	60.0 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		

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	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:	48.260
Medium Trucks:	48.076
Heavy Trucks:	48.094

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	3.10	0.13	-1.20	-4.69	0.000	0.000
Medium Trucks:	79.45	-14.14	0.15	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-18.09	0.15	-1.20	-5.34	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:	70.5	68.6	66.8	60.8	69.4	70.0
Medium Trucks:	64.3	62.8	56.4	54.8	63.3	63.5
Heavy Trucks:	65.1	63.7	54.7	55.9	64.3	64.4
Vehicle Noise:	72.3	70.6	67.4	62.8	71.3	71.8

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	73	158	340	733
CNEL:	79	169	365	786

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY w/o Project
Road Name: Rose Dr.
Road Segment: s/o Alta Vista St.
Project Name: Alta Vista
Job Number: 11195

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	26,500 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,650 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	72 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 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:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	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:	48.260
Medium Trucks:	48.076
Heavy Trucks:	48.094

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	2.28	0.13	-1.20	-4.69	0.000	0.000
Medium Trucks:	79.45	-14.96	0.15	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-18.91	0.15	-1.20	-5.34	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:	69.7	67.8	66.0	59.9	68.6	69.2
Medium Trucks:	63.4	61.9	55.6	54.0	62.5	62.7
Heavy Trucks:	64.3	62.9	53.8	55.1	63.4	63.6
Vehicle Noise:	71.5	69.8	66.6	61.9	70.5	70.9

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	65	139	300	646
CNEL:	69	149	322	693

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY w/o Project
Road Name: Rose Dr.
Road Segment: s/o Del Cerro Dr.
Project Name: Alta Vista
Job Number: 11195

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	26,500 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,650 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	72 feet

Site Data

Barrier Height:	0.0 feet
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 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:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	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:	48.260
Medium Trucks:	48.076
Heavy Trucks:	48.094

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	2.28	0.13	-1.20	-4.69	0.000	0.000
Medium Trucks:	79.45	-14.96	0.15	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-18.91	0.15	-1.20	-5.34	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:	69.7	67.8	66.0	59.9	68.6	69.2
Medium Trucks:	63.4	61.9	55.6	54.0	62.5	62.7
Heavy Trucks:	64.3	62.9	53.8	55.1	63.4	63.6
Vehicle Noise:	71.5	69.8	66.6	61.9	70.5	70.9

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	65	139	300	646
CNEL:	69	149	322	693

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY w/o Project
Road Name: Jefferson St.
Road Segment: n/o Alta Vista St.
Project Name: Alta Vista
Job Number: 11195

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	2,200 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	220 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	48 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	40.0 feet
Centerline Dist. to Observer:	40.0 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:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	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:	32.388
Medium Trucks:	32.114
Heavy Trucks:	32.141

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	-8.02	2.73	-1.20	-4.59	0.000	0.000
Medium Trucks:	77.72	-25.25	2.78	-1.20	-4.87	0.000	0.000
Heavy Trucks:	82.99	-29.21	2.78	-1.20	-5.56	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:	60.0	58.1	56.4	50.3	58.9	59.5
Medium Trucks:	54.0	52.5	46.2	44.6	53.1	53.3
Heavy Trucks:	55.4	53.9	44.9	46.2	54.5	54.6
Vehicle Noise:	62.0	60.3	57.0	52.5	61.0	61.5

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	10	22	47	101
CNEL:	11	23	50	108

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY w/o Project
Road Name: Jefferson St.
Road Segment: s/o Alta Vista St.
Project Name: Alta Vista
Job Number: 11195

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	4,300 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	430 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	48 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	40.0 feet
Centerline Dist. to Observer:	40.0 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:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	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:	32.388
Medium Trucks:	32.114
Heavy Trucks:	32.141

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	-5.10	2.73	-1.20	-4.59	0.000	0.000
Medium Trucks:	77.72	-22.34	2.78	-1.20	-4.87	0.000	0.000
Heavy Trucks:	82.99	-26.30	2.78	-1.20	-5.56	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:	62.9	61.0	59.3	53.2	61.8	62.4
Medium Trucks:	57.0	55.4	49.1	47.5	56.0	56.2
Heavy Trucks:	58.3	56.8	47.8	49.1	57.4	57.5
Vehicle Noise:	65.0	63.2	59.9	55.4	63.9	64.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	16	34	73	158
CNEL:	17	36	78	169

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY w/o Project
Road Name: Buena Vista Av.
Road Segment: e/o Rose Dr.
Project Name: Alta Vista
Job Number: 11195

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	8,700 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	870 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	48 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	40.0 feet
Centerline Dist. to Observer:	40.0 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:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	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:	32.388
Medium Trucks:	32.114
Heavy Trucks:	32.141

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	-2.56	2.73	-1.20	-4.59	0.000	0.000
Medium Trucks:	79.45	-19.79	2.78	-1.20	-4.87	0.000	0.000
Heavy Trucks:	84.25	-23.75	2.78	-1.20	-5.56	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:	67.4	65.5	63.8	57.7	66.3	66.9
Medium Trucks:	61.2	59.7	53.4	51.8	60.3	60.5
Heavy Trucks:	62.1	60.7	51.6	52.9	61.2	61.4
Vehicle Noise:	69.3	67.5	64.4	59.7	68.3	68.7

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	31	66	142	306
CNEL:	33	71	152	328

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY w/o Project
Road Name: Alta Vista St.
Road Segment: w/o Rose Dr.
Project Name: Alta Vista
Job Number: 11195

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	13,500 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,350 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	48 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	40.0 feet
Centerline Dist. to Observer:	40.0 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:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	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:	32.388
Medium Trucks:	32.114
Heavy Trucks:	32.141

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	-0.65	2.73	-1.20	-4.59	0.000	0.000
Medium Trucks:	79.45	-17.89	2.78	-1.20	-4.87	0.000	0.000
Heavy Trucks:	84.25	-21.84	2.78	-1.20	-5.56	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:	69.3	67.4	65.7	59.6	68.2	68.8
Medium Trucks:	63.1	61.6	55.3	53.7	62.2	62.4
Heavy Trucks:	64.0	62.6	53.5	54.8	63.1	63.3
Vehicle Noise:	71.2	69.4	66.3	61.6	70.2	70.6

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	41	88	190	410
CNEL:	44	95	204	440

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY w/o Project
Road Name: Alta Vista St.
Road Segment: e/o Rose Dr.
Project Name: Alta Vista
Job Number: 11195

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	9,600 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	960 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	48 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	40.0 feet
Centerline Dist. to Observer:	40.0 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:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	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:	32.388
Medium Trucks:	32.114
Heavy Trucks:	32.141

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	-2.13	2.73	-1.20	-4.59	0.000	0.000
Medium Trucks:	79.45	-19.37	2.78	-1.20	-4.87	0.000	0.000
Heavy Trucks:	84.25	-23.32	2.78	-1.20	-5.56	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:	67.9	66.0	64.2	58.1	66.8	67.4
Medium Trucks:	61.7	60.2	53.8	52.2	60.7	60.9
Heavy Trucks:	62.5	61.1	52.0	53.3	61.7	61.8
Vehicle Noise:	69.7	68.0	64.8	60.1	68.7	69.1

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	33	70	152	327
CNEL:	35	76	163	350

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY w/o Project
Road Name: Alta Vista St.
Road Segment: e/o Jefferson St.
Project Name: Alta Vista
Job Number: 11195

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	6,800 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	680 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	48 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	40.0 feet
Centerline Dist. to Observer:	40.0 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:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	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:	32.388
Medium Trucks:	32.114
Heavy Trucks:	32.141

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	-3.63	2.73	-1.20	-4.59	0.000	0.000
Medium Trucks:	79.45	-20.86	2.78	-1.20	-4.87	0.000	0.000
Heavy Trucks:	84.25	-24.82	2.78	-1.20	-5.56	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:	66.4	64.5	62.7	56.6	65.3	65.9
Medium Trucks:	60.2	58.7	52.3	50.8	59.2	59.4
Heavy Trucks:	61.0	59.6	50.6	51.8	60.2	60.3
Vehicle Noise:	68.2	66.5	63.3	58.6	67.2	67.6

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	26	56	121	260
CNEL:	28	60	129	278

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY w/o Project
Road Name: Del Cerro Dr.
Road Segment: e/o Rose Dr.
Project Name: Alta Vista
Job Number: 11195

SITE SPECIFIC INPUT DATA		NOISE MODEL INPUTS	
Highway Data		**Site Conditions (Hard = 10, Soft = 15)**	
Average Daily Traffic (Adt):	5,400 vehicles	Autos:	15
Peak Hour Percentage:	10%	Medium Trucks (2 Axles):	15
Peak Hour Volume:	540 vehicles	Heavy Trucks (3+ Axles):	15
Vehicle Speed:	45 mph		
Near/Far Lane Distance:	48 feet		
Site Data		**Vehicle Mix**	
Barrier Height:	**0.0 feet**		
Barrier Type (0-Wall, 1-Berm):	0.0		
Centerline Dist. to Barrier:	40.0 feet		
Centerline Dist. to Observer:	40.0 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		

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	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:	32.388
Medium Trucks:	32.114
Heavy Trucks:	32.141

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	-4.63	2.73	-1.20	-4.59	0.000	0.000
Medium Trucks:	79.45	-21.87	2.78	-1.20	-4.87	0.000	0.000
Heavy Trucks:	84.25	-25.82	2.78	-1.20	-5.56	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:	65.4	63.5	61.7	55.6	64.3	64.9
Medium Trucks:	59.2	57.7	51.3	49.8	58.2	58.4
Heavy Trucks:	60.0	58.6	49.5	50.8	59.2	59.3
Vehicle Noise:	67.2	65.5	62.3	57.6	66.2	66.6

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	22	48	103	223
CNEL:	24	51	111	239

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY w/o Project
Road Name: Orangethorpe Av.
Road Segment: w/o Del Cerro Dr.
Project Name: Alta Vista
Job Number: 11195

SITE SPECIFIC INPUT DATA		NOISE MODEL INPUTS	
Highway Data		**Site Conditions (Hard = 10, Soft = 15)**	
Average Daily Traffic (Adt):	19,200 vehicles	Autos:	15
Peak Hour Percentage:	10%	Medium Trucks (2 Axles):	15
Peak Hour Volume:	1,920 vehicles	Heavy Trucks (3+ Axles):	15
Vehicle Speed:	50 mph		
Near/Far Lane Distance:	72 feet		
Site Data		**Vehicle Mix**	
Barrier Height:	**0.0 feet**		
Barrier Type (0-Wall, 1-Berm):	0.0		
Centerline Dist. to Barrier:	60.0 feet		
Centerline Dist. to Observer:	60.0 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		

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	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:	48.260
Medium Trucks:	48.076
Heavy Trucks:	48.094

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	0.42	0.13	-1.20	-4.69	0.000	0.000
Medium Trucks:	81.00	-16.81	0.15	-1.20	-4.88	0.000	0.000
Heavy Trucks:	85.38	-20.77	0.15	-1.20	-5.34	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:	69.6	67.7	65.9	59.8	68.5	69.1
Medium Trucks:	63.1	61.6	55.3	53.7	62.2	62.4
Heavy Trucks:	63.6	62.1	53.1	54.4	62.7	62.8
Vehicle Noise:	71.3	69.5	66.5	61.7	70.2	70.7

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	62	134	288	621
CNEL:	67	144	310	667

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY w/o Project
Road Name: Orangethorpe Av.
Road Segment: e/o Del Cerro Dr.
Project Name: Alta Vista
Job Number: 11195

SITE SPECIFIC INPUT DATA		NOISE MODEL INPUTS	
Highway Data		**Site Conditions (Hard = 10, Soft = 15)**	
Average Daily Traffic (Adt):	18,300 vehicles	Autos:	15
Peak Hour Percentage:	10%	Medium Trucks (2 Axles):	15
Peak Hour Volume:	1,830 vehicles	Heavy Trucks (3+ Axles):	15
Vehicle Speed:	50 mph		
Near/Far Lane Distance:	72 feet		
Site Data		**Vehicle Mix**	
Barrier Height:	**0.0 feet**		
Barrier Type (0-Wall, 1-Berm):	0.0		
Centerline Dist. to Barrier:	60.0 feet		
Centerline Dist. to Observer:	60.0 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		

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	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:	48.260
Medium Trucks:	48.076
Heavy Trucks:	48.094

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	0.22	0.13	-1.20	-4.69	0.000	0.000
Medium Trucks:	81.00	-17.02	0.15	-1.20	-4.88	0.000	0.000
Heavy Trucks:	85.38	-20.98	0.15	-1.20	-5.34	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:	69.3	67.4	65.7	59.6	68.2	68.9
Medium Trucks:	62.9	61.4	55.1	53.5	62.0	62.2
Heavy Trucks:	63.3	61.9	52.9	54.1	62.5	62.6
Vehicle Noise:	71.0	69.3	66.2	61.5	70.0	70.5

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	60	130	279	601
CNEL:	65	139	300	646

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY w/ Project
Road Name: Rose Dr.
Road Segment: n/o Buena Vista Av.
Project Name: Alta Vista
Job Number: 11195

SITE SPECIFIC INPUT DATA		NOISE MODEL INPUTS	
Highway Data		**Site Conditions (Hard = 10, Soft = 15)**	
Average Daily Traffic (Adt):	31,600 vehicles	Autos:	15
Peak Hour Percentage:	10%	Medium Trucks (2 Axles):	15
Peak Hour Volume:	3,160 vehicles	Heavy Trucks (3+ Axles):	15
Vehicle Speed:	45 mph		
Near/Far Lane Distance:	72 feet		
Site Data		**Vehicle Mix**	
Barrier Height:	**0.0 feet**		
Barrier Type (0-Wall, 1-Berm):	0.0		
Centerline Dist. to Barrier:	60.0 feet		
Centerline Dist. to Observer:	60.0 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		

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	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:	48.260
Medium Trucks:	48.076
Heavy Trucks:	48.094

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	3.05	0.13	-1.20	-4.69	0.000	0.000
Medium Trucks:	79.45	-14.19	0.15	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-18.15	0.15	-1.20	-5.34	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:	70.4	68.5	66.8	60.7	69.3	69.9
Medium Trucks:	64.2	62.7	56.3	54.8	63.3	63.5
Heavy Trucks:	65.1	63.6	54.6	55.8	64.2	64.3
Vehicle Noise:	72.3	70.5	67.4	62.7	71.2	71.7

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	73	157	337	727
CNEL:	78	168	362	780

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY w/ Project | Project Name: Alta Vista
Road Name: Rose Dr. | Job Number: 11195
Road Segment: s/o Buena Vista Av.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	32,300	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	3,230	vehicles
Vehicle Speed:	45	mph
Near/Far Lane Distance:	72	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	60.0	feet
Centerline Dist. to Observer:	60.0	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:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	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:	48.260
Medium Trucks:	48.076
Heavy Trucks:	48.094

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	3.14	0.13	-1.20	-4.69	0.000	0.000
Medium Trucks:	79.45	-14.10	0.15	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-18.05	0.15	-1.20	-5.34	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:	70.5	68.6	66.9	60.8	69.4	70.0
Medium Trucks:	64.3	62.8	56.4	54.9	63.4	63.6
Heavy Trucks:	65.1	63.7	54.7	55.9	64.3	64.4
Vehicle Noise:	72.4	70.6	67.5	62.8	71.3	71.8

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	74	159	342	737
CNEL:	79	170	367	791

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY w/ Project | Project Name: Alta Vista
Road Name: Rose Dr. | Job Number: 11195
Road Segment: s/o Alta Vista St.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	27,200	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	2,720	vehicles
Vehicle Speed:	45	mph
Near/Far Lane Distance:	72	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	60.0	feet
Centerline Dist. to Observer:	60.0	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:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	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:	48.260
Medium Trucks:	48.076
Heavy Trucks:	48.094

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	2.39	0.13	-1.20	-4.69	0.000	0.000
Medium Trucks:	79.45	-14.84	0.15	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-18.80	0.15	-1.20	-5.34	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:	69.8	67.9	66.1	60.1	68.7	69.3
Medium Trucks:	63.6	62.1	55.7	54.1	62.6	62.8
Heavy Trucks:	64.4	63.0	53.9	55.2	63.5	63.7
Vehicle Noise:	71.6	69.9	66.7	62.1	70.6	71.1

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	66	142	305	658
CNEL:	71	152	327	705

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY w/ Project | Project Name: Alta Vista
Road Name: Rose Dr. | Job Number: 11195
Road Segment: s/o Del Cerro Dr.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	27,200	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	2,720	vehicles
Vehicle Speed:	45	mph
Near/Far Lane Distance:	72	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	60.0	feet
Centerline Dist. to Observer:	60.0	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:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	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:	48.260
Medium Trucks:	48.076
Heavy Trucks:	48.094

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	2.39	0.13	-1.20	-4.69	0.000	0.000
Medium Trucks:	79.45	-14.84	0.15	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-18.80	0.15	-1.20	-5.34	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:	69.8	67.9	66.1	60.1	68.7	69.3
Medium Trucks:	63.6	62.1	55.7	54.1	62.6	62.8
Heavy Trucks:	64.4	63.0	53.9	55.2	63.5	63.7
Vehicle Noise:	71.6	69.9	66.7	62.1	70.6	71.1

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	66	142	305	658
CNEL:	71	152	327	705

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY w/ Project | Project Name: Alta Vista
Road Name: Jefferson St. | Job Number: 11195
Road Segment: n/o Alta Vista St.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	2,200	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	220	vehicles
Vehicle Speed:	40	mph
Near/Far Lane Distance:	48	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	40.0	feet
Centerline Dist. to Observer:	40.0	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:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	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:	32.388
Medium Trucks:	32.114
Heavy Trucks:	32.141

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	-8.02	2.73	-1.20	-4.59	0.000	0.000
Medium Trucks:	77.72	-25.25	2.78	-1.20	-4.87	0.000	0.000
Heavy Trucks:	82.99	-29.21	2.78	-1.20	-5.56	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:	60.0	58.1	56.4	50.3	58.9	59.5
Medium Trucks:	54.0	52.5	46.2	44.6	53.1	53.3
Heavy Trucks:	55.4	53.9	44.9	46.2	54.5	54.6
Vehicle Noise:	62.0	60.3	57.0	52.5	61.0	61.5

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	10	22	47	101
CNEL:	11	23	50	108

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY w/ Project
Road Name: Jefferson St.
Road Segment: s/o Alta Vista St.
Project Name: Alta Vista
Job Number: 11195

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	4,300 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	430 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	48 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	40.0 feet
Centerline Dist. to Observer:	40.0 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:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	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:	32.388
Medium Trucks:	32.114
Heavy Trucks:	32.141

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	-5.10	2.73	-1.20	-4.59	0.000	0.000
Medium Trucks:	77.72	-22.34	2.78	-1.20	-4.87	0.000	0.000
Heavy Trucks:	82.99	-26.30	2.78	-1.20	-5.56	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:	62.9	61.0	59.3	53.2	61.8	62.4
Medium Trucks:	57.0	55.4	49.1	47.5	56.0	56.2
Heavy Trucks:	58.3	56.8	47.8	49.1	57.4	57.5
Vehicle Noise:	65.0	63.2	59.9	55.4	63.9	64.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	16	34	73	158
CNEL:	17	36	78	169

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY w/ Project
Road Name: Buena Vista Av.
Road Segment: e/o Rose Dr.
Project Name: Alta Vista
Job Number: 11195

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	8,700 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	870 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	48 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	40.0 feet
Centerline Dist. to Observer:	40.0 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:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	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:	32.388
Medium Trucks:	32.114
Heavy Trucks:	32.141

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	-2.56	2.73	-1.20	-4.59	0.000	0.000
Medium Trucks:	79.45	-19.79	2.78	-1.20	-4.87	0.000	0.000
Heavy Trucks:	84.25	-23.75	2.78	-1.20	-5.56	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:	67.4	65.5	63.8	57.7	66.3	66.9
Medium Trucks:	61.2	59.7	53.4	51.8	60.3	60.5
Heavy Trucks:	62.1	60.7	51.6	52.9	61.2	61.4
Vehicle Noise:	69.3	67.5	64.4	59.7	68.3	68.7

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	31	66	142	306
CNEL:	33	71	152	328

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY w/ Project
Road Name: Alta Vista St.
Road Segment: w/o Rose Dr.
Project Name: Alta Vista
Job Number: 11195

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	13,700 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,370 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	48 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	40.0 feet
Centerline Dist. to Observer:	40.0 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:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	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:	32.388
Medium Trucks:	32.114
Heavy Trucks:	32.141

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	-0.58	2.73	-1.20	-4.59	0.000	0.000
Medium Trucks:	79.45	-17.82	2.78	-1.20	-4.87	0.000	0.000
Heavy Trucks:	84.25	-21.78	2.78	-1.20	-5.56	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:	69.4	67.5	65.7	59.7	68.3	68.9
Medium Trucks:	63.2	61.7	55.3	53.8	62.3	62.5
Heavy Trucks:	64.0	62.6	53.6	54.8	63.2	63.3
Vehicle Noise:	71.3	69.5	66.4	61.7	70.2	70.7

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	41	89	192	414
CNEL:	44	96	206	444

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY w/ Project
Road Name: Alta Vista St.
Road Segment: e/o Rose Dr.
Project Name: Alta Vista
Job Number: 11195

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	11,000 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,100 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	48 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	40.0 feet
Centerline Dist. to Observer:	40.0 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:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	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:	32.388
Medium Trucks:	32.114
Heavy Trucks:	32.141

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	-1.54	2.73	-1.20	-4.59	0.000	0.000
Medium Trucks:	79.45	-18.78	2.78	-1.20	-4.87	0.000	0.000
Heavy Trucks:	84.25	-22.73	2.78	-1.20	-5.56	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:	68.4	66.6	64.8	58.7	67.4	68.0
Medium Trucks:	62.3	60.7	54.4	52.8	61.3	61.5
Heavy Trucks:	63.1	61.7	52.6	53.9	62.2	62.4
Vehicle Noise:	70.3	68.6	65.4	60.7	69.3	69.7

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	36	77	166	358
CNEL:	38	83	178	384

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY w/ Project
Road Name: Alta Vista St.
Road Segment: e/o Jefferson St.
Project Name: Alta Vista
Job Number: 11195

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	6,900	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	690	vehicles
Vehicle Speed:	45	mph
Near/Far Lane Distance:	48	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	40.0	feet
Centerline Dist. to Observer:	40.0	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:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	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:	32.388
Medium Trucks:	32.114
Heavy Trucks:	32.141

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	-3.56	2.73	-1.20	-4.59	0.000	0.000
Medium Trucks:	79.45	-20.80	2.78	-1.20	-4.87	0.000	0.000
Heavy Trucks:	84.25	-24.76	2.78	-1.20	-5.56	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:	66.4	64.5	62.8	56.7	65.3	65.9
Medium Trucks:	60.2	58.7	52.4	50.8	59.3	59.5
Heavy Trucks:	61.1	59.6	50.6	51.9	60.2	60.3
Vehicle Noise:	68.3	66.5	63.4	58.7	67.2	67.7

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	26	56	122	262
CNEL:	28	61	131	281

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY w/ Project
Road Name: Del Cerro Dr.
Road Segment: e/o Rose Dr.
Project Name: Alta Vista
Job Number: 11195

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	5,700	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	570	vehicles
Vehicle Speed:	45	mph
Near/Far Lane Distance:	48	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	40.0	feet
Centerline Dist. to Observer:	40.0	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:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	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:	32.388
Medium Trucks:	32.114
Heavy Trucks:	32.141

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	-4.39	2.73	-1.20	-4.59	0.000	0.000
Medium Trucks:	79.45	-21.63	2.78	-1.20	-4.87	0.000	0.000
Heavy Trucks:	84.25	-25.59	2.78	-1.20	-5.56	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:	65.6	63.7	61.9	55.9	64.5	65.1
Medium Trucks:	59.4	57.9	51.5	50.0	58.4	58.7
Heavy Trucks:	60.2	58.8	49.8	51.0	59.4	59.5
Vehicle Noise:	67.4	65.7	62.5	57.9	66.4	66.9

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	23	50	107	231
CNEL:	25	53	115	248

Monday, November 27, 2017

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY w/ Project
Road Name: Orangethorpe Av.
Road Segment: w/o Del Cerro Dr.
Project Name: Alta Vista
Job Number: 11195

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	19,400	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	1,940	vehicles
Vehicle Speed:	50	mph
Near/Far Lane Distance:	72	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	60.0	feet
Centerline Dist. to Observer:	60.0	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:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	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:	48.260
Medium Trucks:	48.076
Heavy Trucks:	48.094

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	0.47	0.13	-1.20	-4.69	0.000	0.000
Medium Trucks:	81.00	-16.77	0.15	-1.20	-4.88	0.000	0.000
Heavy Trucks:	85.38	-20.72	0.15	-1.20	-5.34	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:	69.6	67.7	65.9	59.9	68.5	69.1
Medium Trucks:	63.2	61.7	55.3	53.8	62.2	62.5
Heavy Trucks:	63.6	62.2	53.1	54.4	62.8	62.9
Vehicle Noise:	71.3	69.5	66.5	61.7	70.3	70.7

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	63	135	290	625
CNEL:	67	145	312	672

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY w/ Project
Road Name: Orangethorpe Av.
Road Segment: e/o Del Cerro Dr.
Project Name: Alta Vista
Job Number: 11195

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	18,400	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	1,840	vehicles
Vehicle Speed:	50	mph
Near/Far Lane Distance:	72	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	60.0	feet
Centerline Dist. to Observer:	60.0	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:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	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:	48.260
Medium Trucks:	48.076
Heavy Trucks:	48.094

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	0.24	0.13	-1.20	-4.69	0.000	0.000
Medium Trucks:	81.00	-17.00	0.15	-1.20	-4.88	0.000	0.000
Heavy Trucks:	85.38	-20.95	0.15	-1.20	-5.34	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:	69.4	67.5	65.7	59.7	68.3	68.9
Medium Trucks:	63.0	61.4	55.1	53.5	62.0	62.2
Heavy Trucks:	63.4	62.0	52.9	54.2	62.5	62.6
Vehicle Noise:	71.1	69.3	66.3	61.5	70.0	70.5

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	60	130	280	604
CNEL:	65	140	301	649

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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) - 6/2/2013

Scenario: Backyard With Wall
Road Name: Rose Dr.
Lot No: 14

Project Name: Alta Vista
Job Number: 11195
Analyst: A. Wolfe

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	45,000	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	4,500	vehicles
Vehicle Speed:	45	mph
Near/Far Lane Distance:	72	feet

Site Data

Barrier Height:	**6.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	81.0	feet
Centerline Dist. to Observer:	91.0	feet
Barrier Distance to Observer:	10.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Barrier Elevation:	0.0	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:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	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:	82.858
Medium Trucks:	82.705
Heavy Trucks:	82.638

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	69.34	4.58	-3.39	-1.20	*0.13*	-6.240	-9.240
Medium Trucks:	77.62	-12.66	-3.38	-1.20	*0.09*	-5.900	-8.900
Heavy Trucks:	82.14	-16.61	-3.38	-1.20	*0.02*	-5.200	-8.200

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	69.3	67.4	65.7	59.6	68.2	68.8
Medium Trucks:	60.4	58.9	52.5	51.0	59.4	59.7
Heavy Trucks:	61.0	59.5	50.5	51.7	60.1	60.2
Vehicle Noise:	70.4	68.6	66.0	60.8	69.3	69.8

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	63.1	61.2	59.4	53.4	62.0	62.6
Medium Trucks:	54.5	53.0	46.6	45.1	53.5	53.8
Heavy Trucks:	55.8	54.3	45.3	46.5	54.9	55.0
Vehicle Noise:	64.3	62.5	59.8	54.7	63.3	63.8

Centerline Distance to Noise Contour (in feet)	*70 dBA*	*65 dBA*	*60 dBA*	*55 dBA*
CNEL:	89	191	412	888

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO) - 6/2/2013

Scenario: Backyard With Wall
Road Name: Rose Dr.
Lot No: 20

Project Name: Alta Vista
Job Number: 11195
Analyst: A. Wolfe

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	45,000	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	4,500	vehicles
Vehicle Speed:	45	mph
Near/Far Lane Distance:	72	feet

Site Data

Barrier Height:	**6.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	77.0	feet
Centerline Dist. to Observer:	87.0	feet
Barrier Distance to Observer:	10.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Barrier Elevation:	0.0	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:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	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:	78.380
Medium Trucks:	78.217
Heavy Trucks:	78.146

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	69.34	4.58	-3.03	-1.20	*0.14*	-6.320	-9.320
Medium Trucks:	77.62	-12.66	-3.02	-1.20	*0.09*	-5.900	-8.900
Heavy Trucks:	82.14	-16.61	-3.01	-1.20	*0.02*	-5.200	-8.200

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	69.7	67.8	66.0	60.0	68.6	69.2
Medium Trucks:	60.7	59.2	52.9	51.3	59.8	60.0
Heavy Trucks:	61.3	59.9	50.9	52.1	60.5	60.6
Vehicle Noise:	70.7	68.9	66.4	61.1	69.7	70.2

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	63.4	61.5	59.7	53.7	62.3	62.9
Medium Trucks:	54.8	53.3	47.0	45.4	53.9	54.1
Heavy Trucks:	56.1	54.7	45.7	46.9	55.3	55.4
Vehicle Noise:	64.6	62.8	60.1	55.0	63.6	64.1

Centerline Distance to Noise Contour (in feet)	*70 dBA*	*65 dBA*	*60 dBA*	*55 dBA*
CNEL:	90	193	416	897

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO) - 6/2/2013

Scenario: Backyard With Wall
Road Name: Rose Dr.
Lot No: Shop 1

Project Name: Alta Vista
Job Number: 11195
Analyst: A. Wolfe

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	45,000 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	4,500 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	72 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	116.0 feet
Centerline Dist. to Observer:	116.0 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
Barrier Elevation:	0.0 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:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	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:	110.386
Medium Trucks:	110.306
Heavy Trucks:	110.313

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	69.34	4.58	-5.26	-1.20	*-4.79*	0.000	0.000
Medium Trucks:	77.62	-12.66	-5.26	-1.20	*-4.88*	0.000	0.000
Heavy Trucks:	82.14	-16.61	-5.26	-1.20	*-5.12*	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:	67.5	65.6	63.8	57.7	66.4	67.0
Medium Trucks:	58.5	57.0	50.6	49.1	57.6	57.8
Heavy Trucks:	59.1	57.6	48.6	49.9	58.2	58.3
Vehicle Noise:	68.5	66.7	64.1	58.9	67.5	68.0

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	67.5	65.6	63.8	57.7	66.4	67.0
Medium Trucks:	58.5	57.0	50.6	49.1	57.6	57.8
Heavy Trucks:	59.1	57.6	48.6	49.9	58.2	58.3
Vehicle Noise:	68.5	66.7	64.1	58.9	67.5	68.0

Centerline Distance to Noise Contour (in feet)	*70 dBA*	*65 dBA*	*60 dBA*	*55 dBA*
CNEL:	85	183	394	849

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO) - 6/2/2013

Scenario: Backyard With Wall
Road Name: Alta Vista St.
Lot No: Shop 2

Project Name: Alta Vista
Job Number: 11195
Analyst: A. Wolfe

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	20,000 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,000 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	48 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	99.0 feet
Centerline Dist. to Observer:	99.0 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
Barrier Elevation:	0.0 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:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	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:	96.177
Medium Trucks:	96.085
Heavy Trucks:	96.094

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	69.34	1.06	-4.36	-1.20	*-4.77*	0.000	0.000
Medium Trucks:	77.62	-16.18	-4.36	-1.20	*-4.88*	0.000	0.000
Heavy Trucks:	82.14	-20.13	-4.36	-1.20	*-5.16*	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:	64.8	62.9	61.2	55.1	63.7	64.3
Medium Trucks:	55.9	54.4	48.0	46.5	54.9	55.2
Heavy Trucks:	56.4	55.0	46.0	47.2	55.6	55.7
Vehicle Noise:	65.9	64.1	61.5	56.3	64.8	65.3

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	64.8	62.9	61.2	55.1	63.7	64.3
Medium Trucks:	55.9	54.4	48.0	46.5	54.9	55.2
Heavy Trucks:	56.4	55.0	46.0	47.2	55.6	55.7
Vehicle Noise:	65.9	64.1	61.5	56.3	64.8	65.3

Centerline Distance to Noise Contour (in feet)	*70 dBA*	*65 dBA*	*60 dBA*	*55 dBA*
CNEL:	48	104	225	484

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO) - 6/2/2013

Scenario: Backyard With Wall
Road Name: Alta Vista St.
Lot No: 3

Project Name: Alta Vista
Job Number: 11195
Analyst: A. Wolfe

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	20,000	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	2,000	vehicles
Vehicle Speed:	45	mph
Near/Far Lane Distance:	48	feet

Site Data

Barrier Height:	**6.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	68.0	feet
Centerline Dist. to Observer:	78.0	feet
Barrier Distance to Observer:	10.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Barrier Elevation:	0.0	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:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	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:	73.956
Medium Trucks:	73.781
Heavy Trucks:	73.705

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	69.34	1.06	-2.65	-1.20	*0.15*	-6.400	-9.400
Medium Trucks:	77.62	-16.18	-2.64	-1.20	*0.10*	-6.000	-9.000
Heavy Trucks:	82.14	-20.13	-2.63	-1.20	*0.02*	-5.200	-8.200

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	66.6	64.7	62.9	56.8	65.5	66.1
Medium Trucks:	57.6	56.1	49.7	48.2	56.7	56.9
Heavy Trucks:	58.2	56.8	47.7	49.0	57.3	57.4
Vehicle Noise:	67.6	65.8	63.2	58.0	66.5	67.1

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	60.2	58.3	56.5	50.4	59.1	59.7
Medium Trucks:	51.6	50.1	43.7	42.2	50.7	50.9
Heavy Trucks:	53.0	51.6	42.5	43.8	52.1	52.2
Vehicle Noise:	61.4	59.6	56.9	51.8	60.3	60.8

Centerline Distance to Noise Contour (in feet)	*70 dBA*	*65 dBA*	*60 dBA*	*55 dBA*
CNEL:	50	107	230	497

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO) - 6/2/2013

Scenario: First Floor With Wall
Road Name: Rose Dr.
Lot No: 14

Project Name: Alta Vista
Job Number: 11195
Analyst: A. Wolfe

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	45,000	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	4,500	vehicles
Vehicle Speed:	45	mph
Near/Far Lane Distance:	72	feet

Site Data

Barrier Height:	**6.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	81.0	feet
Centerline Dist. to Observer:	97.0	feet
Barrier Distance to Observer:	16.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Barrier Elevation:	0.0	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:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	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:	88.839
Medium Trucks:	88.686
Heavy Trucks:	88.619

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	69.34	4.58	-3.85	-1.20	*0.12*	-6.160	-9.160
Medium Trucks:	77.62	-12.66	-3.84	-1.20	*0.08*	-5.800	-8.800
Heavy Trucks:	82.14	-16.61	-3.83	-1.20	*0.01*	-5.100	-8.100

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	68.9	67.0	65.2	59.2	67.8	68.4
Medium Trucks:	59.9	58.4	52.1	50.5	59.0	59.2
Heavy Trucks:	60.5	59.1	50.0	51.3	59.6	59.8
Vehicle Noise:	69.9	68.1	65.5	60.3	68.9	69.4

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	62.7	60.8	59.1	53.0	61.6	62.2
Medium Trucks:	54.1	52.6	46.3	44.7	53.2	53.4
Heavy Trucks:	55.4	54.0	44.9	46.2	54.5	54.7
Vehicle Noise:	63.9	62.1	59.4	54.3	62.9	63.4

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO) - 6/2/2013

Scenario: First Floor With Wall
Road Name: Rose Dr.
Lot No: 20

Project Name: Alta Vista
Job Number: 11195
Analyst: A. Wolfe

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	45,000	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	4,500	vehicles
Vehicle Speed:	45	mph
Near/Far Lane Distance:	72	feet

Site Data

Barrier Height:	**6.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	77.0	feet
Centerline Dist. to Observer:	97.0	feet
Barrier Distance to Observer:	20.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Barrier Elevation:	0.0	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:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	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:	88.355
Medium Trucks:	88.192
Heavy Trucks:	88.121

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	69.34	4.58	-3.81	-1.20	*0.13*	-6.240	-9.240
Medium Trucks:	77.62	-12.66	-3.80	-1.20	*0.07*	-5.700	-8.700
Heavy Trucks:	82.14	-16.61	-3.80	-1.20	*0.00*	-4.900	-7.900

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	68.9	67.0	65.2	59.2	67.8	68.4
Medium Trucks:	60.0	58.5	52.1	50.6	59.0	59.2
Heavy Trucks:	60.5	59.1	50.1	51.3	59.7	59.8
Vehicle Noise:	70.0	68.2	65.6	60.3	68.9	69.4

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	62.7	60.8	59.0	53.0	61.6	62.2
Medium Trucks:	54.3	52.8	46.4	44.9	53.3	53.5
Heavy Trucks:	55.6	54.2	45.2	46.4	54.8	54.9
Vehicle Noise:	64.0	62.2	59.4	54.3	62.9	63.4

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO) - 6/2/2013

Scenario: First Floor With Wall
Road Name: Rose Dr.
Lot No: Shop 1

Project Name: Alta Vista
Job Number: 11195
Analyst: A. Wolfe

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	45,000	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	4,500	vehicles
Vehicle Speed:	45	mph
Near/Far Lane Distance:	72	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	116.0	feet
Centerline Dist. to Observer:	116.0	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
Barrier Elevation:	0.0	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:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	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:	110.386
Medium Trucks:	110.306
Heavy Trucks:	110.313

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	69.34	4.58	-5.26	-1.20	*-4.79*	0.000	0.000
Medium Trucks:	77.62	-12.66	-5.26	-1.20	*-4.88*	0.000	0.000
Heavy Trucks:	82.14	-16.61	-5.26	-1.20	*-5.12*	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:	67.5	65.6	63.8	57.7	66.4	67.0
Medium Trucks:	58.5	57.0	50.6	49.1	57.6	57.8
Heavy Trucks:	59.1	57.6	48.6	49.9	58.2	58.3
Vehicle Noise:	68.5	66.7	64.1	58.9	67.5	68.0

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	67.5	65.6	63.8	57.7	66.4	67.0
Medium Trucks:	58.5	57.0	50.6	49.1	57.6	57.8
Heavy Trucks:	59.1	57.6	48.6	49.9	58.2	58.3
Vehicle Noise:	68.5	66.7	64.1	58.9	67.5	68.0

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO) - 6/2/2013

Scenario: First Floor With Wall
Road Name: Alta Vista St.
Lot No: Shop 2

Project Name: Alta Vista
Job Number: 11195
Analyst: A. Wolfe

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	20,000 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,000 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	48 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	99.0 feet
Centerline Dist. to Observer:	99.0 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
Barrier Elevation:	0.0 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:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	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:	96.177
Medium Trucks:	96.085
Heavy Trucks:	96.094

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	69.34	1.06	-4.36	-1.20	*-4.77*	0.000	0.000
Medium Trucks:	77.62	-16.18	-4.36	-1.20	*-4.88*	0.000	0.000
Heavy Trucks:	82.14	-20.13	-4.36	-1.20	*-5.16*	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:	64.8	62.9	61.2	55.1	63.7	64.3
Medium Trucks:	55.9	54.4	48.0	46.5	54.9	55.2
Heavy Trucks:	56.4	55.0	46.0	47.2	55.6	55.7
Vehicle Noise:	65.9	64.1	61.5	56.3	64.8	65.3

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	64.8	62.9	61.2	55.1	63.7	64.3
Medium Trucks:	55.9	54.4	48.0	46.5	54.9	55.2
Heavy Trucks:	56.4	55.0	46.0	47.2	55.6	55.7
Vehicle Noise:	65.9	64.1	61.5	56.3	64.8	65.3

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO) - 6/2/2013

Scenario: First Floor With Wall
Road Name: Alta Vista St.
Lot No: 3

Project Name: Alta Vista
Job Number: 11195
Analyst: A. Wolfe

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	20,000	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	2,000	vehicles
Vehicle Speed:	45	mph
Near/Far Lane Distance:	48	feet

Site Data

Barrier Height:	**6.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	68.0	feet
Centerline Dist. to Observer:	93.0	feet
Barrier Distance to Observer:	25.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Barrier Elevation:	0.0	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:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	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:	88.926
Medium Trucks:	88.752
Heavy Trucks:	88.676

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	69.34	1.06	-3.85	-1.20	*0.15*	-6.400	-9.400
Medium Trucks:	77.62	-16.18	-3.84	-1.20	*0.08*	-5.800	-8.800
Heavy Trucks:	82.14	-20.13	-3.84	-1.20	*0.00*	-4.900	-7.900

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	65.3	63.5	61.7	55.6	64.3	64.9
Medium Trucks:	56.4	54.9	48.5	47.0	55.4	55.7
Heavy Trucks:	57.0	55.5	46.5	47.8	56.1	56.2
Vehicle Noise:	66.4	64.6	62.0	56.8	65.3	65.9

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	58.9	57.1	55.3	49.2	57.9	58.5
Medium Trucks:	50.6	49.1	42.7	41.2	49.6	49.9
Heavy Trucks:	52.1	50.6	41.6	42.9	51.2	51.3
Vehicle Noise:	60.3	58.5	55.7	50.7	59.2	59.7

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO) - 6/2/2013

Scenario: Second Floor With Wall
Road Name: Rose Dr.
Lot No: 14

Project Name: Alta Vista
Job Number: 11195
Analyst: A. Wolfe

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	45,000	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	4,500	vehicles
Vehicle Speed:	45	mph
Near/Far Lane Distance:	72	feet

Site Data

Barrier Height:	**6.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	81.0	feet
Centerline Dist. to Observer:	97.0	feet
Barrier Distance to Observer:	16.0	feet
Observer Height (Above Pad):	14.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Barrier Elevation:	0.0	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:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	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:	91.154
Medium Trucks:	90.829
Heavy Trucks:	90.271

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	69.34	4.58	-4.02	-1.20	*-1.08*	0.000	0.000
Medium Trucks:	77.62	-12.66	-3.99	-1.20	*-1.24*	0.000	0.000
Heavy Trucks:	82.14	-16.61	-3.95	-1.20	*-1.69*	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:	68.7	66.8	65.0	59.0	67.6	68.2
Medium Trucks:	59.8	58.3	51.9	50.4	58.8	59.1
Heavy Trucks:	60.4	59.0	49.9	51.2	59.5	59.7
Vehicle Noise:	69.8	68.0	65.4	60.1	68.7	69.2

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	68.7	66.8	65.0	59.0	67.6	68.2
Medium Trucks:	59.8	58.3	51.9	50.4	58.8	59.1
Heavy Trucks:	60.4	59.0	49.9	51.2	59.5	59.7
Vehicle Noise:	69.8	68.0	65.4	60.1	68.7	69.2

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO) - 6/2/2013

Scenario: Second Floor With Wall
Road Name: Rose Dr.
Lot No: 20

Project Name: Alta Vista
Job Number: 11195
Analyst: A. Wolfe

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	45,000	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	4,500	vehicles
Vehicle Speed:	45	mph
Near/Far Lane Distance:	72	feet

Site Data

Barrier Height:	**6.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	77.0	feet
Centerline Dist. to Observer:	97.0	feet
Barrier Distance to Observer:	20.0	feet
Observer Height (Above Pad):	14.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Barrier Elevation:	0.0	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:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	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:	91.154
Medium Trucks:	90.829
Heavy Trucks:	90.271

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	69.34	4.58	-4.02	-1.20	*-0.75*	0.000	0.000
Medium Trucks:	77.62	-12.66	-3.99	-1.20	*-0.91*	0.000	0.000
Heavy Trucks:	82.14	-16.61	-3.95	-1.20	*-1.35*	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:	68.7	66.8	65.0	59.0	67.6	68.2
Medium Trucks:	59.8	58.3	51.9	50.4	58.8	59.1
Heavy Trucks:	60.4	59.0	49.9	51.2	59.5	59.7
Vehicle Noise:	69.8	68.0	65.4	60.1	68.7	69.2

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	68.7	66.8	65.0	59.0	67.6	68.2
Medium Trucks:	59.8	58.3	51.9	50.4	58.8	59.1
Heavy Trucks:	60.4	59.0	49.9	51.2	59.5	59.7
Vehicle Noise:	69.8	68.0	65.4	60.1	68.7	69.2

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO) - 6/2/2013

Scenario: Second Floor With Wall
Road Name: Rose Dr.
Lot No: Shop 1

Project Name: Alta Vista
Job Number: 11195
Analyst: A. Wolfe

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	45,000 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	4,500 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	72 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	116.0 feet
Centerline Dist. to Observer:	116.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	14.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Barrier Elevation:	0.0 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:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	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:	111.158
Medium Trucks:	110.892
Heavy Trucks:	110.435

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	69.34	4.58	-5.31	-1.20	*-12.87*	0.000	0.000
Medium Trucks:	77.62	-12.66	-5.29	-1.20	*-13.14*	0.000	0.000
Heavy Trucks:	82.14	-16.61	-5.27	-1.20	*-13.82*	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:	67.4	65.5	63.8	57.7	66.3	66.9
Medium Trucks:	58.5	57.0	50.6	49.1	57.5	57.8
Heavy Trucks:	59.1	57.6	48.6	49.9	58.2	58.3
Vehicle Noise:	68.5	66.7	64.1	58.8	67.4	67.9

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	67.4	65.5	63.8	57.7	66.3	66.9
Medium Trucks:	58.5	57.0	50.6	49.1	57.5	57.8
Heavy Trucks:	59.1	57.6	48.6	49.9	58.2	58.3
Vehicle Noise:	68.5	66.7	64.1	58.8	67.4	67.9

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO) - 6/2/2013

Scenario: Second Floor With Wall
Road Name: Alta Vista St.
Lot No: Shop 2

Project Name: Alta Vista
Job Number: 11195
Analyst: A. Wolfe

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	20,000 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,000 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	48 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	99.0 feet
Centerline Dist. to Observer:	99.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	14.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Barrier Elevation:	0.0 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:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	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:	97.062
Medium Trucks:	96.757
Heavy Trucks:	96.234

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	69.34	1.06	-4.42	-1.20	*-12.73*	0.000	0.000
Medium Trucks:	77.62	-16.18	-4.40	-1.20	*-13.05*	0.000	0.000
Heavy Trucks:	82.14	-20.13	-4.37	-1.20	*-13.84*	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:	64.8	62.9	61.1	55.1	63.7	64.3
Medium Trucks:	55.8	54.3	48.0	46.4	54.9	55.1
Heavy Trucks:	56.4	55.0	46.0	47.2	55.6	55.7
Vehicle Noise:	65.8	64.0	61.4	56.2	64.8	65.3

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	64.8	62.9	61.1	55.1	63.7	64.3
Medium Trucks:	55.8	54.3	48.0	46.4	54.9	55.1
Heavy Trucks:	56.4	55.0	46.0	47.2	55.6	55.7
Vehicle Noise:	65.8	64.0	61.4	56.2	64.8	65.3

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO) - 6/2/2013

Scenario: Second Floor With Wall
Road Name: Alta Vista St.
Lot No: 3

Project Name: Alta Vista
Job Number: 11195
Analyst: A. Wolfe

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	20,000 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,000 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	48 feet

Site Data

Barrier Height:	**6.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	68.0 feet
Centerline Dist. to Observer:	93.0 feet
Barrier Distance to Observer:	25.0 feet
Observer Height (Above Pad):	14.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Barrier Elevation:	0.0 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:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	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:	90.934
Medium Trucks:	90.609
Heavy Trucks:	90.050

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	69.34	1.06	-4.00	-1.20	*-0.46*	0.000	0.000
Medium Trucks:	77.62	-16.18	-3.98	-1.20	*-0.60*	0.000	0.000
Heavy Trucks:	82.14	-20.13	-3.94	-1.20	*-1.06*	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:	65.2	63.3	61.5	55.5	64.1	64.7
Medium Trucks:	56.3	54.8	48.4	46.9	55.3	55.5
Heavy Trucks:	56.9	55.4	46.4	47.7	56.0	56.1
Vehicle Noise:	66.3	64.5	61.9	56.6	65.2	65.7

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	65.2	63.3	61.5	55.5	64.1	64.7
Medium Trucks:	56.3	54.8	48.4	46.9	55.3	55.5
Heavy Trucks:	56.9	55.4	46.4	47.7	56.0	56.1
Vehicle Noise:	66.3	64.5	61.9	56.6	65.2	65.7

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APPENDIX 10.1:

OPERATIONAL NOISE LEVEL CALCULATIONS

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STATIONARY SOURCE NOISE PREDICTION MODEL

11/29/2017

Observer Location: **R1**
Source: Air Conditioning Unit (Roof-Top)
Condition: Operational

Project Name: Alta Vista
Job Number: 11195
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	419.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	419.0 feet	*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	20.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet		

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	0.0	74.4	76.1	77.4	77.7	78.2
Distance Attenuation	419.0	-38.5	-38.5	-38.5	-38.5	-38.5	-38.5
Shielding (Barrier Attenuation)	419.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		-38.5	35.9	37.6	38.9	39.2	39.7
39 Minute Hourly Adjustment		**-40.4**	**34.0**	**35.7**	**37.0**	**37.3**	**37.8**

STATIONARY SOURCE NOISE PREDICTION MODEL

11/29/2017

Observer Location: **R1**
Source: Drive-Thru Speakerphone
Condition: Operational

Project Name: Alta Vista
Job Number: 11195
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	475.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	475.0 feet	*Noise Source Height:*	3.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet		

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	15.0	0.0	60.9	62.1	63.6	65.3	66.4
Distance Attenuation	475.0	-30.0	-30.0	-30.0	-30.0	-30.0	-30.0
Shielding (Barrier Attenuation)	475.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		-30.0	30.9	32.1	33.6	35.3	36.4
60 Minute Hourly Adjustment		**-30.0**	**30.9**	**32.1**	**33.6**	**35.3**	**36.4**

STATIONARY SOURCE NOISE PREDICTION MODEL

11/29/2017

Observer Location: **R1**
Source: Entry Gate Activity
Condition: Operational

Project Name: Alta Vista
Job Number: 11195
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	1,009.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	1,009.0 feet	*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet		

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	40.0	0.0	52.6	55.3	60.7	63.7	65.6
Distance Attenuation	1,009.0	-28.0	-28.0	-28.0	-28.0	-28.0	-28.0
Shielding (Barrier Attenuation)	1,009.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		-28.0	24.6	27.3	32.7	35.7	37.6
60 Minute Hourly Adjustment		**-28.0**	**24.6**	**27.3**	**32.7**	**35.7**	**37.6**

STATIONARY SOURCE NOISE PREDICTION MODEL

11/29/2017

Observer Location: **R1**
Source: Park Activity
Condition: Operational

Project Name: Alta Vista
Job Number: 11195
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	766.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	766.0 feet	*Noise Source Height:*	4.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet		

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	0.0	61.7	64.1	67.0	69.7	73.9
Distance Attenuation	766.0	-43.7	-43.7	-43.7	-43.7	-43.7	-43.7
Shielding (Barrier Attenuation)	766.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		-43.7	18.0	20.4	23.3	26.0	30.2
60 Minute Hourly Adjustment		**-43.7**	**18.0**	**20.4**	**23.3**	**26.0**	**30.2**

STATIONARY SOURCE NOISE PREDICTION MODEL 11/29/2017

Observer Location: **R1**
Source: Parking Lot Vehicle Movements
Condition: Operational

Project Name: Alta Vista
Job Number: 11195
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	533.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	533.0 feet	*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet		

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	0.0	56.7	60.7	63.7	67.1	79.5
Distance Attenuation	533.0	-40.6	-40.6	-40.6	-40.6	-40.6	-40.6
Shielding (Barrier Attenuation)	533.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		-40.6	16.1	20.1	23.1	26.5	38.9
60 Minute Hourly Adjustment		**-40.6**	**16.1**	**20.1**	**23.1**	**26.5**	**38.9**

STATIONARY SOURCE NOISE PREDICTION MODEL 11/29/2017

Observer Location: **R2**
Source: Air Conditioning Unit (Roof-Top)
Condition: Operational

Project Name: Alta Vista
Job Number: 11195
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	949.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	949.0 feet	*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	20.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet		

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	0.0	74.4	76.1	77.4	77.7	78.2
Distance Attenuation	949.0	-45.6	-45.6	-45.6	-45.6	-45.6	-45.6
Shielding (Barrier Attenuation)	949.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		-45.6	28.8	30.5	31.8	32.1	32.6
39 Minute Hourly Adjustment		**-47.5**	**26.9**	**28.6**	**29.9**	**30.2**	**30.7**

STATIONARY SOURCE NOISE PREDICTION MODEL 11/29/2017

Observer Location: **R2**
Source: Drive-Thru Speakerphone
Condition: Operational

Project Name: Alta Vista
Job Number: 11195
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	985.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	985.0 feet	*Noise Source Height:*	3.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet		

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	15.0	0.0	60.9	62.1	63.6	65.3	66.4
Distance Attenuation	985.0	-36.3	-36.3	-36.3	-36.3	-36.3	-36.3
Shielding (Barrier Attenuation)	985.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		-36.3	24.6	25.8	27.3	29.0	30.1
60 Minute Hourly Adjustment		**-36.3**	**24.6**	**25.8**	**27.3**	**29.0**	**30.1**

STATIONARY SOURCE NOISE PREDICTION MODEL 11/29/2017

Observer Location: **R2**
Source: Entry Gate Activity
Condition: Operational

Project Name: Alta Vista
Job Number: 11195
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	724.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	724.0 feet	*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet		

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	40.0	0.0	52.6	55.3	60.7	63.7	65.6
Distance Attenuation	724.0	-25.2	-25.2	-25.2	-25.2	-25.2	-25.2
Shielding (Barrier Attenuation)	724.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		-25.2	27.4	30.1	35.5	38.5	40.4
60 Minute Hourly Adjustment		**-25.2**	**27.4**	**30.1**	**35.5**	**38.5**	**40.4**

STATIONARY SOURCE NOISE PREDICTION MODEL

11/29/2017

Observer Location: **R2**
Source: Park Activity
Condition: Operational

Project Name: Alta Vista
Job Number: 11195
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	1,039.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	1,039.0 feet	*Noise Source Height:*	4.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet		

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	0.0	61.7	64.1	67.0	69.7	73.9
Distance Attenuation	1,039.0	-46.4	-46.4	-46.4	-46.4	-46.4	-46.4
Shielding (Barrier Attenuation)	1,039.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		-46.4	15.3	17.7	20.6	23.3	27.5
60 Minute Hourly Adjustment		**-46.4**	**15.3**	**17.7**	**20.6**	**23.3**	**27.5**

STATIONARY SOURCE NOISE PREDICTION MODEL

11/29/2017

Observer Location: **R2**
Source: Parking Lot Vehicle Movements
Condition: Operational

Project Name: Alta Vista
Job Number: 11195
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	833.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	833.0 feet	*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet		

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	0.0	56.7	60.7	63.7	67.1	79.5
Distance Attenuation	833.0	-44.4	-44.4	-44.4	-44.4	-44.4	-44.4
Shielding (Barrier Attenuation)	833.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		-44.4	12.3	16.3	19.3	22.7	35.1
60 Minute Hourly Adjustment		**-44.4**	**12.3**	**16.3**	**19.3**	**22.7**	**35.1**

STATIONARY SOURCE NOISE PREDICTION MODEL 11/29/2017

Observer Location: **R3**
Source: Air Conditioning Unit (Roof-Top)
Condition: Operational

Project Name: Alta Vista
Job Number: 11195
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	524.0 feet	***Barrier Height:***	**6.0 feet**
Noise Distance to Barrier:	514.0 feet	*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	10.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	20.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet		

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	0.0	74.4	76.1	77.4	77.7	78.2
Distance Attenuation	524.0	-40.4	-40.4	-40.4	-40.4	-40.4	-40.4
Shielding (Barrier Attenuation)	514.0	-5.2	-5.2	-5.2	-5.2	-5.2	-5.2
Raw (Distance + Barrier)		-45.6	28.8	30.5	31.8	32.1	32.6
39 Minute Hourly Adjustment		**-47.5**	**26.9**	**28.6**	**29.9**	**30.2**	**30.7**

STATIONARY SOURCE NOISE PREDICTION MODEL 11/29/2017

Observer Location: **R3**
Source: Drive-Thru Speakerphone
Condition: Operational

Project Name: Alta Vista
Job Number: 11195
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	575.0 feet	***Barrier Height:***	**6.0 feet**
Noise Distance to Barrier:	565.0 feet	*Noise Source Height:*	3.0 feet
Barrier Distance to Observer:	10.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet		

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	15.0	0.0	60.9	62.1	63.6	65.3	66.4
Distance Attenuation	575.0	-31.7	-31.7	-31.7	-31.7	-31.7	-31.7
Shielding (Barrier Attenuation)	565.0	-5.5	-5.5	-5.5	-5.5	-5.5	-5.5
Raw (Distance + Barrier)		-37.2	23.7	24.9	26.4	28.1	29.2
60 Minute Hourly Adjustment		**-37.2**	**23.7**	**24.9**	**26.4**	**28.1**	**29.2**

STATIONARY SOURCE NOISE PREDICTION MODEL 11/29/2017

Observer Location: **R3**
Source: Entry Gate Activity
Condition: Operational

Project Name: Alta Vista
Job Number: 11195
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	45.0 feet	***Barrier Height:***	**6.0 feet**
Noise Distance to Barrier:	35.0 feet	*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	10.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet		

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	40.0	0.0	52.6	55.3	60.7	63.7	65.6
Distance Attenuation	45.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Shielding (Barrier Attenuation)	35.0	-5.6	-5.6	-5.6	-5.6	-5.6	-5.6
Raw (Distance + Barrier)		-6.6	46.0	48.7	54.1	57.1	59.0
60 Minute Hourly Adjustment		**-6.6**	**46.0**	**48.7**	**54.1**	**57.1**	**59.0**

STATIONARY SOURCE NOISE PREDICTION MODEL 11/29/2017

Observer Location: **R3**
Source: Park Activity
Condition: Operational

Project Name: Alta Vista
Job Number: 11195
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	390.0 feet	***Barrier Height:***	**6.0 feet**
Noise Distance to Barrier:	380.0 feet	*Noise Source Height:*	4.0 feet
Barrier Distance to Observer:	10.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet		

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	0.0	61.7	64.1	67.0	69.7	73.9
Distance Attenuation	390.0	-37.8	-37.8	-37.8	-37.8	-37.8	-37.8
Shielding (Barrier Attenuation)	380.0	-5.5	-5.5	-5.5	-5.5	-5.5	-5.5
Raw (Distance + Barrier)		-43.3	18.4	20.8	23.7	26.4	30.6
60 Minute Hourly Adjustment		**-43.3**	**18.4**	**20.8**	**23.7**	**26.4**	**30.6**

STATIONARY SOURCE NOISE PREDICTION MODEL 11/29/2017

Observer Location: **R3**
Source: Parking Lot Vehicle Movements
Condition: Operational

Project Name: Alta Vista
Job Number: 11195
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	375.0 feet	***Barrier Height:***	**6.0 feet**
Noise Distance to Barrier:	365.0 feet	*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	10.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet		

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	0.0	56.7	60.7	63.7	67.1	79.5
Distance Attenuation	375.0	-37.5	-37.5	-37.5	-37.5	-37.5	-37.5
Shielding (Barrier Attenuation)	365.0	-5.5	-5.5	-5.5	-5.5	-5.5	-5.5
Raw (Distance + Barrier)		-43.0	13.7	17.7	20.7	24.1	36.5
60 Minute Hourly Adjustment		**-43.0**	**13.7**	**17.7**	**20.7**	**24.1**	**36.5**

STATIONARY SOURCE NOISE PREDICTION MODEL 11/29/2017

Observer Location: **R4**
Source: Air Conditioning Unit (Roof-Top)
Condition: Operational

Project Name: Alta Vista
Job Number: 11195
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	560.0 feet	***Barrier Height:***	**6.0 feet**
Noise Distance to Barrier:	550.0 feet	*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	10.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	20.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet		

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	0.0	74.4	76.1	77.4	77.7	78.2
Distance Attenuation	560.0	-41.0	-41.0	-41.0	-41.0	-41.0	-41.0
Shielding (Barrier Attenuation)	550.0	-5.2	-5.2	-5.2	-5.2	-5.2	-5.2
Raw (Distance + Barrier)		-46.2	28.2	29.9	31.2	31.5	32.0
39 Minute Hourly Adjustment		**-48.1**	**26.3**	**28.0**	**29.3**	**29.6**	**30.1**

STATIONARY SOURCE NOISE PREDICTION MODEL 11/29/2017

Observer Location: **R4**
Source: Drive-Thru Speakerphone
Condition: Operational

Project Name: Alta Vista
Job Number: 11195
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	616.0 feet	***Barrier Height:***	**6.0 feet**
Noise Distance to Barrier:	606.0 feet	*Noise Source Height:*	3.0 feet
Barrier Distance to Observer:	10.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet		

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	15.0	0.0	60.9	62.1	63.6	65.3	66.4
Distance Attenuation	616.0	-32.3	-32.3	-32.3	-32.3	-32.3	-32.3
Shielding (Barrier Attenuation)	606.0	-5.5	-5.5	-5.5	-5.5	-5.5	-5.5
Raw (Distance + Barrier)		-37.8	23.1	24.3	25.8	27.5	28.6
60 Minute Hourly Adjustment		**-37.8**	**23.1**	**24.3**	**25.8**	**27.5**	**28.6**

STATIONARY SOURCE NOISE PREDICTION MODEL 11/29/2017

Observer Location: **R4**
Source: Entry Gate Activity
Condition: Operational

Project Name: Alta Vista
Job Number: 11195
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	267.0 feet	***Barrier Height:***	**6.0 feet**
Noise Distance to Barrier:	257.0 feet	*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	10.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet		

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	40.0	0.0	52.6	55.3	60.7	63.7	65.6
Distance Attenuation	267.0	-16.5	-16.5	-16.5	-16.5	-16.5	-16.5
Shielding (Barrier Attenuation)	257.0	-5.5	-5.5	-5.5	-5.5	-5.5	-5.5
Raw (Distance + Barrier)		-22.0	30.6	33.3	38.7	41.7	43.6
60 Minute Hourly Adjustment		**-22.0**	**30.6**	**33.3**	**38.7**	**41.7**	**43.6**

STATIONARY SOURCE NOISE PREDICTION MODEL

11/29/2017

Observer Location: **R4**
Source: Park Activity
Condition: Operational

Project Name: Alta Vista
Job Number: 11195
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	254.0 feet	***Barrier Height:***	**6.0 feet**
Noise Distance to Barrier:	244.0 feet	*Noise Source Height:*	4.0 feet
Barrier Distance to Observer:	10.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet		

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	0.0	61.7	64.1	67.0	69.7	73.9
Distance Attenuation	254.0	-34.1	-34.1	-34.1	-34.1	-34.1	-34.1
Shielding (Barrier Attenuation)	244.0	-5.5	-5.5	-5.5	-5.5	-5.5	-5.5
Raw (Distance + Barrier)		-39.6	22.1	24.5	27.4	30.1	34.3
60 Minute Hourly Adjustment		**-39.6**	**22.1**	**24.5**	**27.4**	**30.1**	**34.3**

STATIONARY SOURCE NOISE PREDICTION MODEL

11/29/2017

Observer Location: **R4**
Source: Parking Lot Vehicle Movements
Condition: Operational

Project Name: Alta Vista
Job Number: 11195
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	421.0 feet	***Barrier Height:***	**6.0 feet**
Noise Distance to Barrier:	411.0 feet	*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	10.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet		

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	0.0	56.7	60.7	63.7	67.1	79.5
Distance Attenuation	421.0	-38.5	-38.5	-38.5	-38.5	-38.5	-38.5
Shielding (Barrier Attenuation)	411.0	-5.5	-5.5	-5.5	-5.5	-5.5	-5.5
Raw (Distance + Barrier)		-44.0	12.7	16.7	19.7	23.1	35.5
60 Minute Hourly Adjustment		**-44.0**	**12.7**	**16.7**	**19.7**	**23.1**	**35.5**

STATIONARY SOURCE NOISE PREDICTION MODEL 11/29/2017

Observer Location: **R5** *Project Name:* Alta Vista
Source: Air Conditioning Unit (Roof-Top) *Job Number:* 11195
Condition: Operational *Analyst:* A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	641.0 feet	***Barrier Height:***	**6.0 feet**
Noise Distance to Barrier:	631.0 feet	*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	10.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	20.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet		

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	0.0	74.4	76.1	77.4	77.7	78.2
Distance Attenuation	641.0	-42.2	-42.2	-42.2	-42.2	-42.2	-42.2
Shielding (Barrier Attenuation)	631.0	-5.2	-5.2	-5.2	-5.2	-5.2	-5.2
Raw (Distance + Barrier)		-47.4	27.0	28.7	30.0	30.3	30.8
39 Minute Hourly Adjustment		**-49.3**	**25.1**	**26.8**	**28.1**	**28.4**	**28.9**

STATIONARY SOURCE NOISE PREDICTION MODEL 11/29/2017

Observer Location: **R5** *Project Name:* Alta Vista
Source: Drive-Thru Speakerphone *Job Number:* 11195
Condition: Operational *Analyst:* A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	774.0 feet	***Barrier Height:***	**6.0 feet**
Noise Distance to Barrier:	764.0 feet	*Noise Source Height:*	3.0 feet
Barrier Distance to Observer:	10.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet		

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	15.0	0.0	60.9	62.1	63.6	65.3	66.4
Distance Attenuation	774.0	-34.3	-34.3	-34.3	-34.3	-34.3	-34.3
Shielding (Barrier Attenuation)	764.0	-5.5	-5.5	-5.5	-5.5	-5.5	-5.5
Raw (Distance + Barrier)		-39.8	21.1	22.3	23.8	25.5	26.6
60 Minute Hourly Adjustment		**-39.8**	**21.1**	**22.3**	**23.8**	**25.5**	**26.6**

STATIONARY SOURCE NOISE PREDICTION MODEL 11/29/2017

Observer Location: **R5**
Source: Entry Gate Activity
Condition: Operational

Project Name: Alta Vista
Job Number: 11195
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	633.0 feet	***Barrier Height:***	**6.0 feet**
Noise Distance to Barrier:	623.0 feet	*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	10.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet		

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	40.0	0.0	52.6	55.3	60.7	63.7	65.6
Distance Attenuation	633.0	-24.0	-24.0	-24.0	-24.0	-24.0	-24.0
Shielding (Barrier Attenuation)	623.0	-5.5	-5.5	-5.5	-5.5	-5.5	-5.5
Raw (Distance + Barrier)		-29.5	23.1	25.8	31.2	34.2	36.1
60 Minute Hourly Adjustment		**-29.5**	**23.1**	**25.8**	**31.2**	**34.2**	**36.1**

STATIONARY SOURCE NOISE PREDICTION MODEL 11/29/2017

Observer Location: **R5**
Source: Park Activity
Condition: Operational

Project Name: Alta Vista
Job Number: 11195
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	383.0 feet	***Barrier Height:***	**6.0 feet**
Noise Distance to Barrier:	373.0 feet	*Noise Source Height:*	4.0 feet
Barrier Distance to Observer:	10.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet		

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	0.0	61.7	64.1	67.0	69.7	73.9
Distance Attenuation	383.0	-37.7	-37.7	-37.7	-37.7	-37.7	-37.7
Shielding (Barrier Attenuation)	373.0	-5.5	-5.5	-5.5	-5.5	-5.5	-5.5
Raw (Distance + Barrier)		-43.2	18.5	20.9	23.8	26.5	30.7
60 Minute Hourly Adjustment		**-43.2**	**18.5**	**20.9**	**23.8**	**26.5**	**30.7**

STATIONARY SOURCE NOISE PREDICTION MODEL

11/29/2017

Observer Location: **R5**
Source: Parking Lot Vehicle Movements
Condition: Operational

Project Name: Alta Vista
Job Number: 11195
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	494.0 feet	***Barrier Height:***	**6.0 feet**
Noise Distance to Barrier:	484.0 feet	*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	10.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet		

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	0.0	56.7	60.7	63.7	67.1	79.5
Distance Attenuation	494.0	-39.9	-39.9	-39.9	-39.9	-39.9	-39.9
Shielding (Barrier Attenuation)	484.0	-5.5	-5.5	-5.5	-5.5	-5.5	-5.5
Raw (Distance + Barrier)		-45.4	11.3	15.3	18.3	21.7	34.1
60 Minute Hourly Adjustment		**-45.4**	**11.3**	**15.3**	**18.3**	**21.7**	**34.1**

STATIONARY SOURCE NOISE PREDICTION MODEL

11/29/2017

Observer Location: **R6**
Source: Air Conditioning Unit (Roof-Top)
Condition: Operational

Project Name: Alta Vista
Job Number: 11195
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	216.0 feet	***Barrier Height:***	**6.0 feet**
Noise Distance to Barrier:	206.0 feet	*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	10.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	20.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet		

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	0.0	74.4	76.1	77.4	77.7	78.2
Distance Attenuation	216.0	-32.7	-32.7	-32.7	-32.7	-32.7	-32.7
Shielding (Barrier Attenuation)	206.0	-4.9	-4.9	-4.9	-4.9	-4.9	-4.9
Raw (Distance + Barrier)		-37.6	36.8	38.5	39.8	40.1	40.6
39 Minute Hourly Adjustment		**-39.5**	**34.9**	**36.6**	**37.9**	**38.2**	**38.7**

STATIONARY SOURCE NOISE PREDICTION MODEL 11/29/2017

Observer Location: **R6**
Source: Drive-Thru Speakerphone
Condition: Operational

Project Name: Alta Vista
Job Number: 11195
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	335.0 feet	***Barrier Height:***	**6.0 feet**
Noise Distance to Barrier:	325.0 feet	*Noise Source Height:*	3.0 feet
Barrier Distance to Observer:	10.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet		

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	15.0	0.0	60.9	62.1	63.6	65.3	66.4
Distance Attenuation	335.0	-27.0	-27.0	-27.0	-27.0	-27.0	-27.0
Shielding (Barrier Attenuation)	325.0	-5.6	-5.6	-5.6	-5.6	-5.6	-5.6
Raw (Distance + Barrier)		-32.6	28.3	29.5	31.0	32.7	33.8
60 Minute Hourly Adjustment		**-32.6**	**28.3**	**29.5**	**31.0**	**32.7**	**33.8**

STATIONARY SOURCE NOISE PREDICTION MODEL 11/29/2017

Observer Location: **R6**
Source: Entry Gate Activity
Condition: Operational

Project Name: Alta Vista
Job Number: 11195
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	781.0 feet	***Barrier Height:***	**6.0 feet**
Noise Distance to Barrier:	771.0 feet	*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	10.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet		

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	40.0	0.0	52.6	55.3	60.7	63.7	65.6
Distance Attenuation	781.0	-25.8	-25.8	-25.8	-25.8	-25.8	-25.8
Shielding (Barrier Attenuation)	771.0	-5.5	-5.5	-5.5	-5.5	-5.5	-5.5
Raw (Distance + Barrier)		-31.3	21.3	24.0	29.4	32.4	34.3
60 Minute Hourly Adjustment		**-31.3**	**21.3**	**24.0**	**29.4**	**32.4**	**34.3**

STATIONARY SOURCE NOISE PREDICTION MODEL 11/29/2017

Observer Location: **R6**
Source: Park Activity
Condition: Operational

Project Name: Alta Vista
Job Number: 11195
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	447.0 feet	***Barrier Height:***	**6.0 feet**
Noise Distance to Barrier:	437.0 feet	*Noise Source Height:*	4.0 feet
Barrier Distance to Observer:	10.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet		

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	0.0	61.7	64.1	67.0	69.7	73.9
Distance Attenuation	447.0	-39.0	-39.0	-39.0	-39.0	-39.0	-39.0
Shielding (Barrier Attenuation)	437.0	-5.5	-5.5	-5.5	-5.5	-5.5	-5.5
Raw (Distance + Barrier)		-44.5	17.2	19.6	22.5	25.2	29.4
60 Minute Hourly Adjustment		**-44.5**	**17.2**	**19.6**	**22.5**	**25.2**	**29.4**

STATIONARY SOURCE NOISE PREDICTION MODEL 11/29/2017

Observer Location: **R6**
Source: Parking Lot Vehicle Movements
Condition: Operational

Project Name: Alta Vista
Job Number: 11195
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	232.0 feet	***Barrier Height:***	**6.0 feet**
Noise Distance to Barrier:	222.0 feet	*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	10.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet		

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	0.0	56.7	60.7	63.7	67.1	79.5
Distance Attenuation	232.0	-33.3	-33.3	-33.3	-33.3	-33.3	-33.3
Shielding (Barrier Attenuation)	222.0	-5.5	-5.5	-5.5	-5.5	-5.5	-5.5
Raw (Distance + Barrier)		-38.8	17.9	21.9	24.9	28.3	40.7
60 Minute Hourly Adjustment		**-38.8**	**17.9**	**21.9**	**24.9**	**28.3**	**40.7**

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