Emerald Hills

NOISE IMPACT ANALYSIS

CITY OF SAN DIEGO

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LIST OF ABBREVIATED TERMS

(1)	Reference
ADT	Average Daily Traffic
ANSI	American National Standards Institute
BNSF	Burlington Northern Santa Fe Railroad
Caltrans	California Department of Transportation
CEQA	California Environmental Quality Act
CNEL	Community Noise Equivalent Level
dBA	A-weighted decibels
EPA	Environmental Protection Agency
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
Hz	Hertz
I-15	Interstate 15
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
OPR	Office of Planning and Research
PPV	Peak particle velocity
Project	Emerald Hills
REMEL	Reference Energy Mean Emission Level
TGA	Trip Generation Assessment

EXECUTIVE SUMMARY

Urban Crossroads, Inc. has prepared this noise study to determine the noise exposure and the necessary noise mitigation measures for the proposed Emerald Hills development ("Project"). The Project site is located north of Old Memory Lane, south of Tooley Street, east of Emerald Hills Park and Johnson Elementary School, and west of 60th Street in the City of San Diego. The Project is proposed to develop 123 single-family detached residential lots on 31.2 acres. This noise study has been prepared to satisfy the applicable City of San Diego noise standards.

The results of this Noise Impact Analysis are summarized below based on the significance criteria in Section 4 of this report consistent with the City of San Diego California Environmental Quality Act (CEQA) Significance Determination Thresholds, California CEQA Guidelines (1) and the Southeastern San Diego and Encanto Neighborhoods Program Environmental Impact Report (Encanto EIR). Table ES-1 shows the findings of significance for each potential noise and/or vibration impact under CEQA before and after any identified mitigation measures.

TABLE ES-1: SUMMARY OF CEQA SIGNIFICANCE FINDINGS

Analysis	Report Section	Significance Findings	
		Unmitigated	Mitigated
Off-site Traffic Noise	7	*Less Than Significant*	-
On-site Traffic Noise	8	*Less Than Significant*	-
Aircraft Noise	9	*Less Than Significant*	-
Operational Noise	11	*Less Than Significant*	-
Construction Noise	12	*Less Than Significant*	-
Construction Vibration		*Less Than Significant*	-

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1 INTRODUCTION

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

1.1 SITE LOCATION

The Project site is located north of Old Memory Lane, south of Tooley Street, east of Emerald Hills Park and Johnson Elementary School, and west of 60th Street in the City of San Diego, as shown on Exhibit 1-A. The site is located in the Encanto Neighborhoods Community Planning Area, as described in the Southeastern San Diego and Encanto Neighborhoods Community Plan Updates Final Program Environmental Impact Report (PEIR) (2).

1.2 PROJECT DESCRIPTION

A request for a tentative map, a site development permit, a neighborhood development permit, and a neighborhood use permit, for the removal of existing broadcasting towers and outbuildings and the construction of 123 single-family lots, 13 of which are affordable, and 7 private HOA open space lots. The project also includes public road improvements and public and private utility improvements. The 31.18-acre site is designated Residential Low per the Encanto Neighborhoods Community Plan area and zoned RS-1-2. The project is located within the Airport Land Use Compatibility Overlay Zone (San Diego International), ALUCP Airport Influence Area (San Diego International, Review Area 2), and the Affordable Housing Parking Demand. The proposed Project site plan is shown on Exhibit 1-B.

The site is currently developed with existing buildings and two radio transmission towers which total approximately 13,945 sf that will be demolished or approximately 2,400 cy of demolition export. For grading, per client provided data, this analysis assumes that earthwork activities are expected to balance on site and no import or export of soils would be required. Construction is expected to commence in October 2025 and will last through January 2028. The Project is anticipated to have an Opening Year of 2028 (buildout of the Project)

EXHIBIT 1-A: LOCATION MAP

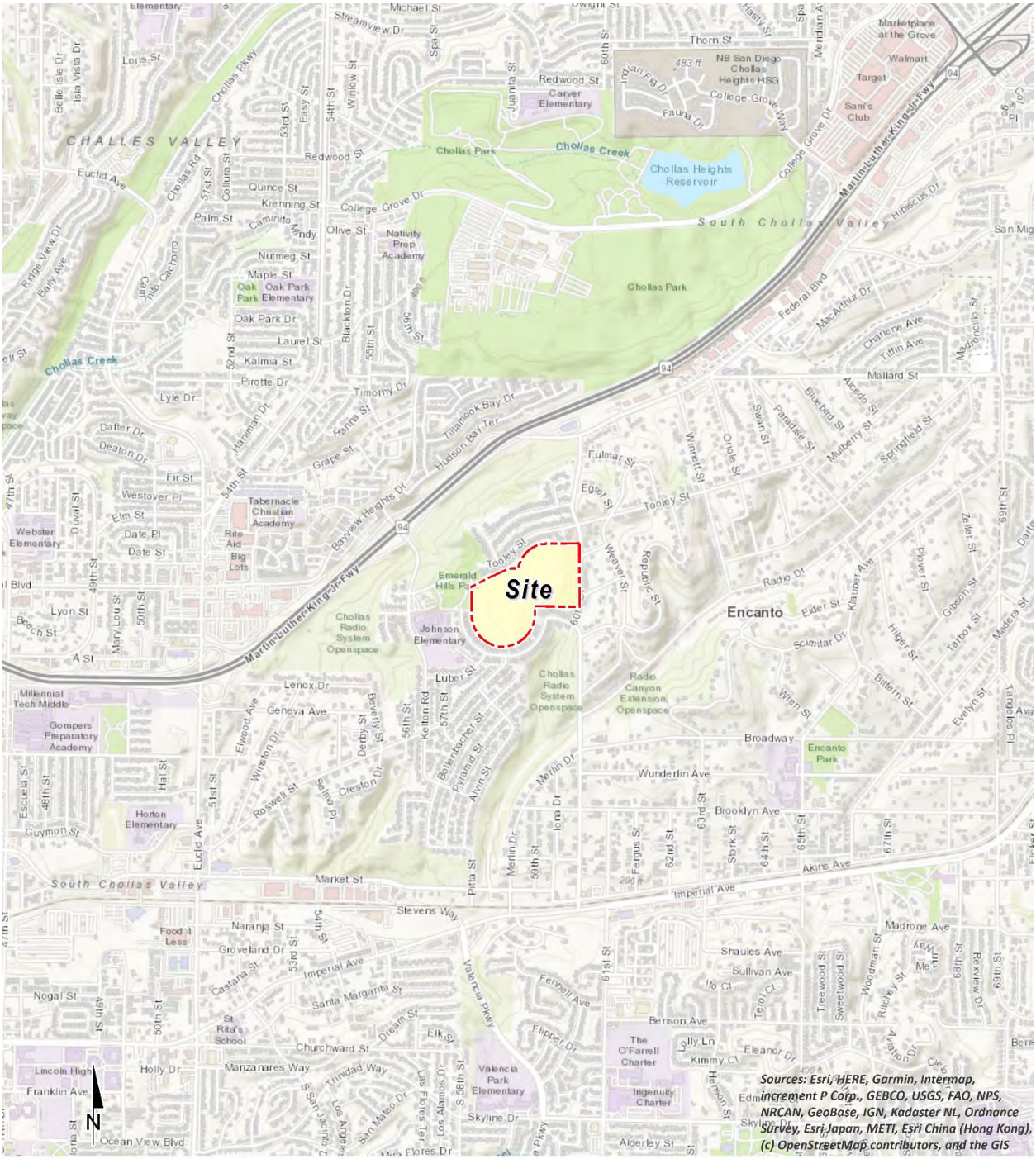
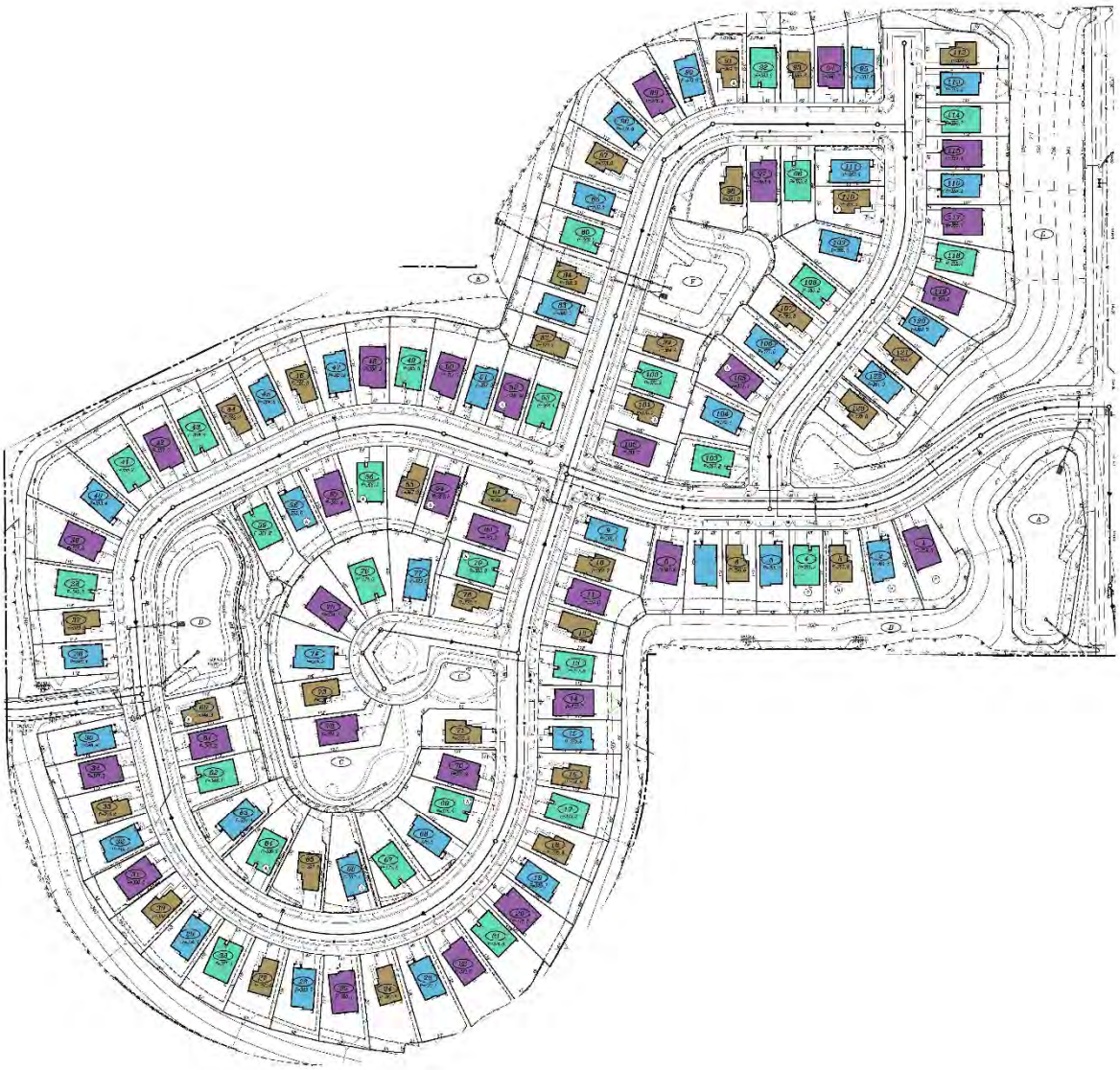


EXHIBIT 1-B: SITE PLAN



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2 FUNDAMENTALS

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

EXHIBIT 2-A: TYPICAL NOISE LEVELS

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

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

2.1 RANGE OF NOISE

Since the range of intensities that the human ear can detect is so large, the scale frequently used to measure intensity is a scale based on multiples of 10, the logarithmic scale. The scale for measuring intensity is the decibel scale. Each interval of 10 decibels indicates a sound energy ten times greater than before, which is perceived by the human ear as being roughly twice as loud. (3) 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. (4) Another important aspect of noise is the duration of the sound and the way it is described and distributed in time.

2.2 NOISE DESCRIPTORS

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

To describe the time-varying character of environmental noise, the statistical or percentile noise descriptors L_{50}, L_{25}, L_8 and L_2, are commonly used. The percentile noise descriptors are the noise levels equaled or exceeded during 50 percent, 25 percent, 8 percent, and 2 percent of a stated time. Sound levels associated with the L_2 and L_8 typically describe transient or short-term events, while levels associated with the L_{50} describe the steady state (or median) noise conditions. The relies on the percentile noise levels to describe the stationary source noise level limits. While the L_{50} describes the noise levels occurring 50 percent of the time, the L_{eq} accounts for the total energy (average) observed for the entire hour.

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 San Diego 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. (3)

2.3.2 GROUND ABSORPTION

The propagation path of noise from a highway to a receiver is usually very close to the ground. Noise attenuation from ground absorption and reflective wave canceling adds to the attenuation associated with geometric spreading. Traditionally, the excess attenuation has also been expressed in terms of attenuation per doubling of distance. This approximation is usually sufficiently accurate for distances of less than 200 ft. For acoustically hard sites (i.e., sites with a reflective surface between the source and the receiver, such as a parking lot or body of water), no excess ground attenuation is assumed. For acoustically absorptive or soft sites (i.e., those sites with an absorptive ground surface between the source and the receiver such as soft dirt, grass, or scattered bushes and trees), an excess ground attenuation value of 1.5 dB per doubling of distance is normally assumed. When added to the cylindrical spreading, the excess ground attenuation results in an overall drop-off rate of 4.5 dB per doubling of distance from a line source. (5)

2.3.3 ATMOSPHERIC EFFECTS

Receivers located downwind from a source can be exposed to increased noise levels relative to calm conditions, whereas locations upwind can have lowered noise levels. Sound levels can be increased at large distances (e.g., more than 500 feet) due to atmospheric temperature inversion (i.e., increasing temperature with elevation). Other factors such as air temperature, humidity, and turbulence can also have significant effects. (3)

2.3.4 SHIELDING

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

2.3.5 REFLECTION

Field studies conducted by the FHWA have shown that the reflection from barriers and buildings does not substantially increase noise levels. (5) If all the noise striking a structure was reflected back to a given receiving point, the increase would be theoretically limited to 3 dBA. Further, not all the acoustical energy is reflected back to same point. Some of the energy would go over the structure, some is reflected to points other than the given receiving point, some is scattered by ground coverings (e.g., grass and other plants), and some is blocked by intervening structures

and/or obstacles (e.g., the noise source itself). Additionally, some of the reflected energy is lost due to the longer path that the noise must travel. FHWA measurements made to quantify reflective increases in traffic noise have not shown an increase of greater than 1-2 dBA; an increase that is not perceptible to the average human ear.

2.4 NOISE CONTROL

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

2.5 NOISE BARRIER ATTENUATION

Effective noise barriers can reduce noise levels by up to 10 to 15 dBA, cutting the loudness of traffic noise in half. A noise barrier is most effective when placed close to the noise source or receiver. Noise barriers, however, do have limitations. For a noise barrier to work, it must be high enough and long enough to block the path of the noise source. (5)

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. (6)

2.7 COMMUNITY RESPONSE TO NOISE

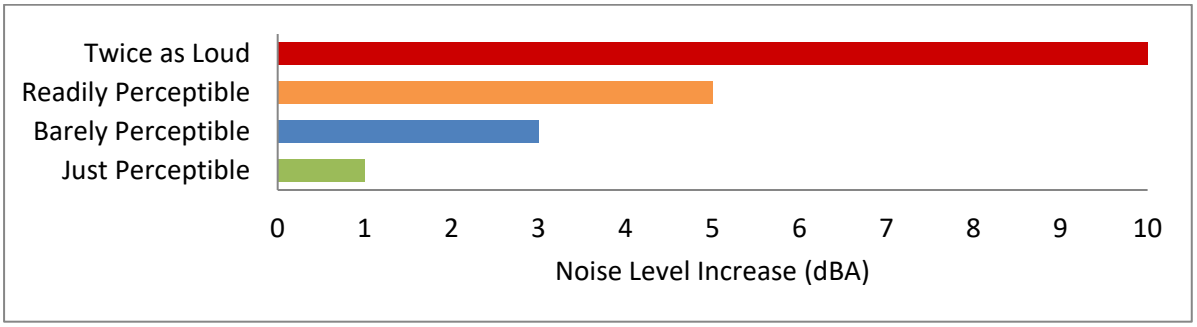
Community responses to noise varies depending upon everyone's susceptibility to noise and personal attitudes about noise. Several factors are related to the level of community annoyance including:

- 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; and,
- Belief that the noise source can be controlled.

Approximately ten percent of the population has a very low tolerance for noise and will object to any noise not of their making. Consequently, even in the quietest environment, some complaints will occur. Twenty-five percent of the population will not complain even in very severe noise

environments. Thus, a variety of reactions can be expected from people exposed to any given noise environment. (7) 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. (7) Despite this variability in behavior on an individual level, the population can be expected to exhibit the following responses to changes in noise levels as shown on Exhibit 2-B. A change of 3 dBA is considered *barely perceptible*, and changes of 5 dBA are considered *readily perceptible*. (5)

EXHIBIT 2-B: NOISE LEVEL INCREASE PERCEPTION



2.8 VIBRATION

Per the Federal Transit Administration (FTA) *Transit Noise and Vibration Impact Assessment Manual*, 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.

Additionally, in contrast to airborne noise, ground-borne vibration outdoors is not a common environmental problem and annoyance from ground-borne vibration is almost exclusively an indoor phenomenon (8). Therefore, the effects of vibrations should only be evaluated at a structure and the effects of the building structure on the vibration should be considered. Wood-frame buildings, such as typical residential structures, are more easily excited by ground vibration than heavier buildings. In contrast, large masonry buildings with spread footings have a low response to ground vibration (8). In general, the heavier a building is, the lower the response will be to the incident vibration energy. However, all structurers reduce vibration levels due to the coupling of the building to the soil.

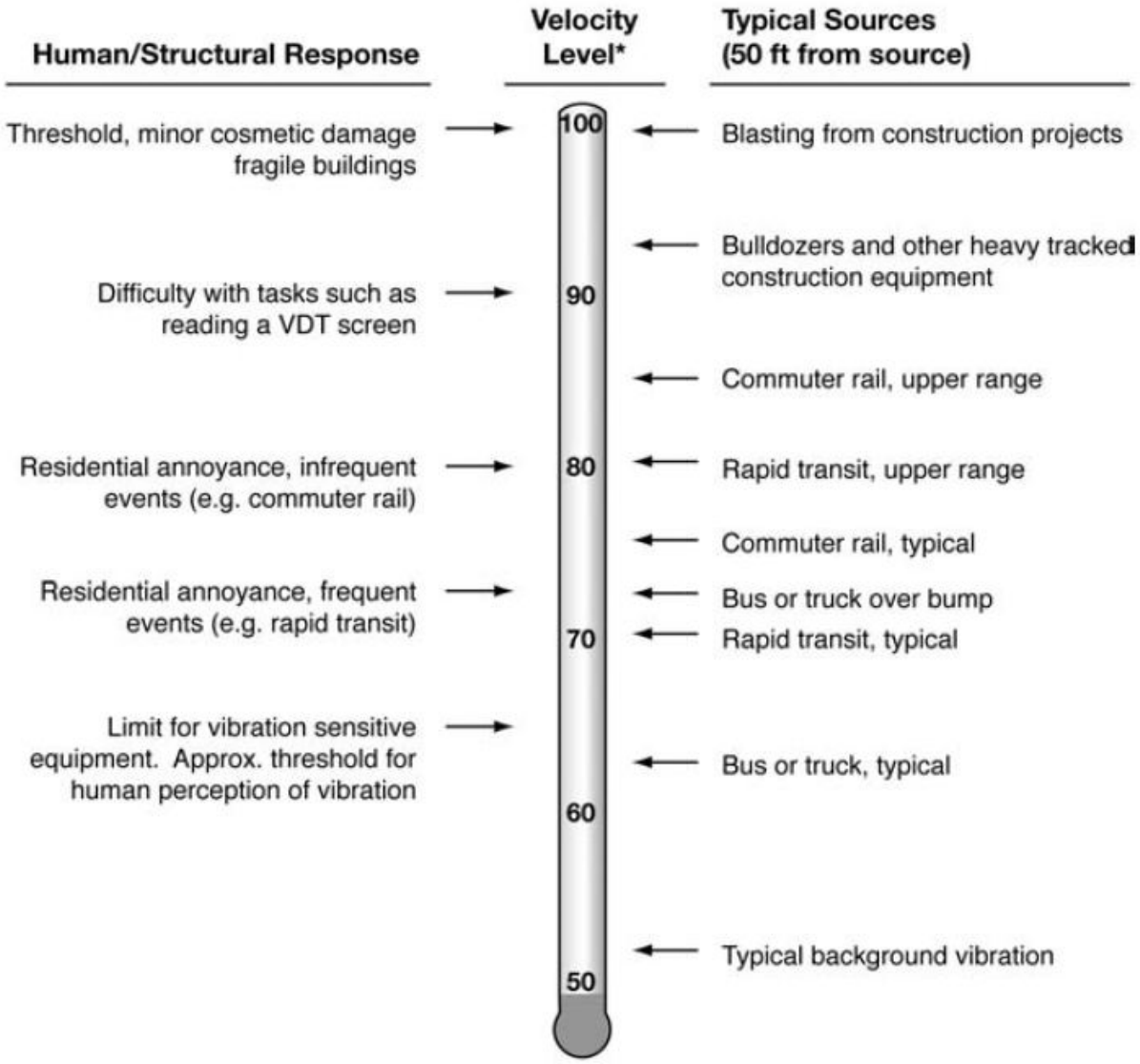
There are several different methods that are used to quantify vibration. The peak particle velocity (PPV) is defined as the maximum instantaneous peak of the vibration signal (8). The PPV is most frequently used to describe vibration impacts to buildings but is not always suitable for evaluating human 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 (8). However, the RMS amplitude and PPV are related mathematically, and the RMS amplitude of equipment is typically calculated from the PPV reference level. The RMS amplitude is approximately 70% of the PPV (9). Thus, either can be used on the description of vibration impacts.

While not universally accepted, vibration decibel notation (VdB) is another vibration notation developed and used by the FTA in their guidance manual to describe vibration levels and provide a background of common vibration levels and set vibration limits (10). Decibel notation (VdB) serves to reduce the range of numbers used to describe vibration levels and is used in this report to describe vibration levels.

As stated in the FTA guidance manual, 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 and Vibration Impact Assessment Manual.

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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 (11). The purpose of the Noise Element is to *limit the exposure of the community to excessive noise levels*. In addition, the California Environmental Quality Act (CEQA) requires that all known environmental effects of a project be analyzed, including environmental noise impacts (12).

3.2 STATE OF CALIFORNIA BUILDING CODE

The State of California's noise insulation standards for non-residential standards are codified in Title 24, Part 11, the California Green Building Standards Code Section 5.507.4, Acoustical Control. 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 assemblies must be used when buildings are developed near major transportation noise sources, and where such noise sources create an exterior noise level of 65 CNEL or higher. Acoustical studies that accompany building plans must demonstrate that the structure has been designed to limit interior noise in habitable rooms to acceptable noise levels. For new non-residential buildings, the acceptable interior noise limit in occupied spaces is 50 CNEL. CalGreen exempts "buildings with few or no occupants or where occupants are not likely to be affected by exterior noise, as determined by the enforcement authority, such as factories, stadiums, storage, enclosed parking structures and utility buildings."

3.3 CITY OF SAN DIEGO NOISE ELEMENT

The noise criteria identified in the City of San Diego Noise Element (Table NE-3) are guidelines to evaluate the land use compatibility of transportation related noise. The compatibility criteria, shown on Exhibit 3-A, provides the City with a planning tool to gauge the compatibility of land uses relative to existing and future exterior noise levels.

EXHIBIT 3-A: LAND USE - NOISE COMPATIBILITY GUIDELINES

Land Use Category	Exterior Noise Exposure (dBA CNEL) 60	65	70	75
Open Space and Parks and Recreational				
Community & Neighborhood Parks; Passive Recreation				
Regional Parks; Outdoor Spectator Sports, Golf Courses; Athletic Fields; Outdoor Spectator Sports, Water Recreational Facilities; Horse Stables; Park Maint. Facilities				
Agricultural				
Crop Raising & Farming; Aquaculture, Dairies; Horticulture Nurseries & Greenhouses; Animal Raising, Maintain & Keeping; Commercial Stables				
Residential				
Single Units; Mobile Homes; Senior Housing		45		
Multiple Units; Mixed-Use Commercial/Residential; Live Work; Group Living Accommodations *For uses affected by aircraft noise, refer to Policies NE-D.2. & NE-D.3.		45	45*	
Institutional				
Hospitals; Nursing Facilities; Intermediate Care Facilities; Kindergarten through Grade 12 Educational Facilities; Libraries; Museums; Places of Worship; Child Care Facilities		45		
Vocational or Professional Educational Facilities; Higher Education Institution Facilities (Community or Junior Colleges, Colleges, or Universities)		45	45	
Cemeteries				
Sales				
Building Supplies/Equipment; Food, Beverages & Groceries; Pets & Pet Supplies; Sundries, Pharmaceutical, & Convenience Sales; Wearing Apparel & Accessories			50	50
Commercial Services				
Building Services; Business Support; Eating & Drinking; Financial Institutions; Assembly & Entertainment; Radio & Television Studios; Golf Course Support			50	50
Visitor Accommodations		45	45	45
Offices				
Business & Professional; Government; Medical, Dental & Health Practitioner; Regional & Corporate Headquarters			50	50
Vehicle and Vehicular Equipment Sales and Services Use				
Commercial or Personal Vehicle Repair & Maintenance; Commercial or Personal Vehicle Sales & Rentals; Vehicle Equipment & Supplies Sales & Rentals; Vehicle Parking				
Wholesale, Distribution, Storage Use Category				
Equipment & Materials Storage Yards; Moving & Storage Facilities; Warehouse; Wholesale Distribution				
Industrial				
Heavy Manufacturing; Light Manufacturing; Marine Industry; Trucking & Transportation Terminals; Mining & Extractive Industries				
Research & Development				50

	Compatible	**Indoor Uses**	Standard construction methods should attenuate exterior noise to an acceptable indoor noise level. Refer to Section I.
		Outdoor Uses	Activities associated with the land use may be carried out.
	Conditionally Compatible	**Indoor Uses**	Building structure must attenuate exterior noise to the indoor noise level indicated by the number for occupied areas. Refer to Section I.
		Outdoor Uses	Feasible noise mitigation techniques should be analyzed and incorporated make the outdoor activities acceptable. Refer to Section I.
	Incompatible	**Indoor Uses**	New construction should not be undertaken.
		Outdoor Uses	Severe noise interference makes outdoor activities unacceptable.

Source: City of San Diego General Plan Noise Element, Table NE-3.

The Land Use Compatibility for Community Noise Exposure matrix describes categories of compatibility and not specific noise standards. (13) For conditionally compatible exterior noise levels, approaching 75 dBA CNEL for office land uses, building structures must attenuate exterior noise to the indoor noise level of 50 CNEL for occupied areas.

3.4 CITY OF SAN DIEGO NOISE ORDINANCE

While the City of San Diego General Plan Noise Element provides guidelines to assess transportation noise on sensitive land uses, the City Municipal Code Section 59.5.0401 has established noise level limits for operational (stationary) and construction related noise sources.

3.4.1 OPERATIONAL NOISE STANDARDS

Chapter 5, Public Safety, Morals, and Welfare-Article 9.5 of the City of San Diego Municipal Code contains the City's Noise Abatement and Control Ordinance. Table 3-1 outlines the operational noise standards in Section 59.5.0401 of the City of San Diego Noise Abatement and Control Ordinance (14):

A. It shall be unlawful for any person to cause noise by any means to the extent that the one-hour average sound level exceeds the applicable limit…

B. The sound level limit at a location on a boundary between two zoning districts is the arithmetic mean of the respective limits for the two districts…

TABLE 3-1: OPERATIONAL NOISE STANDARDS

City	Land Use	Exterior Noise Level Standards (dBA Leq)[3]		
		Daytime	Evening	Nighttime
City of San Diego[1]	Single-Family Residential	50	45	40
	Multi-Family Residential	55	50	45
	All Other Residential	60	55	50
	Commercial	65	60	60
	Industrial or Agricultural	75	75	75

[1] City of San Diego Municipal Code, Section 59.5.0401 (Appendix 3.1).
[2] L_{eq} represents a steady state sound level containing the same total energy as a time varying signal over a given period.
"Daytime" = 7:00 a.m. to 7:00 p.m.; "Evening" = 7:00 p.m. to 10:00 p.m.; "Nighttime" = 10:00 p.m. to 7:00 a.m.

The single-family noise level standards applicable at property lines are 50 dBA L_{eq} during the daytime, 45 dBA L_{eq} during the evening, and 45 dBA L_{eq} during the nighttime hours.

3.4.2 CONSTRUCTION NOISE STANDARDS

To control noise impacts associated with the construction of the proposed Project the City of San Diego has established limits in Section 59.5.0404 to the hours of construction and noise levels. Relevant to the Project, according to of the City's Noise Abatement and Control Ordinance:

A. It shall be unlawful for any person, between the hours of 7:00 P.M. of any day and 7:00 A.M. of the following day, or on legal holidays as specified in Section 21.0104 of the San

Diego Municipal Code, with exception of Columbus Day and Washington's Birthday, or on Sundays, to erect, construct, demolish, excavate for, alter or repair any building or structure in such a manner as to create disturbing, excessive or offensive noise unless a permit has been applied for and granted beforehand by the Noise Abatement and Control Administrator…

B. It shall be unlawful for any person, including the City of San Diego, to conduct any construction activity so as to cause, at or beyond the property lines of any property zoned residential, an average sound level greater than 75 decibels during the 12-hour period from 7:00 A.M. to 7:00 P.M.

3.5 AIRCRAFT NOISE

The San Diego County Regional Airport Authority (SDCRAA), serving as the Airport Land Use Commission, is responsible for the management and development of the Airport Land Use Compatibility Plan (ALUCP) for each public use and military airport in San Diego County. Each ALUCP identifies land use and noise level compatibility due to operations at airports as well as forecasted noise level contours based on future operations at each airport. These noise level contours and land use compatibility noise levels are used in determining whether a proposed land use is consistent with forecasted noise levels. Exhibits 3-A and 3-B presents the land uses and the compatible noise levels. The ALUCP for the Project Site is the San Diego International Airport (SDIA) ALUCP. The Project is within the SDIA Review area 2 and approximately 0.75 miles north of the 60 CNEL noise level contour.

3.6 CONSTRUCTION VIBRATION STANDARDS

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 complaints are 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. (15) Occasionally large bulldozers and loaded trucks can cause perceptible vibration levels at close proximity.

To analyze vibration impacts originating from the construction of the vibration-generating construction activities are appropriately evaluated against standards established under a City's Municipal Code, if such standards exist. However, the City of San Diego does not identify specific construction vibration level limits. Since the City of San Diego does not identify any construction related vibration standards, this analysis relies on the Caltrans *Transportation and Construction Vibration Guidance Manual*, (9 p. 38) Table 19 and 20, vibration damage and annoyance criteria are used in this noise study to assess potential temporary construction-related impacts at adjacent receiver locations.

BUILDING DAMAGE:

While ground vibrations from construction activities do not often reach the levels that can damage structures, fragile buildings must receive special consideration. The construction

vibration damage potential criteria include consideration of the building conditions. (4 p. 182) Table 3-2 describes the maximum acceptable transient and continuous vibration building damage potential levels by structure type and condition.

Exhibit 3-A: SDIA ALUCP Noise Compatibility Standards (1 of 2)

Land Use Category [a]	Noise Contour Range (dB CNEL)			
	60–65	65–70	70–75	75 +
RESIDENTIAL				
Single-Family, Multi-family	45	45[1]	45[1,2]	45[1,2]
Single Room Occupancy (SRO) Facility	45	45[1]	45[1,2]	45[1,2]
Group Quarters [b]	45	45[1]	45[1,2]	45[1,2]
COMMERCIAL, OFFICE, SERVICE, TRANSIENT LODGING				
Hotel, Motel, Resort	45/50	45/50	45/50	45/50
Office - Medical, Financial, Professional Services, Civic			50	50
Retail (e.g., Convenience Market, Drug Store, Pet Store)			50	50
Service - Low Intensity (e.g., Gas Station, Auto Repair, Car Wash)			50	50
Service - Medium Intensity (e.g., Check-cashing, Veterinary Clinics, Kennels, Personal Services)			50	50
Service - High Intensity (e.g., Eating, Drinking Establishment, Funeral Chapel, Mortuary)			50	50
Sport/Fitness Facility			50	50
Theater - Movie/Live Performance/Dinner		45	45	45
EDUCATIONAL, INSTITUTIONAL, PUBLIC SERVICES				
Assembly - Adult (Religious, Fraternal, Other)	45	45[1]	45[1]	45[1]
Assembly - Children (Instructional Studios, Cultural Heritage Schools, Religious, Other) [3]	45			
Cemetery				
Child Day Care Center/Pre-K	45			
Convention Center				
Fire and Police Stations			50	50
Jail, Prison		45/50	45/50	45/50
Library, Museum, Gallery		45	45	45
Medical Care - Congregate Care Facility, Nursing and Convalescent Home [b]	45			
Medical Care - Hospital	45			
Medical Care - Out-Patient Surgery Centers	45			
School for Adults – College, University, Vocational/Trade School	45	45[1]	45[1]	
School – Kindergarten through Grade 12 (Includes Charter Schools)	45			
INDUSTRIAL				
Junkyard, Dump, Recycling Center, Construction Yard				
Manufacturing/Processing - General				
Manufacturing/Processing of Biomedical Agents, Biosafety Levels 3 and 4 Only				
Manufacturing/Processing of Hazardous Materials [4]				
Mining, Extractive Industry				
Research and Development - Scientific, Technical				
Sanitary Landfill				
Self-storage Facility				
Warehousing/Storage - General				
Warehousing/Storage of Biomedical Agents, Biosafety Levels 3 and 4 Only				
Warehousing/Storage of Hazardous Materials [4]				

Exhibit 3-B: SDIA ALUCP Noise Compatibility Standards (2 of 2)

Land Use Category [a]	Noise Contour Range (dB CNEL)			
	60–65	65–70	70–75	75 +
TRANSPORTATION, COMMUNICATION, UTILITIES				
Auto Parking				
Electrical Power Generation Plant				
Electrical Substation				
Emergency Communications Facilities				
Marine Cargo Terminal				
Marine Passenger Terminal				
Transit Center, Bus/Rail Station				
Transportation, Communication, Utilities - General				
Truck Terminal				
Water, Wastewater Treatment Plant				
RECREATION, PARK, OPEN SPACE				
Arena, Stadium				
Golf Course				
Golf Course Clubhouse				
Marina				
Park, Open Space, Recreation				
AGRICULTURE				
Aquaculture				
Agriculture				

LEGEND	
	Compatible: Use is permitted.
	Conditionally Compatible: Use is permitted subject to stated conditions.
	Incompatible: Use is not permitted under any circumstances.
45	Indoor uses: building must be capable of attenuating exterior noise to 45 dB CNEL.
50	Indoor uses: building must be capable of attenuating exterior noise to 50 dB CNEL.
45/50	Sleeping rooms must be attenuated to 45 dB CNEL and any other indoor areas must be attenuated to 50 dB CNEL.
1	Avigation easement must be dedicated to the Airport owner/operator.
2	New residential use is permitted above the 70 dB CNEL contour only if the current General/Community Plan designation allows for residential use. General/Community Plan amendments from a nonresidential designation to a residential designation are not permitted.
3	Refer to Appendix A for definition of Assembly - Children.
4	Refer to Appendix A for definitions of manufacturing, processing and storage of hazardous materials.
a	Land uses not specifically listed shall be evaluated, as determined by the ALUC, using the criteria for similar uses. Refer to Appendix A.
b	If this land use would occur within a single- or multi-family residence, it must be evaluated using the criteria for single- or multi-family residential.

TABLE 3-2: BUILDING DAMAGE VIBRATION CRITERIA

Structure and Condition	Maximum Transient Vibration Levels PPV (in/sec)	Maximum Continuous Vibration Levels PPV (in/sec)
Extremely fragile historic buildings	0.12	0.08
Fragile buildings	0.2	0.1
Historic and some old buildings	0.5	0.25
Older residential structures	0.5	0.3
New residential structures	1.0	0.5
Modern industrial/commercial buildings	2.0	0.5

Caltrans Transportation and Construction Vibration Guidance Manual, April 2020, Tables 19, p. 38.

Based on a review of aerial photography, the residential building near the Project Site were developed prior to 1994 and thus can described as older residential structures with a maximum acceptable transient vibration threshold of 0.5 PPV (in/sec). There is no other vibration-sensitive use or equipment known in the vicinity of the project.

HUMAN ANNOYANCE

For sensitive residential receiver locations, potential annoyance due to construction-related vibration levels is evaluated based on the Caltrans annoyance potential criteria. Table 3-3 describes the maximum acceptable criteria used to describe the transient and continuous sources of vibration. To describe the human annoyance due to construction vibration levels, this analysis relies on the distinctly perceptible maximum transient vibration threshold of 0.25 PPV (in/sec).

TABLE 3-3: HUMAN ANNOYANCE VIBRATION CRITERIA

Human Response	Maximum Transient Vibration Levels PPV (in/sec)	Maximum Continuous Vibration Levels PPV (in/sec)
Barely perceptible	0.04	0.01
Distinctly perceptible	0.25	0.04
Strongly perceptible	0.9	0.10
Severe	2.0	0.4

Caltrans Transportation and Construction Vibration Guidance Manual, April 2020, Tables 20, p. 38.

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4 SIGNIFICANCE CRITERIA

The following significance criteria are based on guidance provided by the City of San Diego CEQA Significance Determination Thresholds. For the purposes of this report, impacts would be potentially significant if the Project results in or causes:

1. Expose people or sensitive receptors to potential health hazards (e.g., exposing sensitive receptors to hazardous materials in industrial areas);
2. Result in a project located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, create a significant hazard to the public or environment;
3. Impair implementation of, or physically interfere with an adopted emergency response plan or emergency evacuation plan;
4. Expose people or structures to a significant risk of loss, injury, or death involving wildland fires, including when wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands;
5. Result in hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within a quarter-mile of an existing or proposed school; or
6. Result in a safety hazard for people residing or working in a designated airport influence area.

4.1 SIGNIFICANCE CRITERIA SUMMARY

TRAFFIC NOISE

Per the City Significance Determination Thresholds, traffic noise impacts would be considered significant if any of the following occur as a direct result of the proposed development. Table 4-1 presents a summary of the City's traffic noise significance criteria.

TABLE 4-1: TRAFFIC NOISE SIGNIFICANCE CRITERIA

Structure of Proposed Use that would be Impacted by Traffic Noise	Interior Space (CNEL)	Exterior Useable Space (CNEL)	General Indication of Potential Significance
Single-family detached	45 dB	65 dB	Structure or outdoor useable area is <50 feet from the center of the closest (outside) lane on a street with existing or future ADTs >7,500
Multi-family, school, library, hospital, day care center, hotel, motel, park, convalescent home	Development Services Department ensures 45 dB pursuant to Title 24	65 dB	
Office, church, business, professional uses	n/a	70 dB	Structure or outdoor useable area is <50 feet from the center of the closest lane on a street with existing or future ADTs >20,000
Commercial, retail, industrial, outdoor spectator sports uses	n/a	75 dB	Structure or outdoor useable area is <50 feet from the center of the closest lane on a street with existing or future ADTs >40,000

In addition to the criteria in Table 4-1, per the Encanto EIR, "if an area is already exposed to noise levels in excess of the land use compatibility guidelines" and "noise levels were to result in greater than a 3 dB(A) increase, then the impact would be considered significant. If an area is currently exposed to noise levels that do not exceed the land use compatibility guidelines and noise levels were to result in greater than a 5 dB(A) increase, then the impact would be considered significant."

AIRCRAFT NOISE

The City Significance Determination Thresholds relative to aircraft noise impacts are primarily focused on noise impacts from San Diego Internal Airport (SDIA) and noise sensitive land uses such as residences, hospitals, schools, and daycare centers. The San Diego County Airport Land Use Commission has developed an Airport Land Use Compatibility Plan (ALUCP) for SDIA (16). The SDIA ALUCP provides aircraft noise levels contours, the airport influence zones, and a land use compatibility table for assessing noise impacts to various land uses. The land use compatibility table of the SDIA ALUCP in shown as Table 3-2. The Project is within the SDIA Review area 2 and approximately 0.75 miles north of the 60 CNEL noise level contour.

STATIONARY NOISE SOURCES

Per the City Significance Determination Guidelines, operational noise levels would be considered significant if they exceed the noise level limits shown in Table 3-1 at the property line of the Project site. Further the thresholds state "If a non-residential use, such as a commercial, industrial, or school use, is proposed to abut an existing residential use, the decibel level at the property line should be the arithmetic mean of the decibel levels allowed for each use as set forth

in Section 59.5.0401 of the Municipal Code. Although the noise level above could be consistent with the City's Noise Ordinance Standards, a noise level above 65 dB (A) CNEL at the residential property line could be considered a significant environmental impact." An area is currently exposed to noise levels that do not exceed the land use compatibility guidelines and noise levels were to result in greater than a 5 dB(A) increase, then the impact would be considered significant.

CONSTRUCTION NOISE

Per the City Significance Determination Guidelines, "construction noise levels measured at or beyond the property lines of any property zoned residential shall not exceed an average sound level greater than 75 dBA L_{eq} during the period of 7:00 a.m. to 7:00 p.m. In addition, construction activity that would create disturbing, excessive, or offensive noise is prohibited between the hours of 7:00 p.m. of any day and 7:00 a.m. of the following day, or on legal holidays as specified in Section 21.04 of the San Diego Municipal Code, with exception of Columbus Day and Washington's Birthday, or on Sundays. Construction may occur during these periods only if a permit has been applied for and granted beforehand by the Noise Abatement and Control Administrator, in conformance with San Diego Municipal Code Section 59.5.0404. Additionally, where temporary construction noise would substantially interfere with normal business communication, or affect sensitive receptors, such as day care facilities, a significant noise impact may be identified.

CONSTRUCTION VIBRATION

If Project-related construction activities create vibration levels which exceed the Caltrans guidelines for the maximum-acceptable vibration criteria of 0.5 in/sec for older residential uses or 0.25 PPV in/sec for Human annoyance, the vibration may be considered significant. Vibration thresholds are summarized in Table 4-2.

TABLE 4-2: CONSTRUCTION NOISE AND VIBRATION SIGNIFICANCE CRITERIA

Analysis	Condition(s)	Significance Criteria	
		Daytime	Nighttime
Construction	Exempt from the exterior noise level standards between the hours of 7:00 p.m. and 7:00 a.m. on weekdays, between the hours of 5:00 p.m. and 8:00 a.m. on Saturdays, or at any time on Sunday or a federal holiday. Construction is not allowed outside these hours without a permit.[1]		
	Noise Level Threshold[1]	75 dBA L_{eq} at Nearest Residential Property Line	n/a
		Increase ambient by 10 dBA L_{eq}	n/a
	Structural Vibration Level Threshold[2]	0.5 PPV (in/sec)	n/a
	Annoyance Vibration Level Threshold[2]	0.25 PPV (in/sec)	n/a

[1] City of San Diego Municipal Code Section 59.5.0404

[2] Caltrans Transportation and Construction Vibration Manual, April 2020 Table 19.

"Daytime" = 7:00 a.m. - 10:00 p.m.; "Nighttime" = 10:00 p.m. - 7:00 a.m.; "PPV" = Peak Particle Velocity

NOISE/LAND USE COMPATIBILITY

Per the City Significance Determination Guidelines, noise is one factor to be considered in determining whether a land use is compatible. Land use compatibility noise factors are presented in Exhibit 3-A. Based on Exhibit 3-A, the Project would be compatible with noise levels up to 60 dBA CNEL, conditionally compatible with noise levels up to 65 dBA CNEL, and incompatible with noise levels over 65 dBA CNEL. Under the conditionally compatible criteria, the structure must be capable of reducing interior noise levels to 45 dBA CNEL or less.

5 EXISTING NOISE LEVEL MEASUREMENTS

To assess the existing noise level environment, 24-hour noise level measurements were taken at four locations in the vicinity of the Project site. The receiver locations were selected to describe and document the existing noise environment in the vicinity of Project site. Exhibit 5-A provides the boundaries of the Project site and the noise level measurement locations. To fully describe the existing noise conditions, noise level measurements were collected by Urban Crossroads, Inc. on Monday, November 13th, 2023. 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. (17)

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 Federal Transit Authority (FTA) recognize that it is not reasonable to collect noise level measurements that can fully represent every part of a private yard, patio, deck, or balcony normally used for human activity when estimating impacts for new development projects. This is demonstrated in the Caltrans general site location guidelines which indicate that, *sites must be free of noise contamination by sources other than sources of interest. Avoid sites located near sources such as barking dogs, lawnmowers, pool pumps, and air conditioners unless it is the express intent of the analyst to measure these sources*. (3) 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*. (18)

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. (18) 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. Noise measurement locations in the Project study area are described below and shown on Exhibit 5-A.

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.

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

Location[1]	Description	Energy Average Noise Level (dBA L_{eq})[2]	
		Daytime	Nighttime
L1	Located south of the Project site near single-family residence at 5960 Old Memory Lane.	57.4	50.2
L2	Located south of the Project site near an existing residence at 5796 Old Memory Lane	54.2	52.6
L3	Located west of the Project site in the Emerald Hills Park south of the tennis court.	60.4	65.1
L4	Located north of the Project site at an existing residence at 5787 Tooley Street	54.0	53.4
L5	Located north of the Project site near an existing residence at 5909 Tooley Street	54.7	52.2
L6	Located east of the Project site near an existing residence at 6005 Dipper Street	56.1	54.4

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

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.

EXHIBIT 5-A: NOISE MEASUREMENT LOCATIONS

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6 TRAFFIC NOISE METHODS AND PROCEDURES

The following section outlines the methods and procedures used to estimate and analyze the future traffic noise environment. Consistent with OPR land use/noise compatibility standards, all transportation related noise levels are presented in terms of the 24-hour CNEL's.

6.1 FHWA TRAFFIC NOISE PREDICTION MODEL

The expected roadway noise level increases from vehicular traffic were calculated by Urban Crossroads, Inc. using a computer program that replicates the Federal Highway Administration (FHWA) Traffic Noise Model- FHWA TNM. (19) FHWA TNM arrives at a predicted noise level through a series of adjustments to the Reference Energy Mean Emission Level (REMEL). 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 OFF-SITE TRAFFIC NOISE PREDICTION MODEL INPUTS

Table 6-1 identifies the twelve off-site study area roadway segments, the distance from the centerline to adjacent land use based on the functional roadway classifications per the City of San Diego Encanto Community Plan and the posted vehicle speeds. Consistent with the Emerald Hills Local Mobility Analysis prepared by Urban Crossroads, Inc., the off-site traffic noise analysis includes the following traffic scenarios (20).

- Existing without Project
- Existing with Project
- Opening Year Cumulative (2028) without Project
- Opening Year Cumulative (2028) with Project

The average daily traffic (ADT) volumes used for this study are presented in Table 6-2. Based on the Emerald Hills Local Mobility Analysis, the Project is anticipated to generate a total of 1,107 trips per day. (20) Table 6-3 presents the time-of-day vehicle splits by vehicle type and roadway classification, and Table 6-4 presents the total traffic flow distributions (vehicle mixes) used for this analysis. The vehicle mix provides the hourly distribution percentages of automobiles, medium trucks, and heavy trucks for input into the FHWA Model based on roadway types.

TABLE 6-1: OFF-SITE ROADWAY PARAMETERS

ID	Roadway	Segment	Receiving Land Use[1]	Classification[2]	Centerline Distance to Receiving Land Use (Feet)[2]	Vehicle Speed (mph)
1	60th St	s/o Federal Blvd	Residential	Collector	18	30
2	60th St	n/o Project Entrance	Residential	Collector	18	30
3	60th St	n/o Imperial Ave	Residential	Collector	18	30
4	Federal Blvd	w/o 60th St	Residential	Collector	41	40
5	Federal Blvd	e/o 60th St	Residential	Collector	41	40
6	Imperial Ave	w/o 60th St	Residential	Major Arterial	38	35
7	Imperial Ave	e/o 60th St	Residential	Major Arterial	38	35

[1] Based on a review of existing aerial imagery. Noise-sensitive uses are limited to existing residential land uses.
[2] City of San Diego Encanto Community Plan.

TABLE 6-2: AVERAGE DAILY TRAFFIC VOLUMES

ID	Roadway	Segment	Existing (2023)	Opening Year Cumulative (2027)		
			Without Project	With Project	Without Project	With Project
1	60th St	s/o Federal Blvd	10,043	10,541	10,412	10,910
2	60th St	n/o Project Entrance	7,339	7,837	7,654	8,152
3	60th St	n/o Imperial Ave	10,225	10,747	10,597	11,119
4	Federal Blvd	w/o 60th St	23,665	24,041	24,250	24,626
5	Federal Blvd	e/o 60th St	19,529	19,651	19,976	20,098
6	Imperial Ave	w/o 60th St	16,427	16,627	17,234	17,434
7	Imperial Ave	e/o 60th St	20,040	20,362	21,087	21,409

[1] Emerald Hills Local Mobility Analysis, Urban Crossroads, Inc. 2024

TABLE 6-3: ON-SITE ROADWAY PARAMETERS

Roadway Segment	Time of Day Vehicle Distribution[1]			
	Daytime	Evening	Nighttime	Total
All	80%	10%	10%	100%

[1] City of San Diego, Noise Analysis for the Southeastern San Diego and Encanto Neighborhoods Community Plan Updates
"Daytime" = 7:00 a.m. to 7:00 p.m.; "Evening" = 7:00 p.m. to 10:00 p.m.; "Nighttime" = 10:00 p.m. to 7:00 a.m.

TABLE 6-4: TIME OF DAY VEHICLE SPLITS

Roadway	Total % Traffic Flow			Total
	Autos	Medium Trucks	Heavy Trucks	
SR-94[1]	96.25%	2.73%	1.02%	100.00%
60th Street[2]	97.42%	1.84%	0.74%	100.00%

[1] Caltrans 2022 Truck Traffic Census on SR-94.
[2] County of San Diego Guidelines for Determining Significance for Noise - Appendix C: Screening Criteria for Potential Adverse Traffic Noise Effects, January 2009.

6.2 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 in Table 6-5. Based on the City of San Diego Encanto Community Plan, 6th Street, is classified as a collector, and State Route 94 (SR-94) is classified as a freeway. (21)

TABLE 6-5: TRAFFIC FLOW BY VEHICLE TYPE (VEHICLE MIX)

Roadway	Lanes	Classification[1]	Average Daily Traffic Volume	Posted Speed Limits (mph)	Site Conditions
SR-94[2]	8	Freeway	122,200	65	Hard
60th Street[3]	2	Collector	11,119	25	Hard

[1]City of San Diego, Encanto Community Plan
[2] SANDAG Transportation Forecast Information Center, Year 2050, version ABM2+/2021 RP.
[3] Emerald Hills Local Mobility Analysis, Urban Crossroads.

Future average daily traffic volumes, shown in Table 6-5, were obtained from the San Diego Association of Governments Transportation Forecast Information Center and the Emerald Hills Local Mobility Analysis prepared by Urban Crossroads. (20) The vehicle speed is based on the posted speed limits for 60th Street and SR-94. Hard site conditions were conservatively used to analyze the traffic noise impacts within the Project study area which account for the sound propagation loss over hard surfaces.

To predict the future noise environment at the Project buildings and within the private outdoor use areas (backyards), coordinate information was collected to identify the noise transmission path between the noise source and receiver. The site plan is used to identify the relationship between the roadway centerline and the centerline distance to the building façade and the pad elevations. Roadway elevations were collected from NearMap Lidar Data (22). The first-floor exterior noise level receivers were assumed to be located five feet above the ground elevation. Second-floor receivers were assumed to be located 14 feet above the ground elevation.

7 OFF-SITE TRANSPORTATION NOISE IMPACTS

As described in Section 4.1, the off-site traffic noise impacts are evaluated based on noise level increases resulting from the Project. 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. To assess the off-site transportation CNEL noise level impacts associated with the development of the proposed Project, noise contours were developed for each of the project scenarios outlined in the Emerald Hills Local Mobility Analysis prepared by Urban Crossroads, Inc. (20) Noise contour boundaries represent equal levels of noise exposure and are measured in CNEL from the center of the roadway.

7.1 TRAFFIC NOISE CONTOURS

Noise contours were used to assess the Project's incremental 24-hour dBA CNEL 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 CNEL 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 the 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 through 7-4 present a summary of the exterior dBA CNEL traffic noise levels. Twelve roadway segments are analyzed in each of the following scenarios: Existing without and with the Project and Opening Year Cumulative (2028) without and with the Project. Appendix 7.1 includes a summary of the dBA CNEL traffic noise level contours for each of the traffic scenarios.

TABLE 7-1: EXISTING (2023) WITHOUT PROJECT NOISE CONTOURS

ID	Road	Segment	Receiving Land Use[1]	CNEL at Nearest Receiving Land Use (dBA)[2]	Distance to Contour from Centerline (Feet)		
					65 dBA CNEL	60 dBA CNEL	55 dBA CNEL
1	60th St	s/o Federal Blvd	Residential	69.1	34	73	156
2	60th St	n/o Project Entrance	Residential	67.7	27	59	127
3	60th St	n/o Imperial Ave	Residential	69.2	34	73	158
4	Federal Blvd	w/o 60th St	Residential	71.2	106	229	493
5	Federal Blvd	e/o 60th St	Residential	70.4	93	201	434
6	Imperial Ave	w/o 60th St	Residential	69.2	72	156	335
7	Imperial Ave	e/o 60th St	Residential	70.0	82	178	383

[1] Based on a review of existing aerial imagery. Noise-sensitive uses are limited to existing residential land uses.
[2] The CNEL is calculated at the boundary of the right-of-way of each roadway and the property line of the nearest receiving land use.
"RW" = Location of the respective noise contour falls within the right-of-way of the road.

TABLE 7-2: EXISTING (2023) WITH PROJECT NOISE CONTOURS

ID	Road	Segment	Receiving Land Use[1]	CNEL at Nearest Receiving Land Use (dBA)[2]	Distance to Contour from Centerline (Feet)		
					65 dBA CNEL	60 dBA CNEL	55 dBA CNEL
1	60th St	s/o Federal Blvd	Residential	69.3	35	75	161
2	60th St	n/o Project Entrance	Residential	68.0	29	61	132
3	60th St	n/o Imperial Ave	Residential	69.4	35	76	164
4	Federal Blvd	w/o 60th St	Residential	71.3	107	231	498
5	Federal Blvd	e/o 60th St	Residential	70.4	94	202	436
6	Imperial Ave	w/o 60th St	Residential	69.2	73	157	338
7	Imperial Ave	e/o 60th St	Residential	70.1	83	179	387

[1] Based on a review of existing aerial imagery. Noise-sensitive uses are limited to existing residential land uses.
[2] The CNEL is calculated at the boundary of the right-of-way of each roadway and the property line of the nearest receiving land use.
"RW" = Location of the respective noise contour falls within the right-of-way of the road.

TABLE 7-3: OPENING YEAR CUMULATIVE (2027) WITHOUT PROJECT NOISE CONTOURS

ID	Road	Segment	Receiving Land Use[1]	CNEL at Nearest Receiving Land Use (dBA)[2]	Distance to Contour from Centerline (Feet)		
					65 dBA CNEL	60 dBA CNEL	55 dBA CNEL
1	60th St	s/o Federal Blvd	Residential	69.2	34	74	160
2	60th St	n/o Project Entrance	Residential	67.9	28	61	130
3	60th St	n/o Imperial Ave	Residential	69.3	35	75	162
4	Federal Blvd	w/o 60th St	Residential	71.3	108	233	501
5	Federal Blvd	e/o 60th St	Residential	70.5	95	204	441
6	Imperial Ave	w/o 60th St	Residential	69.4	75	161	346
7	Imperial Ave	e/o 60th St	Residential	70.3	85	184	396

[1] Based on a review of existing aerial imagery. Noise-sensitive uses are limited to existing residential land uses.
[2] The CNEL is calculated at the boundary of the right-of-way of each roadway and the property line of the nearest receiving land use.
"RW" = Location of the respective noise contour falls within the right-of-way of the road.

TABLE 7-4: OPENING YEAR CUMULATIVE (2027) WITH PROJECT NOISE CONTOURS

ID	Road	Segment	Receiving Land Use[1]	CNEL at Nearest Receiving Land Use (dBA)[2]	Distance to Contour from Centerline (Feet)		
					65 dBA CNEL	60 dBA CNEL	55 dBA CNEL
1	60th St	s/o Federal Blvd	Residential	69.4	36	77	165
2	60th St	n/o Project Entrance	Residential	68.2	29	63	136
3	60th St	n/o Imperial Ave	Residential	69.5	36	78	167
4	Federal Blvd	w/o 60th St	Residential	71.4	109	235	507
5	Federal Blvd	e/o 60th St	Residential	70.5	95	205	442
6	Imperial Ave	w/o 60th St	Residential	69.4	75	162	349
7	Imperial Ave	e/o 60th St	Residential	70.3	86	186	400

[1] Based on a review of existing aerial imagery. Noise-sensitive uses are limited to existing residential land uses.
[2] The CNEL is calculated at the boundary of the right-of-way of each roadway and the property line of the nearest receiving land use.
"RW" = Location of the respective noise contour falls within the right-of-way of the road.

7.2 EXISTING PROJECT TRAFFIC NOISE LEVELS

Table 7-1 shows the existing without Project exterior noise levels are expected to range from 67.7 to 71.2 dBA CNEL. Table 7-2 shows the Existing with Project conditions will range from 68.0 to 71.3 dBA CNEL. The noise level contours do not account for any noise attenuation features such as noise barriers or topography. Table 7-5 shows that the Project off-site traffic noise level increases will range from less than 0.1 to 0.3 dBA CNEL. Based on the significance criteria for off-

site traffic noise presented in Table 4-1, land uses adjacent to the study area roadway segments would experience *less than significant* noise level increases on receiving land uses due to the Project-related traffic.

7.3 OPENING YEAR CUMULATIVE (2028) TRAFFIC NOISE LEVEL INCREASES

Table 7-3 shows the Opening Year Cumulative (2028) without Project noise levels are expected to range from 67.9 to 68.2 dBA CNEL. Table 7-4 shows the Opening Year Cumulative (2028) with Project noise levels will range from 68.2 to 71.4 dBA CNEL. Table 7-6 shows that the Project's contribution to cumulative off-site traffic noise level increases would range from less than 0.1 to 0.3 dBA CNEL. Based on the significance criteria for off-site traffic noise presented in Table 4-1, land uses adjacent to the study area roadway segments would experience *less than significant* noise level increases on receiving land uses due to the Project-related traffic. Therefore, impacts would be considered a *less than significant* and *not cumulatively considerable*.

TABLE 7-5: EXISTING WITH PROJECT TRAFFIC NOISE INCREASES

ID	Road	Segment	Receiving Land Use[1]	CNEL at Receiving Land Use (dBA)[2]			Incremental Noise Level Increase Threshold[3]	
				No Project	With Project	Project Addition	Significance Thresholds	Exceeded?
1	60th St	s/o Federal Blvd	Residential	69.1	69.3	0.2	3.0	No
2	60th St	n/o Project Entrance	Residential	67.7	68.0	0.3	3.0	No
3	60th St	n/o Imperial Ave	Residential	69.2	69.4	0.2	3.0	No
4	Federal Blvd	w/o 60th St	Residential	71.2	71.3	0.1	3.0	No
5	Federal Blvd	e/o 60th St	Residential	70.4	70.4	0.0	3.0	No
6	Imperial Ave	w/o 60th St	Residential	69.2	69.2	0.0	3.0	No
7	Imperial Ave	e/o 60th St	Residential	70.0	70.1	0.1	3.0	No

[1] Based on a review of existing aerial imagery. Noise-sensitive uses are limited to existing residential land uses.
[2] The CNEL is calculated at the boundary of the right-of-way of each roadway and the property line of the receiving land use.
[3] Does the Project create an incremental noise level increase exceeding the significance criteria (Table 4-1)?

TABLE 7-6: OPENING YEAR CUMULATIVE (2028) WITH PROJECT TRAFFIC NOISE INCREASES

ID	Road	Segment	Receiving Land Use[1]	CNEL at Receiving Land Use (dBA)[2]			Incremental Noise Level Increase Threshold[3]	
				No Project	With Project	Project Addition	Significance Thresholds	Exceeded?
1	60th St	s/o Federal Blvd	Residential	69.2	69.4	0.2	3.0	No
2	60th St	n/o Project Entrance	Residential	67.9	68.2	0.3	3.0	No
3	60th St	n/o Imperial Ave	Residential	69.3	69.5	0.2	3.0	No
4	Federal Blvd	w/o 60th St	Residential	71.3	71.4	0.1	3.0	No
5	Federal Blvd	e/o 60th St	Residential	70.5	70.5	0.0	3.0	No
6	Imperial Ave	w/o 60th St	Residential	69.4	69.4	0.0	3.0	No
7	Imperial Ave	e/o 60th St	Residential	70.3	70.3	0.0	3.0	No

[1] Based on a review of existing aerial imagery. Noise-sensitive uses are limited to existing residential land uses.
[2] The CNEL is calculated at the boundary of the right-of-way of each roadway and the property line of the receiving land use.
[3] Does the Project create an incremental noise level increase exceeding the significance criteria (Table 4-1)?

8 ON-SITE TRANSPORTATION NOISE IMPACTS

The Encanto Community Plan Land Use section includes noise level contours for planning purposes. Based on Figure 2-5, the Project site may be exposed to noise levels ranging from 60 dBA CNEL to 70 CNEL in the future at the buildout of the community plan. According to the Encanto Community Plan, "Future noise levels are expected to often exceed 65 dB CNEL, which is a generally acceptable level of noise when outdoors." The Encanto Community Plan acknowledges that "Noise levels exceed the 65 dB CNEL…in parts of Encanto Neighborhoods today." Additionally, based on noise level measurements disclosed in Chapter 5, noise levels at the project site are exposed to noise levels around 60 dBA CNEL to 65 dBA CNEL.

An on-site exterior noise analysis has been completed to determine the noise exposure levels that would result from adjacent transportation noise sources to the noise-sensitive residential land use and to identify potential noise abatement measures that would achieve acceptable Project exterior and interior noise levels. The primary source of transportation noise affecting the Project site is anticipated to be from 60th Street and SR-94.

8.1 ON-SITE EXTERIOR NOISE ANALYSIS

Using the FHWA traffic noise prediction model and the parameters outlined in Tables 6-1 to 6-3, the expected future exterior noise levels for private outdoor living areas were calculated. Table 8-1 summarizes future exterior noise levels in the private outdoor living areas (backyards) within the Project lots. The on-site traffic noise level impacts indicate that the private outdoor living areas facing 60th Street and SR-94 will experience unmitigated exterior noise levels from traffic ranging from 55.6 to 68.9 dBA CNEL. The on-site traffic noise analysis calculations are provided in Appendix 8.1.

This noise analysis shows that the Project will be exposed to "normally acceptable" exterior noise level standards for single-family residential land uses at lots along 60th Street. However, lots nearest SR-94 would be exposed to "conditionally compatible" noise conditions, requiring that new construction or development conduct a "detailed noise analysis of the noise reduction requirements are made and needed noise insulation features are included in the design. Conventional construction, but with closed windows and fresh air supply systems or air conditioning will normally suffice." (23) Therefore, the following interior noise analysis has been completed to demonstrate the "needed noise insulation features are included in the design."

8.2 AIRCRAFT NOISE LEVEL ANALYSIS

The SDIA ALUCP noise level contours shown in Exhibit 3-E indicate the Project site is approximately 0.75 south of the Project site. Thus, the Project would not be exposed to aircraft noise in excess of 60 dBA CNEL. Therefore, the exterior airport noise levels at the Project site would be compatible with the City of San Diego standards and impacts would be *less than significant*.

TABLE 8-1: EXTERIOR NOISE LEVELS (CNEL)

Location	Roadway	Unmitigated Noise Level Back Yard (dBA CNEL)[1]	Unmitigated Noise Level 1st Floor (dBA CNEL)[1]	Unmitigated Noise Level 2nd Floor (dBA CNEL)[1]
O1	SR-94	68.8	68.7	68.7
O2	SR-94	68.9	68.9	68.9
O3	SR-94	68.9	68.8	68.8
O4	SR-94	68.8	68.8	68.8
O5	SR-94	68.8	68.7	68.7
O6	60th Street	55.6	55.4	55.4
O7	60th Street	56.6	51.1	56.3
O8	60th Street	56.6	50.9	56.3
O9	60th Street	56.5	50.8	56.2
O10	60th Street	56.6	56.4	56.3

[1] On-site traffic noise level calculations are included in Appendix 8.1.

8.3 ON-SITE INTERIOR NOISE ANALYSIS

The future noise levels were calculated at the building façades to ensure that the interior noise levels comply with the City of San Diego 45 dBA CNEL interior noise standards.

The interior noise level is the difference between the predicted exterior noise level at the building façade and the noise reduction of the structure. Typical building construction will provide a Noise Reduction (NR) of approximately 12 dBA with "windows open" and a minimum 25 dBA noise reduction with "windows closed." (5) 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] exterior wall/roof assembles free of cut outs or openings; and [4] mechanical ventilation/air conditioning.

8.3.1 INTERIOR NOISE LEVEL ASSESSMENT

Table 8-2 shows that the units facing 60th Street and SR-94 will experience future unmitigated noise levels ranging from 50.8 to 68.9 dBA CNEL at the private outdoor use spaces, with interior noise levels ranging from 25.8 to 43.9 CNEL. Table 8-3 shows that the second-floor units facing 60th Street and SR-94 will experience future unmitigated exterior noise levels ranging from 55.4 to 68.9 dBA CNEL at the building façade, with interior noise levels ranging from 30.4 to 43.9 CNEL. The interior noise level analysis shows that the City of San Diego 45 dBA CNEL with windows closed interior noise standards can be satisfied at all locations using standard construction and standard windows with a minimum STC rating of 27. As analyzed in this report, the Project will provide air conditioning for all units. Therefore, the interior noise analysis shows that with the provided air conditioning, the Project will satisfy the City of San Diego 45 dBA CNEL windows closed interior noise level standards for residential development.

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

Location	Roadway	Noise Level at Façade[1]	Required Interior NR[2]	Estimated Interior NR[3]	Upgraded Windows[4]	Interior Noise Level[5]	Threshold	Threshold Exceeded?
O1	SR-94	68.7	23.7	25.0	No	43.7	45	No
O2	SR-94	68.9	23.9	25.0	No	43.9	45	No
O3	SR-94	68.8	23.8	25.0	No	43.8	45	No
O4	SR-94	68.8	23.8	25.0	No	43.8	45	No
O5	SR-94	68.7	23.7	25.0	No	43.7	45	No
O6	60th Street	55.4	10.4	25.0	No	30.4	45	No
O7	60th Street	51.1	6.1	25.0	No	26.1	45	No
O8	60th Street	50.9	5.9	25.0	No	25.9	45	No
O9	60th Street	50.8	5.8	25.0	No	25.8	45	No
O10	60th Street	56.4	11.4	25.0	No	31.4	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] Estimated minimum interior noise reduction.
[4] Does the required interior noise reduction trigger upgraded 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)

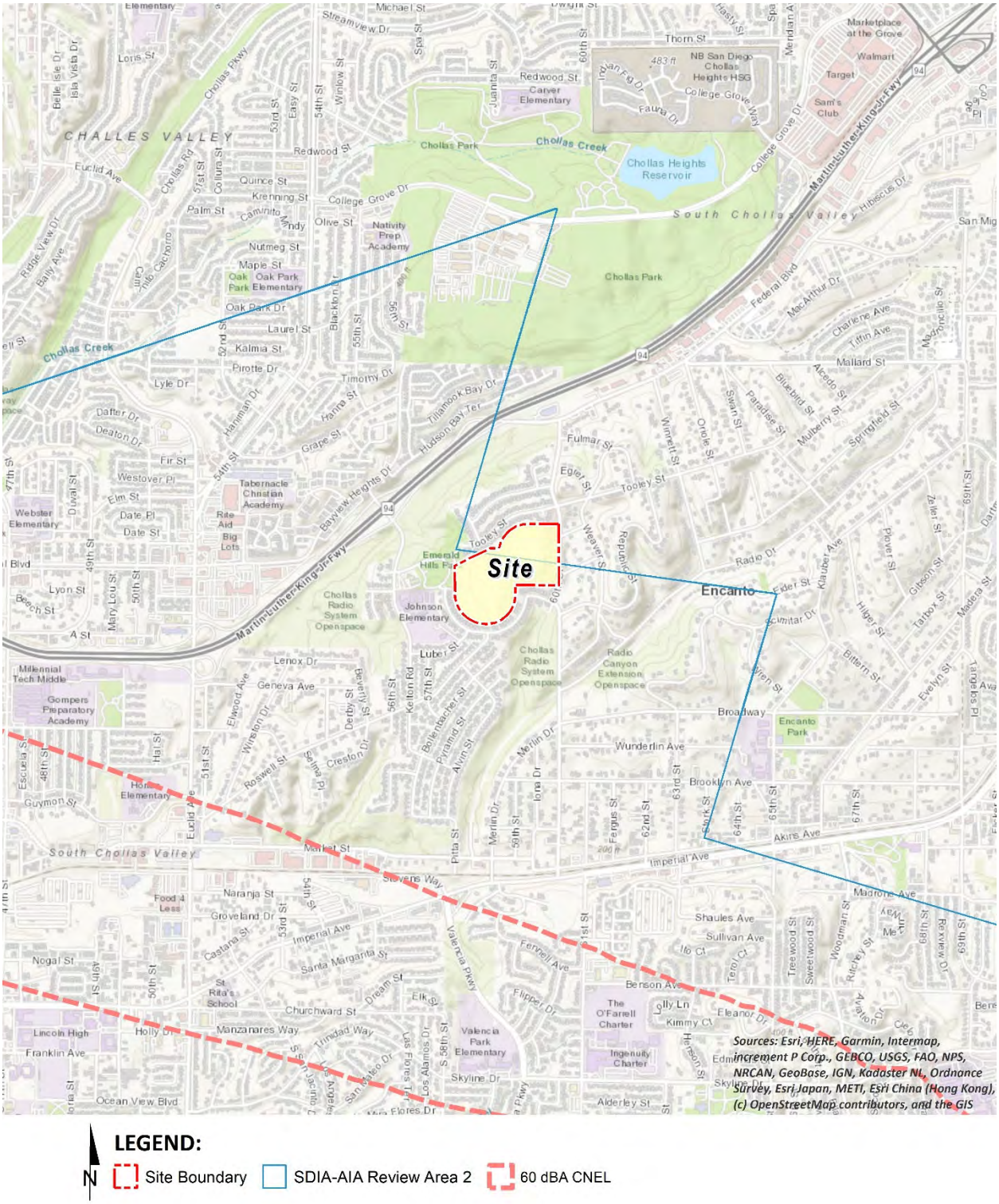
Location	Roadway	Noise Level at Façade[1]	Required Interior NR[2]	Estimated Interior NR[3]	Upgraded Windows[4]	Interior Noise Level[5]	Threshold	Threshold Exceeded?
O1	SR-94	68.7	23.7	25.0	No	43.7	45.0	No
O2	SR-94	68.9	23.9	25.0	No	43.9	45.0	No
O3	SR-94	68.8	23.8	25.0	No	43.8	45.0	No
O4	SR-94	68.8	23.8	25.0	No	43.8	45.0	No
O5	SR-94	68.7	23.7	25.0	No	43.7	45.0	No
O6	60th Street	55.4	10.4	25.0	No	30.4	45.0	No
O7	60th Street	56.3	11.3	25.0	No	31.3	45.0	No
O8	60th Street	56.3	11.3	25.0	No	31.3	45.0	No
O9	60th Street	56.2	11.2	25.0	No	31.2	45.0	No
O10	60th Street	56.3	11.3	25.0	No	31.3	45.0	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] Estimated minimum interior noise reduction.
[4] Does the required interior noise reduction trigger upgraded with a minimum STC rating of greater than 27?
[5] Estimated interior noise level with minimum STC rating for all windows.
"NR" = Noise reduction

9 AIRCRAFT NOISE

San Diego International Airport is located approximately 6 miles west of the Project site. The Project site is partially located within the SDIA airport influence area (AIA) within Review Area 2. As shown in Exhibit 8-A, the 60 dBA CNEL contours for the SDIA is located approximately 0.75 miles south of the Project site and does not encroach on the Project site. This is well below the compatibility standards of 60 dBA CNEL for residential land uses as shown in Table 3-2. Therefore, impacts due to aircraft noise would be *less than significant*.

EXHIBIT 9-A: SAN DIEGO INTERNATIONAL ALUCP NOISE LEVEL CONTOURS NEAR PROJECT SITE



10 RECEIVER LOCATIONS

To assess the potential for long-term operational and short-term construction noise impacts, the following sensitive receiver locations, as shown on Exhibit 10-A, were identified as representative locations for analysis. Sensitive receivers are generally defined as locations where people reside or where the presence of unwanted sound could otherwise adversely affect the use of the land. Noise-sensitive land uses are generally considered to include schools, hospitals, single-family dwellings, mobile home parks, churches, libraries, and recreation areas. Moderately noise-sensitive land uses typically include multi-family dwellings, hotels, motels, dormitories, out-patient clinics, cemeteries, golf courses, country clubs, athletic/tennis clubs, and equestrian clubs. Land uses that are considered relatively insensitive to noise include business, commercial, and professional developments. Land uses that are typically not affected by noise include: industrial, manufacturing, utilities, agriculture, undeveloped land, parking lots, warehousing, liquid and solid waste facilities, salvage yards, and transit terminals.

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

R1: Location R1 represents the existing noise sensitive residence at 5960 Old Memory Lane, immediately south of the Project site. R1 is placed in the private outdoor living areas (backyard) facing the Project site. A 24-hour noise measurement was taken near this location, L1, to describe the existing ambient noise environment.

R2: Location R2 represents the existing noise sensitive residence at 8512 Old Memory Lane, immediately south of the Project site. R2 is placed in the private outdoor living areas (backyard) facing the Project site. A 24-hour noise measurement was taken near this location, L2, to describe the existing ambient noise environment.

R3: Location R3 represents the Emerald Hills Park at 1501 Kelton Road, immediately west of the Project site. R3 is placed in an outdoor use area (Tennis/Basketball Courts) facing the Project site. A 24-hour noise measurement was taken near this location, L3, to describe the existing ambient noise environment.

R4: Location R4 represents the existing noise sensitive residence at 5787 Tooley Street, immediately south of the Project site. R4 is placed in the private outdoor living areas (backyard) facing the Project site. A 24-hour noise measurement was taken near this location, L4, to describe the existing ambient noise environment.

R5: Location R5 represents the existing noise sensitive residence at 5899 Tooley Street, immediately south of the Project site. R5 is placed in the private outdoor living areas

(backyard) facing the Project site. A 24-hour noise measurement was taken near this location, L5, to describe the existing ambient noise environment.

R6: Location R6 represents the existing noise sensitive residence at 6006 Dipper Street, immediately south of the Project site. R6 is placed in the private outdoor living areas (backyard) facing the Project site. A 24-hour noise measurement was taken near this location, L6, to describe the existing ambient noise environment.

EXHIBIT 10-A: RECEIVER LOCATIONS

11 OPERATIONAL NOISE IMPACTS

This section analyzes the potential stationary-source operational noise impacts at the nearest receiver locations, resulting from the operation of the proposed Emerald Hills Project. Exhibit 11-A identifies the noise source locations used to assess the hourly average L_{eq} operational noise levels consistent with the City of San Diego Noise Ordinance and Noise Element of the General Plan. Modeling of stationary sources is conservative as it does not account topography or existing structures that may obstruct the path of the soundwaves.

11.1 OPERATIONAL NOISE SOURCES

The proposed residential land uses are considered noise-sensitive receiving land uses and are not expected to include any specific type of operational noise sources beyond the typical noise sources associated with existing residential land uses in the Project study area. The on-site Project-related noise sources are expected to include: ground-mounted air conditioning units.

11.2 REFERENCE NOISE LEVELS

To estimate the Project operational noise impacts, reference noise levels of similar equipment are used to represent the noise levels expected with the development of the proposed Project.

A detailed description of the reference noise level measurements shown on Table 10-1 is provided in the following sections. It is important to note that the following projected noise levels assume the worst-case noise environment with the ground-mounted air conditioning units all operating simultaneously. Appendix 10.1 includes the detailed noise model inputs.

EXHIBIT 11-A: OPERATIONAL NOISE SOURCE LOCATIONS

TABLE 11-1: REFERENCE NOISE LEVELS

Noise Source[1]	Noise Source Height (Feet)	Min./Hour[2]			Reference Noise Level (dBA L_{eq}) @ 50 Feet	Sound Power Level (dBA)[3]
		Day	Evening	Night		
Air Conditioners	3'	45	45	30	44.4	76.0

[1] Anticipated duration (minutes within the hour) of noise activity during typical hourly conditions expected at the Project site. "Daytime" = 8:00 a.m. - 10:00 p.m.; "Nighttime" = 10:01 p.m. - 7:59 a.m.

[2] Sound power level represents the total amount of acoustical energy (noise level) produced by a sound source independent of distance or surroundings. Sound power levels calculated using the CadnaA noise model at the reference distance to the noise source. Numbers may vary due to size differences between point and area noise sources.

AIR CONDITIONING UNITS

To assess the noise levels created by the air conditioning units, reference noise levels were taken from equipment specifications for a 1- to 5-ton residential packaged air conditioning unit (Carrier 48VGB). Each air conditioning unit was modeled 5 feet above the ground elevation. Each air conditioning unit was modeled as operating 45 minutes per hour during the daytime and 30 minutes during the nighttime. For this noise analysis, the air conditioning units are expected to be ground mounted adjacent to the proposed buildings. At a uniform reference distance of 50 feet, each unit would generate a reference noise level of 44.4 dBA L_{max}.

11.3 CADNAA NOISE PREDICTION MODEL

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

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

The operational noise level calculations provided in this noise study account for the distance attenuation provided due to geometric spreading, when sound from a localized stationary source (i.e., a point source) propagates uniformly outward in a spherical pattern. A standard ground attenuation factor of 0.5 was used in the noise analysis to account for mixed ground representing a combination of hard and soft surfaces consistent with study area conditions.

11.4 PROJECT OPERATIONAL NOISE LEVELS

Using the reference noise levels to represent the proposed Project operations that include ground-mounted air conditioning units, Urban Crossroads, Inc. calculated the operational source noise levels that are expected to be generated at the Project site and the Project-related noise level increases that would be experienced at each of the receiver locations. Table 11-2 shows the Project operational noise levels during the daytime hours of 7:00 a.m. to 10:00 p.m. The daytime hourly noise levels at the off-site receiver locations are expected to range from 34.4 to 41.6 dBA L_{eq}.

TABLE 11-2: DAYTIME PROJECT OPERATIONAL NOISE LEVELS

Noise Source[1]	Operational Noise Levels by Receiver Location (dBA L_{eq})					
	R1	R2	R3	R4	R5	R6
Air Conditioners	40.5	40.0	37.2	41.6	41.4	34.4
Total (All Noise Sources)	**40.5**	**40.0**	**37.2**	**41.6**	**41.4**	**34.4**

[1] See Exhibit 11-A for the noise source and receiver locations. CadnaA noise model calculations are included in Appendix 11.1.

Table 11-3 shows the Project operational noise levels during the evening hours of 7:00 p.m. to 10:00 p.m. to 7:00 a.m. The evening hourly noise levels at the off-site receiver locations are expected to range from 34.4 to 41.6 dBA L_{eq}.

TABLE 11-3: EVENING PROJECT OPERATIONAL NOISE LEVELS

Noise Source[1]	Operational Noise Levels by Receiver Location (dBA L_{eq})					
	R1	R2	R3	R4	R5	R6
Air Conditioners	40.5	40.0	37.2	41.6	41.4	34.4
Total (All Noise Sources)	**40.5**	**40.0**	**37.2**	**41.6**	**41.4**	**34.4**

[1] See Exhibit 11-A for the noise source locations. CadnaA noise model calculations are included in Appendix 11.1.

Table 11-4 shows the Project operational noise levels during the nighttime hours of 10:00 p.m. to 7:00 a.m. The nighttime hourly noise levels at the off-site receiver locations are expected to range from 32.6 to 39.8 dBA L_{eq}. Appendix 11.1 includes the detailed noise model inputs.

TABLE 11-4: NIGHTTIME PROJECT OPERATIONAL NOISE LEVELS

Noise Source[1]	Operational Noise Levels by Receiver Location (dBA L_{eq})					
	R1	R2	R3	R4	R5	R6
Air Conditioners	38.7	38.3	35.4	39.8	39.7	32.6
Total (All Noise Sources)	**38.7**	**38.3**	**35.4**	**39.8**	**39.7**	**32.6**

[1] See Exhibit 11-A for the noise source locations. CadnaA noise model calculations are included in Appendix 11.1.

11.5 PROJECT OPERATIONAL NOISE LEVEL COMPLIANCE

To demonstrate compliance with local noise regulations, the Project-only operational noise levels are evaluated against exterior noise level thresholds based on the City of San Diego exterior noise level standards at receiver locations at the Project property lines. Table 11-5 shows the operational noise levels associated with Emerald Hills Project will satisfy the City of San Diego daytime and nighttime exterior noise level standards at the nearest receiver locations. Therefore, the operational noise impacts are considered *less than significant*.

TABLE 11-5: OPERATIONAL NOISE LEVEL COMPLIANCE

Receiver Location[1]	Project Operational Noise Levels (dBA Leq)[2]			Noise Level Standards (dBA Leq)[3]			Noise Level Standards Exceeded?[4]		
	Daytime	Evening	Nighttime	Daytime	Evening	Nighttime	Daytime	Evening	Nighttime
R1	40.5	40.5	38.7	50	45	40	No	No	No
R2	40.0	40.0	38.3	50	45	40	No	No	No
R3	37.2	37.2	35.4	50	45	40	No	No	No
R4	41.6	41.6	39.8	50	45	40	No	No	No
R5	41.4	41.4	39.7	50	45	40	No	No	No
R6	34.4	34.4	32.6	50	45	40	No	No	No

[1] See Exhibit 10-A for the receiver locations.
[2] Proposed Project operational noise levels as shown on Tables 11-2, 11-3 and 11-4.
[3] Exterior noise level standards for residential land use, as shown on Table 3-1. Per the City Significance Determination Thresholds, the limit at a residential and non-residential property is the arithmetic mean of the two zones.
[4] Do the estimated Project operational noise source activities exceed the noise level standards?
"Daytime" = 7:00 a.m. to 9:00 p.m.; "Nighttime" = 9:00 p.m. to 7:00 a.m.

11.6 PROJECT OPERATIONAL NOISE LEVEL INCREASES

To describe the Project operational noise level increases, the Project operational noise levels are combined with the existing ambient noise levels measurements for the nearest 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. (3) 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 describes the Project noise level increases to the existing ambient noise environment. As indicated in Tables 11-6 and 11-7, the Project will generate unmitigated daytime and nighttime operational noise level increases ranging from less than 0.0 to 0.2 dBA L_{eq} at the nearest receiver locations. Project-related operational noise level increases will satisfy the operational noise level increase significance criteria presented in Section 4, the increases at the sensitive receiver locations will be *less than significant.*

TABLE 11-6: DAYTIME PROJECT OPERATIONAL NOISE LEVEL INCREASES

Receiver Location[1]	Total Project Operational Noise Level[2]	Measurement Location[3]	Reference Ambient Noise Levels	Combined Project and Ambient[4]	Project Increase[5]	Increase Criteria[6]	Increase Criteria Exceeded?
R1	40.5	L2	54.2	54.4	0.2	5	No
R2	40.0	L3	60.4	60.4	0.0	3	No
R3	37.2	L3	60.4	60.4	0.0	3	No
R4	41.6	L3	60.4	60.5	0.1	3	No
R5	41.4	L4	54.0	54.2	0.2	5	No
R6	34.4	L1	57.4	57.4	0.0	5	No

[1] See Exhibit 10-A for the receiver locations.
[2] Total Project daytime operational noise levels as shown on Table 11-2.
[3] Observed daytime ambient noise levels as shown on Table 5-1.
[4] Represents the combined ambient conditions plus the Project activities.
[5] The noise level increase expected with the addition of the proposed Project activities.
[6] Significance increase criteria as shown in Section 4.

TABLE 11-7: NIGHTTIME OPERATIONAL NOISE LEVEL INCREASES

Receiver Location[1]	Total Project Operational Noise Level[2]	Measurement Location[3]	Reference Ambient Noise Levels	Combined Project and Ambient[4]	Project Increase[5]	Increase Criteria[6]	Increase Criteria Exceeded?
R1	38.7	L2	54.2	54.3	0.1	5	No
R2	38.3	L3	60.4	60.4	0.0	3	No
R3	35.4	L3	60.4	60.4	0.0	3	No
R4	39.8	L3	60.4	60.4	0.0	3	No
R5	39.7	L4	54.0	54.2	0.2	5	No
R6	32.6	L1	57.4	57.4	0.0	5	No

[1] See Exhibit 10-A for the receiver locations.
[2] Total Project nighttime operational noise levels as shown on Table 11-4.
[3] Observed nighttime ambient noise levels as shown on Table 5-1.
[4] Represents the combined ambient conditions plus the Project activities.
[5] The noise level increase expected with the addition of the proposed Project activities.
[6] Significance increase criteria as shown in Section 4.

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12 CONSTRUCTION IMPACTS

This section analyzes potential average dBA L_{eq} impacts resulting from the short-term construction activities associated with the development of the Project. Exhibit 12-A shows the construction noise source locations in relation to the nearest residential sensitive receiver locations previously described in Section 8. The analysis of construction noise is conservative as it does not account for any topography or existing structure that may obstruct the path of the soundwaves.

12.1 CONSTRUCTION NOISE LEVELS

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

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

This construction noise analysis was prepared using reference noise level measurements taken by Urban Crossroads, Inc. to describe the typical construction activity noise levels for each stage of Project construction. The construction reference noise level measurements represent a list of typical construction activity noise levels.

12.2 TYPICAL CONSTRUCTION REFERENCE NOISE LEVELS

To describe construction noise activities, this construction noise analysis was prepared using reference construction equipment noise levels from the Federal Highway Administration (FHWA) published the Roadway Construction Noise Model (RCNM), which includes a national database of construction equipment reference noise emission levels. (24) The RCNM equipment database, provides a comprehensive list of the noise generating characteristics for specific types of construction equipment as show in Table 12-1. In addition, the database provides an acoustical usage factor to estimate the fraction of time each piece of construction equipment is operating at full power (i.e., its loudest condition) during a construction operation.

EXHIBIT 12-A: CONSTRUCTION NOISE SOURCE LOCATIONS

TABLE 12-1: CONSTRUCTION REFERENCE NOISE LEVELS

Construction Stage	Reference Construction Equipmnet[1]	Reference Noise Level @ 50 Feet (dBA L_{eq})	Composite Reference Noise Level (dBA L_{eq})	Reference Power Level (dBA L_w)
Site Preparation	Dozer	78.0	83.4	115.1
	Front End Loader	75.0		
	Grader	81.0		
Grading	Excavator	77.0	84.0	115.6
	Tractor	80.0		
	Scraper	80.0		
Building Construction	Crane	73.0	77.4	109.1
	Backhoe	74.0		
	Generator (<25kVA)	70.0		
Paving	Paver	74.0	77.8	109.5
	Dump Truck	72.0		
	Roller	73.0		
Architectural Coating	Man Lift	68.0	76.2	107.8
	Compressor (air)	74.0		
	Generator (<25kVA)	70.0		

[1] FHWA Road Construction Noise Model.

12.3 TYPICAL CONSTRUCTION NOISE ANALYSIS

Using the reference construction equipment noise levels and the CadnaA noise prediction model, calculations of the Project construction noise level impacts at the nearest sensitive receiver locations were completed. To assess the worst-case construction noise levels, the Project construction noise analysis relies on the highest noise level impacts when the equipment with the highest reference noise level is operating at the closest point from the edge of primary construction activity (Project site boundary) to each receiver location. Noise calculations are conservative and do not account for the effects of intervening terrain or obstacles. As shown on Table 12-2, the construction noise levels are expected to range from 54.6 to 67.6 dBA L_{eq}, and the highest construction levels are expected to be 62.4 and 67.6 dBA L_{eq} at the nearest receiver locations. Appendix 12.1 includes the detailed CadnaA construction noise model inputs.

TABLE 12-2: CONSTRUCTION EQUIPMENT NOISE LEVEL SUMMARY

Receiver Location[1]	Construction Noise Levels (dBA L_{eq})					
	Site Preparation	Grading	Building Construction	Paving	Architectural Coating	Highest Levels[2]
R1	67.1	67.6	61.0	61.5	59.8	67.6
R2	66.7	67.2	60.6	61.1	59.4	67.2
R3	65.2	65.7	59.1	59.6	57.9	65.7
R4	67.0	67.5	60.9	61.4	59.7	67.5
R5	66.6	67.1	60.5	61.0	59.3	67.1
R6	61.9	62.4	55.8	56.3	54.6	62.4

[1] Noise receiver locations are shown on Exhibit 10-A.
[2] Construction noise level calculations based on distance from the project site boundaries (construction activity area) to nearest receiver locations. CadnaA construction noise model inputs are included in Appendix 12.1.

12.4 TYPICAL CONSTRUCTION NOISE LEVEL COMPLIANCE

To evaluate whether the Project will generate potentially significant short-term noise levels at nearby sensitive residential receiver locations, the City's construction-related the noise level threshold is used as acceptable thresholds to assess construction noise level impacts. The construction noise analysis shows that the nearby receiver locations will satisfy the City of San Diego significance threshold during Project construction activities as shown on Table 12-3. Therefore, the noise impacts due to Project construction noise is considered *less than significant* at all receiver locations.

TABLE 12-3: CONSTRUCTION NOISE LEVEL COMPLIANCE

Receiver Location[1]	Construction Noise Levels (dBA L_{eq})		
	Highest Construction Noise Levels[2]	Threshold[3]	Threshold Exceeded?[4]
R1	67.6	75	No
R2	67.2	75	No
R3	65.7	75	No
R4	67.5	75	No
R5	67.1	75	No
R6	62.4	75	No

[1] Noise receiver locations are shown on Exhibit 10-A.
[2] Highest construction noise level calculations based on distance from the construction noise source activity to nearby receiver locations as shown on Table 12-2.
[3] Construction noise level thresholds as shown on Table 4-2.
[4] Do the estimated Project construction noise levels exceed the construction noise level threshold?

12.5 TYPICAL 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. Ground-borne vibration levels resulting from typical construction activities occurring within the Project site were estimated by data published by the Federal Transit Administration (FTA) (25). 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 12-4. Based on the representative vibration levels presented for various construction equipment types, it is possible to estimate the potential Project construction vibration levels using the following vibration assessment methods defined by the FTA. The FTA provides the following equation: $PPV_{equip} = PPV_{ref} \times (25/D)^{1.5}$

TABLE 12-4: VIBRATION SOURCE LEVELS FOR CONSTRUCTION EQUIPMENT

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

Federal Transit Administration, Transit Noise and Vibration Impact Assessment

Table 12-5 presents the expected Project related typical construction activity vibration levels at each of the nearest receiver locations. At distances ranging from 15 to 60 feet from the Project construction activity, the transient construction vibration velocity levels are estimated to range from 0.02 to 0.19 PPV in/sec. Based on maximum acceptable continuous vibration threshold of 0.5 PPV (in/sec) for older residential structures or commercial buildings, the typical Project construction vibration levels will satisfy the building damage thresholds at all the nearest receiver locations. In addition, the construction vibration analysis on Table 12-5 shows that the impacts will satisfy the *distinctly perceptible* maximum the continuous vibration human annoyance threshold of 0.25 PPV (in/sec) at all the nearest receiver locations. These levels would be well below the level required to adversely affect the structure and would be below the human annoyance thresholds of perception. Therefore, the vibration impacts due to the typical Project construction activities are considered *less than significant*.

TABLE 12-5: TYPICAL PROJECT CONSTRUCTION VIBRATION LEVELS

Receiver[1]	Distance to Const. Activity (Feet)[3]	Typical Construction Vibration Levels PPV (in/sec)[4]					Thresholds PPV (in/sec)[5]		Thresholds Exceeded?[6]	
		Small bulldozer	Jackhammer	Loaded Trucks	Large bulldozer	Highest Vibration Level	Building Damage	Human Annoyance	Building Damage	Human Annoyance
R1	30'	0.00	0.03	0.06	0.07	0.07	0.50	0.25	No	No
R2	30'	0.00	0.03	0.06	0.07	0.07	0.50	0.25	No	No
R3	15'	0.01	0.08	0.16	0.19	0.19	NA	NA	No	No
R4	15'	0.01	0.08	0.16	0.19	0.19	0.50	0.25	No	No
R5	30'	0.00	0.03	0.06	0.07	0.07	0.50	0.25	No	No
R6	60'	0.00	0.01	0.02	0.02	0.02	0.50	0.25	No	No

[1] Receiver locations are shown on Exhibit 10-A.
[2] Caltrans Transportation and Construction Vibration Guidance Manual, April 2020, Tables 19, p. 38.
[3] Distance from receiver location to Project construction boundary.
[4] Based on the Vibration Source Levels of Construction Equipment (Table 12-5).
[5] Thresholds for transient sources associated with typical construction activities, Caltrans Transportation and Construction Vibration Manual, April 2020 p.38. (see Tables 3-1 & 3-2).
[6] Does the peak vibration exceed the acceptable vibration thresholds?
"PPV" = Peak Particle Velocity

Moreover, the impacts at the site of the closest sensitive receivers are unlikely to be sustained during the entire construction period but will occur rather only during the times that heavy construction equipment is operating adjacent to the Project site perimeter.

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14 CERTIFICATION

The contents of this noise study report represent an accurate depiction of the noise environment and impacts associated with the proposed Emerald Hills 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 (619) 778-1971.

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EDUCATION

Bachelor of Science in Urban and Regional Planning
California Polytechnic State University, Pomona • June 2000

PROFESSIONAL AFFILIATIONS

ASA – Acoustical Society of America
AEP – Association of Environmental Planners
AWMA – Air and Waste Management Association
INCE – Institute of Noise Control Engineers

PROFESSIONAL CERTIFICATIONS

Approved Acoustical Consultant • County of San Diego
Approved Air Quality Consultant • County of San Diego
FHWA Traffic Noise Model of Training • November 2004
CadnaA Basic and Advanced Training Certificate • October 2008.

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APPENDIX 3.1:

CITY OF SAN DIEGO MUNICIPAL CODE

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Article 9.5: Noise Abatement and Control

("Noise Abatement and Control" added 9–18–1973 by O–11122 N.S.)

Division 1: General

("General" added 9–18–1973 by O–11122 N.S.)

§59.5.0101 Purpose and Intent

The Council of The City of San Diego finds and declares that:

(a) Inadequately controlled noise presents a growing danger to the health and welfare of the residents of the City of San Diego;

(b) The making and creating of disturbing, excessive, or offensive noises within the jurisdictional limits of the City of San Diego is a condition which has persisted, and the level and frequency of occurrences of such noises continue to increase;

(c) The making, creation, or continuance of such excessive noises, which are prolonged or unusual in their time, place, and use, affect and are a detriment to the public health, comfort, convenience, safety, welfare, and prosperity of the residents of the City of San Diego;

(d) Every person is entitled to an environment in which the noise is not detrimental to his or her life, health, or enjoyment of property; and

(e) The necessity, in the public interest, for the provisions and prohibitions hereinafter contained and enacted is declared to be a matter of legislative determination and public policy, and it is further declared that the provisions and prohibitions hereinafter contained and enacted are in pursuance of and for the purpose of securing and promoting the public health, comfort, convenience, safety, welfare, prosperity, peace, and quiet of the City of San Diego and its inhabitants.

(Amended 9–22–1976 by O–11916 N.S.)

§59.5.0102 Definitions

Whenever the following words and phrases are used in this article, they shall have the meaning ascribed to them in this section:

(a) Average Sound Level — a sound level typical of the sound levels at a certain place during a given period of time, averaged by the general rule of combination for sound levels, said general rule being set forth in American National Standard Specifications for Sound Level Meters Sl. 4–1971. Average sound level is also called equivalent continuous sound level.

(b) Community Noise Equivalent Level — an average sound level during a 24–hour day, obtained after addition of five (5) decibels to sound levels in the evening from 7:00 p.m. to 10:00 p.m., and after addition of ten (10) decibels to sound levels in the night before 7:00 a.m. and after 10:00 p.m.

(c) Construction Equipment — any tools, machinery, or equipment used in connection with construction operations, including all types of "special construction" equipment as defined in the pertinent sections of the California Vehicle Code when used in the construction process on any construction site, regardless of whether such construction site be located on–highway or off–highway.

(d) Decibel (dB) — a unit measure of sound (noise) level.

(e) Emergency Work — work made necessary to restore property to a safe condition following a public calamity, or work required to protect persons or property from imminent exposure to danger of damage, or work by public or private utilities when restoring utility service.

(f) Motor Vehicles — any and all self–propelled vehicles as defined in the California Vehicle Code, specifically including but not limited to "mini–bikes" and "go–carts."

(g) Noise Level — the same as "sound level." The terms may be used interchangeably herein.

(h) Person — a person, firm, association, copartnership, joint venture, corporation, or any entity, public or private.

(i) Sound Level — in decibels, that quantity measured with a sound level meter as defined herein, by use of the "A" frequency weighting and "fast" time averaging unless some other time averaging is specified.

(j) Sound Level Meter — an instrument for the measurement of sound, including a microphone, an amplifier, an attenuator, networks at least for the standardized frequency weighting A, and an indicating instrument having at

least the standardized dynamic characteristic "fast," as specified in American National Standard Specifications for Sound Level Meters Sl. 4–1971 or its successor.

(k) Sound Amplifying Equipment — equipment as specified in Section 33.0203b of the San Diego Municipal Code.

(l) Disturbing, Excessive or Offensive Noise — any sound or noise conflicting with the criteria or levels set forth in this article.

(m) Supplementary Definitions of Technical Terms — definitions of technical terms not defined herein shall be obtained from American National Standard Acoustical Terminology, Sl.1–1960 (R– 1976).

(Amended 9–22–1976 by O–11916 N.S.)

Article 9.5: Noise Abatement and Control

Division 2: Administration

("Administration" added 9–18–1973 by O–11122 N.S.)

§59.5.0201 Establishment of Noise Abatement and Control Administrator

There is hereby established within the Neighborhood Code Compliance Department of The City of San Diego the function of Noise Abatement and Control Administration which shall be administered by the Director of the Neighborhood Code Compliance Department (hereinafter referred to as the "Administrator"). *(Amended 7–25–1994 by O–18088 N.S.)*

§59.5.0202 Duties and Responsibilities of the Noise Abatement Administrator

(a) The Administrator and his staff have the responsibility of regulating and controlling the emission of all excessive or offensive noises within the City of San Diego and shall take such action, subject to the provisions of this article, as is reasonable and necessary to abate noise. The Administrator shall coordinate the activities of all City departments relating to noise control and reduction in those activities carried out by the various departments, including the Environmental Impact Report review process relating to noise pollution. The Administrator may exercise or delegate any of the functions, powers and duties vested in his office or in the administration of his office.

(b) The Administrator is expressly charged:

(1) To make any necessary investigations, inspections, or studies which, in his opinion, are necessary for the purpose of enforcing the provisions of this article or controlling or abating a disturbing, excessive or offensive noise. Information derived from noise studies shall be made available to the public upon request.

(2) To institute necessary proceedings to prosecute violations of this article and to compel the prevention and abatement of disturbing, excessive, or offensive noise, and as further set forth in Division 6 of this article.

(3) To allow exceptions to the requirements of this article, subject to conditions, when practical difficulties or unnecessary hardship involved in carrying out this article exist, if the exception will not be contrary to the purpose and intent of this article or detrimental to the public health, safety, and general welfare of the citizens of the City of San Diego.

4) To do any and all other acts which may be necessary for the successful prosecution of the purposes of this article and such other acts as may be specifically enumerated herein as duties.

("Duties and Responsibilities of the Administrator Noise Abatement" retitled and amended 11–18–1997 by O–18439 N.S.)
(Retitled to "Duties and Responsibilities of the Noise Abatement Administrator" and amended 6-18-2013 by O-20261 N.S.; effective 7-19-2013.)

§59.5.0205 Inspection by Administrator

(a) The Administrator may inspect, at any reasonable time and in a reasonable manner, any device or mechanism (1) which is intended to, or which actually does produce sound and (2) which creates or may create any disturbing noise, including, but not limited to, the premises where such device or mechanism is used.

(b) If entry to premises is denied or refused, the Administrator shall obtain an inspection warrant from a court of a competent jurisdiction.

(Amended 9–22–1976 by O–11916 N.S.)

Article 9.5: Noise Abatement and Control

Division 3: Noise Abatement Contract Compliance

("Noise Abatement Contract Compliance" added 9–18–1973 by O–11122 N.S.)

§59.5.0301 Contract Provisions

(a) Contract

As used in this section, the term "contract" shall mean any written agreement or legal instrument whereby The City of San Diego is committed to expend, or does expend, public funds in consideration for work, labor, services, equipment, or any combination of the foregoing, except that the term "contract" shall not include:

(1) Contracts for financial or other assistance entered into by The City of San Diego with any federal, state or other local governmental entity or agency.

(2) Contracts, resolutions, indentures, declarations of trust, or other legal instruments authorizing or relating to (a) the purchase of insurance, (b) the authorization, issuance, award and sale of bonds, and (c) certificates of indebtedness, notes, or other fiscal obligations of the City.

(b) Contract Provisions

No contract shall be awarded or entered into by The City of San Diego unless such contract contains provisions requiring that:

Devices and activities which will be operated, conducted, or constructed pursuant to the contract and which are subject to the provisions of this Code, will be operated, conducted, or constructed without causing a violation of this article.

(c) Regulations

The Administrator may, from time to time, recommend to the City's Purchasing Agent and/or other City departments such specifications for the operation or construction of devices and activities pursuant to City contracts.

The Administrator shall make the recommendations necessary to achieve compliance with the provisions of this section.

(d) No person shall cause or permit the operations of a device or conducting of an activity in such a way as to violate any provisions of a contract required by this action.

(e) The provisions of this section shall not apply to those contracts awarded prior to three (3) months from the effective date (October 19, 1973) of this article.

(Amended 9–22–1976 by O–11916 N.S.)

Article 9.5: Noise Abatement and Control

Division 4: Limits

("Noise Level Limits, Standards and Control"
added 9–18–1973 by O–11122 N.S.)
(Retitled to "Limits" on 9–22–1976 by O–11916 N.S.)

§59.5.0401 Sound Level Limits

(a) It shall be unlawful for any person to cause noise by any means to the extent that the one–hour average sound level exceeds the applicable limit given in the following table, at any location in the City of San Diego on or beyond the boundaries of the property on which the noise is produced. The noise subject to these limits is that part of the total noise at the specified location that is due solely to the action of said person.

TABLE OF APPLICABLE LIMITS

Land Use	Time of Day	One-Hour Average Sound Level (decibels)
1. Single Family Residential	7 a.m. to 7 p.m. 7 p.m. to 10 p.m. 10 p.m. to 7 a.m.	50 45 40
2. Multi-Family Residential (Up to a maximum density of 1/2000)	7 a.m. to 7 p.m. 7 p.m. to 10 p.m. 10 p.m. to 7 a.m.	55 50 45
3. All other Residential	7 a.m. to 7 p.m. 7 p.m. to 10 p.m. 10 p.m. to 7 a.m.	60 55 50
4. Commercial	7 a.m. to 7 p.m. 7 p.m. to 10 p.m. 10 p.m. to 7 a.m.	65 60 60
5. Industrial or Agricultural	any time	75

(b) The sound level limit at a location on a boundary between two zoning districts is the arithmetic mean of the respective limits for the two districts. Permissible construction noise level limits shall be governed by Sections 59.5.0404 of this article.

(c) Fixed–location public utility distribution or transmission facilities located on or adjacent to a property line shall be subject to the noise level limits of Part A. of this section, measured at or beyond six feet from the boundary of the easement upon which the equipment is located.

(d) This section does not apply to firework displays authorized by permit from the Fire Department.

(e) This section does not apply to noise generated by helicopters at heliports or helistops authorized by a conditional use permit, nor to any roller coaster operated on City–owned parkland.

(Amended 9–11–1989 by O–17337 N.S.)
(Amended 11-28-2005 by O-19446 N.S.; effective 2-9-2006.)

§59.5.0402 Motor Vehicles

(a) Off–Highway

(1) Except as otherwise provided for in this article, it shall be unlawful to operate any motor vehicle of any type on any site, other than on a public street or highway as defined in the California Vehicle Code, in any manner so as to cause noise in excess of those noise levels permitted for on– highway motor vehicles as specified in the table for "45 mile– per–hour or less speed limits" contained in Section 23130 of the California Vehicle Code, and as corrected for distances set forth in subsection A.2. below.

(2) Corrections

The maximum noise level as the off–highway vehicle passes may be measured at a distance of other than fifty (50) feet from the center line of travel, provided the measurement is further adjusted by adding algebraically the applicable correction as follows:

Distance (Feet)	Correction (decibels)
25	-6
28	-5
32	-4
35	-3
40	-2
45	-1
50 (preferred distance)	0
56	+1
63	+2
70	+3
80	+4
90	+5
100	+6

(3) A measured noise level thus corrected shall be deemed in violation of this section if it exceeds the applicable noise–level limit as specified above.

(b) Nothing in this section shall apply to authorized emergency vehicles when being used in emergency situations, including the blowing of sirens and/or horns.

("Motor Vehicles" renumbered from Sec. 59.5.0403 on 9–22–1976 by O–11916 N.S.)

§59.5.0403 Watercraft

Violations for excessive noise of watercraft operating in waters under the jurisdiction of The City of San Diego shall be prosecuted under applicable provisions of the California Harbors and Navigation Code. Permits issued by The City of San Diego for the operation of watercraft not in compliance with noise criteria of the Harbors and Navigation Code shall be reviewed and approved by the Administrator prior to issuance.

("Watercraft" renumbered from Sec. 59.5.0407 and amended 9–22–1976 by O-11916 N.S.)

§59.5.0404 Construction Noise

(a) It shall be unlawful for any person, between the hours of 7:00 p.m. of any day and 7:00 a.m. of the following day, or on legal holidays as specified in Section 21.0104 of the San Diego Municipal Code, with exception of Columbus Day and Washington's Birthday, or on Sundays, to erect, construct, demolish, excavate for, alter or repair any building or structure in such a manner as to create disturbing, excessive or offensive noise unless a permit has been applied for and granted beforehand by the Noise Abatement and Control Administrator. In granting such permit, the Administrator shall consider whether the construction noise in the vicinity of the proposed work site would be less objectionable at night than during the daytime because of different population densities or different neighboring activities; whether obstruction and interference with traffic particularly on streets of major importance, would be less objectionable at night than during the daytime; whether the type of work to be performed emits noises at such a low level as to not cause significant disturbances in the vicinity of the work site; the character and nature of the neighborhood of the proposed work site; whether great economic hardship would occur if the work were spread over a longer time; whether proposed night work is in the general public interest; and he shall prescribe such conditions, working times, types of construction equipment to be used, and permissible noise levels as he deems to be required in the public interest.

(b) Except as provided in subsection C. hereof, it shall be unlawful for any person, including The City of San Diego, to conduct any construction activity so as to cause, at or beyond the property lines of any property zoned residential, an average sound level greater than 75 decibels during the 12–hour period from 7:00 a.m. to 7:00 p.m.

(c) The provisions of subsection B. of this section shall not apply to construction equipment used in connection with emergency work, provided the Administrator is notified within 48 hours after commencement of work.

(Amended 1–3–1984 by O–16100 N.S.)
(Amended 8-9-2019 by O-21114 N.S.; effective 9-8-2019.)

§59.5.0406 Refuse Vehicles and Parking Lot Sweepers

No person shall operate or permit to be operated a refuse compacting, processing, or collection vehicle between the hours of 7:00 p.m. to 6:00 a.m. or a parking lot sweeper between the hours of 7:00 p.m. to 7:00 a.m. in any residential area unless a permit has been applied for and granted by the Administrator.
("Refuse Vehicles" added 9–18–1973 by O–11122 N.S.; amended 9–22–1976 by O–11916 N.S.)
(Amended 6-9-2010 by O-19960 N.S.; effective 7-9-2010.)

Article 9.5: Noise Abatement and Control

Division 5: Public Nuisance Noise

("General Noise Regulations" added 9–18–1973 by O–11122 N.S.) (Retitled to "Public Nuisance Noise" on 9–22–1976 by O–11916 N.S.)

§59.5.0501 General Prohibitions

(a) It shall be unlawful for any person to make, continue, or cause to be made or continued, within the limits of said City, any disturbing, excessive, or offensive noise which causes discomfort or annoyance to any reasonable person of normal sensitiveness residing in the area.

(b) The characteristics and conditions which should be considered in determining whether a violation of the provisions of this section exists should include, but not be limited to the following:

(1) The level of the noise;

(2) Whether the nature of the noise is usual or unusual;

(3) Whether the origin of the noise is natural or unnatural;

(4) The level of the ambient noise;

(5) The proximity of the noise to sleeping facilities;

(6) The nature and zoning of the area from which the noise emanates and the area where it is received;

(7) The time of day or night the noise occurs;

(8) The duration of the noise; and

(9) Whether the noise is recurrent, intermittent, or constant.

(Amended 1–3–1984 by O–16100 N.S.)

§59.5.0502 Disturbing, Excessive, Offensive Noises — Declaration of Certain Acts Constituting

The following activities, among others, are declared to cause disturbing, excessive or offensive noises in violation of this section and are unlawful, namely:

(a) Horns, Signaling Devices, etc.

Unnecessary use or operation of horns, signaling devices, or other similar devices, on automobiles, motorcycles, or any other vehicle.

(b) Radios, Television Sets, Phonographs, Loud Speaking Amplifiers and Similar Devices.

(1) Uses Restricted

The use or operation of any sound production or reproduction device, radio receiving set, musical instrument, drums, phonograph, television set, loud speakers and sound amplifier or other similar machine or device for the producing or reproducing of sound in such a manner as to disturb the peace, quiet, or comfort of any reasonable person of normal sensitivity in any area of the City is prohibited. This provision shall not apply to any participant in a licensed parade, or to any person who has been otherwise duly authorized by The City of San Diego to engage in such conduct.

(2) Prima Facie Violations

Any of the following shall constitute evidence of a prima facie violation of this section:

(A) The operation of any such sound production or reproduction device, radio receiving set, musical instrument, drum, phonograph, television set, machine, loud speaker and sound amplifier or similar machine or device between the hours of 10:00 p.m. and 8:00 a.m. in such a manner as to be plainly audible at a distance of fifty feet from the building, structure, or vehicle in which it is located.

(B) The operation of any sound amplifier, which is part of, or connected to, any radio, stereo receiver, compact disc player, cassette tape player, or other similar device when operated in

such a manner as to be plainly audible at a distance of fifty (50) feet and when operated in such a manner as to cause a person to be aware of vibration accompanying the sound at a distance of fifty (50) feet from the source.

(3) Enforcement of Prima Facie Violations

(A) Any person who is authorized to enforce the provisions of this Article and who encounters evidence of a prima facie violation of this section is empowered to confiscate and impound as evidence, any or all of the components amplifying or transmitting the sound.

(B) Any peace officer, as defined in Chapter 4.5 (commencing with Section 830) of the Penal Code, who encounters evidence of a prima facie violation of this section whereby the component(s) amplifying or transmitting the sound are attached to a vehicle may, in accordance with the provisions of California Vehicle Code section 22655.5, impound the vehicle, as containing evidence of a criminal offense, when the amplifying and/or transmitting component(s) cannot be readily removed from the vehicle without damaging the component(s) or vehicle.

(c) Animals

(1) The keeping or maintenance, or the permitting to be kept or maintained upon any premises owned, occupied, or controlled by any person of any animal or animals which by any frequent or long–continued noise, shall cause annoyance or discomfort to a reasonable person of normal sensitiveness in the vicinity.

(2) The noise from any such animal or animals that disturbs two or more residents residing in separate residences adjacent to any part of the property on which the subject animal or animals are kept or maintained, or three or more residents residing in separate residences in close proximity to the property on which the subject animal or animals are kept or maintained shall be prima facie evidence of a violation of this section.

(d) Hospitals, Schools, Libraries, Rest Homes, Long–Term Medical or Mental Care Facilities

To make noise adjacent to a hospital, school, library, rest home, or long–term medical or mental care facility, which noise unreasonably interferes with the workings of such institutions or which disturbs or unduly annoys occupants in said institutions.

(e) Playing of Radios on Buses and Trolleys

The operation of any radio, phonograph, or tape player on an urban transit bus or trolley so as to emit noise that is audible to any other person in the vehicle is prohibited.

(f) Playing of Radios, Phonographs, and Other Sound Production or Reproduction Devices in Public Parks and Beach Areas and Public Parking Lots and Streets Adjacent Thereto.

The operation of any radio, phonograph, television set, or any other sound production or reproduction device in any public park or on any public beach or any public parking lot or street adjacent to such park or beach, without the prior written approval of the City Manager or the Administrator, in such a manner that such radio, phonograph, television set or sound production or reproduction device emits a sound level exceeding those found in the following table at any point ten (10) feet or more from the noise source is prohibited:

TABLE OF APPLICABLE LIMITS

Time of Day	Sound Level Limit
7 a.m. to 7 p.m.	65 decibels
7:01 p.m. to 6:59 a.m.	55 decibels

(g) Leaf Blowers

(1) A "leaf blower" means any portable, hand–held or back pack, engine powered device with a nozzle that creates a directable airstream which is capable of and intended for moving leaves and light materials.

(2) No person shall operate a leaf blower in any residential zoned area between the hours of 7 p.m. and 8 a.m. on weekdays and 5 p.m. and 9

a.m. on weekends or on legal holidays specified in section 21.04 of this Code.

(3) After October 9, 1991 and through June 30, 1993, no person may operate any leaf blower at a sound level in excess of 70 decibels measured at a distance of 50 feet or greater from the point of noise origin. Beginning on July 1, 1993, no person may operate any leaf blower at a sound level in excess of 65 decibels measured at a distance of 50 feet or greater from the point of noise origin.

(4) Beginning on July 1, 1993, leaf blowers shall be equipped with functional mufflers and an approved sound limiting device required to ensure that the leaf blower is not capable of generating a sound level exceeding any limit prescribed in this section.

(5) All litter and debris generated by leaf blower operation shall be cleaned up and disposed of in accordance with Chapter 9, Article 4, of this Code.

(Amended 9–9–1991 by O–17676 N.S.)

§59.5.0503 Burglar Alarms

(a) Audible burglar alarms for structures or motor vehicles are prohibited unless the operation of such burglar alarms can be terminated within 20 minutes of being activated.

(b) Notwithstanding the requirements of this provision, any member of the Police Department of The City of San Diego shall have the right to take such steps as may be reasonable and necessary to disconnect any such alarm installed in any building, dwelling, or motor vehicle at any time during the period of its activation. On or after thirty (30) days from the effective date of this article, any building, dwelling or motor vehicle upon which a burglar alarm has been installed shall prominently display the telephone number at which communication may be made with the owner of such building, dwelling, or motor vehicle.

(Amended 1–3–1984 by O–16100 N.S.)

Article 9.5: Noise Abatement and Control

Division 6: Violations And Enforcement

("Violations And Enforcement" added 9–18–1973 by O–11122 N.S.)

§59.5.0601 Violations: Misdemeanors

Any person violating any of the provisions of this article shall be deemed guilty of a misdemeanor and upon conviction thereof shall be fined in an amount not exceeding one thousand dollars ($1000.00) or be imprisoned in the City or County jail for a period not exceeding six (6) months, or by both such fine and imprisonment. Each day such violation is committed or permitted to continue shall constitute a separate offense and shall be punishable as such.

Notwithstanding the above described penalties, following the conviction of a defendant for any prima facie violations of this article, the prosecutor may bring a motion requesting the court to order the destruction of any or all of the components amplifying or transmitting the sound.
(Amended 10–30–1989 by O–17380 N.S.)

§59.5.0602 Violations: Additional Remedies: Injunctions

As an additional remedy, the operation or maintenance of any activity, device, instrument, vehicle or machinery in violation of any provision of this article, which operation or maintenance causes discomfort or annoyance to reasonable persons of normal sensitiveness or which endangers the comfort, repose, health, or peace of residents in the area, shall be deemed, and is declared to be, a public nuisance, and may be subject to abatement summarily by a restraining order or injunction issued by a court of competent jurisdiction.
(Amended 9–22–1976 by O–11916 N.S.)

§59.5.0604 Manner of Enforcement

Violations of this article shall be prosecuted in the same manner as other misdemeanor violations of the San Diego Municipal Code; however, nothing in this article shall prevent the Administrator, in his enforcement of the provisions of this article for which he is responsible, from making efforts to obtain voluntary compliance by way of warning, notice, or educational means.
("Manner of Enforcement" added 9–18–1973 by O–11122 N.S.)

§59.5.0605 Display of Permits and Other Notices

Any permit or certificate required herein shall be displayed or maintained on the premises designated on the permit.
("Display of Permits and Other Notices" added 9–18–1973 by O–11122 N.S.)

§59.5.0606 False and Misleading Statement: Unlawful Reproduction or Alteration of Documents

(a) No person shall knowingly make a false or misleading statement or submit a false or misleading document to the Administrator as to any matter within his jurisdiction.

(b) No person shall make, reproduce, alter, or cause to be made, reproduced, or altered, a permit, certificate, or other document issued by the Administrator or required by this article.

(Amended 9–22–1976 by O–11916 N.S.)

§59.5.0607 Severability

If any provision, clause, sentence, or paragraph of this article or the application thereof to any person or circumstances shall be held invalid, such invalidity shall not affect the other provisions or applications of the provisions of this article which can be given effect without the invalid provision or application, and to this end the provisions of this article are hereby declared to be severable.
("Severability" added 9–22–1976 by O–11916 N.S.)

Article 9.5: Noise Abatement and Control

Division 8: Sound Trucks — Loud Speakers — Sound Amplifiers

("Sound Trucks — Loud Speakers — Sound Amplifiers" added 2–23–1987 by O–16813 N.S.)

§59.5.0801 Sound Trucks — Loud Speakers — Sound Amplifiers Defined

(a) "Sound Truck" — shall mean any motor vehicle, or any other vehicle regardless of motive power, whether in motion or stationary, having mounted thereon or attached thereto, any sound amplifying equipment.

(b) "Sound Amplifying Equipment" — the words, "sound amplifying equipment" as used herein shall mean any machine or device for the amplification of the human voice, music or any other sound. "Sound amplifying equipment" as used herein shall not be construed as including standard automobile radios when used and heard only by occupants of the vehicle in which installed or warning devices on authorized emergency vehicles or horns or other warning devices on other vehicles used only for traffic safety purposes.

('Sound Trucks — Loud Speakers — Sound Amplifiers Defined" added 2–23–1987 by O–16813 N.S.)

§59.5.0802 Noncommercial Use of Sound Trucks — Registration Required

It shall be unlawful for any person to use or cause to be used a sound truck with its sound amplifying equipment in operation for noncommercial purposes in the City of San Diego before filing a registration statement with the Director of the Communications Division of the General Services Department. This registration statement shall be filed in duplicate and shall state the following:

(a) Name and home address of the applicant;

(b) Address of place of business of applicant;

(c) License number and body style, make and year of the sound truck to be used by applicant;

(d) Name and address of person who owns the sound truck;

(e) Name and address of person having direct charge of the sound truck;

(f) Names and addresses of all persons who will use or operate the sound truck;

(g) The purpose for which the sound truck will be used;

(h) A general statement as to the section or sections of the City in which the sound truck will be used;

(i) The proposed hours of operation of the sound truck;

(j) The number of days of proposed operation of the sound truck;

(k) A general description of the sound amplifier and of each accessory unit to be used with it.

("Noncommercial Use of Sound Trucks — Registration Required" added 2–23–1987 by O–16813 N.S.)

§59.5.0803 Endorsement of Registration Statement of Noncommercial Sound Trucks

All persons using or causing to be used sound trucks for noncommercial purposes shall submit their sound trucks together with the sound amplifying and sound reproducing equipment which they intend to use to an inspection to be given by or under the direction of the Director of the Communication Division of the General Services Department of the City of San Diego. The Deputy Director shall test said equipment in the course of his inspection and shall endorse the original registration statement of the person applying for a permit, together with the copies of said statement, if said equipment may be calibrated and/or controlled so as to comply with the regulations provided in this Division. Said endorsement shall designate the calibration or points at which the controls of the sound amplifying and reproducing equipment may be set in order to maintain the maximum sound level permissible under the regulatory provisions of this Division.

("Endorsement of Registration Statement of Noncommercial Sound Trucks" added 2–23–1987 by O–16813 N.S.)

§59.5.0804 Registration Statement Amendment

Any person using, or causing to be used, sound trucks for noncommercial purposes shall amend any registration statement filed pursuant to Section 59.5.0802 within forty–eight (48) hours after any change in the information therein furnished.

("Registration Statement Amendment" added 2–23–1987 by O–16813 N.S.)

§59.5.0805 Registration and Identification

The Director of the Communications Division of the General Services Department shall return to each applicant under Section 59.5.0802 one copy of said registration statement duly certified by the Director of the Communications Division of the General Services Department as a correct copy of said application. Said certified copy of the application, as endorsed, shall be in the possession of any person operating the sound truck at all times while the sound truck's sound amplifying equipment is in operation and said copy shall be promptly displayed and shown to any officer of the City of San Diego, upon request.
("Registration and Identification" added 2–23–1987 by O–16813 N.S.)

§59.5.0806 Regulations for Use

Noncommercial use of sound trucks in the City of San Diego with sound amplifying equipment in operation shall be subject to the following regulations:

(a) The only sounds permitted are music or human speech.

(b) Operations are permitted between the hours of 8:00 a.m. and 9:00 p.m. at and during public events and affairs of interest to the general public.

(c) Sound amplifying equipment shall not be operated unless the sound truck upon which such equipment is mounted is operated at a speed of at least ten (10) miles per hour except when said truck is stopped or impeded by traffic. Where stopped by traffic the said sound amplifying equipment shall not be operated for longer than one minute at each stop.

(d) Sound shall not be issued within one hundred (100) yards of hospitals, schools, churches, or courthouses.

(e) No sound truck with its amplifying device in operation shall be operated within the Central Traffic District of the City of San Diego as said Central Traffic District is defined in Chapter 8.

(f) The human speech and music amplified shall not be obscene, lewd, indecent or slanderous.

(g) The volume of sound shall be controlled so that said volume is not unreasonably loud, raucous, jarring, disturbing or a nuisance to persons within the area of audibility and so that the volume of sound shall not exceed an "A"

weighted sound level of 65 decibels on the "slow" scale at a distance of 50 feet from the sound amplifying equipment as measured by a sound level meter which meets "American National Standard" ANSI S1.4–1983 or its successor.

(h) No sound amplifying equipment shall be operated unless the axis of the center of any sound reproducing equipment used shall be parallel to the direction of travel of the sound truck; provided, however, that any sound reproducing equipment may be so placed upon said sound truck as to not vary more than 15 (degrees) either side of the axis of the center of the direction of travel.

(i) No sound truck with its amplifying device in operation shall be driven on the same street past the same point more than twice in a period of one hour.

(j) It shall be unlawful to operate a noncommercial sound truck in violation of these regulations.

("Regulations for Use" added 2–23–1987 by O–16813 N.S.)

§59.5.0807 Commercial Use Sound Truck Regulated — License Required

It shall be unlawful for any person to operate or cause to be operated any sound truck in the City of San Diego for commercial advertising purposes with sound amplifying equipment in operation unless an application has been made to the Director of the Communications Division of the General Services Department and said application has been approved and endorsed. The Director shall inspect and test said sound truck together with its sound amplifying and sound reproducing equipment to operate and conform to the regulatory provisions provided in Section 59.5.0806.

Said sound trucks shall be inspected on an annual basis to insure that their operation remains in conformity to the regulatory provisions contained in Section 59.5.0806. In the event said sound truck is found in violation of any regulatory provision contained in Section 59.5.0806, said violation shall be cause for revocation of such license.
("Commercial Use Sound Truck Regulated — License Required" added 2–23–1987 by O–16813 N.S.)

§59.5.0808 Application for License

Persons applying for the license required under Section 59.5.0807, shall file with the Director of the Communications Division of the General Services Department an application in writing, giving in said application the information required in the registration statement required in Section 59.5.0802 and deposit the fee prescribed therefor in the City Composite Rate Schedule.
("Application for License" added 2–23–1987 by O–16813 N.S.)

§59.5.0809 Issuance of License

A license shall be issued under Section 59.5.0807 upon payment of the required permit fee, unless the application required in Section 59.5.0808 hereof has been denied by the Director of the Communications Division of the General Services Department as indicated by writing or stamping with his signature "DENIED" on a copy of the license application.
("Issuance of License" added 2–23–1987 by O–16813 N.S.)

§59.5.0810 Possession and Display of License

A licensee shall keep such license in his possession in the sound truck during the time the sound truck's sound amplifying equipment is in operation. The license shall be promptly displayed and shown to any officer of the City of San Diego, upon request.
("Possession and Display of License" added 2–23–1987 by O–16813 N.S.)

§59.5.0811 Regulations for Use

It shall be unlawful for any person to operate or cause to be operated any sound truck for commercial sound advertising purposes in violation of the regulations set forth in Section 59.5.0806.
("Regulations for Use" added 2–23–1987 by O–16813 N.S.)

APPENDIX 5.1:

STUDY AREA PHOTOS

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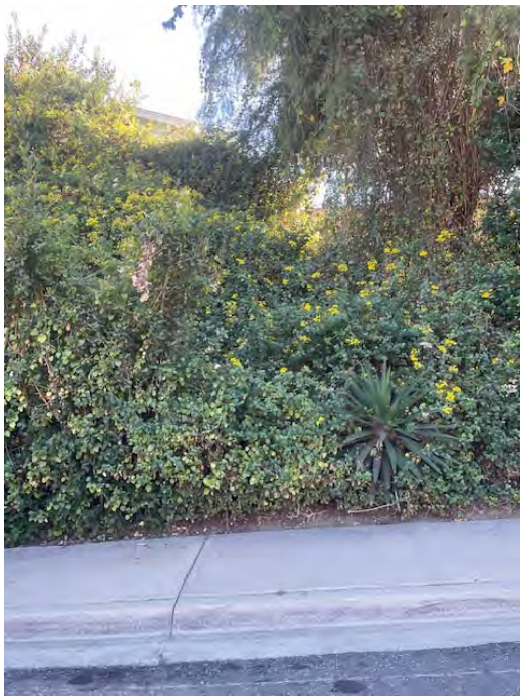
15133 - Emerald Hills

15133_L1_V_E

15133_L1_V_N

15133_L1_V_S



15133_L1_V_W

15133 - Emerald Hills

15133_L2_D_E

15133_L2_D_N

15133_L2_D_S

15133_L2_D_W

15133 - Emerald Hills

15133_L3_E_E

15133_L3_E_N

15133_L3_E_S

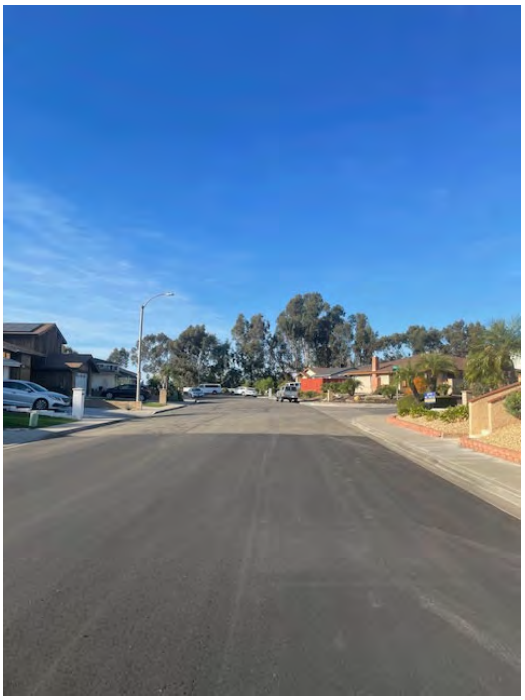
15133_L3_E_W

15133 - Emerald Hills

15133_L4_U_E

15133_L4_U_N

15133_L4_U_S



15133_L4_U_W

15133 - Emerald Hills

15133_L5_G_E

15133_L5_G_N

15133_L5_G_S

15133_L5_G_W

15133 - Emerald Hills

15133_L6_K_E

15133_L6_K_N

15133_L6_K_S

15133_L6_K_W

APPENDIX 5.2:

NOISE LEVEL MEASUREMENT WORKSHEETS

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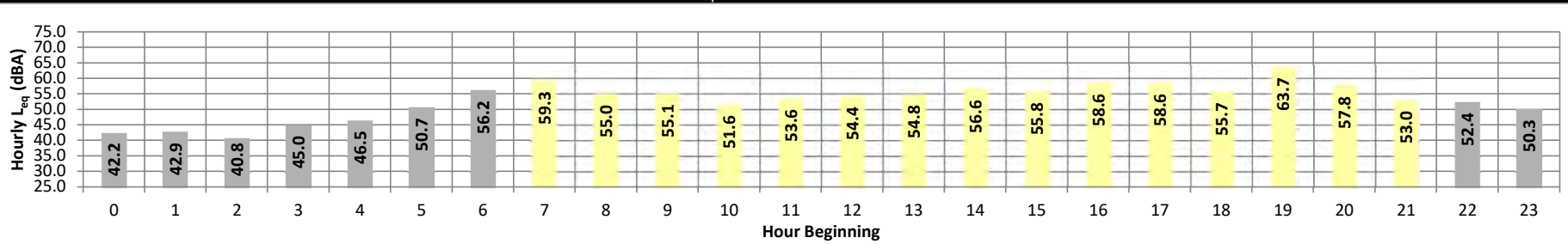
24-Hour Noise Level Measurement Summary

Date: Monday, November 13, 2023 | *Location:* L1 - Located south of the Project site near single-family | *Meter:* Piccolo II | *JN:* 15133

Project: Emerald Hills | *Source:* residence at 5960 Old Memory Lane. | *Analyst:* B. Maddux

Hourly L_{eq} dBA Readings (unadjusted)



Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%	L_{eq}	Adj.	Adj. L_{eq}
Night	0	42.2	55.0	35.2	53.9	52.4	45.7	44.3	40.5	38.5	36.3	36.0	35.5	42.2	10.0	52.2
	1	42.9	56.9	33.5	55.6	53.1	48.5	46.7	40.5	37.2	34.5	34.2	33.8	42.9	10.0	52.9
	2	40.8	50.8	35.0	49.3	47.8	45.4	44.4	40.5	38.8	36.4	36.0	35.4	40.8	10.0	50.8
	3	45.0	56.0	37.8	54.3	52.3	50.1	49.0	44.8	42.6	39.2	38.9	38.3	45.0	10.0	55.0
	4	46.5	57.2	40.2	56.2	55.2	51.8	50.2	46.0	43.7	41.5	41.1	40.6	46.5	10.0	56.5
	5	50.7	60.9	44.8	59.7	58.3	56.1	54.9	50.2	47.6	46.0	45.7	45.3	50.7	10.0	60.7
	6	56.2	66.6	45.7	65.5	64.2	62.3	61.1	56.7	52.1	47.5	46.9	46.2	56.2	10.0	66.2
Day	7	59.3	69.1	50.5	67.6	66.3	64.6	63.5	59.9	56.5	52.3	51.7	51.0	59.3	0.0	59.3
	8	55.0	65.9	42.0	64.8	63.7	61.7	60.1	55.0	49.8	43.8	43.1	42.4	55.0	0.0	55.0
	9	55.1	69.8	38.2	67.5	65.9	61.5	59.5	52.8	46.2	40.1	39.3	38.6	55.1	0.0	55.1
	10	51.6	64.2	37.8	62.7	61.6	58.6	56.6	50.2	44.6	39.8	39.0	38.2	51.6	0.0	51.6
	11	53.6	65.5	39.0	64.2	62.9	60.2	58.5	53.3	47.9	41.6	40.9	39.5	53.6	0.0	53.6
	12	54.4	67.4	39.8	66.1	64.7	61.4	59.2	52.3	46.9	41.7	41.1	40.3	54.4	0.0	54.4
	13	54.8	69.4	40.0	67.2	65.1	61.5	59.3	52.7	46.6	41.8	41.2	40.5	54.8	0.0	54.8
	14	56.6	69.7	40.8	68.3	67.3	64.3	61.4	53.9	47.4	42.6	41.9	41.2	56.6	0.0	56.6
	15	55.8	67.7	41.0	66.1	64.9	62.2	60.8	55.6	50.1	43.8	43.0	41.6	55.8	0.0	55.8
	16	58.6	72.1	42.7	69.5	67.7	65.1	63.4	58.1	53.0	45.3	44.4	43.4	58.6	0.0	58.6
	17	58.6	74.6	43.4	71.8	68.4	64.1	62.0	56.0	50.9	45.7	44.8	43.8	58.6	0.0	58.6
	18	55.7	69.3	45.6	66.4	65.2	62.2	60.3	54.6	50.5	47.2	46.8	46.1	55.7	0.0	55.7
	19	63.7	77.1	52.7	73.5	72.4	69.3	67.1	64.1	60.4	54.5	54.0	53.3	63.7	5.0	68.7
	20	57.8	68.5	53.1	67.1	65.8	62.2	60.3	57.1	55.8	54.4	54.1	53.6	57.8	5.0	62.8
	21	53.0	64.6	46.2	63.5	62.1	58.2	55.8	52.1	50.2	47.9	47.4	46.8	53.0	5.0	58.0
Night	22	52.4	64.9	45.5	63.1	61.5	57.4	55.2	51.3	49.5	47.2	46.7	46.1	52.4	10.0	62.4
	23	50.3	61.7	43.1	60.6	58.7	55.4	54.0	49.9	47.1	44.7	44.2	43.6	50.3	10.0	60.3

Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%
Day	Min	51.6	64.2	37.8	62.7	61.6	58.2	55.8	50.2	44.6	39.8	39.0	38.2
	Max	63.7	77.1	53.1	73.5	72.4	69.3	67.1	64.1	60.4	54.5	54.1	53.6
Energy Average		57.4	Average:		67.1	65.6	62.5	60.5	55.2	50.4	45.5	44.8	44.0
Night	Min	40.8	50.8	33.5	49.3	47.8	45.4	44.3	40.5	37.2	34.5	34.2	33.8
	Max	56.2	66.6	45.7	65.5	64.2	62.3	61.1	56.7	52.1	47.5	46.9	46.2
Energy Average		50.2	Average:		57.6	55.9	52.5	51.1	46.7	44.1	41.5	41.1	40.5

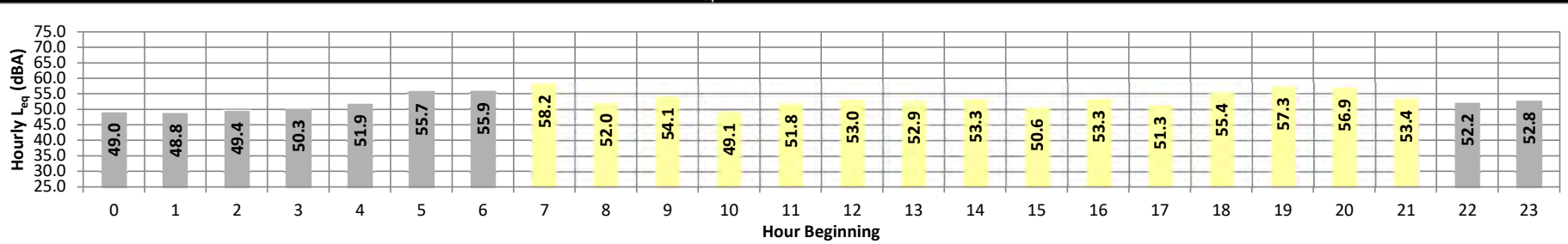
L_{eq} (dBA)		
24-Hour	Daytime (7am-10pm)	Nighttime (10pm-7am)
55.8	**57.4**	**50.2**

24-Hour Noise Level Measurement Summary

Date: Monday, November 13, 2023 *Location:* L2 - Located south of the Project site near an existing residence *Meter:* Piccolo II *JN:* 15133

Project: Emerald Hills *Source:* at 5796 Old Memory Lane *Analyst:* B. Maddux

Hourly L_{eq} dBA Readings (unadjusted)



Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%	L_{eq}	Adj.	Adj. L_{eq}
Night	0	49.0	54.8	45.8	53.6	53.0	51.7	51.0	49.5	48.4	47.0	46.6	46.2	49.0	10.0	59.0
	1	48.8	55.8	45.2	54.7	53.8	52.5	51.5	48.9	47.9	46.5	46.1	45.6	48.8	10.0	58.8
	2	49.4	55.3	45.4	53.3	52.7	51.9	51.4	50.1	49.0	46.9	46.5	45.8	49.4	10.0	59.4
	3	50.3	55.5	47.2	54.3	53.7	52.8	52.2	50.8	49.8	48.4	48.1	47.7	50.3	10.0	60.3
	4	51.9	55.3	50.0	54.2	53.8	53.3	53.1	52.4	51.8	50.9	50.7	50.3	51.9	10.0	61.9
	5	55.7	58.4	54.0	57.7	57.3	56.8	56.6	56.0	55.5	54.8	54.6	54.3	55.7	10.0	65.7
	6	55.9	59.1	54.4	57.9	57.4	57.0	56.7	56.2	55.8	55.2	55.0	54.7	55.9	10.0	65.9
Day	7	58.2	63.0	54.1	62.0	61.6	61.0	60.6	59.2	57.7	55.5	55.1	54.5	58.2	0.0	58.2
	8	52.0	59.6	48.5	57.1	56.2	55.2	54.6	52.7	51.2	49.5	49.2	48.8	52.0	0.0	52.0
	9	54.1	60.8	45.9	59.7	59.2	58.4	57.5	55.3	53.1	47.5	46.9	46.3	54.1	0.0	54.1
	10	49.1	56.7	45.6	54.7	53.9	52.4	51.7	49.7	48.1	46.4	46.2	45.9	49.1	0.0	49.1
	11	51.8	59.7	47.9	57.4	56.5	55.3	54.5	52.4	50.7	48.9	48.6	48.3	51.8	0.0	51.8
	12	53.0	65.3	47.9	62.2	60.0	57.9	56.5	52.7	50.4	48.8	48.6	48.2	53.0	0.0	53.0
	13	52.9	58.4	50.2	56.7	56.1	55.2	54.7	53.4	52.4	51.2	50.9	50.5	52.9	0.0	52.9
	14	53.3	60.5	50.3	58.6	57.4	56.1	55.5	53.7	52.6	51.3	51.1	50.7	53.3	0.0	53.3
	15	50.6	60.5	46.4	57.2	56.0	54.2	53.4	51.2	49.2	47.3	47.1	46.7	50.6	0.0	50.6
	16	53.3	65.1	47.3	61.0	59.8	58.2	57.3	53.3	51.2	48.6	48.3	47.8	53.3	0.0	53.3
	17	51.3	56.8	48.3	55.0	54.4	53.6	53.3	52.0	50.9	49.2	49.0	48.6	51.3	0.0	51.3
	18	55.4	59.3	53.1	58.4	57.9	57.3	56.9	55.9	55.1	54.1	53.8	53.5	55.4	0.0	55.4
	19	57.3	61.2	55.1	59.9	59.5	58.9	58.6	57.8	57.1	56.0	55.8	55.4	57.3	5.0	62.3
	20	56.9	60.1	54.9	59.1	58.7	58.3	58.1	57.4	56.8	55.8	55.6	55.2	56.9	5.0	61.9
	21	53.4	58.1	50.9	56.7	56.1	55.5	55.2	54.1	53.0	51.8	51.6	51.2	53.4	5.0	58.4
Night	22	52.2	57.2	49.6	55.7	55.1	54.4	54.0	52.8	51.8	50.6	50.3	50.0	52.2	10.0	62.2
	23	52.8	59.6	49.0	57.8	57.2	56.5	56.0	53.5	51.5	50.0	49.8	49.4	52.8	10.0	62.8

Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%
Day	Min	49.1	56.7	45.6	54.7	53.9	52.4	51.7	49.7	48.1	46.4	46.2	45.9
	Max	58.2	65.3	55.1	62.2	61.6	61.0	60.6	59.2	57.7	56.0	55.8	55.4
Energy Average		54.2	Average:		58.4	57.5	56.5	55.9	54.1	52.6	50.8	50.5	50.1
Night	Min	48.8	54.8	45.2	53.3	52.7	51.7	51.0	48.9	47.9	46.5	46.1	45.6
	Max	55.9	59.6	54.4	57.9	57.4	57.0	56.7	56.2	55.8	55.2	55.0	54.7
Energy Average		52.6	Average:		55.5	54.9	54.1	53.6	52.2	51.3	50.0	49.8	49.3

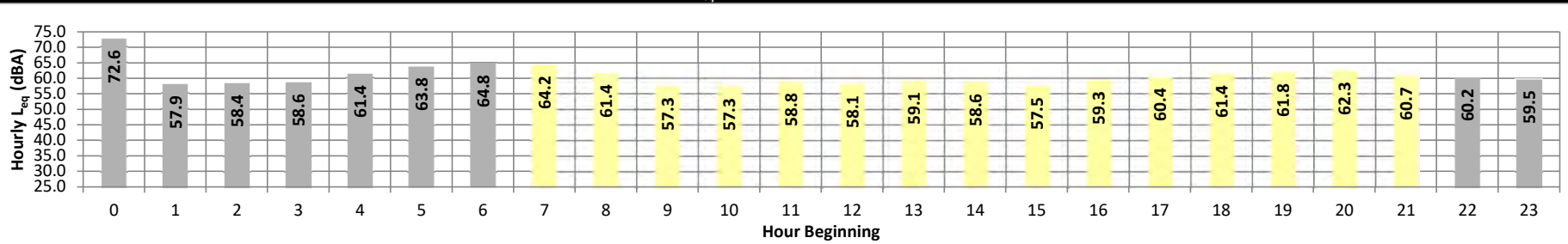
L_{eq} (dBA)		
24-Hour	Daytime (7am-10pm)	Nighttime (10pm-7am)
53.7	**54.2**	**52.6**

24-Hour Noise Level Measurement Summary

Date: Monday, November 13, 2023 *Location:* L3 - Located west of the Project site in the Emerald Hills Park *Meter:* Piccolo II *JN:* 15133

Project: Emerald Hills *Source:* south of the tennis court. *Analyst:* B. Maddux

Hourly L_{eq} dBA Readings (unadjusted)



Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%	L_{eq}	Adj.	Adj. L_{eq}
Night	0	72.6	82.6	56.1	81.3	80.8	79.6	78.7	72.6	63.6	57.5	57.0	56.5	72.6	10.0	82.6
	1	57.9	62.6	53.4	61.7	61.2	60.3	59.9	58.7	57.5	55.4	54.9	54.1	57.9	10.0	67.9
	2	58.4	63.4	53.4	62.3	61.8	61.2	60.7	59.3	58.0	55.4	54.8	54.0	58.4	10.0	68.4
	3	58.6	62.4	54.7	61.7	61.4	60.8	60.5	59.4	58.3	56.4	55.9	55.3	58.6	10.0	68.6
	4	61.4	64.3	58.7	63.6	63.3	62.9	62.7	61.9	61.2	59.9	59.6	59.1	61.4	10.0	71.4
	5	63.8	66.5	61.7	65.7	65.4	65.0	64.7	64.2	63.7	62.7	62.5	62.1	63.8	10.0	73.8
	6	64.8	68.7	63.0	67.2	66.7	66.1	65.8	65.1	64.6	63.9	63.7	63.4	64.8	10.0	74.8
Day	7	64.2	67.1	62.0	66.5	66.2	65.8	65.6	64.8	64.1	63.0	62.7	62.3	64.2	0.0	64.2
	8	61.4	66.0	58.8	64.9	64.4	63.7	63.2	61.8	61.1	59.9	59.6	59.2	61.4	0.0	61.4
	9	57.3	61.0	54.6	59.9	59.6	59.1	58.8	57.9	57.1	55.8	55.4	55.0	57.3	0.0	57.3
	10	57.3	63.6	54.5	62.0	61.4	59.4	58.6	57.5	56.8	55.6	55.3	54.9	57.3	0.0	57.3
	11	58.8	63.1	56.2	61.2	60.8	60.4	60.1	59.3	58.6	57.4	57.1	56.6	58.8	0.0	58.8
	12	58.1	63.6	55.7	62.0	61.3	60.1	59.3	58.5	57.9	56.8	56.5	56.1	58.1	0.0	58.1
	13	59.1	64.0	56.8	61.9	61.3	60.7	60.4	59.5	58.9	57.9	57.7	57.3	59.1	0.0	59.1
	14	58.6	64.2	56.2	62.8	62.0	60.6	60.1	58.9	58.2	57.2	56.9	56.5	58.6	0.0	58.6
	15	57.5	63.0	55.2	60.8	60.0	59.1	58.7	57.8	57.2	56.3	56.0	55.6	57.5	0.0	57.5
	16	59.3	64.3	57.3	61.9	61.2	60.5	60.2	59.6	59.1	58.3	58.1	57.7	59.3	0.0	59.3
	17	60.4	63.5	58.6	62.5	62.1	61.6	61.3	60.7	60.3	59.5	59.3	59.0	60.4	0.0	60.4
	18	61.4	63.9	59.6	63.3	63.1	62.6	62.4	61.8	61.3	60.5	60.3	60.0	61.4	0.0	61.4
	19	61.8	64.1	59.9	63.5	63.3	63.0	62.8	62.3	61.8	60.9	60.7	60.3	61.8	5.0	66.8
	20	62.3	64.4	60.2	64.0	63.8	63.5	63.3	62.8	62.3	61.3	61.0	60.6	62.3	5.0	67.3
	21	60.7	63.7	58.5	62.9	62.6	62.1	61.9	61.2	60.6	59.5	59.3	58.9	60.7	5.0	65.7
Night	22	60.2	63.8	57.5	62.9	62.5	61.9	61.6	60.8	60.0	58.8	58.5	58.0	60.2	10.0	70.2
	23	59.5	63.8	56.2	63.0	62.6	62.0	61.6	60.1	59.0	57.6	57.2	56.7	59.5	10.0	69.5

Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%
Day	Min	57.3	61.0	54.5	59.9	59.6	59.1	58.6	57.5	56.8	55.6	55.3	54.9
	Max	64.2	67.1	62.0	66.5	66.2	65.8	65.6	64.8	64.1	63.0	62.7	62.3
Energy Average		60.4	Average:		62.7	62.2	61.5	61.1	60.3	59.7	58.6	58.4	58.0
Night	Min	57.9	62.4	53.4	61.7	61.2	60.3	59.9	58.7	57.5	55.4	54.8	54.0
	Max	72.6	82.6	63.0	81.3	80.8	79.6	78.7	72.6	64.6	63.9	63.7	63.4
Energy Average		65.1	Average:		65.5	65.1	64.4	64.0	62.5	60.7	58.6	58.2	57.7

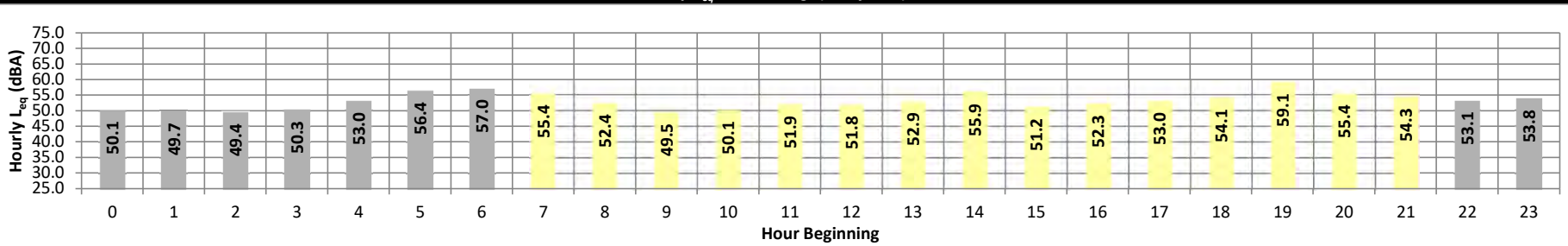
L_{eq} (dBA)		
24-Hour	Daytime (7am-10pm)	Nighttime (10pm-7am)
62.8	**60.4**	**65.1**

24-Hour Noise Level Measurement Summary

Date: Monday, November 13, 2023 *Location:* L4 - Located north of the Project site at an existing residence at *Meter:* Piccolo II *JN:* 15133

Project: Emerald Hills *Source:* 5787 Tooley St *Analyst:* B. Maddux

Hourly L_{eq} dBA Readings (unadjusted)



Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%	L_{eq}	Adj.	Adj. L_{eq}
Night	0	50.1	54.9	46.9	53.9	53.4	52.5	52.1	50.7	49.7	48.1	47.8	47.3	50.1	10.0	60.1
	1	49.7	55.2	45.4	54.0	53.6	52.6	51.9	50.4	49.1	47.0	46.6	45.9	49.7	10.0	59.7
	2	49.4	55.7	44.7	54.4	53.7	52.6	52.0	50.2	48.7	46.3	45.8	45.2	49.4	10.0	59.4
	3	50.3	55.3	47.0	54.2	53.6	52.7	52.3	50.9	49.9	48.3	48.0	47.5	50.3	10.0	60.3
	4	53.0	56.4	50.5	55.6	55.3	54.7	54.4	53.5	52.8	51.7	51.4	51.0	53.0	10.0	63.0
	5	56.4	59.4	54.4	58.7	58.3	57.8	57.5	56.8	56.2	55.3	55.1	54.8	56.4	10.0	66.4
	6	57.0	59.3	55.4	58.7	58.4	58.1	57.9	57.3	56.9	56.2	56.0	55.7	57.0	10.0	67.0
Day	7	55.4	59.4	53.5	58.2	57.7	57.1	56.8	55.8	55.2	54.3	54.1	53.8	55.4	0.0	55.4
	8	52.4	59.2	49.8	56.9	56.2	55.0	54.3	52.8	51.7	50.7	50.5	50.1	52.4	0.0	52.4
	9	49.5	56.1	46.5	54.5	53.9	53.0	52.2	50.2	48.4	47.3	47.1	46.8	49.5	0.0	49.5
	10	50.1	57.5	47.1	55.8	55.1	53.5	52.5	50.3	49.1	48.0	47.7	47.4	50.1	0.0	50.1
	11	51.9	59.4	48.6	57.1	56.2	55.0	54.4	52.4	51.1	49.6	49.3	49.0	51.9	0.0	51.9
	12	51.8	59.5	48.9	57.4	56.5	54.9	54.0	52.1	51.0	49.8	49.6	49.3	51.8	0.0	51.8
	13	52.9	62.0	50.1	58.3	57.2	55.5	54.6	53.0	52.2	51.1	50.8	50.5	52.9	0.0	52.9
	14	55.9	68.8	50.7	66.7	65.1	60.3	58.4	54.5	52.9	51.7	51.5	51.1	55.9	0.0	55.9
	15	51.2	57.6	48.2	56.0	55.3	54.2	53.7	51.7	50.2	49.1	48.9	48.6	51.2	0.0	51.2
	16	52.3	60.9	49.0	58.8	57.8	55.9	54.5	52.6	51.1	49.9	49.7	49.3	52.3	0.0	52.3
	17	53.0	59.4	50.6	57.3	56.5	55.3	54.7	53.5	52.6	51.4	51.2	50.9	53.0	0.0	53.0
	18	54.1	58.3	52.0	57.0	56.6	55.9	55.5	54.5	53.7	52.8	52.6	52.4	54.1	0.0	54.1
	19	59.1	74.3	53.1	71.5	69.6	65.1	58.7	55.5	54.8	53.9	53.7	53.4	59.1	5.0	64.1
	20	55.4	58.3	53.4	57.6	57.3	56.8	56.6	55.9	55.2	54.3	54.0	53.7	55.4	5.0	60.4
	21	54.3	58.9	51.4	57.9	57.4	56.6	56.1	54.9	53.9	52.5	52.3	51.8	54.3	5.0	59.3
Night	22	53.1	57.4	50.3	56.4	55.8	55.1	54.7	53.7	52.8	51.5	51.2	50.7	53.1	10.0	63.1
	23	53.8	59.8	49.5	58.9	58.5	57.7	57.2	54.5	52.5	50.7	50.4	49.9	53.8	10.0	63.8

Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%
Day	Min	49.5	56.1	46.5	54.5	53.9	53.0	52.2	50.2	48.4	47.3	47.1	46.8
	Max	59.1	74.3	53.5	71.5	69.6	65.1	58.7	55.9	55.2	54.3	54.1	53.8
Energy Average		54.0	Average:		58.7	57.9	56.3	55.1	53.3	52.2	51.1	50.9	50.5
Night	Min	49.4	54.9	44.7	53.9	53.4	52.5	51.9	50.2	48.7	46.3	45.8	45.2
	Max	57.0	59.8	55.4	58.9	58.5	58.1	57.9	57.3	56.9	56.2	56.0	55.7
Energy Average		53.4	Average:		56.1	55.6	54.9	54.4	53.1	52.1	50.6	50.2	49.8

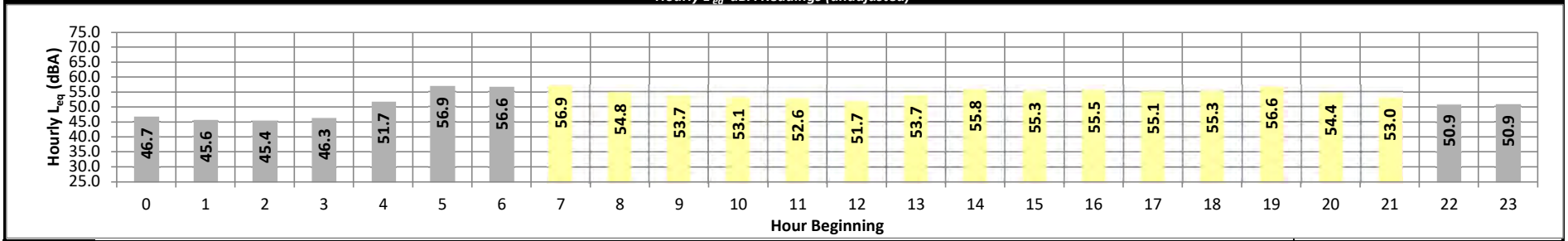
L_{eq} (dBA)		
24-Hour	Daytime (7am-10pm)	Nighttime (10pm-7am)
53.8	**54.0**	**53.4**

24-Hour Noise Level Measurement Summary

Date: Monday, November 13, 2023 *Location:* L5 - Located north of the Project site near an existing residence *Meter:* Piccolo II *JN:* 15133

Project: Emerald Hills *Source:* at 5909 Tooley St *Analyst:* B. Maddux

Hourly L_{eq} dBA Readings (unadjusted)



Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%	L_{eq}	Adj.	Adj. L_{eq}
Night	0	46.7	57.3	41.9	55.8	54.3	51.1	49.1	46.3	45.0	43.0	42.7	42.2	46.7	10.0	56.7
	1	45.6	56.8	41.1	54.9	53.5	49.3	47.9	45.0	43.8	42.2	41.9	41.5	45.6	10.0	55.6
	2	45.4	55.1	41.1	53.9	52.8	48.9	47.4	45.1	44.0	42.3	42.0	41.5	45.4	10.0	55.4
	3	46.3	56.9	42.3	55.3	54.0	49.6	48.0	46.0	44.9	43.4	43.1	42.7	46.3	10.0	56.3
	4	51.7	61.9	47.4	60.3	59.3	56.4	54.2	51.1	50.0	48.6	48.3	47.9	51.7	10.0	61.7
	5	56.9	69.3	52.1	67.4	65.4	61.3	59.5	55.8	54.3	53.0	52.8	52.5	56.9	10.0	66.9
	6	56.6	69.6	51.3	66.8	64.7	62.1	60.3	55.1	53.3	52.1	51.9	51.6	56.6	10.0	66.6
Day	7	56.9	68.2	51.1	66.3	65.0	62.4	60.9	56.6	53.7	52.1	51.8	51.5	56.9	0.0	56.9
	8	54.8	66.5	46.3	64.8	63.7	60.5	59.0	54.6	51.1	47.7	47.3	46.7	54.8	0.0	54.8
	9	53.7	66.5	42.4	65.2	63.9	60.2	58.1	52.2	47.2	43.6	43.2	42.7	53.7	0.0	53.7
	10	53.1	67.2	42.0	65.7	64.1	59.4	56.4	50.2	46.6	43.2	42.8	42.4	53.1	0.0	53.1
	11	52.6	64.0	44.1	62.9	62.0	59.0	56.7	51.8	48.6	45.4	45.0	44.5	52.6	0.0	52.6
	12	51.7	63.7	44.8	62.0	61.0	57.1	54.6	51.0	48.6	46.1	45.7	45.2	51.7	0.0	51.7
	13	53.7	66.0	47.0	64.2	63.1	59.6	57.6	52.3	50.3	48.1	47.8	47.4	53.7	0.0	53.7
	14	55.8	69.2	47.0	67.4	65.5	61.5	58.4	54.1	52.1	48.7	48.0	47.4	55.8	0.0	55.8
	15	55.3	67.4	43.9	65.9	64.8	61.7	59.9	54.6	50.0	45.4	44.8	44.3	55.3	0.0	55.3
	16	55.5	69.7	44.8	66.9	64.6	61.3	59.2	54.2	51.1	46.6	45.9	45.3	55.5	0.0	55.5
	17	55.1	66.9	45.8	65.1	64.0	61.3	59.1	54.7	51.5	47.2	46.7	46.2	55.1	0.0	55.1
	18	55.3	67.7	48.3	66.3	64.9	60.5	58.3	54.1	51.9	49.5	49.2	48.7	55.3	0.0	55.3
	19	56.6	68.4	50.5	66.5	65.5	62.5	60.4	55.6	53.4	51.6	51.3	50.9	56.6	5.0	61.6
	20	54.4	63.5	50.4	62.6	61.8	58.8	56.9	54.1	52.9	51.4	51.1	50.7	54.4	5.0	59.4
	21	53.0	63.4	47.6	62.3	61.1	58.0	55.9	52.4	50.8	48.8	48.4	48.0	53.0	5.0	58.0
Night	22	50.9	60.9	46.2	59.5	58.6	55.4	53.4	50.6	49.2	47.5	47.1	46.7	50.9	10.0	60.9
	23	50.9	60.3	45.9	59.1	58.3	55.4	53.7	51.0	48.8	47.1	46.8	46.3	50.9	10.0	60.9

Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%
Day	Min	51.7	63.4	42.0	62.0	61.0	57.1	54.6	50.2	46.6	43.2	42.8	42.4
	Max	56.9	69.7	51.1	67.4	65.5	62.5	60.9	56.6	53.7	52.1	51.8	51.5
Energy Average		54.7	Average:		64.9	63.7	60.3	58.1	53.5	50.7	47.7	47.3	46.8
Night	Min	45.4	55.1	41.1	53.9	52.8	48.9	47.4	45.0	43.8	42.2	41.9	41.5
	Max	56.9	69.6	52.1	67.4	65.4	62.1	60.3	55.8	54.3	53.0	52.8	52.5
Energy Average		52.2	Average:		59.2	57.9	54.4	52.6	49.5	48.1	46.6	46.3	45.9

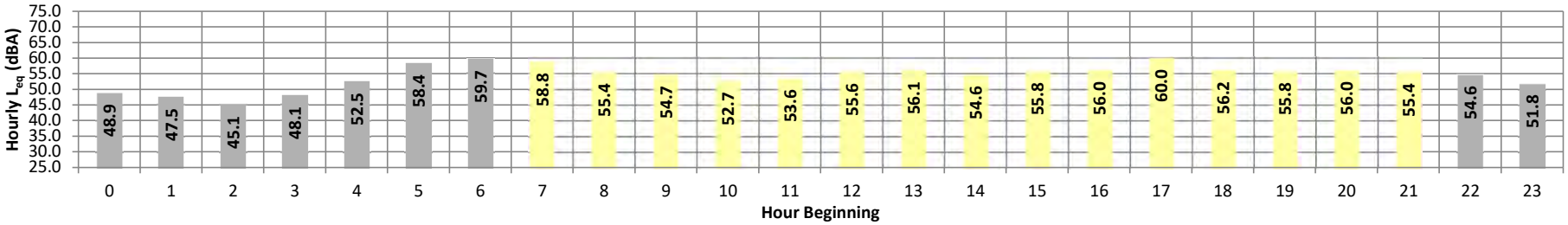
L_{eq} (dBA)		
24-Hour	Daytime (7am-10pm)	Nighttime (10pm-7am)
54.0	**54.7**	**52.2**

24-Hour Noise Level Measurement Summary

Date: Monday, November 13, 2023 *Location:* L6 - Located east of the Project site near an existing residnce at *Meter:* Piccolo II *JN:* 15133

Project: Emerald Hills *Source:* 6005 Dipper St *Analyst:* B. Maddux

Hourly L_{eq} dBA Readings (unadjusted)



Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%	L_{eq}	Adj.	Adj. L_{eq}
Night	0	48.9	60.0	39.8	58.6	57.4	54.6	52.9	48.8	45.7	41.8	41.1	40.4	48.9	10.0	58.9
	1	47.5	60.2	36.5	58.0	56.3	54.0	52.4	46.8	42.7	38.3	37.6	36.9	47.5	10.0	57.5
	2	45.1	56.9	36.9	55.2	53.4	50.7	49.4	44.6	41.3	38.3	37.8	37.3	45.1	10.0	55.1
	3	48.1	59.8	39.8	58.0	56.5	54.3	51.4	47.8	45.0	41.5	40.9	40.3	48.1	10.0	58.1
	4	52.5	64.6	44.5	63.1	61.6	58.7	56.9	51.3	48.7	46.2	45.7	45.0	52.5	10.0	62.5
	5	58.4	73.7	50.5	71.1	67.5	63.5	60.9	56.1	54.1	51.9	51.5	51.0	58.4	10.0	68.4
	6	59.7	74.3	51.0	72.7	70.2	64.8	62.1	57.0	54.6	52.4	52.0	51.5	59.7	10.0	69.7
Day	7	58.8	69.2	54.1	67.7	66.0	63.0	61.1	58.5	57.1	55.3	55.0	54.5	58.8	0.0	58.8
	8	55.4	67.5	45.1	66.1	64.5	61.4	59.6	54.8	51.3	46.9	46.3	45.6	55.4	0.0	55.4
	9	54.7	69.5	40.7	67.8	65.4	61.2	58.2	51.8	47.5	42.6	41.9	41.2	54.7	0.0	54.7
	10	52.7	64.7	41.9	63.5	62.3	59.2	56.8	51.7	48.1	43.8	43.1	42.4	52.7	0.0	52.7
	11	53.6	66.0	41.3	64.6	63.2	60.5	58.0	52.2	48.4	43.5	42.6	41.8	53.6	0.0	53.6
	12	55.6	69.6	41.8	68.0	66.3	61.8	59.3	53.9	49.5	44.0	43.1	42.2	55.6	0.0	55.6
	13	56.1	71.4	42.1	67.7	65.7	62.4	60.2	54.1	50.0	44.1	43.4	42.6	56.1	0.0	56.1
	14	54.6	68.7	43.7	66.6	63.8	59.2	57.8	53.8	50.6	45.8	45.0	44.1	54.6	0.0	54.6
	15	55.8	68.6	44.1	67.3	65.2	60.8	59.2	55.3	51.9	46.6	45.8	44.7	55.8	0.0	55.8
	16	56.0	67.8	45.4	65.9	64.2	61.5	59.9	56.0	53.1	48.0	46.9	45.9	56.0	0.0	56.0
	17	60.0	74.7	48.1	72.5	71.1	66.1	62.7	57.1	54.3	50.4	49.6	48.6	60.0	0.0	60.0
	18	56.2	68.6	48.4	66.7	64.6	60.7	58.8	55.8	53.6	50.2	49.6	48.9	56.2	0.0	56.2
	19	55.8	66.3	48.8	65.0	63.9	60.5	59.2	55.8	53.4	50.3	49.7	49.2	55.8	5.0	60.8
	20	56.0	66.8	50.0	65.0	63.5	60.7	59.1	55.9	53.9	51.5	51.1	50.5	56.0	5.0	61.0
	21	55.4	65.3	49.4	64.0	62.5	60.2	58.6	55.4	53.8	51.1	50.6	49.9	55.4	5.0	60.4
Night	22	54.6	63.3	48.9	61.5	60.3	58.4	57.4	55.1	53.5	50.7	50.2	49.4	54.6	10.0	64.6
	23	51.8	60.4	45.8	58.7	57.4	55.8	54.9	52.5	50.5	47.7	47.1	46.3	51.8	10.0	61.8

Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%
Day	Min	52.7	64.7	40.7	63.5	62.3	59.2	56.8	51.7	47.5	42.6	41.9	41.2
	Max	60.0	74.7	54.1	72.5	71.1	66.1	62.7	58.5	57.1	55.3	55.0	54.5
Energy Average		56.1	Average:		66.6	64.8	61.3	59.2	54.8	51.8	47.6	46.9	46.1
Night	Min	45.1	56.9	36.5	55.2	53.4	50.7	49.4	44.6	41.3	38.3	37.6	36.9
	Max	59.7	74.3	51.0	72.7	70.2	64.8	62.1	57.0	54.6	52.4	52.0	51.5
Energy Average		54.4	Average:		61.9	60.1	57.2	55.4	51.1	48.5	45.4	44.9	44.2

L_{eq} (dBA)		
24-Hour	Daytime (7am-10pm)	Nighttime (10pm-7am)
55.6	**56.1**	**54.4**

APPENDIX 7.1:

OFF-SIE TRAFFIC NOISE MODEL

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing
Road Name: 60th St
Road Segment: s/o Federal Blvd

Project Name: Emerald Hills
Job Number: 15133

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	10,043 vehicles
Peak Hour Percentage:	8.25%
Peak Hour Volume:	829 vehicles
Vehicle Speed:	30 mph
Near/Far Lane Distance:	12 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	18.0 feet
Centerline Dist. to Observer:	18.0 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:	80.0%	10.0%	10.0%	97.42%
Medium Trucks:	80.0%	10.0%	10.0%	1.84%
Heavy Trucks:	80.0%	10.0%	10.0%	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:	17.692
Medium Trucks:	17.184
Heavy Trucks:	17.235

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	61.75	-1.01	6.66	-1.20	*-4.23*	0.000	0.000
Medium Trucks:	73.48	-18.25	6.85	-1.20	*-4.84*	0.000	0.000
Heavy Trucks:	79.92	-22.20	6.84	-1.20	*-6.31*	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:	66.2	65.3	62.3	57.5	66.0	66.5
Medium Trucks:	60.9	60.0	57.0	52.2	60.7	61.2
Heavy Trucks:	63.4	62.4	59.4	54.6	63.2	63.6
Vehicle Noise:	68.8	67.9	64.9	60.1	68.6	69.1

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	15	31	68	145
CNEL:	16	34	73	156

Friday, June 7, 2024

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing
Road Name: 60th St
Road Segment: n/o Project Entrance

Project Name: Emerald Hills
Job Number: 15133

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	7,339 vehicles
Peak Hour Percentage:	8.25%
Peak Hour Volume:	605 vehicles
Vehicle Speed:	30 mph
Near/Far Lane Distance:	12 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	18.0 feet
Centerline Dist. to Observer:	18.0 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:	80.0%	10.0%	10.0%	97.42%
Medium Trucks:	80.0%	10.0%	10.0%	1.84%
Heavy Trucks:	80.0%	10.0%	10.0%	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:	17.692
Medium Trucks:	17.184
Heavy Trucks:	17.235

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	61.75	-2.37	6.66	-1.20	*-4.23*	0.000	0.000
Medium Trucks:	73.48	-19.61	6.85	-1.20	*-4.84*	0.000	0.000
Heavy Trucks:	79.92	-23.56	6.84	-1.20	*-6.31*	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	63.9	60.9	56.1	64.7	65.1
Medium Trucks:	59.5	58.6	55.6	50.8	59.3	59.8
Heavy Trucks:	62.0	61.1	58.1	53.3	61.8	62.3
Vehicle Noise:	67.4	66.5	63.5	58.7	67.2	67.7

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	12	25	55	118
CNEL:	13	27	59	127

Friday, June 7, 2024

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing
Road Name: 60th St
Road Segment: n/o Imperial Ave

Project Name: Emerald Hills
Job Number: 15133

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	10,225 vehicles
Peak Hour Percentage:	8.25%
Peak Hour Volume:	844 vehicles
Vehicle Speed:	30 mph
Near/Far Lane Distance:	12 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	18.0 feet
Centerline Dist. to Observer:	18.0 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:	80.0%	10.0%	10.0%	97.42%
Medium Trucks:	80.0%	10.0%	10.0%	1.84%
Heavy Trucks:	80.0%	10.0%	10.0%	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:	17.692
Medium Trucks:	17.184
Heavy Trucks:	17.235

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	61.75	-0.93	6.66	-1.20	*-4.23*	0.000	0.000
Medium Trucks:	73.48	-18.17	6.85	-1.20	*-4.84*	0.000	0.000
Heavy Trucks:	79.92	-22.12	6.84	-1.20	*-6.31*	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	65.4	62.4	57.6	66.1	66.6
Medium Trucks:	61.0	60.0	57.0	52.3	60.8	61.3
Heavy Trucks:	63.4	62.5	59.5	54.7	63.3	63.7
Vehicle Noise:	68.9	67.9	64.9	60.2	68.7	69.2

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	15	32	68	147
CNEL:	16	34	73	158

Friday, June 7, 2024

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing
Road Name: Federal Blvd
Road Segment: w/o 60th St

Project Name: Emerald Hills
Job Number: 15133

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	23,665 vehicles
Peak Hour Percentage:	8.25%
Peak Hour Volume:	1,952 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	42 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	41.0 feet
Centerline Dist. to Observer:	41.0 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:	80.0%	10.0%	10.0%	97.42%
Medium Trucks:	80.0%	10.0%	10.0%	1.84%
Heavy Trucks:	80.0%	10.0%	10.0%	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:	35.567
Medium Trucks:	35.317
Heavy Trucks:	35.342

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	66.51	1.47	2.12	-1.20	*-4.59*	0.000	0.000
Medium Trucks:	77.72	-15.77	2.16	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	82.99	-19.73	2.16	-1.20	*-5.54*	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:	68.9	68.0	65.0	60.2	68.7	69.2
Medium Trucks:	62.9	62.0	59.0	54.2	62.7	63.2
Heavy Trucks:	64.2	63.3	60.3	55.5	64.0	64.5
Vehicle Noise:	70.9	70.0	67.0	62.2	70.7	71.2

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	46	99	213	459
CNEL:	49	106	229	493

Friday, June 7, 2024

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing
Road Name: Federal Blvd
Road Segment: e/o 60th St

Project Name: Emerald Hills
Job Number: 15133

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	19,529 vehicles
Peak Hour Percentage:	8.25%
Peak Hour Volume:	1,611 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	42 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	41.0 feet
Centerline Dist. to Observer:	41.0 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:	80.0%	10.0%	10.0%	97.42%
Medium Trucks:	80.0%	10.0%	10.0%	1.84%
Heavy Trucks:	80.0%	10.0%	10.0%	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:	35.567
Medium Trucks:	35.317
Heavy Trucks:	35.342

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	66.51	0.63	2.12	-1.20	*-4.59*	0.000	0.000
Medium Trucks:	77.72	-16.61	2.16	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	82.99	-20.56	2.16	-1.20	*-5.54*	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:	68.1	67.1	64.1	59.4	67.9	68.3
Medium Trucks:	62.1	61.1	58.1	53.4	61.9	62.4
Heavy Trucks:	63.4	62.5	59.5	54.7	63.2	63.7
Vehicle Noise:	70.1	69.2	66.1	61.4	69.9	70.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	40	87	187	404
CNEL:	43	93	201	434

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing
Road Name: Imperial Ave
Road Segment: w/o 60th St

Project Name: Emerald Hills
Job Number: 15133

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	16,427	vehicles
Peak Hour Percentage:	8.25%	
Peak Hour Volume:	1,355	vehicles
Vehicle Speed:	35	mph
Near/Far Lane Distance:	46	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	38.0	feet
Centerline Dist. to Observer:	38.0	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:	80.0%	10.0%	10.0%	97.42%
Medium Trucks:	80.0%	10.0%	10.0%	1.84%
Heavy Trucks:	80.0%	10.0%	10.0%	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:	30.659
Medium Trucks:	30.369
Heavy Trucks:	30.398

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	64.30	0.46	3.08	-1.20	*-4.57*	0.000	0.000
Medium Trucks:	75.75	-16.78	3.14	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	81.57	-20.73	3.14	-1.20	*-5.59*	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:	66.6	65.7	62.7	57.9	66.5	66.9
Medium Trucks:	60.9	60.0	57.0	52.2	60.7	61.2
Heavy Trucks:	62.8	61.8	58.8	54.1	62.6	63.1
Vehicle Noise:	68.9	68.0	65.0	60.2	68.7	69.2

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	31	67	145	312
CNEL:	34	72	156	335

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing
Road Name: Imperial Ave
Road Segment: e/o 60th St

Project Name: Emerald Hills
Job Number: 15133

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	20,040 vehicles
Peak Hour Percentage:	8.25%
Peak Hour Volume:	1,653 vehicles
Vehicle Speed:	35 mph
Near/Far Lane Distance:	46 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	38.0 feet
Centerline Dist. to Observer:	38.0 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:	80.0%	10.0%	10.0%	97.42%
Medium Trucks:	80.0%	10.0%	10.0%	1.84%
Heavy Trucks:	80.0%	10.0%	10.0%	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:	30.659
Medium Trucks:	30.369
Heavy Trucks:	30.398

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	64.30	1.32	3.08	-1.20	*-4.57*	0.000	0.000
Medium Trucks:	75.75	-15.91	3.14	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	81.57	-19.87	3.14	-1.20	*-5.59*	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	66.6	63.6	58.8	67.3	67.8
Medium Trucks:	61.8	60.9	57.8	53.1	61.6	62.1
Heavy Trucks:	63.6	62.7	59.7	54.9	63.5	63.9
Vehicle Noise:	69.8	68.8	65.8	61.0	69.6	70.0

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	36	77	165	356
CNEL:	38	82	178	383

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: E + Project
Road Name: 60th St
Road Segment: s/o Federal Blvd

Project Name: Emerald Hills
Job Number: 15133

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	10,541	vehicles
Peak Hour Percentage:	8.25%	
Peak Hour Volume:	870	vehicles
Vehicle Speed:	30	mph
Near/Far Lane Distance:	12	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	18.0	feet
Centerline Dist. to Observer:	18.0	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:	80.0%	10.0%	10.0%	97.42%
Medium Trucks:	80.0%	10.0%	10.0%	1.84%
Heavy Trucks:	80.0%	10.0%	10.0%	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:	17.692
Medium Trucks:	17.184
Heavy Trucks:	17.235

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	61.75	-0.80	6.66	-1.20	*-4.23*	0.000	0.000
Medium Trucks:	73.48	-18.04	6.85	-1.20	*-4.84*	0.000	0.000
Heavy Trucks:	79.92	-21.99	6.84	-1.20	*-6.31*	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	65.5	62.5	57.7	66.2	66.7
Medium Trucks:	61.1	60.2	57.2	52.4	60.9	61.4
Heavy Trucks:	63.6	62.6	59.6	54.9	63.4	63.9
Vehicle Noise:	69.0	68.1	65.1	60.3	68.8	69.3

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	15	32	70	150
CNEL:	16	35	75	161

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: E + Project
Road Name: 60th St
Road Segment: n/o Project Entrance

Project Name: Emerald Hills
Job Number: 15133

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	7,837 vehicles
Peak Hour Percentage:	8.25%
Peak Hour Volume:	647 vehicles
Vehicle Speed:	30 mph
Near/Far Lane Distance:	12 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	18.0 feet
Centerline Dist. to Observer:	18.0 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:	80.0%	10.0%	10.0%	97.42%
Medium Trucks:	80.0%	10.0%	10.0%	1.84%
Heavy Trucks:	80.0%	10.0%	10.0%	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:	17.692
Medium Trucks:	17.184
Heavy Trucks:	17.235

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	61.75	-2.08	6.66	-1.20	*-4.23*	0.000	0.000
Medium Trucks:	73.48	-19.32	6.85	-1.20	*-4.84*	0.000	0.000
Heavy Trucks:	79.92	-23.28	6.84	-1.20	*-6.31*	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	64.2	61.2	56.4	65.0	65.4
Medium Trucks:	59.8	58.9	55.9	51.1	59.6	60.1
Heavy Trucks:	62.3	61.4	58.3	53.6	62.1	62.6
Vehicle Noise:	67.7	66.8	63.8	59.0	67.5	68.0

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	12	27	57	123
CNEL:	13	29	61	132

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: E + Project
Road Name: 60th St
Road Segment: n/o Imperial Ave

Project Name: Emerald Hills
Job Number: 15133

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	10,747	vehicles
Peak Hour Percentage:	8.25%	
Peak Hour Volume:	887	vehicles
Vehicle Speed:	30	mph
Near/Far Lane Distance:	12	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	18.0	feet
Centerline Dist. to Observer:	18.0	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:	80.0%	10.0%	10.0%	97.42%
Medium Trucks:	80.0%	10.0%	10.0%	1.84%
Heavy Trucks:	80.0%	10.0%	10.0%	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:	17.692
Medium Trucks:	17.184
Heavy Trucks:	17.235

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	61.75	-0.71	6.66	-1.20	*-4.23*	0.000	0.000
Medium Trucks:	73.48	-17.95	6.85	-1.20	*-4.84*	0.000	0.000
Heavy Trucks:	79.92	-21.91	6.84	-1.20	*-6.31*	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:	66.5	65.6	62.6	57.8	66.3	66.8
Medium Trucks:	61.2	60.3	57.2	52.5	61.0	61.5
Heavy Trucks:	63.6	62.7	59.7	54.9	63.5	63.9
Vehicle Noise:	69.1	68.2	65.1	60.4	68.9	69.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	15	33	71	152
CNEL:	16	35	76	164

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: E + Project
Road Name: Federal Blvd
Road Segment: w/o 60th St

Project Name: Emerald Hills
Job Number: 15133

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	24,041 vehicles
Peak Hour Percentage:	8.25%
Peak Hour Volume:	1,983 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	42 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	41.0 feet
Centerline Dist. to Observer:	41.0 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:	80.0%	10.0%	10.0%	97.42%
Medium Trucks:	80.0%	10.0%	10.0%	1.84%
Heavy Trucks:	80.0%	10.0%	10.0%	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:	35.567
Medium Trucks:	35.317
Heavy Trucks:	35.342

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	66.51	1.53	2.12	-1.20	*-4.59*	0.000	0.000
Medium Trucks:	77.72	-15.70	2.16	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	82.99	-19.66	2.16	-1.20	*-5.54*	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:	69.0	68.0	65.0	60.3	68.8	69.3
Medium Trucks:	63.0	62.0	59.0	54.3	62.8	63.3
Heavy Trucks:	64.3	63.4	60.4	55.6	64.1	64.6
Vehicle Noise:	71.0	70.1	67.0	62.3	70.8	71.3

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	46	100	215	464
CNEL:	50	107	231	498

Friday, June 7, 2024

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: E + Project
Road Name: Federal Blvd
Road Segment: e/o 60th St

Project Name: Emerald Hills
Job Number: 15133

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	19,651 vehicles
Peak Hour Percentage:	8.25%
Peak Hour Volume:	1,621 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	42 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	41.0 feet
Centerline Dist. to Observer:	41.0 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:	80.0%	10.0%	10.0%	97.42%
Medium Trucks:	80.0%	10.0%	10.0%	1.84%
Heavy Trucks:	80.0%	10.0%	10.0%	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:	35.567
Medium Trucks:	35.317
Heavy Trucks:	35.342

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	66.51	0.66	2.12	-1.20	*-4.59*	0.000	0.000
Medium Trucks:	77.72	-16.58	2.16	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	82.99	-20.54	2.16	-1.20	*-5.54*	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:	68.1	67.2	64.2	59.4	67.9	68.4
Medium Trucks:	62.1	61.2	58.2	53.4	61.9	62.4
Heavy Trucks:	63.4	62.5	59.5	54.7	63.2	63.7
Vehicle Noise:	70.1	69.2	66.2	61.4	69.9	70.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	41	87	188	406
CNEL:	44	94	202	436

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: E + Project
Road Name: Imperial Ave
Road Segment: w/o 60th St

Project Name: Emerald Hills
Job Number: 15133

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	16,627	vehicles
Peak Hour Percentage:	8.25%	
Peak Hour Volume:	1,372	vehicles
Vehicle Speed:	35	mph
Near/Far Lane Distance:	46	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	38.0	feet
Centerline Dist. to Observer:	38.0	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:	80.0%	10.0%	10.0%	97.42%
Medium Trucks:	80.0%	10.0%	10.0%	1.84%
Heavy Trucks:	80.0%	10.0%	10.0%	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:	30.659
Medium Trucks:	30.369
Heavy Trucks:	30.398

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	64.30	0.51	3.08	-1.20	*-4.57*	0.000	0.000
Medium Trucks:	75.75	-16.73	3.14	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	81.57	-20.68	3.14	-1.20	*-5.59*	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:	66.7	65.8	62.8	58.0	66.5	67.0
Medium Trucks:	61.0	60.0	57.0	52.3	60.8	61.3
Heavy Trucks:	62.8	61.9	58.9	54.1	62.6	63.1
Vehicle Noise:	68.9	68.0	65.0	60.2	68.8	69.2

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	31	68	146	314
CNEL:	34	73	157	338

Friday, June 7, 2024

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: E + Project
Road Name: Imperial Ave
Road Segment: e/o 60th St

Project Name: Emerald Hills
Job Number: 15133

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	20,362	vehicles
Peak Hour Percentage:	8.25%	
Peak Hour Volume:	1,680	vehicles
Vehicle Speed:	35	mph
Near/Far Lane Distance:	46	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	38.0	feet
Centerline Dist. to Observer:	38.0	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:	80.0%	10.0%	10.0%	97.42%
Medium Trucks:	80.0%	10.0%	10.0%	1.84%
Heavy Trucks:	80.0%	10.0%	10.0%	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:	30.659
Medium Trucks:	30.369
Heavy Trucks:	30.398

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	64.30	1.39	3.08	-1.20	*-4.57*	0.000	0.000
Medium Trucks:	75.75	-15.85	3.14	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	81.57	-19.80	3.14	-1.20	*-5.59*	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:	67.6	66.7	63.6	58.9	67.4	67.9
Medium Trucks:	61.8	60.9	57.9	53.1	61.7	62.1
Heavy Trucks:	63.7	62.8	59.8	55.0	63.5	64.0
Vehicle Noise:	69.8	68.9	65.9	61.1	69.6	70.1

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	36	78	167	360
CNEL:	39	83	179	387

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OYC (2028) NP
Road Name: 60th St
Road Segment: s/o Federal Blvd

Project Name: Emerald Hills
Job Number: 15133

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	10,412	vehicles
Peak Hour Percentage:	8.25%	
Peak Hour Volume:	859	vehicles
Vehicle Speed:	30	mph
Near/Far Lane Distance:	12	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	18.0	feet
Centerline Dist. to Observer:	18.0	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:	80.0%	10.0%	10.0%	97.42%
Medium Trucks:	80.0%	10.0%	10.0%	1.84%
Heavy Trucks:	80.0%	10.0%	10.0%	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:	17.692
Medium Trucks:	17.184
Heavy Trucks:	17.235

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	61.75	-0.85	6.66	-1.20	*-4.23*	0.000	0.000
Medium Trucks:	73.48	-18.09	6.85	-1.20	*-4.84*	0.000	0.000
Heavy Trucks:	79.92	-22.04	6.84	-1.20	*-6.31*	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	65.4	62.4	57.7	66.2	66.7
Medium Trucks:	61.0	60.1	57.1	52.3	60.9	61.3
Heavy Trucks:	63.5	62.6	59.6	54.8	63.3	63.8
Vehicle Noise:	68.9	68.0	65.0	60.2	68.8	69.2

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	15	32	69	149
CNEL:	16	34	74	160

Friday, June 7, 2024

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OYC (2028) NP
Road Name: 60th St
Road Segment: n/o Project Entrance

Project Name: Emerald Hills
Job Number: 15133

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	7,654	vehicles
Peak Hour Percentage:	8.25%	
Peak Hour Volume:	631	vehicles
Vehicle Speed:	30	mph
Near/Far Lane Distance:	12	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	18.0	feet
Centerline Dist. to Observer:	18.0	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:	80.0%	10.0%	10.0%	97.42%
Medium Trucks:	80.0%	10.0%	10.0%	1.84%
Heavy Trucks:	80.0%	10.0%	10.0%	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:	17.692
Medium Trucks:	17.184
Heavy Trucks:	17.235

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	61.75	-2.19	6.66	-1.20	*-4.23*	0.000	0.000
Medium Trucks:	73.48	-19.43	6.85	-1.20	*-4.84*	0.000	0.000
Heavy Trucks:	79.92	-23.38	6.84	-1.20	*-6.31*	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:	65.0	64.1	61.1	56.3	64.9	65.3
Medium Trucks:	59.7	58.8	55.8	51.0	59.5	60.0
Heavy Trucks:	62.2	61.2	58.2	53.5	62.0	62.5
Vehicle Noise:	67.6	66.7	63.7	58.9	67.4	67.9

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	12	26	56	121
CNEL:	13	28	61	130

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OYC (2028) NP
Road Name: 60th St
Road Segment: n/o Imperial Ave

Project Name: Emerald Hills
Job Number: 15133

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	10,597	vehicles
Peak Hour Percentage:	8.25%	
Peak Hour Volume:	874	vehicles
Vehicle Speed:	30	mph
Near/Far Lane Distance:	12	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	18.0	feet
Centerline Dist. to Observer:	18.0	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:	80.0%	10.0%	10.0%	97.42%
Medium Trucks:	80.0%	10.0%	10.0%	1.84%
Heavy Trucks:	80.0%	10.0%	10.0%	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:	17.692
Medium Trucks:	17.184
Heavy Trucks:	17.235

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	61.75	-0.77	6.66	-1.20	*-4.23*	0.000	0.000
Medium Trucks:	73.48	-18.01	6.85	-1.20	*-4.84*	0.000	0.000
Heavy Trucks:	79.92	-21.97	6.84	-1.20	*-6.31*	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	65.5	62.5	57.7	66.3	66.7
Medium Trucks:	61.1	60.2	57.2	52.4	60.9	61.4
Heavy Trucks:	63.6	62.7	59.7	54.9	63.4	63.9
Vehicle Noise:	69.0	68.1	65.1	60.3	68.8	69.3

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	15	32	70	151
CNEL:	16	35	75	162

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OYC (2028) NP
Road Name: Federal Blvd
Road Segment: w/o 60th St

Project Name: Emerald Hills
Job Number: 15133

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	24,250 vehicles
Peak Hour Percentage:	8.25%
Peak Hour Volume:	2,001 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	42 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	41.0 feet
Centerline Dist. to Observer:	41.0 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:	80.0%	10.0%	10.0%	97.42%
Medium Trucks:	80.0%	10.0%	10.0%	1.84%
Heavy Trucks:	80.0%	10.0%	10.0%	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:	35.567
Medium Trucks:	35.317
Heavy Trucks:	35.342

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	66.51	1.57	2.12	-1.20	*-4.59*	0.000	0.000
Medium Trucks:	77.72	-15.67	2.16	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	82.99	-19.62	2.16	-1.20	*-5.54*	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:	69.0	68.1	65.1	60.3	68.8	69.3
Medium Trucks:	63.0	62.1	59.1	54.3	62.8	63.3
Heavy Trucks:	64.3	63.4	60.4	55.6	64.1	64.6
Vehicle Noise:	71.0	70.1	67.1	62.3	70.8	71.3

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	47	101	217	467
CNEL:	50	108	233	501

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OYC (2028) NP
Road Name: Federal Blvd
Road Segment: e/o 60th St

Project Name: Emerald Hills
Job Number: 15133

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	19,976 vehicles
Peak Hour Percentage:	8.25%
Peak Hour Volume:	1,648 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	42 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	41.0 feet
Centerline Dist. to Observer:	41.0 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:	80.0%	10.0%	10.0%	97.42%
Medium Trucks:	80.0%	10.0%	10.0%	1.84%
Heavy Trucks:	80.0%	10.0%	10.0%	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:	35.567
Medium Trucks:	35.317
Heavy Trucks:	35.342

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	66.51	0.73	2.12	-1.20	*-4.59*	0.000	0.000
Medium Trucks:	77.72	-16.51	2.16	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	82.99	-20.46	2.16	-1.20	*-5.54*	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:	68.2	67.2	64.2	59.5	68.0	68.4
Medium Trucks:	62.2	61.2	58.2	53.5	62.0	62.5
Heavy Trucks:	63.5	62.6	59.6	54.8	63.3	63.8
Vehicle Noise:	70.2	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:	41	88	190	410
CNEL:	44	95	204	441

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OYC (2028) NP
Road Name: Imperial Ave
Road Segment: w/o 60th St

Project Name: Emerald Hills
Job Number: 15133

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	17,234	vehicles
Peak Hour Percentage:	8.25%	
Peak Hour Volume:	1,422	vehicles
Vehicle Speed:	35	mph
Near/Far Lane Distance:	46	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	38.0	feet
Centerline Dist. to Observer:	38.0	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:	80.0%	10.0%	10.0%	97.42%
Medium Trucks:	80.0%	10.0%	10.0%	1.84%
Heavy Trucks:	80.0%	10.0%	10.0%	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:	30.659
Medium Trucks:	30.369
Heavy Trucks:	30.398

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	64.30	0.67	3.08	-1.20	*-4.57*	0.000	0.000
Medium Trucks:	75.75	-16.57	3.14	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	81.57	-20.53	3.14	-1.20	*-5.59*	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:	66.9	65.9	62.9	58.1	66.7	67.1
Medium Trucks:	61.1	60.2	57.2	52.4	60.9	61.4
Heavy Trucks:	63.0	62.1	59.0	54.3	62.8	63.3
Vehicle Noise:	69.1	68.2	65.2	60.4	68.9	69.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	32	69	149	322
CNEL:	35	75	161	346

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OYC (2028) NP
Road Name: Imperial Ave
Road Segment: e/o 60th St

Project Name: Emerald Hills
Job Number: 15133

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	21,087	vehicles
Peak Hour Percentage:	8.25%	
Peak Hour Volume:	1,740	vehicles
Vehicle Speed:	35	mph
Near/Far Lane Distance:	46	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	38.0	feet
Centerline Dist. to Observer:	38.0	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:	80.0%	10.0%	10.0%	97.42%
Medium Trucks:	80.0%	10.0%	10.0%	1.84%
Heavy Trucks:	80.0%	10.0%	10.0%	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:	30.659
Medium Trucks:	30.369
Heavy Trucks:	30.398

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	64.30	1.55	3.08	-1.20	*-4.57*	0.000	0.000
Medium Trucks:	75.75	-15.69	3.14	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	81.57	-19.65	3.14	-1.20	*-5.59*	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:	67.7	66.8	63.8	59.0	67.6	68.0
Medium Trucks:	62.0	61.1	58.1	53.3	61.8	62.3
Heavy Trucks:	63.9	62.9	59.9	55.2	63.7	64.1
Vehicle Noise:	70.0	69.1	66.0	61.3	69.8	70.3

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	37	79	171	368
CNEL:	40	85	184	396

Friday, June 7, 2024

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OYC (2028) WP
Road Name: 60th St
Road Segment: s/o Federal Blvd

Project Name: Emerald Hills
Job Number: 15133

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	10,910 vehicles
Peak Hour Percentage:	8.25%
Peak Hour Volume:	900 vehicles
Vehicle Speed:	30 mph
Near/Far Lane Distance:	12 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	18.0 feet
Centerline Dist. to Observer:	18.0 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:	80.0%	10.0%	10.0%	97.42%
Medium Trucks:	80.0%	10.0%	10.0%	1.84%
Heavy Trucks:	80.0%	10.0%	10.0%	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:	17.692
Medium Trucks:	17.184
Heavy Trucks:	17.235

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	61.75	-0.65	6.66	-1.20	*-4.23*	0.000	0.000
Medium Trucks:	73.48	-17.89	6.85	-1.20	*-4.84*	0.000	0.000
Heavy Trucks:	79.92	-21.84	6.84	-1.20	*-6.31*	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:	66.6	65.6	62.6	57.9	66.4	66.9
Medium Trucks:	61.2	60.3	57.3	52.5	61.1	61.5
Heavy Trucks:	63.7	62.8	59.8	55.0	63.5	64.0
Vehicle Noise:	69.2	68.2	65.2	60.4	69.0	69.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	15	33	71	154
CNEL:	17	36	77	165

Friday, June 7, 2024

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OYC (2028) WP
Road Name: 60th St
Road Segment: n/o Project Entrance

Project Name: Emerald Hills
Job Number: 15133

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	8,152	vehicles
Peak Hour Percentage:	8.25%	
Peak Hour Volume:	673	vehicles
Vehicle Speed:	30	mph
Near/Far Lane Distance:	12	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	18.0	feet
Centerline Dist. to Observer:	18.0	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:	80.0%	10.0%	10.0%	97.42%
Medium Trucks:	80.0%	10.0%	10.0%	1.84%
Heavy Trucks:	80.0%	10.0%	10.0%	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:	17.692
Medium Trucks:	17.184
Heavy Trucks:	17.235

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	61.75	-1.91	6.66	-1.20	*-4.23*	0.000	0.000
Medium Trucks:	73.48	-19.15	6.85	-1.20	*-4.84*	0.000	0.000
Heavy Trucks:	79.92	-23.11	6.84	-1.20	*-6.31*	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:	65.3	64.4	61.4	56.6	65.1	65.6
Medium Trucks:	60.0	59.1	56.0	51.3	59.8	60.3
Heavy Trucks:	62.4	61.5	58.5	53.7	62.3	62.7
Vehicle Noise:	67.9	67.0	63.9	59.2	67.7	68.2

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	13	27	59	127
CNEL:	14	29	63	136

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OYC (2028) WP
Road Name: 60th St
Road Segment: n/o Imperial Ave

Project Name: Emerald Hills
Job Number: 15133

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	11,119	vehicles
Peak Hour Percentage:	8.25%	
Peak Hour Volume:	917	vehicles
Vehicle Speed:	30	mph
Near/Far Lane Distance:	12	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	18.0	feet
Centerline Dist. to Observer:	18.0	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:	80.0%	10.0%	10.0%	97.42%
Medium Trucks:	80.0%	10.0%	10.0%	1.84%
Heavy Trucks:	80.0%	10.0%	10.0%	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:	17.692
Medium Trucks:	17.184
Heavy Trucks:	17.235

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	61.75	-0.56	6.66	-1.20	*-4.23*	0.000	0.000
Medium Trucks:	73.48	-17.80	6.85	-1.20	*-4.84*	0.000	0.000
Heavy Trucks:	79.92	-21.76	6.84	-1.20	*-6.31*	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:	66.7	65.7	62.7	57.9	66.5	66.9
Medium Trucks:	61.3	60.4	57.4	52.6	61.2	61.6
Heavy Trucks:	63.8	62.9	59.9	55.1	63.6	64.1
Vehicle Noise:	69.2	68.3	65.3	60.5	69.1	69.5

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	16	34	72	156
CNEL:	17	36	78	167

Friday, June 7, 2024

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OYC (2028) WP
Road Name: Federal Blvd
Road Segment: w/o 60th St

Project Name: Emerald Hills
Job Number: 15133

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	24,626	vehicles
Peak Hour Percentage:	8.25%	
Peak Hour Volume:	2,032	vehicles
Vehicle Speed:	40	mph
Near/Far Lane Distance:	42	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	41.0	feet
Centerline Dist. to Observer:	41.0	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:	80.0%	10.0%	10.0%	97.42%
Medium Trucks:	80.0%	10.0%	10.0%	1.84%
Heavy Trucks:	80.0%	10.0%	10.0%	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:	35.567
Medium Trucks:	35.317
Heavy Trucks:	35.342

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	66.51	1.64	2.12	-1.20	*-4.59*	0.000	0.000
Medium Trucks:	77.72	-15.60	2.16	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	82.99	-19.56	2.16	-1.20	*-5.54*	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	68.1	65.1	60.4	68.9	69.4
Medium Trucks:	63.1	62.2	59.1	54.4	62.9	63.4
Heavy Trucks:	64.4	63.5	60.5	55.7	64.2	64.7
Vehicle Noise:	71.1	70.2	67.2	62.4	70.9	71.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	47	102	219	471
CNEL:	51	109	235	507

Friday, June 7, 2024

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OYC (2028) WP
Road Name: Federal Blvd
Road Segment: e/o 60th St

Project Name: Emerald Hills
Job Number: 15133

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	20,098	vehicles
Peak Hour Percentage:	8.25%	
Peak Hour Volume:	1,658	vehicles
Vehicle Speed:	40	mph
Near/Far Lane Distance:	42	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	41.0	feet
Centerline Dist. to Observer:	41.0	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:	80.0%	10.0%	10.0%	97.42%
Medium Trucks:	80.0%	10.0%	10.0%	1.84%
Heavy Trucks:	80.0%	10.0%	10.0%	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:	35.567
Medium Trucks:	35.317
Heavy Trucks:	35.342

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	66.51	0.76	2.12	-1.20	*-4.59*	0.000	0.000
Medium Trucks:	77.72	-16.48	2.16	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	82.99	-20.44	2.16	-1.20	*-5.54*	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:	68.2	67.3	64.2	59.5	68.0	68.5
Medium Trucks:	62.2	61.3	58.3	53.5	62.0	62.5
Heavy Trucks:	63.5	62.6	59.6	54.8	63.3	63.8
Vehicle Noise:	70.2	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:	41	89	191	412
CNEL:	44	95	205	442

Friday, June 7, 2024

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OYC (2028) WP
Road Name: Imperial Ave
Road Segment: w/o 60th St

Project Name: Emerald Hills
Job Number: 15133

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	17,434	vehicles
Peak Hour Percentage:	8.25%	
Peak Hour Volume:	1,438	vehicles
Vehicle Speed:	35	mph
Near/Far Lane Distance:	46	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	38.0	feet
Centerline Dist. to Observer:	38.0	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:	80.0%	10.0%	10.0%	97.42%
Medium Trucks:	80.0%	10.0%	10.0%	1.84%
Heavy Trucks:	80.0%	10.0%	10.0%	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:	30.659
Medium Trucks:	30.369
Heavy Trucks:	30.398

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	64.30	0.72	3.08	-1.20	*-4.57*	0.000	0.000
Medium Trucks:	75.75	-16.52	3.14	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	81.57	-20.48	3.14	-1.20	*-5.59*	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:	66.9	66.0	63.0	58.2	66.7	67.2
Medium Trucks:	61.2	60.2	57.2	52.5	61.0	61.5
Heavy Trucks:	63.0	62.1	59.1	54.3	62.9	63.3
Vehicle Noise:	69.1	68.2	65.2	60.4	69.0	69.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	32	70	151	324
CNEL:	35	75	162	349

Friday, June 7, 2024

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OYC (2028) WP
Road Name: Imperial Ave
Road Segment: e/o 60th St

Project Name: Emerald Hills
Job Number: 15133

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	21,409 vehicles
Peak Hour Percentage:	8.25%
Peak Hour Volume:	1,766 vehicles
Vehicle Speed:	35 mph
Near/Far Lane Distance:	46 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	38.0 feet
Centerline Dist. to Observer:	38.0 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:	80.0%	10.0%	10.0%	97.42%
Medium Trucks:	80.0%	10.0%	10.0%	1.84%
Heavy Trucks:	80.0%	10.0%	10.0%	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:	30.659
Medium Trucks:	30.369
Heavy Trucks:	30.398

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	64.30	1.61	3.08	-1.20	*-4.57*	0.000	0.000
Medium Trucks:	75.75	-15.63	3.14	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	81.57	-19.58	3.14	-1.20	*-5.59*	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	66.9	63.9	59.1	67.6	68.1
Medium Trucks:	62.1	61.1	58.1	53.4	61.9	62.4
Heavy Trucks:	63.9	63.0	60.0	55.2	63.7	64.2
Vehicle Noise:	70.0	69.1	66.1	61.3	69.9	70.3

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	37	80	173	372
CNEL:	40	86	186	400

Friday, June 7, 2024

APPENDIX 8.1:

ON-SIE TRAFFIC NOISE MODEL

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO) - v10/31/19

Scenario: Backyard No Wall
Road Name: SR-94
Lot No: O1

Project Name: Emerald Hills
Job Number: 15133
Analyst: B. Maddux

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	122,200	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	12,220	vehicles
Vehicle Speed:	65	mph
Near/Far Lane Distance:	106	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	1,381.0	feet
Centerline Dist. to Observer:	1,391.0	feet
Barrier Distance to Observer:	10.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	351.6	feet
Road Elevation:	221.0	feet
Barrier Elevation:	351.6	feet
Road Grade:	1.0%	

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	10
Medium Trucks (2 Axles):	10
Heavy Trucks (3+ Axles):	10

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	77.5%	12.9%	9.6%	96.25%
Medium Trucks:	84.8%	4.9%	10.3%	2.73%
Heavy Trucks:	86.5%	2.7%	10.8%	1.02%

Noise Source Elevations (in feet)

Autos:	221.00		
Medium Trucks:	223.97		
Heavy Trucks:	229.01	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	########
Medium Trucks:	########
Heavy Trucks:	########

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	75.54	7.27	-14.36	0.00	*-0.72*	0.000	0.000
Medium Trucks:	81.71	-8.20	-14.36	0.00	*-0.73*	0.000	0.000
Heavy Trucks:	85.21	-12.48	-14.36	0.00	*-0.74*	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	64.8	58.7	67.4	68.0
Medium Trucks:	59.1	57.6	51.3	49.7	58.2	58.4
Heavy Trucks:	58.4	56.9	47.9	49.2	57.5	57.6
Vehicle Noise:	69.3	67.5	65.1	59.7	68.2	68.8

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	68.4	66.5	64.8	58.7	67.4	68.0
Medium Trucks:	59.1	57.6	51.3	49.7	58.2	58.4
Heavy Trucks:	58.4	56.9	47.9	49.2	57.5	57.6
Vehicle Noise:	69.3	67.5	65.1	59.7	68.2	68.8

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO) - v10/31/19

Scenario: Backyard No Wall
Road Name: SR-94
Lot No: O2

Project Name: Emerald Hills
Job Number: 15133
Analyst: B. Maddux

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	122,200	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	12,220	vehicles
Vehicle Speed:	65	mph
Near/Far Lane Distance:	106	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	1,334.0	feet
Centerline Dist. to Observer:	1,344.0	feet
Barrier Distance to Observer:	10.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	353.4	feet
Road Elevation:	223.0	feet
Barrier Elevation:	353.4	feet
Road Grade:	1.0%	

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	10
Medium Trucks (2 Axles):	10
Heavy Trucks (3+ Axles):	10

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	77.5%	12.9%	9.6%	96.25%
Medium Trucks:	84.8%	4.9%	10.3%	2.73%
Heavy Trucks:	86.5%	2.7%	10.8%	1.02%

Noise Source Elevations (in feet)

Autos:	223.00		
Medium Trucks:	225.97		
Heavy Trucks:	231.01	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	########
Medium Trucks:	########
Heavy Trucks:	########

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	75.54	7.27	-14.21	0.00	*-0.70*	0.000	0.000
Medium Trucks:	81.71	-8.20	-14.21	0.00	*-0.71*	0.000	0.000
Heavy Trucks:	85.21	-12.48	-14.21	0.00	*-0.73*	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:	68.6	66.7	64.9	58.9	67.5	68.1
Medium Trucks:	59.3	57.8	51.4	49.9	58.3	58.6
Heavy Trucks:	58.5	57.1	48.1	49.3	57.7	57.8
Vehicle Noise:	69.5	67.6	65.2	59.8	68.4	68.9

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	68.6	66.7	64.9	58.9	67.5	68.1
Medium Trucks:	59.3	57.8	51.4	49.9	58.3	58.6
Heavy Trucks:	58.5	57.1	48.1	49.3	57.7	57.8
Vehicle Noise:	69.5	67.6	65.2	59.8	68.4	68.9

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO) - v10/31/19

Scenario: Backyard No Wall
Road Name: SR-94
Lot No: O3

Project Name: Emerald Hills
Job Number: 15133
Analyst: B. Maddux

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	122,200	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	12,220	vehicles
Vehicle Speed:	65	mph
Near/Far Lane Distance:	106	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	1,349.0	feet
Centerline Dist. to Observer:	1,359.0	feet
Barrier Distance to Observer:	10.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	355.2	feet
Road Elevation:	225.0	feet
Barrier Elevation:	355.2	feet
Road Grade:	1.0%	

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	10
Medium Trucks (2 Axles):	10
Heavy Trucks (3+ Axles):	10

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	77.5%	12.9%	9.6%	96.25%
Medium Trucks:	84.8%	4.9%	10.3%	2.73%
Heavy Trucks:	86.5%	2.7%	10.8%	1.02%

Noise Source Elevations (in feet)

Autos:	225.00		
Medium Trucks:	227.97		
Heavy Trucks:	233.01	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	########
Medium Trucks:	########
Heavy Trucks:	########

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	75.54	7.27	-14.26	0.00	*-0.71*	0.000	0.000
Medium Trucks:	81.71	-8.20	-14.26	0.00	*-0.72*	0.000	0.000
Heavy Trucks:	85.21	-12.48	-14.26	0.00	*-0.73*	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:	68.6	66.7	64.9	58.8	67.5	68.1
Medium Trucks:	59.3	57.7	51.4	49.8	58.3	58.5
Heavy Trucks:	58.5	57.1	48.0	49.3	57.6	57.7
Vehicle Noise:	69.4	67.6	65.2	59.8	68.3	68.9

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	68.6	66.7	64.9	58.8	67.5	68.1
Medium Trucks:	59.3	57.7	51.4	49.8	58.3	58.5
Heavy Trucks:	58.5	57.1	48.0	49.3	57.6	57.7
Vehicle Noise:	69.4	67.6	65.2	59.8	68.3	68.9

Friday, June 7, 2024

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO) - v10/31/19

Scenario: Backyard No Wall
Road Name: SR-94
Lot No: O4

Project Name: Emerald Hills
Job Number: 15133
Analyst: B. Maddux

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	122,200	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	12,220	vehicles
Vehicle Speed:	65	mph
Near/Far Lane Distance:	106	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	1,367.0	feet
Centerline Dist. to Observer:	1,377.0	feet
Barrier Distance to Observer:	10.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	357.4	feet
Road Elevation:	227.0	feet
Barrier Elevation:	357.4	feet
Road Grade:	1.0%	

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	10
Medium Trucks (2 Axles):	10
Heavy Trucks (3+ Axles):	10

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	77.5%	12.9%	9.6%	96.25%
Medium Trucks:	84.8%	4.9%	10.3%	2.73%
Heavy Trucks:	86.5%	2.7%	10.8%	1.02%

Noise Source Elevations (in feet)

Autos:	227.00		
Medium Trucks:	229.97		
Heavy Trucks:	235.01	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	########
Medium Trucks:	########
Heavy Trucks:	########

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	75.54	7.27	-14.32	0.00	*-0.71*	0.000	0.000
Medium Trucks:	81.71	-8.20	-14.32	0.00	*-0.72*	0.000	0.000
Heavy Trucks:	85.21	-12.48	-14.31	0.00	*-0.74*	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:	68.5	66.6	64.8	58.8	67.4	68.0
Medium Trucks:	59.2	57.7	51.3	49.8	58.2	58.5
Heavy Trucks:	58.4	57.0	48.0	49.2	57.6	57.7
Vehicle Noise:	69.3	67.5	65.1	59.7	68.3	68.8

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	68.5	66.6	64.8	58.8	67.4	68.0
Medium Trucks:	59.2	57.7	51.3	49.8	58.2	58.5
Heavy Trucks:	58.4	57.0	48.0	49.2	57.6	57.7
Vehicle Noise:	69.3	67.5	65.1	59.7	68.3	68.8

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO) - v10/31/19

Scenario: Backyard No Wall
Road Name: SR-94
Lot No: O5

Project Name: Emerald Hills
Job Number: 15133
Analyst: B. Maddux

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	122,200	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	12,220	vehicles
Vehicle Speed:	65	mph
Near/Far Lane Distance:	106	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	1,382.0	feet
Centerline Dist. to Observer:	1,392.0	feet
Barrier Distance to Observer:	10.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	359.8	feet
Road Elevation:	230.0	feet
Barrier Elevation:	359.8	feet
Road Grade:	1.0%	

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	10
Medium Trucks (2 Axles):	10
Heavy Trucks (3+ Axles):	10

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	77.5%	12.9%	9.6%	96.25%
Medium Trucks:	84.8%	4.9%	10.3%	2.73%
Heavy Trucks:	86.5%	2.7%	10.8%	1.02%

Noise Source Elevations (in feet)

Autos:	230.00		
Medium Trucks:	232.97		
Heavy Trucks:	238.01	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	########
Medium Trucks:	########
Heavy Trucks:	########

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	75.54	7.27	-14.37	0.00	*-0.72*	0.000	0.000
Medium Trucks:	81.71	-8.20	-14.36	0.00	*-0.73*	0.000	0.000
Heavy Trucks:	85.21	-12.48	-14.36	0.00	*-0.74*	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	64.8	58.7	67.3	68.0
Medium Trucks:	59.1	57.6	51.3	49.7	58.2	58.4
Heavy Trucks:	58.4	56.9	47.9	49.2	57.5	57.6
Vehicle Noise:	69.3	67.5	65.1	59.6	68.2	68.8

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	68.4	66.5	64.8	58.7	67.3	68.0
Medium Trucks:	59.1	57.6	51.3	49.7	58.2	58.4
Heavy Trucks:	58.4	56.9	47.9	49.2	57.5	57.6
Vehicle Noise:	69.3	67.5	65.1	59.6	68.2	68.8

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO) - v10/31/19

Scenario: Backyard No Wall
Road Name: 60th Street
Lot No: O6

Project Name: Emerald Hills
Job Number: 15133
Analyst: B. Maddux

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	11,119	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	1,112	vehicles
Vehicle Speed:	25	mph
Near/Far Lane Distance:	12	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	225.0	feet
Centerline Dist. to Observer:	235.0	feet
Barrier Distance to Observer:	10.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	359.8	feet
Road Elevation:	325.0	feet
Barrier Elevation:	359.8	feet
Road Grade:	1.0%	

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	10
Medium Trucks (2 Axles):	10
Heavy Trucks (3+ Axles):	10

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:	325.00		
Medium Trucks:	327.30		
Heavy Trucks:	333.01	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	232.355
Medium Trucks:	231.973
Heavy Trucks:	231.119

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	59.44	1.06	-6.74	0.00	*-0.48*	0.000	0.000
Medium Trucks:	71.09	-16.18	-6.73	0.00	*-0.52*	0.000	0.000
Heavy Trucks:	77.24	-20.13	-6.72	0.00	*-0.60*	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:	53.8	51.9	50.1	44.0	52.7	53.3
Medium Trucks:	48.2	46.7	40.3	38.8	47.2	47.5
Heavy Trucks:	50.4	49.0	39.9	41.2	49.5	49.7
Vehicle Noise:	56.2	54.5	50.9	46.6	55.2	55.6

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	53.8	51.9	50.1	44.0	52.7	53.3
Medium Trucks:	48.2	46.7	40.3	38.8	47.2	47.5
Heavy Trucks:	50.4	49.0	39.9	41.2	49.5	49.7
Vehicle Noise:	56.2	54.5	50.9	46.6	55.2	55.6

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO) - v10/31/19

Scenario: Backyard No Wall
Road Name: 60th Street
Lot No: O7

Project Name: Emerald Hills
Job Number: 15133
Analyst: B. Maddux

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	11,119 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,112 vehicles
Vehicle Speed:	25 mph
Near/Far Lane Distance:	12 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	170.0 feet
Centerline Dist. to Observer:	180.0 feet
Barrier Distance to Observer:	10.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	385.3 feet
Road Elevation:	332.0 feet
Barrier Elevation:	385.3 feet
Road Grade:	1.0%

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	10
Medium Trucks (2 Axles):	10
Heavy Trucks (3+ Axles):	10

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:	332.00		
Medium Trucks:	334.30		
Heavy Trucks:	340.01	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	183.409
Medium Trucks:	182.692
Heavy Trucks:	181.023

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	59.44	1.06	-5.71	0.00	*-0.11*	0.000	0.000
Medium Trucks:	71.09	-16.18	-5.70	0.00	*-0.13*	0.000	0.000
Heavy Trucks:	77.24	-20.13	-5.66	0.00	*-0.19*	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:	54.8	52.9	51.1	45.1	53.7	54.3
Medium Trucks:	49.2	47.7	41.3	39.8	48.3	48.5
Heavy Trucks:	51.5	50.0	41.0	42.2	50.6	50.7
Vehicle Noise:	57.2	55.5	51.9	47.7	56.2	56.6

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	54.8	52.9	51.1	45.1	53.7	54.3
Medium Trucks:	49.2	47.7	41.3	39.8	48.3	48.5
Heavy Trucks:	51.5	50.0	41.0	42.2	50.6	50.7
Vehicle Noise:	57.2	55.5	51.9	47.7	56.2	56.6

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO) - v10/31/19

Scenario: Backyard No Wall
Road Name: 60th Street
Lot No: O8

Project Name: Emerald Hills
Job Number: 15133
Analyst: B. Maddux

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	11,119	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	1,112	vehicles
Vehicle Speed:	25	mph
Near/Far Lane Distance:	12	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	169.0	feet
Centerline Dist. to Observer:	179.0	feet
Barrier Distance to Observer:	10.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	386.9	feet
Road Elevation:	331.0	feet
Barrier Elevation:	386.9	feet
Road Grade:	1.0%	

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	10
Medium Trucks (2 Axles):	10
Heavy Trucks (3+ Axles):	10

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:	331.00		
Medium Trucks:	333.30		
Heavy Trucks:	339.01	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	183.308
Medium Trucks:	182.558
Heavy Trucks:	180.806

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	59.44	1.06	-5.71	0.00	*-0.09*	0.000	0.000
Medium Trucks:	71.09	-16.18	-5.69	0.00	*-0.11*	0.000	0.000
Heavy Trucks:	77.24	-20.13	-5.65	0.00	*-0.16*	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:	54.8	52.9	51.1	45.1	53.7	54.3
Medium Trucks:	49.2	47.7	41.3	39.8	48.3	48.5
Heavy Trucks:	51.5	50.0	41.0	42.2	50.6	50.7
Vehicle Noise:	57.2	55.5	51.9	47.7	56.2	56.6

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	54.8	52.9	51.1	45.1	53.7	54.3
Medium Trucks:	49.2	47.7	41.3	39.8	48.3	48.5
Heavy Trucks:	51.5	50.0	41.0	42.2	50.6	50.7
Vehicle Noise:	57.2	55.5	51.9	47.7	56.2	56.6

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO) - v10/31/19

Scenario: Backyard No Wall
Road Name: 60th Street
Lot No: O9

Project Name: Emerald Hills
Job Number: 15133
Analyst: B. Maddux

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	11,119	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	1,112	vehicles
Vehicle Speed:	25	mph
Near/Far Lane Distance:	12	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	172.0	feet
Centerline Dist. to Observer:	182.0	feet
Barrier Distance to Observer:	10.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	388.7	feet
Road Elevation:	331.0	feet
Barrier Elevation:	388.7	feet
Road Grade:	1.0%	

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	10
Medium Trucks (2 Axles):	10
Heavy Trucks (3+ Axles):	10

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:	331.00		
Medium Trucks:	333.30		
Heavy Trucks:	339.01	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	186.739
Medium Trucks:	185.980
Heavy Trucks:	184.205

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	59.44	1.06	-5.79	0.00	*-0.09*	0.000	0.000
Medium Trucks:	71.09	-16.18	-5.77	0.00	*-0.10*	0.000	0.000
Heavy Trucks:	77.24	-20.13	-5.73	0.00	*-0.15*	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:	54.7	52.8	51.0	45.0	53.6	54.2
Medium Trucks:	49.1	47.6	41.3	39.7	48.2	48.4
Heavy Trucks:	51.4	50.0	40.9	42.2	50.5	50.7
Vehicle Noise:	57.1	55.4	51.8	47.6	56.1	56.5

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	54.7	52.8	51.0	45.0	53.6	54.2
Medium Trucks:	49.1	47.6	41.3	39.7	48.2	48.4
Heavy Trucks:	51.4	50.0	40.9	42.2	50.5	50.7
Vehicle Noise:	57.1	55.4	51.8	47.6	56.1	56.5

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO) - v10/31/19

Scenario: Backyard No Wall
Road Name: 60th Street
Lot No: O10

Project Name: Emerald Hills
Job Number: 15133
Analyst: B. Maddux

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	11,119 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,112 vehicles
Vehicle Speed:	25 mph
Near/Far Lane Distance:	12 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	181.0 feet
Centerline Dist. to Observer:	181.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	390.5 feet
Road Elevation:	337.0 feet
Barrier Elevation:	390.5 feet
Road Grade:	1.0%

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	10
Medium Trucks (2 Axles):	10
Heavy Trucks (3+ Axles):	10

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:	337.00		
Medium Trucks:	339.30		
Heavy Trucks:	345.01	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	184.421
Medium Trucks:	183.706
Heavy Trucks:	182.040

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	59.44	1.06	-5.74	0.00	*-3.40*	0.000	0.000
Medium Trucks:	71.09	-16.18	-5.72	0.00	*-3.46*	0.000	0.000
Heavy Trucks:	77.24	-20.13	-5.68	0.00	*-3.60*	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:	54.8	52.9	51.1	45.0	53.7	54.3
Medium Trucks:	49.2	47.7	41.3	39.8	48.2	48.5
Heavy Trucks:	51.4	50.0	41.0	42.2	50.6	50.7
Vehicle Noise:	57.2	55.5	51.9	47.6	56.2	56.6

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	54.8	52.9	51.1	45.0	53.7	54.3
Medium Trucks:	49.2	47.7	41.3	39.8	48.2	48.5
Heavy Trucks:	51.4	50.0	41.0	42.2	50.6	50.7
Vehicle Noise:	57.2	55.5	51.9	47.6	56.2	56.6

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO) - v10/31/19

Scenario: Backyard With Wall
Road Name: SR-94
Lot No: O1

Project Name: Emerald Hills
Job Number: 15133
Analyst: B. Maddux

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	122,200	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	12,220	vehicles
Vehicle Speed:	65	mph
Near/Far Lane Distance:	106	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	1,381.0	feet
Centerline Dist. to Observer:	1,391.0	feet
Barrier Distance to Observer:	10.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	351.6	feet
Road Elevation:	221.0	feet
Barrier Elevation:	351.6	feet
Road Grade:	1.0%	

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	10
Medium Trucks (2 Axles):	10
Heavy Trucks (3+ Axles):	10

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	77.5%	12.9%	9.6%	96.25%
Medium Trucks:	84.8%	4.9%	10.3%	2.73%
Heavy Trucks:	86.5%	2.7%	10.8%	1.02%

Noise Source Elevations (in feet)

Autos:	221.00		
Medium Trucks:	223.97		
Heavy Trucks:	229.01	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	########
Medium Trucks:	########
Heavy Trucks:	########

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	75.54	7.27	-14.36	0.00	*-0.72*	0.000	0.000
Medium Trucks:	81.71	-8.20	-14.36	0.00	*-0.73*	0.000	0.000
Heavy Trucks:	85.21	-12.48	-14.36	0.00	*-0.74*	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	64.8	58.7	67.4	68.0
Medium Trucks:	59.1	57.6	51.3	49.7	58.2	58.4
Heavy Trucks:	58.4	56.9	47.9	49.2	57.5	57.6
Vehicle Noise:	69.3	67.5	65.1	59.7	68.2	68.8

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	68.4	66.5	64.8	58.7	67.4	68.0
Medium Trucks:	59.1	57.6	51.3	49.7	58.2	58.4
Heavy Trucks:	58.4	56.9	47.9	49.2	57.5	57.6
Vehicle Noise:	69.3	67.5	65.1	59.7	68.2	68.8

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO) - v10/31/19

Scenario: Backyard With Wall
Road Name: SR-94
Lot No: O2

Project Name: Emerald Hills
Job Number: 15133
Analyst: B. Maddux

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	122,200	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	12,220	vehicles
Vehicle Speed:	65	mph
Near/Far Lane Distance:	106	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	1,334.0	feet
Centerline Dist. to Observer:	1,344.0	feet
Barrier Distance to Observer:	10.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	353.4	feet
Road Elevation:	223.0	feet
Barrier Elevation:	353.4	feet
Road Grade:	1.0%	

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	10
Medium Trucks (2 Axles):	10
Heavy Trucks (3+ Axles):	10

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	77.5%	12.9%	9.6%	96.25%
Medium Trucks:	84.8%	4.9%	10.3%	2.73%
Heavy Trucks:	86.5%	2.7%	10.8%	1.02%

Noise Source Elevations (in feet)

Autos:	223.00		
Medium Trucks:	225.97		
Heavy Trucks:	231.01	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	########
Medium Trucks:	########
Heavy Trucks:	########

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	75.54	7.27	-14.21	0.00	*-0.70*	0.000	0.000
Medium Trucks:	81.71	-8.20	-14.21	0.00	*-0.71*	0.000	0.000
Heavy Trucks:	85.21	-12.48	-14.21	0.00	*-0.73*	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:	68.6	66.7	64.9	58.9	67.5	68.1
Medium Trucks:	59.3	57.8	51.4	49.9	58.3	58.6
Heavy Trucks:	58.5	57.1	48.1	49.3	57.7	57.8
Vehicle Noise:	69.5	67.6	65.2	59.8	68.4	68.9

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	68.6	66.7	64.9	58.9	67.5	68.1
Medium Trucks:	59.3	57.8	51.4	49.9	58.3	58.6
Heavy Trucks:	58.5	57.1	48.1	49.3	57.7	57.8
Vehicle Noise:	69.5	67.6	65.2	59.8	68.4	68.9

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO) - v10/31/19

Scenario: Backyard With Wall
Road Name: SR-94
Lot No: O3

Project Name: Emerald Hills
Job Number: 15133
Analyst: B. Maddux

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	122,200	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	12,220	vehicles
Vehicle Speed:	65	mph
Near/Far Lane Distance:	106	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	1,349.0	feet
Centerline Dist. to Observer:	1,359.0	feet
Barrier Distance to Observer:	10.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	355.2	feet
Road Elevation:	225.0	feet
Barrier Elevation:	355.2	feet
Road Grade:	1.0%	

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	10
Medium Trucks (2 Axles):	10
Heavy Trucks (3+ Axles):	10

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	77.5%	12.9%	9.6%	96.25%
Medium Trucks:	84.8%	4.9%	10.3%	2.73%
Heavy Trucks:	86.5%	2.7%	10.8%	1.02%

Noise Source Elevations (in feet)

Autos:	225.00		
Medium Trucks:	227.97		
Heavy Trucks:	233.01	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	########
Medium Trucks:	########
Heavy Trucks:	########

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	75.54	7.27	-14.26	0.00	*-0.71*	0.000	0.000
Medium Trucks:	81.71	-8.20	-14.26	0.00	*-0.72*	0.000	0.000
Heavy Trucks:	85.21	-12.48	-14.26	0.00	*-0.73*	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:	68.6	66.7	64.9	58.8	67.5	68.1
Medium Trucks:	59.3	57.7	51.4	49.8	58.3	58.5
Heavy Trucks:	58.5	57.1	48.0	49.3	57.6	57.7
Vehicle Noise:	69.4	67.6	65.2	59.8	68.3	68.9

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	68.6	66.7	64.9	58.8	67.5	68.1
Medium Trucks:	59.3	57.7	51.4	49.8	58.3	58.5
Heavy Trucks:	58.5	57.1	48.0	49.3	57.6	57.7
Vehicle Noise:	69.4	67.6	65.2	59.8	68.3	68.9

Friday, June 7, 2024

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO) - v10/31/19

Scenario: Backyard With Wall
Road Name: SR-94
Lot No: O4

Project Name: Emerald Hills
Job Number: 15133
Analyst: B. Maddux

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	122,200	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	12,220	vehicles
Vehicle Speed:	65	mph
Near/Far Lane Distance:	106	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	1,367.0	feet
Centerline Dist. to Observer:	1,377.0	feet
Barrier Distance to Observer:	10.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	357.4	feet
Road Elevation:	227.0	feet
Barrier Elevation:	357.4	feet
Road Grade:	1.0%	

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	10
Medium Trucks (2 Axles):	10
Heavy Trucks (3+ Axles):	10

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	77.5%	12.9%	9.6%	96.25%
Medium Trucks:	84.8%	4.9%	10.3%	2.73%
Heavy Trucks:	86.5%	2.7%	10.8%	1.02%

Noise Source Elevations (in feet)

Autos:	227.00		
Medium Trucks:	229.97		
Heavy Trucks:	235.01	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	########
Medium Trucks:	########
Heavy Trucks:	########

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	75.54	7.27	-14.32	0.00	*-0.71*	0.000	0.000
Medium Trucks:	81.71	-8.20	-14.32	0.00	*-0.72*	0.000	0.000
Heavy Trucks:	85.21	-12.48	-14.31	0.00	*-0.74*	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:	68.5	66.6	64.8	58.8	67.4	68.0
Medium Trucks:	59.2	57.7	51.3	49.8	58.2	58.5
Heavy Trucks:	58.4	57.0	48.0	49.2	57.6	57.7
Vehicle Noise:	69.3	67.5	65.1	59.7	68.3	68.8

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	68.5	66.6	64.8	58.8	67.4	68.0
Medium Trucks:	59.2	57.7	51.3	49.8	58.2	58.5
Heavy Trucks:	58.4	57.0	48.0	49.2	57.6	57.7
Vehicle Noise:	69.3	67.5	65.1	59.7	68.3	68.8

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO) - v10/31/19

Scenario: Backyard With Wall
Road Name: SR-94
Lot No: O5

Project Name: Emerald Hills
Job Number: 15133
Analyst: B. Maddux

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	122,200	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	12,220	vehicles
Vehicle Speed:	65	mph
Near/Far Lane Distance:	106	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	1,382.0	feet
Centerline Dist. to Observer:	1,392.0	feet
Barrier Distance to Observer:	10.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	359.8	feet
Road Elevation:	230.0	feet
Barrier Elevation:	359.8	feet
Road Grade:	1.0%	

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	10
Medium Trucks (2 Axles):	10
Heavy Trucks (3+ Axles):	10

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	77.5%	12.9%	9.6%	96.25%
Medium Trucks:	84.8%	4.9%	10.3%	2.73%
Heavy Trucks:	86.5%	2.7%	10.8%	1.02%

Noise Source Elevations (in feet)

Autos:	230.00		
Medium Trucks:	232.97		
Heavy Trucks:	238.01	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	########
Medium Trucks:	########
Heavy Trucks:	########

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	75.54	7.27	-14.37	0.00	*-0.72*	0.000	0.000
Medium Trucks:	81.71	-8.20	-14.36	0.00	*-0.73*	0.000	0.000
Heavy Trucks:	85.21	-12.48	-14.36	0.00	*-0.74*	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	64.8	58.7	67.3	68.0
Medium Trucks:	59.1	57.6	51.3	49.7	58.2	58.4
Heavy Trucks:	58.4	56.9	47.9	49.2	57.5	57.6
Vehicle Noise:	69.3	67.5	65.1	59.6	68.2	68.8

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	68.4	66.5	64.8	58.7	67.3	68.0
Medium Trucks:	59.1	57.6	51.3	49.7	58.2	58.4
Heavy Trucks:	58.4	56.9	47.9	49.2	57.5	57.6
Vehicle Noise:	69.3	67.5	65.1	59.6	68.2	68.8

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO) - v10/31/19

Scenario: Backyard With Wall
Road Name: 60th Street
Lot No: O6

Project Name: Emerald Hills
Job Number: 15133
Analyst: B. Maddux

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	11,119	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	1,112	vehicles
Vehicle Speed:	25	mph
Near/Far Lane Distance:	12	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	225.0	feet
Centerline Dist. to Observer:	235.0	feet
Barrier Distance to Observer:	10.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	359.8	feet
Road Elevation:	325.0	feet
Barrier Elevation:	359.8	feet
Road Grade:	1.0%	

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	10
Medium Trucks (2 Axles):	10
Heavy Trucks (3+ Axles):	10

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:	325.00		
Medium Trucks:	327.30		
Heavy Trucks:	333.01	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	232.355
Medium Trucks:	231.973
Heavy Trucks:	231.119

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	59.44	1.06	-6.74	0.00	*-0.48*	0.000	0.000
Medium Trucks:	71.09	-16.18	-6.73	0.00	*-0.52*	0.000	0.000
Heavy Trucks:	77.24	-20.13	-6.72	0.00	*-0.60*	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:	53.8	51.9	50.1	44.0	52.7	53.3
Medium Trucks:	48.2	46.7	40.3	38.8	47.2	47.5
Heavy Trucks:	50.4	49.0	39.9	41.2	49.5	49.7
Vehicle Noise:	56.2	54.5	50.9	46.6	55.2	55.6

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	53.8	51.9	50.1	44.0	52.7	53.3
Medium Trucks:	48.2	46.7	40.3	38.8	47.2	47.5
Heavy Trucks:	50.4	49.0	39.9	41.2	49.5	49.7
Vehicle Noise:	56.2	54.5	50.9	46.6	55.2	55.6

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO) - v10/31/19

Scenario: Backyard With Wall
Road Name: 60th Street
Lot No: O7

Project Name: Emerald Hills
Job Number: 15133
Analyst: B. Maddux

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	11,119	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	1,112	vehicles
Vehicle Speed:	25	mph
Near/Far Lane Distance:	12	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	170.0	feet
Centerline Dist. to Observer:	180.0	feet
Barrier Distance to Observer:	10.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	385.3	feet
Road Elevation:	332.0	feet
Barrier Elevation:	385.3	feet
Road Grade:	1.0%	

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	10
Medium Trucks (2 Axles):	10
Heavy Trucks (3+ Axles):	10

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:	332.00		
Medium Trucks:	334.30		
Heavy Trucks:	340.01	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	183.409
Medium Trucks:	182.692
Heavy Trucks:	181.023

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	59.44	1.06	-5.71	0.00	*-0.11*	0.000	0.000
Medium Trucks:	71.09	-16.18	-5.70	0.00	*-0.13*	0.000	0.000
Heavy Trucks:	77.24	-20.13	-5.66	0.00	*-0.19*	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:	54.8	52.9	51.1	45.1	53.7	54.3
Medium Trucks:	49.2	47.7	41.3	39.8	48.3	48.5
Heavy Trucks:	51.5	50.0	41.0	42.2	50.6	50.7
Vehicle Noise:	57.2	55.5	51.9	47.7	56.2	56.6

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	54.8	52.9	51.1	45.1	53.7	54.3
Medium Trucks:	49.2	47.7	41.3	39.8	48.3	48.5
Heavy Trucks:	51.5	50.0	41.0	42.2	50.6	50.7
Vehicle Noise:	57.2	55.5	51.9	47.7	56.2	56.6

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO) - v10/31/19

Scenario: Backyard With Wall
Road Name: 60th Street
Lot No: O8

Project Name: Emerald Hills
Job Number: 15133
Analyst: B. Maddux

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	11,119	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	1,112	vehicles
Vehicle Speed:	25	mph
Near/Far Lane Distance:	12	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	169.0	feet
Centerline Dist. to Observer:	179.0	feet
Barrier Distance to Observer:	10.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	386.9	feet
Road Elevation:	331.0	feet
Barrier Elevation:	386.9	feet
Road Grade:	1.0%	

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	10
Medium Trucks (2 Axles):	10
Heavy Trucks (3+ Axles):	10

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:	331.00		
Medium Trucks:	333.30		
Heavy Trucks:	339.01	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	183.308
Medium Trucks:	182.558
Heavy Trucks:	180.806

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	59.44	1.06	-5.71	0.00	*-0.09*	0.000	0.000
Medium Trucks:	71.09	-16.18	-5.69	0.00	*-0.11*	0.000	0.000
Heavy Trucks:	77.24	-20.13	-5.65	0.00	*-0.16*	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:	54.8	52.9	51.1	45.1	53.7	54.3
Medium Trucks:	49.2	47.7	41.3	39.8	48.3	48.5
Heavy Trucks:	51.5	50.0	41.0	42.2	50.6	50.7
Vehicle Noise:	57.2	55.5	51.9	47.7	56.2	56.6

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	54.8	52.9	51.1	45.1	53.7	54.3
Medium Trucks:	49.2	47.7	41.3	39.8	48.3	48.5
Heavy Trucks:	51.5	50.0	41.0	42.2	50.6	50.7
Vehicle Noise:	57.2	55.5	51.9	47.7	56.2	56.6

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO) - v10/31/19

Scenario: Backyard With Wall
Road Name: 60th Street
Lot No: O9

Project Name: Emerald Hills
Job Number: 15133
Analyst: B. Maddux

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	11,119	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	1,112	vehicles
Vehicle Speed:	25	mph
Near/Far Lane Distance:	12	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	172.0	feet
Centerline Dist. to Observer:	182.0	feet
Barrier Distance to Observer:	10.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	388.7	feet
Road Elevation:	331.0	feet
Barrier Elevation:	388.7	feet
Road Grade:	1.0%	

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	10
Medium Trucks (2 Axles):	10
Heavy Trucks (3+ Axles):	10

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:	331.00		
Medium Trucks:	333.30		
Heavy Trucks:	339.01	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	186.739
Medium Trucks:	185.980
Heavy Trucks:	184.205

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	59.44	1.06	-5.79	0.00	*-0.09*	0.000	0.000
Medium Trucks:	71.09	-16.18	-5.77	0.00	*-0.10*	0.000	0.000
Heavy Trucks:	77.24	-20.13	-5.73	0.00	*-0.15*	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:	54.7	52.8	51.0	45.0	53.6	54.2
Medium Trucks:	49.1	47.6	41.3	39.7	48.2	48.4
Heavy Trucks:	51.4	50.0	40.9	42.2	50.5	50.7
Vehicle Noise:	57.1	55.4	51.8	47.6	56.1	56.5

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	54.7	52.8	51.0	45.0	53.6	54.2
Medium Trucks:	49.1	47.6	41.3	39.7	48.2	48.4
Heavy Trucks:	51.4	50.0	40.9	42.2	50.5	50.7
Vehicle Noise:	57.1	55.4	51.8	47.6	56.1	56.5

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO) - v10/31/19

Scenario: Backyard With Wall
Road Name: 60th Street
Lot No: O10

Project Name: Emerald Hills
Job Number: 15133
Analyst: B. Maddux

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	11,119	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	1,112	vehicles
Vehicle Speed:	25	mph
Near/Far Lane Distance:	12	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	181.0	feet
Centerline Dist. to Observer:	181.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	390.5	feet
Road Elevation:	337.0	feet
Barrier Elevation:	390.5	feet
Road Grade:	1.0%	

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	10
Medium Trucks (2 Axles):	10
Heavy Trucks (3+ Axles):	10

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:	337.00		
Medium Trucks:	339.30		
Heavy Trucks:	345.01	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	184.421
Medium Trucks:	183.706
Heavy Trucks:	182.040

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	59.44	1.06	-5.74	0.00	*-3.40*	0.000	0.000
Medium Trucks:	71.09	-16.18	-5.72	0.00	*-3.46*	0.000	0.000
Heavy Trucks:	77.24	-20.13	-5.68	0.00	*-3.60*	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:	54.8	52.9	51.1	45.0	53.7	54.3
Medium Trucks:	49.2	47.7	41.3	39.8	48.2	48.5
Heavy Trucks:	51.4	50.0	41.0	42.2	50.6	50.7
Vehicle Noise:	57.2	55.5	51.9	47.6	56.2	56.6

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	54.8	52.9	51.1	45.0	53.7	54.3
Medium Trucks:	49.2	47.7	41.3	39.8	48.2	48.5
Heavy Trucks:	51.4	50.0	41.0	42.2	50.6	50.7
Vehicle Noise:	57.2	55.5	51.9	47.6	56.2	56.6

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO) - v10/31/19

Scenario: First Floor With Wall
Road Name: SR-94
Lot No: O1

Project Name: Emerald Hills
Job Number: 15133
Analyst: B. Maddux

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	122,200	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	12,220	vehicles
Vehicle Speed:	65	mph
Near/Far Lane Distance:	106	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	1,381.0	feet
Centerline Dist. to Observer:	1,401.0	feet
Barrier Distance to Observer:	20.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	351.6	feet
Road Elevation:	221.0	feet
Barrier Elevation:	351.6	feet
Road Grade:	1.0%	

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	10
Medium Trucks (2 Axles):	10
Heavy Trucks (3+ Axles):	10

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	77.5%	12.9%	9.6%	96.25%
Medium Trucks:	84.8%	4.9%	10.3%	2.73%
Heavy Trucks:	86.5%	2.7%	10.8%	1.02%

Noise Source Elevations (in feet)

Autos:	221.00		
Medium Trucks:	223.97		
Heavy Trucks:	229.01	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	########
Medium Trucks:	########
Heavy Trucks:	########

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	75.54	7.27	-14.39	0.00	*-0.21*	0.000	0.000
Medium Trucks:	81.71	-8.20	-14.39	0.00	*-0.22*	0.000	0.000
Heavy Trucks:	85.21	-12.48	-14.39	0.00	*-0.23*	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	64.8	58.7	67.3	67.9
Medium Trucks:	59.1	57.6	51.2	49.7	58.2	58.4
Heavy Trucks:	58.3	56.9	47.9	49.1	57.5	57.6
Vehicle Noise:	69.3	67.4	65.0	59.6	68.2	68.7

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	68.4	66.5	64.8	58.7	67.3	67.9
Medium Trucks:	59.1	57.6	51.2	49.7	58.2	58.4
Heavy Trucks:	58.3	56.9	47.9	49.1	57.5	57.6
Vehicle Noise:	69.3	67.4	65.0	59.6	68.2	68.7

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO) - v10/31/19

Scenario: First Floor With Wall
Road Name: SR-94
Lot No: O2

Project Name: Emerald Hills
Job Number: 15133
Analyst: B. Maddux

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	122,200	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	12,220	vehicles
Vehicle Speed:	65	mph
Near/Far Lane Distance:	106	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	1,334.0	feet
Centerline Dist. to Observer:	1,354.0	feet
Barrier Distance to Observer:	20.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	353.4	feet
Road Elevation:	223.0	feet
Barrier Elevation:	353.4	feet
Road Grade:	1.0%	

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	10
Medium Trucks (2 Axles):	10
Heavy Trucks (3+ Axles):	10

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	77.5%	12.9%	9.6%	96.25%
Medium Trucks:	84.8%	4.9%	10.3%	2.73%
Heavy Trucks:	86.5%	2.7%	10.8%	1.02%

Noise Source Elevations (in feet)

Autos:	223.00		
Medium Trucks:	225.97		
Heavy Trucks:	231.01	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	########
Medium Trucks:	########
Heavy Trucks:	########

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	75.54	7.27	-14.24	0.00	*-0.20*	0.000	0.000
Medium Trucks:	81.71	-8.20	-14.24	0.00	*-0.21*	0.000	0.000
Heavy Trucks:	85.21	-12.48	-14.24	0.00	*-0.22*	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:	68.6	66.7	64.9	58.8	67.5	68.1
Medium Trucks:	59.3	57.8	51.4	49.9	58.3	58.5
Heavy Trucks:	58.5	57.1	48.0	49.3	57.6	57.8
Vehicle Noise:	69.4	67.6	65.2	59.8	68.4	68.9

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	68.6	66.7	64.9	58.8	67.5	68.1
Medium Trucks:	59.3	57.8	51.4	49.9	58.3	58.5
Heavy Trucks:	58.5	57.1	48.0	49.3	57.6	57.8
Vehicle Noise:	69.4	67.6	65.2	59.8	68.4	68.9

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO) - v10/31/19

Scenario: First Floor With Wall
Road Name: SR-94
Lot No: O3

Project Name: Emerald Hills
Job Number: 15133
Analyst: B. Maddux

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	122,200	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	12,220	vehicles
Vehicle Speed:	65	mph
Near/Far Lane Distance:	106	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	1,349.0	feet
Centerline Dist. to Observer:	1,369.0	feet
Barrier Distance to Observer:	20.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	355.2	feet
Road Elevation:	225.0	feet
Barrier Elevation:	355.2	feet
Road Grade:	1.0%	

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	10
Medium Trucks (2 Axles):	10
Heavy Trucks (3+ Axles):	10

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	77.5%	12.9%	9.6%	96.25%
Medium Trucks:	84.8%	4.9%	10.3%	2.73%
Heavy Trucks:	86.5%	2.7%	10.8%	1.02%

Noise Source Elevations (in feet)

Autos:	225.00		
Medium Trucks:	227.97		
Heavy Trucks:	233.01	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	########
Medium Trucks:	########
Heavy Trucks:	########

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	75.54	7.27	-14.29	0.00	*-0.21*	0.000	0.000
Medium Trucks:	81.71	-8.20	-14.29	0.00	*-0.21*	0.000	0.000
Heavy Trucks:	85.21	-12.48	-14.29	0.00	*-0.23*	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:	68.5	66.6	64.9	58.8	67.4	68.0
Medium Trucks:	59.2	57.7	51.3	49.8	58.3	58.5
Heavy Trucks:	58.4	57.0	48.0	49.2	57.6	57.7
Vehicle Noise:	69.4	67.5	65.1	59.7	68.3	68.8

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	68.5	66.6	64.9	58.8	67.4	68.0
Medium Trucks:	59.2	57.7	51.3	49.8	58.3	58.5
Heavy Trucks:	58.4	57.0	48.0	49.2	57.6	57.7
Vehicle Noise:	69.4	67.5	65.1	59.7	68.3	68.8

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO) - v10/31/19

Scenario: First Floor With Wall
Road Name: SR-94
Lot No: O4

Project Name: Emerald Hills
Job Number: 15133
Analyst: B. Maddux

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	122,200	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	12,220	vehicles
Vehicle Speed:	65	mph
Near/Far Lane Distance:	106	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	1,367.0	feet
Centerline Dist. to Observer:	1,387.0	feet
Barrier Distance to Observer:	20.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	357.4	feet
Road Elevation:	227.0	feet
Barrier Elevation:	357.4	feet
Road Grade:	1.0%	

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	10
Medium Trucks (2 Axles):	10
Heavy Trucks (3+ Axles):	10

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	77.5%	12.9%	9.6%	96.25%
Medium Trucks:	84.8%	4.9%	10.3%	2.73%
Heavy Trucks:	86.5%	2.7%	10.8%	1.02%

Noise Source Elevations (in feet)

Autos:	227.00		
Medium Trucks:	229.97		
Heavy Trucks:	235.01	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	########
Medium Trucks:	########
Heavy Trucks:	########

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	75.54	7.27	-14.35	0.00	*-0.21*	0.000	0.000
Medium Trucks:	81.71	-8.20	-14.35	0.00	*-0.22*	0.000	0.000
Heavy Trucks:	85.21	-12.48	-14.35	0.00	*-0.23*	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:	68.5	66.6	64.8	58.7	67.4	68.0
Medium Trucks:	59.2	57.7	51.3	49.7	58.2	58.4
Heavy Trucks:	58.4	57.0	47.9	49.2	57.5	57.7
Vehicle Noise:	69.3	67.5	65.1	59.7	68.2	68.8

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	68.5	66.6	64.8	58.7	67.4	68.0
Medium Trucks:	59.2	57.7	51.3	49.7	58.2	58.4
Heavy Trucks:	58.4	57.0	47.9	49.2	57.5	57.7
Vehicle Noise:	69.3	67.5	65.1	59.7	68.2	68.8

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO) - v10/31/19

Scenario: First Floor With Wall
Road Name: SR-94
Lot No: O5

Project Name: Emerald Hills
Job Number: 15133
Analyst: B. Maddux

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	122,200	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	12,220	vehicles
Vehicle Speed:	65	mph
Near/Far Lane Distance:	106	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	1,382.0	feet
Centerline Dist. to Observer:	1,402.0	feet
Barrier Distance to Observer:	20.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	359.8	feet
Road Elevation:	230.0	feet
Barrier Elevation:	359.8	feet
Road Grade:	1.0%	

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	10
Medium Trucks (2 Axles):	10
Heavy Trucks (3+ Axles):	10

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	77.5%	12.9%	9.6%	96.25%
Medium Trucks:	84.8%	4.9%	10.3%	2.73%
Heavy Trucks:	86.5%	2.7%	10.8%	1.02%

Noise Source Elevations (in feet)

Autos:	230.00		
Medium Trucks:	232.97		
Heavy Trucks:	238.01	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	########
Medium Trucks:	########
Heavy Trucks:	########

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	75.54	7.27	-14.40	0.00	*-0.22*	0.000	0.000
Medium Trucks:	81.71	-8.20	-14.40	0.00	*-0.22*	0.000	0.000
Heavy Trucks:	85.21	-12.48	-14.40	0.00	*-0.23*	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	58.7	67.3	67.9
Medium Trucks:	59.1	57.6	51.2	49.7	58.2	58.4
Heavy Trucks:	58.3	56.9	47.9	49.1	57.5	57.6
Vehicle Noise:	69.3	67.4	65.0	59.6	68.2	68.7

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	68.4	66.5	64.7	58.7	67.3	67.9
Medium Trucks:	59.1	57.6	51.2	49.7	58.2	58.4
Heavy Trucks:	58.3	56.9	47.9	49.1	57.5	57.6
Vehicle Noise:	69.3	67.4	65.0	59.6	68.2	68.7

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO) - v10/31/19

Scenario: First Floor With Wall
Road Name: 60th Street
Lot No: O6

Project Name: Emerald Hills
Job Number: 15133
Analyst: B. Maddux

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	11,119 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,112 vehicles
Vehicle Speed:	25 mph
Near/Far Lane Distance:	12 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	225.0 feet
Centerline Dist. to Observer:	245.0 feet
Barrier Distance to Observer:	20.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	359.8 feet
Road Elevation:	325.0 feet
Barrier Elevation:	359.8 feet
Road Grade:	1.0%

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	10
Medium Trucks (2 Axles):	10
Heavy Trucks (3+ Axles):	10

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:	325.00		
Medium Trucks:	327.30		
Heavy Trucks:	333.01	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	242.217
Medium Trucks:	241.850
Heavy Trucks:	241.031

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	59.44	1.06	-6.92	0.00	*-0.07*	0.000	0.000
Medium Trucks:	71.09	-16.18	-6.91	0.00	*-0.09*	0.000	0.000
Heavy Trucks:	77.24	-20.13	-6.90	0.00	*-0.14*	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:	53.6	51.7	49.9	43.9	52.5	53.1
Medium Trucks:	48.0	46.5	40.1	38.6	47.0	47.3
Heavy Trucks:	50.2	48.8	39.8	41.0	49.4	49.5
Vehicle Noise:	56.0	54.3	50.7	46.4	55.0	55.4

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	53.6	51.7	49.9	43.9	52.5	53.1
Medium Trucks:	48.0	46.5	40.1	38.6	47.0	47.3
Heavy Trucks:	50.2	48.8	39.8	41.0	49.4	49.5
Vehicle Noise:	56.0	54.3	50.7	46.4	55.0	55.4

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO) - v10/31/19

Scenario: First Floor With Wall
Road Name: 60th Street
Lot No: O7

Project Name: Emerald Hills
Job Number: 15133
Analyst: B. Maddux

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	11,119 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,112 vehicles
Vehicle Speed:	25 mph
Near/Far Lane Distance:	12 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	170.0 feet
Centerline Dist. to Observer:	190.0 feet
Barrier Distance to Observer:	20.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	385.3 feet
Road Elevation:	332.0 feet
Barrier Elevation:	385.3 feet
Road Grade:	1.0%

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	10
Medium Trucks (2 Axles):	10
Heavy Trucks (3+ Axles):	10

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:	332.00		
Medium Trucks:	334.30		
Heavy Trucks:	340.01	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	192.955
Medium Trucks:	192.258
Heavy Trucks:	190.649

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	59.44	1.06	-5.93	0.00	*0.04*	-5.400	-8.400
Medium Trucks:	71.09	-16.18	-5.92	0.00	*0.03*	-5.300	-8.300
Heavy Trucks:	77.24	-20.13	-5.88	0.00	*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:	54.6	52.7	50.9	44.8	53.5	54.1
Medium Trucks:	49.0	47.5	41.1	39.6	48.0	48.3
Heavy Trucks:	51.2	49.8	40.8	42.0	50.4	50.5
Vehicle Noise:	57.0	55.3	51.7	47.4	56.0	56.4

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	49.2	47.3	45.5	39.4	48.1	48.7
Medium Trucks:	43.7	42.2	35.8	34.3	42.7	43.0
Heavy Trucks:	46.1	44.7	35.7	36.9	45.3	45.4
Vehicle Noise:	51.7	50.0	46.3	42.2	50.7	51.1

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO) - v10/31/19

Scenario: First Floor With Wall
Road Name: 60th Street
Lot No: O8

Project Name: Emerald Hills
Job Number: 15133
Analyst: B. Maddux

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	11,119 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,112 vehicles
Vehicle Speed:	25 mph
Near/Far Lane Distance:	12 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	169.0 feet
Centerline Dist. to Observer:	189.0 feet
Barrier Distance to Observer:	20.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	386.9 feet
Road Elevation:	331.0 feet
Barrier Elevation:	386.9 feet
Road Grade:	1.0%

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	10
Medium Trucks (2 Axles):	10
Heavy Trucks (3+ Axles):	10

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:	331.00		
Medium Trucks:	333.30		
Heavy Trucks:	339.01	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	192.830
Medium Trucks:	192.098
Heavy Trucks:	190.400

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	59.44	1.06	-5.93	0.00	*0.07*	-5.700	-8.700
Medium Trucks:	71.09	-16.18	-5.91	0.00	*0.05*	-5.500	-8.500
Heavy Trucks:	77.24	-20.13	-5.88	0.00	*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:	54.6	52.7	50.9	44.9	53.5	54.1
Medium Trucks:	49.0	47.5	41.1	39.6	48.0	48.3
Heavy Trucks:	51.2	49.8	40.8	42.0	50.4	50.5
Vehicle Noise:	57.0	55.3	51.7	47.4	56.0	56.4

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	48.9	47.0	45.2	39.2	47.8	48.4
Medium Trucks:	43.5	42.0	35.6	34.1	42.5	42.8
Heavy Trucks:	46.1	44.7	35.7	36.9	45.3	45.4
Vehicle Noise:	51.5	49.8	46.1	42.0	50.5	50.9

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO) - v10/31/19

Scenario: First Floor With Wall
Road Name: 60th Street
Lot No: O9

Project Name: Emerald Hills
Job Number: 15133
Analyst: B. Maddux

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	11,119 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,112 vehicles
Vehicle Speed:	25 mph
Near/Far Lane Distance:	12 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	172.0 feet
Centerline Dist. to Observer:	192.0 feet
Barrier Distance to Observer:	20.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	388.7 feet
Road Elevation:	331.0 feet
Barrier Elevation:	388.7 feet
Road Grade:	1.0%

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	10
Medium Trucks (2 Axles):	10
Heavy Trucks (3+ Axles):	10

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:	331.00		
Medium Trucks:	333.30		
Heavy Trucks:	339.01	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	196.255
Medium Trucks:	195.514
Heavy Trucks:	193.790

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	59.44	1.06	-6.01	0.00	*0.07*	-5.700	-8.700
Medium Trucks:	71.09	-16.18	-5.99	0.00	*0.05*	-5.500	-8.500
Heavy Trucks:	77.24	-20.13	-5.95	0.00	*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:	54.5	52.6	50.8	44.8	53.4	54.0
Medium Trucks:	48.9	47.4	41.1	39.5	48.0	48.2
Heavy Trucks:	51.2	49.7	40.7	41.9	50.3	50.4
Vehicle Noise:	56.9	55.2	51.6	47.4	55.9	56.3

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	48.8	46.9	45.1	39.1	47.7	48.3
Medium Trucks:	43.4	41.9	35.6	34.0	42.5	42.7
Heavy Trucks:	46.0	44.5	35.5	36.7	45.1	45.2
Vehicle Noise:	51.4	49.7	46.0	41.9	50.4	50.8

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO) - v10/31/19

Scenario: First Floor With Wall
Road Name: 60th Street
Lot No: O10

Project Name: Emerald Hills
Job Number: 15133
Analyst: B. Maddux

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	11,119 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,112 vehicles
Vehicle Speed:	25 mph
Near/Far Lane Distance:	12 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	181.0 feet
Centerline Dist. to Observer:	191.0 feet
Barrier Distance to Observer:	10.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	390.5 feet
Road Elevation:	337.0 feet
Barrier Elevation:	390.5 feet
Road Grade:	1.0%

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	10
Medium Trucks (2 Axles):	10
Heavy Trucks (3+ Axles):	10

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:	337.00		
Medium Trucks:	339.30		
Heavy Trucks:	345.01	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	193.936
Medium Trucks:	193.256
Heavy Trucks:	191.673

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	59.44	1.06	-5.96	0.00	*-0.14*	0.000	0.000
Medium Trucks:	71.09	-16.18	-5.94	0.00	*-0.16*	0.000	0.000
Heavy Trucks:	77.24	-20.13	-5.90	0.00	*-0.22*	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:	54.5	52.6	50.9	44.8	53.4	54.1
Medium Trucks:	49.0	47.5	41.1	39.6	48.0	48.2
Heavy Trucks:	51.2	49.8	40.7	42.0	50.4	50.5
Vehicle Noise:	57.0	55.2	51.7	47.4	55.9	56.4

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	54.5	52.6	50.9	44.8	53.4	54.1
Medium Trucks:	49.0	47.5	41.1	39.6	48.0	48.2
Heavy Trucks:	51.2	49.8	40.7	42.0	50.4	50.5
Vehicle Noise:	57.0	55.2	51.7	47.4	55.9	56.4

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO) - v10/31/19

Scenario: Second Floor With Wall
Road Name: SR-94
Lot No: O1

Project Name: Emerald Hills
Job Number: 15133
Analyst: B. Maddux

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	122,200	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	12,220	vehicles
Vehicle Speed:	65	mph
Near/Far Lane Distance:	106	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	1,381.0	feet
Centerline Dist. to Observer:	1,401.0	feet
Barrier Distance to Observer:	20.0	feet
Observer Height (Above Pad):	14.0	feet
Pad Elevation:	351.6	feet
Road Elevation:	221.0	feet
Barrier Elevation:	351.6	feet
Road Grade:	1.0%	

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	10
Medium Trucks (2 Axles):	10
Heavy Trucks (3+ Axles):	10

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	77.5%	12.9%	9.6%	96.25%
Medium Trucks:	84.8%	4.9%	10.3%	2.73%
Heavy Trucks:	86.5%	2.7%	10.8%	1.02%

Noise Source Elevations (in feet)

Autos:	221.00		
Medium Trucks:	223.97		
Heavy Trucks:	229.01	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	########
Medium Trucks:	########
Heavy Trucks:	########

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	75.54	7.27	-14.40	0.00	*-3.02*	0.000	0.000
Medium Trucks:	81.71	-8.20	-14.40	0.00	*-3.04*	0.000	0.000
Heavy Trucks:	85.21	-12.48	-14.39	0.00	*-3.09*	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	58.7	67.3	67.9
Medium Trucks:	59.1	57.6	51.2	49.7	58.2	58.4
Heavy Trucks:	58.3	56.9	47.9	49.1	57.5	57.6
Vehicle Noise:	69.3	67.4	65.0	59.6	68.2	68.7

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	68.4	66.5	64.7	58.7	67.3	67.9
Medium Trucks:	59.1	57.6	51.2	49.7	58.2	58.4
Heavy Trucks:	58.3	56.9	47.9	49.1	57.5	57.6
Vehicle Noise:	69.3	67.4	65.0	59.6	68.2	68.7

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO) - v10/31/19

Scenario: Second Floor With Wall
Road Name: SR-94
Lot No: O2

Project Name: Emerald Hills
Job Number: 15133
Analyst: B. Maddux

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	122,200	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	12,220	vehicles
Vehicle Speed:	65	mph
Near/Far Lane Distance:	106	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	1,334.0	feet
Centerline Dist. to Observer:	1,354.0	feet
Barrier Distance to Observer:	20.0	feet
Observer Height (Above Pad):	14.0	feet
Pad Elevation:	353.4	feet
Road Elevation:	223.0	feet
Barrier Elevation:	353.4	feet
Road Grade:	1.0%	

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	10
Medium Trucks (2 Axles):	10
Heavy Trucks (3+ Axles):	10

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	77.5%	12.9%	9.6%	96.25%
Medium Trucks:	84.8%	4.9%	10.3%	2.73%
Heavy Trucks:	86.5%	2.7%	10.8%	1.02%

Noise Source Elevations (in feet)

Autos:	223.00		
Medium Trucks:	225.97		
Heavy Trucks:	231.01	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	########
Medium Trucks:	########
Heavy Trucks:	########

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	75.54	7.27	-14.25	0.00	*-2.98*	0.000	0.000
Medium Trucks:	81.71	-8.20	-14.24	0.00	*-3.00*	0.000	0.000
Heavy Trucks:	85.21	-12.48	-14.24	0.00	*-3.05*	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:	68.6	66.7	64.9	58.8	67.5	68.1
Medium Trucks:	59.3	57.8	51.4	49.9	58.3	58.5
Heavy Trucks:	58.5	57.1	48.0	49.3	57.6	57.8
Vehicle Noise:	69.4	67.6	65.2	59.8	68.4	68.9

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	68.6	66.7	64.9	58.8	67.5	68.1
Medium Trucks:	59.3	57.8	51.4	49.9	58.3	58.5
Heavy Trucks:	58.5	57.1	48.0	49.3	57.6	57.8
Vehicle Noise:	69.4	67.6	65.2	59.8	68.4	68.9

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO) - v10/31/19

Scenario: Second Floor With Wall
Road Name: SR-94
Lot No: O3

Project Name: Emerald Hills
Job Number: 15133
Analyst: B. Maddux

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	122,200	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	12,220	vehicles
Vehicle Speed:	65	mph
Near/Far Lane Distance:	106	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	1,349.0	feet
Centerline Dist. to Observer:	1,369.0	feet
Barrier Distance to Observer:	20.0	feet
Observer Height (Above Pad):	14.0	feet
Pad Elevation:	355.2	feet
Road Elevation:	225.0	feet
Barrier Elevation:	355.2	feet
Road Grade:	1.0%	

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	10
Medium Trucks (2 Axles):	10
Heavy Trucks (3+ Axles):	10

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	77.5%	12.9%	9.6%	96.25%
Medium Trucks:	84.8%	4.9%	10.3%	2.73%
Heavy Trucks:	86.5%	2.7%	10.8%	1.02%

Noise Source Elevations (in feet)

Autos:	225.00		
Medium Trucks:	227.97		
Heavy Trucks:	233.01	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	########
Medium Trucks:	########
Heavy Trucks:	########

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	75.54	7.27	-14.29	0.00	*-2.99*	0.000	0.000
Medium Trucks:	81.71	-8.20	-14.29	0.00	*-3.02*	0.000	0.000
Heavy Trucks:	85.21	-12.48	-14.29	0.00	*-3.06*	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:	68.5	66.6	64.9	58.8	67.4	68.0
Medium Trucks:	59.2	57.7	51.3	49.8	58.3	58.5
Heavy Trucks:	58.4	57.0	48.0	49.2	57.6	57.7
Vehicle Noise:	69.4	67.5	65.1	59.7	68.3	68.8

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	68.5	66.6	64.9	58.8	67.4	68.0
Medium Trucks:	59.2	57.7	51.3	49.8	58.3	58.5
Heavy Trucks:	58.4	57.0	48.0	49.2	57.6	57.7
Vehicle Noise:	69.4	67.5	65.1	59.7	68.3	68.8

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO) - v10/31/19

Scenario: Second Floor With Wall
Road Name: SR-94
Lot No: O4

Project Name: Emerald Hills
Job Number: 15133
Analyst: B. Maddux

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	122,200	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	12,220	vehicles
Vehicle Speed:	65	mph
Near/Far Lane Distance:	106	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	1,367.0	feet
Centerline Dist. to Observer:	1,387.0	feet
Barrier Distance to Observer:	20.0	feet
Observer Height (Above Pad):	14.0	feet
Pad Elevation:	357.4	feet
Road Elevation:	227.0	feet
Barrier Elevation:	357.4	feet
Road Grade:	1.0%	

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	10
Medium Trucks (2 Axles):	10
Heavy Trucks (3+ Axles):	10

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	77.5%	12.9%	9.6%	96.25%
Medium Trucks:	84.8%	4.9%	10.3%	2.73%
Heavy Trucks:	86.5%	2.7%	10.8%	1.02%

Noise Source Elevations (in feet)

Autos:	227.00		
Medium Trucks:	229.97		
Heavy Trucks:	235.01	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	########
Medium Trucks:	########
Heavy Trucks:	########

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	75.54	7.27	-14.35	0.00	*-3.01*	0.000	0.000
Medium Trucks:	81.71	-8.20	-14.35	0.00	*-3.03*	0.000	0.000
Heavy Trucks:	85.21	-12.48	-14.35	0.00	*-3.08*	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:	68.5	66.6	64.8	58.7	67.4	68.0
Medium Trucks:	59.2	57.6	51.3	49.7	58.2	58.4
Heavy Trucks:	58.4	57.0	47.9	49.2	57.5	57.7
Vehicle Noise:	69.3	67.5	65.1	59.7	68.2	68.8

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	68.5	66.6	64.8	58.7	67.4	68.0
Medium Trucks:	59.2	57.6	51.3	49.7	58.2	58.4
Heavy Trucks:	58.4	57.0	47.9	49.2	57.5	57.7
Vehicle Noise:	69.3	67.5	65.1	59.7	68.2	68.8

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO) - v10/31/19

Scenario: Second Floor With Wall
Road Name: SR-94
Lot No: O5

Project Name: Emerald Hills
Job Number: 15133
Analyst: B. Maddux

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	122,200	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	12,220	vehicles
Vehicle Speed:	65	mph
Near/Far Lane Distance:	106	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	1,382.0	feet
Centerline Dist. to Observer:	1,402.0	feet
Barrier Distance to Observer:	20.0	feet
Observer Height (Above Pad):	14.0	feet
Pad Elevation:	359.8	feet
Road Elevation:	230.0	feet
Barrier Elevation:	359.8	feet
Road Grade:	1.0%	

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	10
Medium Trucks (2 Axles):	10
Heavy Trucks (3+ Axles):	10

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	77.5%	12.9%	9.6%	96.25%
Medium Trucks:	84.8%	4.9%	10.3%	2.73%
Heavy Trucks:	86.5%	2.7%	10.8%	1.02%

Noise Source Elevations (in feet)

Autos:	230.00		
Medium Trucks:	232.97		
Heavy Trucks:	238.01	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	########
Medium Trucks:	########
Heavy Trucks:	########

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	75.54	7.27	-14.40	0.00	*-3.03*	0.000	0.000
Medium Trucks:	81.71	-8.20	-14.40	0.00	*-3.05*	0.000	0.000
Heavy Trucks:	85.21	-12.48	-14.40	0.00	*-3.10*	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	58.7	67.3	67.9
Medium Trucks:	59.1	57.6	51.2	49.7	58.2	58.4
Heavy Trucks:	58.3	56.9	47.9	49.1	57.5	57.6
Vehicle Noise:	69.3	67.4	65.0	59.6	68.2	68.7

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	68.4	66.5	64.7	58.7	67.3	67.9
Medium Trucks:	59.1	57.6	51.2	49.7	58.2	58.4
Heavy Trucks:	58.3	56.9	47.9	49.1	57.5	57.6
Vehicle Noise:	69.3	67.4	65.0	59.6	68.2	68.7

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO) - v10/31/19

Scenario: Second Floor With Wall
Road Name: 60th Street
Lot No: O6

Project Name: Emerald Hills
Job Number: 15133
Analyst: B. Maddux

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	11,119	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	1,112	vehicles
Vehicle Speed:	25	mph
Near/Far Lane Distance:	12	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	225.0	feet
Centerline Dist. to Observer:	245.0	feet
Barrier Distance to Observer:	20.0	feet
Observer Height (Above Pad):	14.0	feet
Pad Elevation:	359.8	feet
Road Elevation:	325.0	feet
Barrier Elevation:	359.8	feet
Road Grade:	1.0%	

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	10
Medium Trucks (2 Axles):	10
Heavy Trucks (3+ Axles):	10

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:	325.00		
Medium Trucks:	327.30		
Heavy Trucks:	333.01	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	243.857
Medium Trucks:	243.408
Heavy Trucks:	242.382

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	59.44	1.06	-6.95	0.00	*-2.18*	0.000	0.000
Medium Trucks:	71.09	-16.18	-6.94	0.00	*-2.28*	0.000	0.000
Heavy Trucks:	77.24	-20.13	-6.92	0.00	*-2.53*	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:	53.6	51.7	49.9	43.8	52.5	53.1
Medium Trucks:	48.0	46.5	40.1	38.6	47.0	47.2
Heavy Trucks:	50.2	48.8	39.7	41.0	49.3	49.5
Vehicle Noise:	55.9	54.2	50.7	46.4	54.9	55.4

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	53.6	51.7	49.9	43.8	52.5	53.1
Medium Trucks:	48.0	46.5	40.1	38.6	47.0	47.2
Heavy Trucks:	50.2	48.8	39.7	41.0	49.3	49.5
Vehicle Noise:	55.9	54.2	50.7	46.4	54.9	55.4

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO) - v10/31/19

Scenario: Second Floor With Wall
Road Name: 60th Street
Lot No: O7

Project Name: Emerald Hills
Job Number: 15133
Analyst: B. Maddux

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	11,119	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	1,112	vehicles
Vehicle Speed:	25	mph
Near/Far Lane Distance:	12	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	170.0	feet
Centerline Dist. to Observer:	190.0	feet
Barrier Distance to Observer:	20.0	feet
Observer Height (Above Pad):	14.0	feet
Pad Elevation:	385.3	feet
Road Elevation:	332.0	feet
Barrier Elevation:	385.3	feet
Road Grade:	1.0%	

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	10
Medium Trucks (2 Axles):	10
Heavy Trucks (3+ Axles):	10

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:	332.00		
Medium Trucks:	334.30		
Heavy Trucks:	340.01	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	195.830
Medium Trucks:	195.052
Heavy Trucks:	193.225

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	59.44	1.06	-6.00	0.00	*-0.92*	0.000	0.000
Medium Trucks:	71.09	-16.18	-5.98	0.00	*-0.99*	0.000	0.000
Heavy Trucks:	77.24	-20.13	-5.94	0.00	*-1.21*	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:	54.5	52.6	50.8	44.8	53.4	54.0
Medium Trucks:	48.9	47.4	41.1	39.5	48.0	48.2
Heavy Trucks:	51.2	49.7	40.7	42.0	50.3	50.4
Vehicle Noise:	56.9	55.2	51.6	47.4	55.9	56.3

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	54.5	52.6	50.8	44.8	53.4	54.0
Medium Trucks:	48.9	47.4	41.1	39.5	48.0	48.2
Heavy Trucks:	51.2	49.7	40.7	42.0	50.3	50.4
Vehicle Noise:	56.9	55.2	51.6	47.4	55.9	56.3

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO) - v10/31/19

Scenario: Second Floor With Wall
Road Name: 60th Street
Lot No: O8

Project Name: Emerald Hills
Job Number: 15133
Analyst: B. Maddux

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	11,119	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	1,112	vehicles
Vehicle Speed:	25	mph
Near/Far Lane Distance:	12	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	169.0	feet
Centerline Dist. to Observer:	189.0	feet
Barrier Distance to Observer:	20.0	feet
Observer Height (Above Pad):	14.0	feet
Pad Elevation:	386.9	feet
Road Elevation:	331.0	feet
Barrier Elevation:	386.9	feet
Road Grade:	1.0%	

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	10
Medium Trucks (2 Axles):	10
Heavy Trucks (3+ Axles):	10

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:	331.00		
Medium Trucks:	333.30		
Heavy Trucks:	339.01	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	195.803
Medium Trucks:	194.995
Heavy Trucks:	193.090

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	59.44	1.06	-6.00	0.00	*-0.82*	0.000	0.000
Medium Trucks:	71.09	-16.18	-5.98	0.00	*-0.89*	0.000	0.000
Heavy Trucks:	77.24	-20.13	-5.94	0.00	*-1.10*	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:	54.5	52.6	50.8	44.8	53.4	54.0
Medium Trucks:	48.9	47.4	41.1	39.5	48.0	48.2
Heavy Trucks:	51.2	49.8	40.7	42.0	50.3	50.4
Vehicle Noise:	56.9	55.2	51.6	47.4	55.9	56.3

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	54.5	52.6	50.8	44.8	53.4	54.0
Medium Trucks:	48.9	47.4	41.1	39.5	48.0	48.2
Heavy Trucks:	51.2	49.8	40.7	42.0	50.3	50.4
Vehicle Noise:	56.9	55.2	51.6	47.4	55.9	56.3

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO) - v10/31/19

Scenario: Second Floor With Wall
Road Name: 60th Street
Lot No: O9

Project Name: Emerald Hills
Job Number: 15133
Analyst: B. Maddux

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	11,119 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,112 vehicles
Vehicle Speed:	25 mph
Near/Far Lane Distance:	12 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	172.0 feet
Centerline Dist. to Observer:	192.0 feet
Barrier Distance to Observer:	20.0 feet
Observer Height (Above Pad):	14.0 feet
Pad Elevation:	388.7 feet
Road Elevation:	331.0 feet
Barrier Elevation:	388.7 feet
Road Grade:	1.0%

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	10
Medium Trucks (2 Axles):	10
Heavy Trucks (3+ Axles):	10

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:	331.00		
Medium Trucks:	333.30		
Heavy Trucks:	339.01	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	199.251
Medium Trucks:	198.436
Heavy Trucks:	196.512

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	59.44	1.06	-6.07	0.00	*-0.80*	0.000	0.000
Medium Trucks:	71.09	-16.18	-6.06	0.00	*-0.87*	0.000	0.000
Heavy Trucks:	77.24	-20.13	-6.01	0.00	*-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:	54.4	52.5	50.8	44.7	53.3	53.9
Medium Trucks:	48.9	47.3	41.0	39.4	47.9	48.1
Heavy Trucks:	51.1	49.7	40.6	41.9	50.2	50.4
Vehicle Noise:	56.8	55.1	51.6	47.3	55.8	56.2

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	54.4	52.5	50.8	44.7	53.3	53.9
Medium Trucks:	48.9	47.3	41.0	39.4	47.9	48.1
Heavy Trucks:	51.1	49.7	40.6	41.9	50.2	50.4
Vehicle Noise:	56.8	55.1	51.6	47.3	55.8	56.2

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO) - v10/31/19

Scenario: Second Floor With Wall
Road Name: 60th Street
Lot No: O10

Project Name: Emerald Hills
Job Number: 15133
Analyst: B. Maddux

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	11,119	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	1,112	vehicles
Vehicle Speed:	25	mph
Near/Far Lane Distance:	12	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	181.0	feet
Centerline Dist. to Observer:	191.0	feet
Barrier Distance to Observer:	10.0	feet
Observer Height (Above Pad):	14.0	feet
Pad Elevation:	390.5	feet
Road Elevation:	337.0	feet
Barrier Elevation:	390.5	feet
Road Grade:	1.0%	

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	10
Medium Trucks (2 Axles):	10
Heavy Trucks (3+ Axles):	10

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:	337.00		
Medium Trucks:	339.30		
Heavy Trucks:	345.01	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	196.838
Medium Trucks:	196.062
Heavy Trucks:	194.238

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	59.44	1.06	-6.02	0.00	*-3.20*	0.000	0.000
Medium Trucks:	71.09	-16.18	-6.00	0.00	*-3.31*	0.000	0.000
Heavy Trucks:	77.24	-20.13	-5.96	0.00	*-3.61*	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:	54.5	52.6	50.8	44.8	53.4	54.0
Medium Trucks:	48.9	47.4	41.0	39.5	48.0	48.2
Heavy Trucks:	51.1	49.7	40.7	41.9	50.3	50.4
Vehicle Noise:	56.9	55.2	51.6	47.4	55.9	56.3

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	54.5	52.6	50.8	44.8	53.4	54.0
Medium Trucks:	48.9	47.4	41.0	39.5	48.0	48.2
Heavy Trucks:	51.1	49.7	40.7	41.9	50.3	50.4
Vehicle Noise:	56.9	55.2	51.6	47.4	55.9	56.3

APPENDIX 11.1:

CADNAA OPERATIONAL NOISE MODEL INPUTS

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15133 - Emerald Hills

CadnaA Noise Prediction Model: 15133-03_Operation.cna
Date: 07.06.24
Analyst: B. Maddux

Calculation Configuration

Configuration	
Parameter	**Value**
General	
Max. Error (dB)	**0.00**
Max. Search Radius (#(Unit,LEN))	**2000.01**
Min. Dist Src to Rcvr	**0.00**
Partition	
Raster Factor	**0.50**
Max. Length of Section (#(Unit,LEN))	**999.99**
Min. Length of Section (#(Unit,LEN))	**1.01**
Min. Length of Section (%)	**0.00**
Proj. Line Sources	**On**
Proj. Area Sources	**On**
Ref. Time	
Daytime Penalty (dB)	**0.00**
Recr. Time Penalty (dB)	**5.00**
Night-time Penalty (dB)	**10.00**
DTM	
Standard Height (m)	**0.00**
Model of Terrain	**Triangulation**
Reflection	
max. Order of Reflection	**2**
Search Radius Src	**100.00**
Search Radius Rcvr	**100.00**
Max. Distance Source - Rcvr	**1000.00 1000.00**
Min. Distance Rvcr - Reflector	**1.00 1.00**
Min. Distance Source - Reflector	**0.10**
Industrial (ISO 9613)	
Lateral Diffraction	**some Obj**
Obst. within Area Src do not shield	**On**
Screening	**Incl. Ground Att. over Barrier**
	Dz with limit (20/25)
Barrier Coefficients C1,2,3	**3.0 20.0 0.0**
Temperature (#(Unit,TEMP))	**10**
rel. Humidity (%)	**70**
Ground Absorption G	**0.50**
Wind Speed for Dir. (#(Unit,SPEED))	**3.0**
Roads (TNM)	
Railways (FTA/FRA)	
Aircraft (???)	
Strictly acc. to AzB	

Receiver Noise Levels

Name	M.	ID	Level Lr				Limit. Value				Land Use			Height		Coordinates			
			Day	Evening	Night	CNEL	Day	Evening	Night	CNEL	Type	Auto	Noise Type			X	Y	Z	
			(dBA)	(dBA)	(dBA)	(dBA)	(dBA)	(dBA)	(dBA)	(dBA)				(ft)		(ft)	(ft)	(ft)	
R1		R1	40.5	40.5	38.7	45.8	0.0	0.0	0.0	0.0		x	Total	5.00	a	6309659.24	1843028.13	5.00	
R2		R2	40.0	40.0	38.3	45.3	0.0	0.0	0.0	0.0		x	Total	5.00	a	6308801.56	1842530.67	5.00	
R3		R3	37.2	37.2	35.4	42.5	0.0	0.0	0.0	0.0		x	Total	5.00	a	6308572.00	1843299.00	5.00	
R4		R4	41.6	41.6	39.8	46.9	0.0	0.0	0.0	0.0		x	Total	5.00	a	6308946.30	1843483.12	5.00	
R5		R5	41.4	41.4	39.7	46.7	0.0	0.0	0.0	0.0		x	Total	5.00	a	6309520.01	1843892.23	5.00	
R6		R6	34.4	34.4	32.6	39.7	0.0	0.0	0.0	0.0		x	Total	5.00	a	6310102.35	1843519.41	5.00	

Point Source(s)

Name	M.	ID	Result. PWL			Lw / Li			Operating Time			Height		Coordinates		
			Day	Evening	Night	Type	Value	norm.	Day	Special	Night			X	Y	Z
			(dBA)	(dBA)	(dBA)			dB(A)	(min)	(min)	(min)	(ft)		(ft)	(ft)	(ft)
AC001		AC001	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	3.00	a	6309798.06	1843136.73	3.00
AC002		AC002	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	3.00	a	6309739.46	1843119.80	3.00
AC003		AC003	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	3.00	a	6309680.87	1843120.89	3.00
AC004		AC004	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	3.00	a	6309632.91	1843116.55	3.00
AC005		AC005	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	3.00	a	6309587.55	1843115.46	3.00
AC006		AC006	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	3.00	a	6309543.07	1843121.32	3.00
AC007		AC007	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	3.00	a	6309527.35	1843115.68	3.00
AC008		AC008	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	3.00	a	6309440.72	1843122.45	3.00
AC009		AC009	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	3.00	a	6309405.13	1843165.85	3.00
AC010		AC010	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	3.00	a	6309386.56	1843124.88	3.00
AC011		AC011	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	3.00	a	6309378.74	1843078.87	3.00
AC012		AC012	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	3.00	a	6309370.41	1843067.59	3.00
AC013		AC013	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	3.00	a	6309367.11	1843022.28	3.00
AC014		AC014	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	3.00	a	6309365.72	1842945.02	3.00

Name	M.	ID	Result. PWL			Lw / Li			Operating Time			Height		Coordinates		
			Day	Evening	Night	Type	Value	norm.	Day	Special	Night			X	Y	Z
			(dBA)	(dBA)	(dBA)			dB(A)	(min)	(min)	(min)	(ft)		(ft)	(ft)	(ft)
AC015		AC015	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	3.00	a	6309365.20	1842899.53	3.00
AC016		AC016	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	3.00	a	6309356.87	1842846.93	3.00
AC017		AC017	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	3.00	a	6309350.62	1842792.24	3.00
AC018		AC018	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	3.00	a	6309327.70	1842743.63	3.00
AC019		AC019	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	3.00	a	6309305.31	1842692.76	3.00
AC020		AC020	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	3.00	a	6309271.28	1842649.88	3.00
AC021		AC021	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	3.00	a	6309261.21	1842641.37	3.00
AC022		AC022	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	3.00	a	6309219.37	1842598.49	3.00
AC023		AC023	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	3.00	a	6309165.90	1842569.50	3.00
AC024		AC024	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	3.00	a	6309105.31	1842559.43	3.00
AC025		AC025	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	3.00	a	6309047.49	1842544.33	3.00
AC026		AC026	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	3.00	a	6308986.56	1842546.23	3.00
AC027		AC027	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	3.00	a	6308927.70	1842564.46	3.00
AC028		AC028	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	3.00	a	6308870.41	1842582.17	3.00
AC029		AC029	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	3.00	a	6308817.63	1842613.94	3.00
AC030		AC030	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	3.00	a	6308776.01	1842658.95	3.00
AC031		AC031	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	3.00	a	6308738.90	1842695.84	3.00
AC032		AC032	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	3.00	a	6308710.47	1842746.63	3.00
AC033		AC033	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	3.00	a	6308696.36	1842799.36	3.00
AC034		AC034	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	3.00	a	6308679.00	1842846.02	3.00
AC035		AC035	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	3.00	a	6308669.02	1842891.16	3.00
AC036		AC036	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	3.00	a	6308648.62	1843035.04	3.00
AC037		AC037	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	3.00	a	6308650.79	1843080.61	3.00
AC038		AC038	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	3.00	a	6308644.06	1843138.99	3.00
AC039		AC039	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	3.00	a	6308657.95	1843204.96	3.00
AC040		AC040	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	3.00	a	6308690.72	1843262.25	3.00
AC041		AC041	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	3.00	a	6308739.55	1843307.39	3.00
AC042		AC042	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	3.00	a	6308789.46	1843336.04	3.00
AC043		AC043	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	3.00	a	6308834.82	1843357.30	3.00
AC044		AC044	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	3.00	a	6308882.35	1843374.66	3.00
AC045		AC045	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	3.00	a	6308924.66	1843402.44	3.00
AC046		AC046	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	3.00	a	6308976.75	1843417.63	3.00
AC047		AC047	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	3.00	a	6309029.05	1843435.64	3.00
AC048		AC048	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	3.00	a	6309083.95	1843440.85	3.00
AC049		AC049	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	3.00	a	6309138.86	1843435.21	3.00
AC050		AC050	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	3.00	a	6309192.02	1843423.93	3.00
AC051		AC051	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	3.00	a	6309234.78	1843409.60	3.00
AC052		AC052	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	3.00	a	6309277.74	1843395.93	3.00
AC053		AC053	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	3.00	a	6309290.55	1843390.07	3.00
AC054		AC054	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	3.00	a	6309276.88	1843440.42	3.00
AC055		AC055	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	3.00	a	6309284.26	1843485.12	3.00
AC056		AC056	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	3.00	a	6309303.79	1843527.22	3.00
AC057		AC057	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	3.00	a	6309324.84	1843611.43	3.00
AC058		AC058	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	3.00	a	6309338.07	1843658.73	3.00
AC059		AC059	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	3.00	a	6309363.47	1843712.34	3.00
AC060		AC060	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	3.00	a	6309393.41	1843767.24	3.00
AC061		AC061	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	3.00	a	6309443.11	1843809.99	3.00
AC062		AC062	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	3.00	a	6309500.02	1843815.25	3.00
AC063		AC063	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	3.00	a	6309548.41	1843823.32	3.00
AC064		AC064	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	3.00	a	6309606.30	1843841.46	3.00
AC065		AC065	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	3.00	a	6309651.44	1843836.69	3.00
AC066		AC066	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	3.00	a	6309697.02	1843842.55	3.00
AC067		AC067	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	3.00	a	6309709.82	1843842.33	3.00
AC068		AC068	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	3.00	a	6309878.22	1843818.02	3.00
AC069		AC069	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	3.00	a	6309884.52	1843804.13	3.00
AC070		AC070	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	3.00	a	6309883.00	1843759.00	3.00
AC071		AC071	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	3.00	a	6309885.38	1843680.87	3.00
AC072		AC072	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	3.00	a	6309885.38	1843667.85	3.00
AC073		AC073	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	3.00	a	6309885.82	1843622.71	3.00
AC074		AC074	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	3.00	a	6309879.09	1843566.50	3.00
AC075		AC075	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	3.00	a	6309864.98	1843511.38	3.00
AC076		AC076	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	3.00	a	6309838.94	1843460.82	3.00
AC077		AC077	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	3.00	a	6309802.70	1843421.32	3.00
AC078		AC078	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	3.00	a	6309778.40	1843382.04	3.00
AC079		AC079	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	3.00	a	6309744.54	1843347.75	3.00
AC080		AC080	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	3.00	a	6309477.79	1843419.69	3.00
AC081		AC081	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	3.00	a	6309467.59	1843369.78	3.00
AC082		AC082	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	3.00	a	6309458.91	1843358.50	3.00
AC083		AC083	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	3.00	a	6309450.44	1843308.15	3.00
AC084		AC084	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	3.00	a	6309497.54	1843306.85	3.00
AC085		AC085	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	3.00	a	6309513.38	1843371.95	3.00
AC086		AC086	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	3.00	a	6309545.50	1843429.03	3.00
AC087		AC087	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	3.00	a	6309578.27	1843469.61	3.00
AC088		AC088	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	3.00	a	6309615.38	1843506.50	3.00
AC089		AC089	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	3.00	a	6309644.02	1843550.12	3.00
AC090		AC090	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	3.00	a	6309666.16	1843594.39	3.00
AC091		AC091	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	3.00	a	6309682.22	1843646.47	3.00

Name	M.	ID	Result. PWL			Lw / Li			Operating Time			Height		Coordinates		
			Day	Evening	Night	Type	Value	norm.	Day	Special	Night			X	Y	Z
			(dBA)	(dBA)	(dBA)			dB(A)	(min)	(min)	(min)	(ft)		(ft)	(ft)	(ft)
AC092		AC092	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	3.00	a	6309676.57	1843660.36	3.00
AC093		AC093	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	3.00	a	6309652.27	1843631.50	3.00
AC094		AC094	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	3.00	a	6309606.91	1843630.20	3.00
AC095		AC095	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	3.00	a	6309560.90	1843628.03	3.00
AC096		AC096	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	3.00	a	6308865.46	1842942.29	3.00
AC097		AC097	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	3.00	a	6308881.95	1842898.88	3.00
AC098		AC098	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	3.00	a	6308890.64	1842854.09	3.00
AC099		AC099	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	3.00	a	6308959.21	1843009.99	3.00
AC100		AC100	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	3.00	a	6308970.84	1842985.17	3.00
AC101		AC101	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	3.00	a	6308989.25	1842936.73	3.00
AC102		AC102	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	3.00	a	6308921.19	1842815.20	3.00
AC103		AC103	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	3.00	a	6308952.79	1842779.61	3.00
AC104		AC104	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	3.00	a	6308997.75	1842759.47	3.00
AC105		AC105	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	3.00	a	6309045.15	1842762.60	3.00
AC106		AC106	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	3.00	a	6309091.16	1842775.79	3.00
AC107		AC107	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	3.00	a	6309126.05	1842809.99	3.00
AC108		AC108	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	3.00	a	6309149.49	1842848.19	3.00
AC109		AC109	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	3.00	a	6309151.05	1842861.56	3.00
AC110		AC110	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	3.00	a	6309162.16	1842909.82	3.00
AC111		AC111	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	3.00	a	6308976.16	1843091.95	3.00
AC112		AC112	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	3.00	a	6308947.25	1843178.02	3.00
AC113		AC113	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	3.00	a	6308993.34	1843199.37	3.00
AC114		AC114	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	3.00	a	6309035.27	1843146.51	3.00
AC115		AC115	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	3.00	a	6309145.17	1843154.84	3.00
AC116		AC116	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	3.00	a	6309178.11	1843119.42	3.00
AC117		AC117	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	3.00	a	6309177.07	1843133.88	3.00
AC118		AC118	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	3.00	a	6309190.48	1843183.88	3.00
AC119		AC119	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	3.00	a	6309166.91	1843209.14	3.00
AC120		AC120	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	3.00	a	6309211.83	1843230.23	3.00
AC121		AC121	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	3.00	a	6309124.72	1843227.37	3.00
AC122		AC122	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	3.00	a	6309080.32	1843227.76	3.00
AC123		AC123	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	3.00	a	6309038.14	1843217.99	3.00

Line Source(s)

Name	M.	ID	Result. PWL			Result. PWL'			Lw / Li			Operating Time			Moving Pt. Src				Height
			Day	Evening	Night	Day	Evening	Night	Type	Value	norm.	Day	Special	Night	Number			Speed	
			(dBA)	(dBA)	(dBA)	(dBA)	(dBA)	(dBA)			dB(A)	(min)	(min)	(min)	Day	Evening	Night	(mph)	(ft)

Name	ID	Height		Coordinates			
		Begin	End	x	y	z	Ground
		(ft)	(ft)	(ft)	(ft)	(ft)	(ft)

Area Source(s)

Name	M.	ID	Result. PWL			Result. PWL''			Lw / Li			Operating Time			Height
			Day	Evening	Night	Day	Evening	Night	Type	Value	norm.	Day	Special	Night	(ft)
			(dBA)	(dBA)	(dBA)	(dBA)	(dBA)	(dBA)			dB(A)	(min)	(min)	(min)	

Name	ID	Height		Coordinates			
		Begin	End	x	y	z	Ground
		(ft)	(ft)	(ft)	(ft)	(ft)	(ft)

Barrier(s)

Name	Sel.	M.	ID	Absorption		Z-Ext.	Cantilever		Height		Coordinates			
				left	right		horz.	vert.	Begin	End	x	y	z	Ground
						(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)

Building(s)

Name	Sel.	M.	ID	RB	Residents	Absorption	Height	Coordinates				
							Begin	x	y	z	Ground	
							(ft)	(ft)	(ft)	(ft)	(ft)	

Ground Absorption(s)

Name	Sel.	M.	ID	G	Coordinates	
					x	y
					(ft)	(ft)

Contour(s)

Name	Sel.	M.	ID	OnlyPts	Height		Coordinates		
					Begin	End	x	y	z
					(ft)	(ft)	(ft)	(ft)	(ft)

Vertical Area Source(s)

Name	ID	Height		Coordinates			
		Begin	End	x	y	z	Ground
		(ft)	(ft)	(ft)	(ft)	(ft)	(ft)

Rail

Name	Sel.	M.	ID	Lw'		Train Class	Correct.	Vmax
				Day	Night		Track	
				(dBA)	(dBA)		(dB)	(km(mph)

Sound Level Spectra

Name	ID	Type	Oktave Spectrum (dB)												Source
			Weight.	31.5	63	125	250	500	1000	2000	4000	8000	A	lin	

Roads

Name	Sel.	M.	ID	Lme			Count Data		exact Count Data						Speed Limit		SCS	Surface		Gradient	Mult. Reflection		
				Day	Evening	Night	DTV	Str.class.	M			p (%)			Auto	Truck	Dist.	Dstro	Type		Drefl	Hbuild	Dist.
				(dBA)	(dBA)	(dBA)			Day	Evening	Night	Day	Evening	Night	(mph)	(mph)		(dB)		(%)	(dB)	(ft)	(ft)

RoadsGeo

Name	Height		Coordinates				Dist	LSlope
	Begin	End	x	y	z	Ground	(ft)	(%)
	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)		

APPENDIX 12.1:

CADNAA CONSTRUCTION NOISE MODEL INPUTS

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15133 - Emerald Hills

CadnaA Noise Prediction Model: 15133-02_Construction.cna
Date: 07.06.24
Analyst: B. Maddux

Calculation Configuration

Configuration	
Parameter	**Value**
General	
Max. Error (dB)	**0.00**
Max. Search Radius (#(Unit,LEN))	**2000.01**
Min. Dist Src to Rcvr	**0.00**
Partition	
Raster Factor	**0.50**
Max. Length of Section (#(Unit,LEN))	**999.99**
Min. Length of Section (#(Unit,LEN))	**1.01**
Min. Length of Section (%)	**0.00**
Proj. Line Sources	**On**
Proj. Area Sources	**On**
Ref. Time	
Daytime Penalty (dB)	**0.00**
Recr. Time Penalty (dB)	**5.00**
Night-time Penalty (dB)	**10.00**
DTM	
Standard Height (m)	**0.00**
Model of Terrain	**Triangulation**
Reflection	
max. Order of Reflection	**2**
Search Radius Src	**100.00**
Search Radius Rcvr	**100.00**
Max. Distance Source - Rcvr	**1000.00 1000.00**
Min. Distance Rvcr - Reflector	**1.00 1.00**
Min. Distance Source - Reflector	**0.10**
Industrial (ISO 9613)	
Lateral Diffraction	**some Obj**
Obst. within Area Src do not shield	**On**
Screening	**Incl. Ground Att. over Barrier**
	Dz with limit (20/25)
Barrier Coefficients C1,2,3	**3.0 20.0 0.0**
Temperature (#(Unit,TEMP))	**10**
rel. Humidity (%)	**70**
Ground Absorption G	**0.50**
Wind Speed for Dir. (#(Unit,SPEED))	**3.0**
Roads (TNM)	
Railways (FTA/FRA)	
Aircraft (???)	
Strictly acc. to AzB	

Receiver Noise Levels

Name	M.	ID	Level Lr				Limit. Value				Land Use			Height		Coordinates		
			Day	Evening	Night	CNEL	Day	Evening	Night	CNEL	Type	Auto	Noise Type			X	Y	Z
			(dBA)	(dBA)	(dBA)	(dBA)	(dBA)	(dBA)	(dBA)	(dBA)				(ft)		(ft)	(ft)	(ft)
R1		R1	68.6	-31.4	-31.4	65.6	0.0	0.0	0.0	0.0		x	Total	5.00	a	6309659.24	1843028.13	5.00
R2		R2	68.3	-31.7	-31.7	65.3	0.0	0.0	0.0	0.0		x	Total	5.00	a	6308801.56	1842530.67	5.00
R3		R3	66.9	-33.1	-33.1	63.9	0.0	0.0	0.0	0.0		x	Total	5.00	a	6308572.00	1843299.00	5.00
R4		R4	68.6	-31.4	-31.4	65.6	0.0	0.0	0.0	0.0		x	Total	5.00	a	6308946.30	1843483.12	5.00
R5		R5	66.4	-33.6	-33.6	63.4	0.0	0.0	0.0	0.0		x	Total	5.00	a	6309520.85	1843890.53	5.00
R6		R6	63.4	-36.6	-36.6	60.4	0.0	0.0	0.0	0.0		x	Total	5.00	a	6310102.35	1843519.41	5.00

Point Source(s)

Name	M.	ID	Result. PWL			Lw / Li			Operating Time			Height		Coordinates		
			Day	Evening	Night	Type	Value	norm.	Day	Special	Night			X	Y	Z
			(dBA)	(dBA)	(dBA)			dB(A)	(min)	(min)	(min)	(ft)		(ft)	(ft)	(ft)

Line Source(s)

Name	M.	ID	Result. PWL			Result. PWL'			Lw / Li			Operating Time			Moving Pt. Src				Height	
			Day	Evening	Night	Day	Evening	Night	Type	Value	norm.	Day	Special	Night	Number			Speed		
			(dBA)	(dBA)	(dBA)	(dBA)	(dBA)	(dBA)			dB(A)	(min)	(min)	(min)	Day	Evening	Night	(mph)	(ft)	

Name	ID	Height		Coordinates			
		Begin	End	x	y	z	Ground
		(ft)	(ft)	(ft)	(ft)	(ft)	(ft)

Area Source(s)

Name	M.	ID	Result. PWL			Result. PWL''			Lw / Li			Operating Time			Height	
			Day	Evening	Night	Day	Evening	Night	Type	Value	norm.	Day	Special	Night	(ft)	
			(dBA)	(dBA)	(dBA)	(dBA)	(dBA)	(dBA)			dB(A)	(min)	(min)	(min)		
CA1		CA1	117.6	17.6	17.6	66.5	-33.5	-33.5	PWL-Pt	117.6					8	a

Name	ID	Height			Coordinates			
		Begin		End	x	y	z	Ground
		(ft)		(ft)	(ft)	(ft)	(ft)	(ft)
CA1	CA1	8.00	a		6310058.21	1843895.00	8.00	0.00
					6310061.21	1843021.00	8.00	0.00
					6309439.59	1843032.00	8.00	0.00
					6309440.61	1842937.00	8.00	0.00
					6309433.15	1842841.50	8.00	0.00
					6309427.64	1842790.76	8.00	0.00
					6309414.40	1842748.84	8.00	0.00
					6309395.65	1842701.41	8.00	0.00
					6309370.28	1842657.28	8.00	0.00
					6309343.80	1842624.19	8.00	0.00
					6309308.50	1842585.58	8.00	0.00
					6309272.10	1842555.79	8.00	0.00
					6309231.28	1842524.91	8.00	0.00
					6309195.67	1842507.62	8.00	0.00
					6309141.64	1842485.32	8.00	0.00
					6309085.67	1842474.16	8.00	0.00
					6309030.52	1842467.55	8.00	0.00
					6308980.82	1842474.03	8.00	0.00
					6308925.21	1842483.00	8.00	0.00
					6308873.54	1842497.04	8.00	0.00
					6308824.21	1842518.00	8.00	0.00
					6308787.86	1842537.64	8.00	0.00
					6308748.22	1842565.01	8.00	0.00
					6308712.77	1842595.54	8.00	0.00
					6308680.36	1842630.12	8.00	0.00
					6308652.85	1842666.43	8.00	0.00
					6308629.13	1842705.53	8.00	0.00
					6308609.82	1842746.25	8.00	0.00
					6308593.47	1842793.07	8.00	0.00
					6308582.13	1842843.32	8.00	0.00
					6308577.79	1842878.05	8.00	0.00
					6308580.45	1842955.12	8.00	0.00
					6308571.21	1843299.00	8.00	0.00
					6308740.21	1843387.00	8.00	0.00
					6308814.14	1843421.62	8.00	0.00
					6308875.17	1843450.19	8.00	0.00
					6308930.61	1843476.15	8.00	0.00
					6308988.55	1843503.27	8.00	0.00
					6309046.10	1843530.22	8.00	0.00
					6309079.05	1843547.49	8.00	0.00
					6309201.21	1843548.11	8.00	0.00
					6309212.53	1843566.24	8.00	0.00
					6309229.08	1843624.71	8.00	0.00
					6309255.55	1843679.87	8.00	0.00
					6309286.44	1843727.30	8.00	0.00
					6309320.64	1843770.32	8.00	0.00
					6309361.97	1843805.76	8.00	0.00
					6309401.67	1843833.69	8.00	0.00
					6309446.39	1843860.78	8.00	0.00
					6309492.74	1843877.07	8.00	0.00
					6309542.05	1843888.15	8.00	0.00
					6309596.33	1843894.63	8.00	0.00
					6309644.24	1843895.13	8.00	0.00
					6309691.09	1843896.93	8.00	0.00
					6309765.12	1843897.98	8.00	0.00
					6309876.60	1843894.97	8.00	0.00
					6310023.21	1843893.91	8.00	0.00

Barrier(s)

Name	Sel.	M.	ID	Absorption		Z-Ext.	Cantilever		Height		Coordinates			
				left	right		horz.	vert.	Begin	End	x	y	z	Ground
						(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)

Building(s)

Name	Sel.	M.	ID	RB	Residents	Absorption	Height	Coordinates				
							Begin	x	y	z	Ground	
							(ft)	(ft)	(ft)	(ft)	(ft)	

Ground Absorption(s)

Name	Sel.	M.	ID	G	Coordinates	
					x	y
					(ft)	(ft)

Contour(s)

Name	Sel.	M.	ID	OnlyPts	Height		Coordinates		
					Begin	End	x	y	z
					(ft)	(ft)	(ft)	(ft)	(ft)

Vertical Area Source(s)

Name	ID	Height		Coordinates			
		Begin	End	x	y	z	Ground
		(ft)	(ft)	(ft)	(ft)	(ft)	(ft)

Rail

Name	Sel.	M.	ID	Lw'		Train Class	Correct.	Vmax
				Day	Night		Track	
				(dBA)	(dBA)		(dB)	(km(mph)

Sound Level Spectra

Name	ID	Type	Oktave Spectrum (dB)											Source
			Weight.	31.5	63	125	250	500	1000	2000	4000	8000	A	lin	

Roads

Name	Sel.	M.	ID	Lme			Count Data		exact Count Data						Speed Limit		SCS	Surface		Gradient	Mult. Reflection		
				Day	Evening	Night	DTV	Str.class.	M			p (%)			Auto	Truck	Dist.	Dstro	Type		Drefl	Hbuild	Dist.
				(dBA)	(dBA)	(dBA)			Day	Evening	Night	Day	Evening	Night	(mph)	(mph)		(dB)		(%)	(dB)	(ft)	(ft)

RoadsGeo

Name	Height				Coordinates				Dist	LSlope
	Begin		End		x	y	z	Ground	(ft)	(%)
	(ft)		(ft)		(ft)	(ft)	(ft)	(ft)		

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