APPLE VALLEY 84

NOISE AND VIBRATION ANALYSIS

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Reference Number
16408-03 NA

Agency
Town of Apple Valley

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TABLE OF CONTENTS

APPENDICES

LIST OF EXHIBITS

LIST OF TABLES

LIST OF ABBREVIATED TERMS

(1)	Reference
ANSI	American National Standards Institute
AVMC	Apple Valley Municipal Code
Calveno	California Vehicle Noise
CEQA	California Environmental Quality Act
CNEL	Community Noise Equivalent Level
dBA	A-weighted decibels
EPA	Environmental Protection Agency
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
INCE	Institute of Noise Control Engineering
L_{eq}	Equivalent continuous (average) sound level
L_{max}	Maximum level measured over the time interval
OPR	Governor's Office of Planning and Research
PPV	Peak Particle Velocity
Project	Apple Valley 84
REMEL	Reference Energy Mean Emission Level
RMS	Root-mean-square
VdB	Vibration Decibels

EXECUTIVE SUMMARY

Urban Crossroads, Inc. has prepared this noise study to determine the noise exposure and the necessary noise mitigation measures for the proposed Apple Valley 84 (Project) in the Town of Apple Valley. The Project consists of the development of a single industrial warehouse and distribution building totaling 1,381,412 square feet. This noise study has been prepared to satisfy applicable Town of Apple Valley noise standards and significance criteria based on Appendix G of the California Environmental Quality Act (CEQA) Guidelines. (1)

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

TABLE ES-1: SUMMARY OF CEQA SIGNIFICANCE FINDINGS

Analysis	Report Section	Significance Findings	
		Unmitigated	Mitigated
Off-Site Traffic Noise	7	*Less Than Significant*	-
Operational Noise	9	*Less Than Significant*	-
Project Construction Noise	10	*Less Than Significant*	-
Nighttime Concrete Pour	10	*Less Than Significant*	-
Construction Vibration	10	*Less Than Significant*	-

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1 INTRODUCTION

This Noise and Vibration Analysis has been completed to determine the noise impacts associated with the development of the proposed Apple Valley 84 (Project). This noise and vibration analysis briefly describes the Project, provides information regarding noise fundamentals, sets out the local regulatory setting, presents the study methods and procedures for noise analysis, evaluates the future exterior noise environment, potential off-site traffic impacts, the Project-related long-term stationary-source operational noise, and Project-related short-term construction noise and vibration impacts.

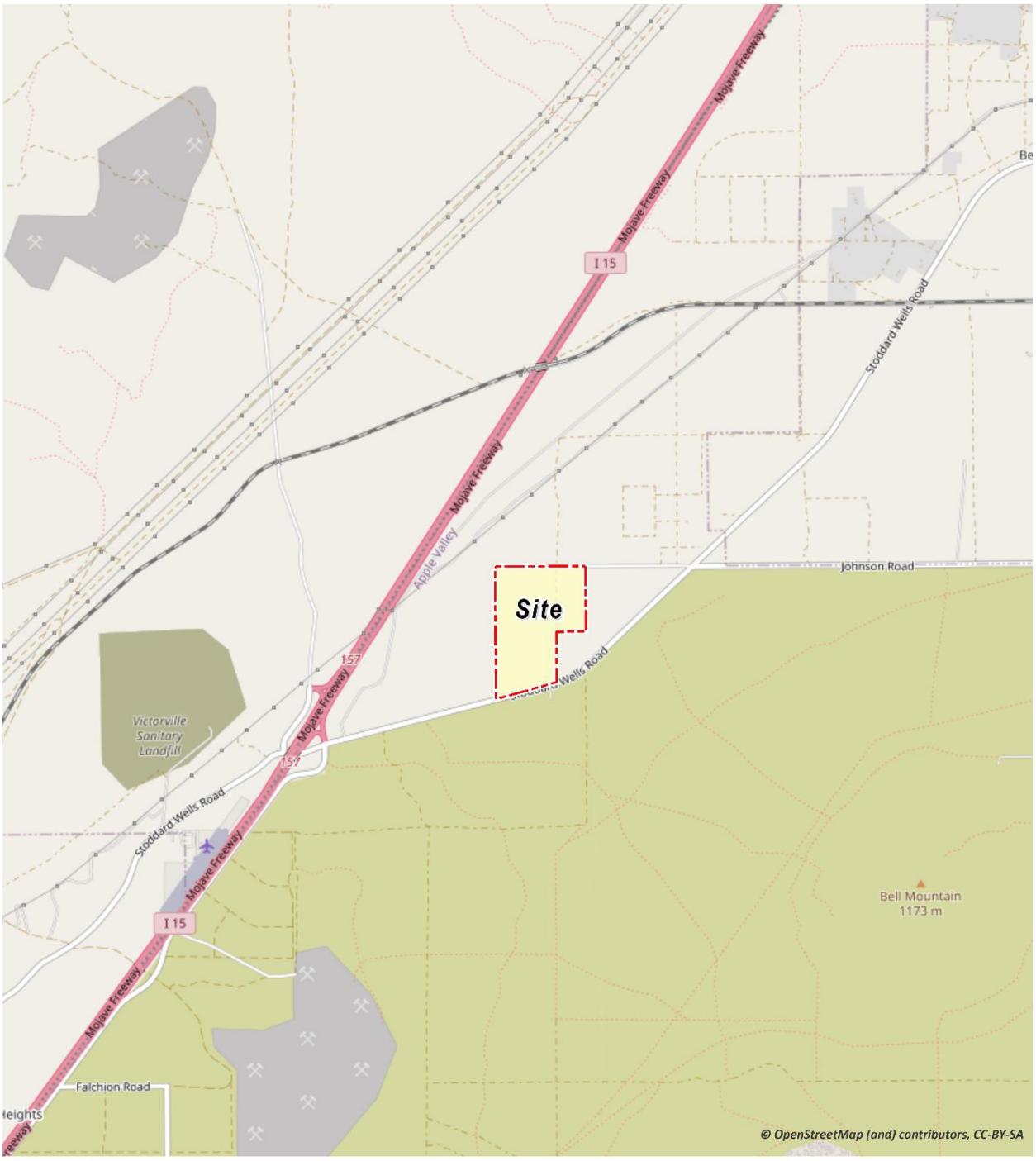
1.1 SITE LOCATION

The Project site is located north of Stoddard Wells Road and south of Johnson Road in the Town of Apple Valley, as shown in Exhibit 1-1. The nearest existing noise-sensitive residential use is located south of the Project site.

1.2 PROJECT DESCRIPTION

The Project is proposed to consist of the development of a single industrial warehouse and distribution building totaling 1,381,412 square feet. It is proposed that the Project mix will assume 10% General Light Industrial, 15% High-Cube Cold Storage Warehouse use and 75% High-Cube Fulfillment (Non-Sort) Center Warehouse use. The Project is anticipated to have an Opening Year of 2028. A preliminary site plan for the proposed Project is shown in Exhibit 1-2.

EXHIBIT 1-1: PROJECT LOCATION



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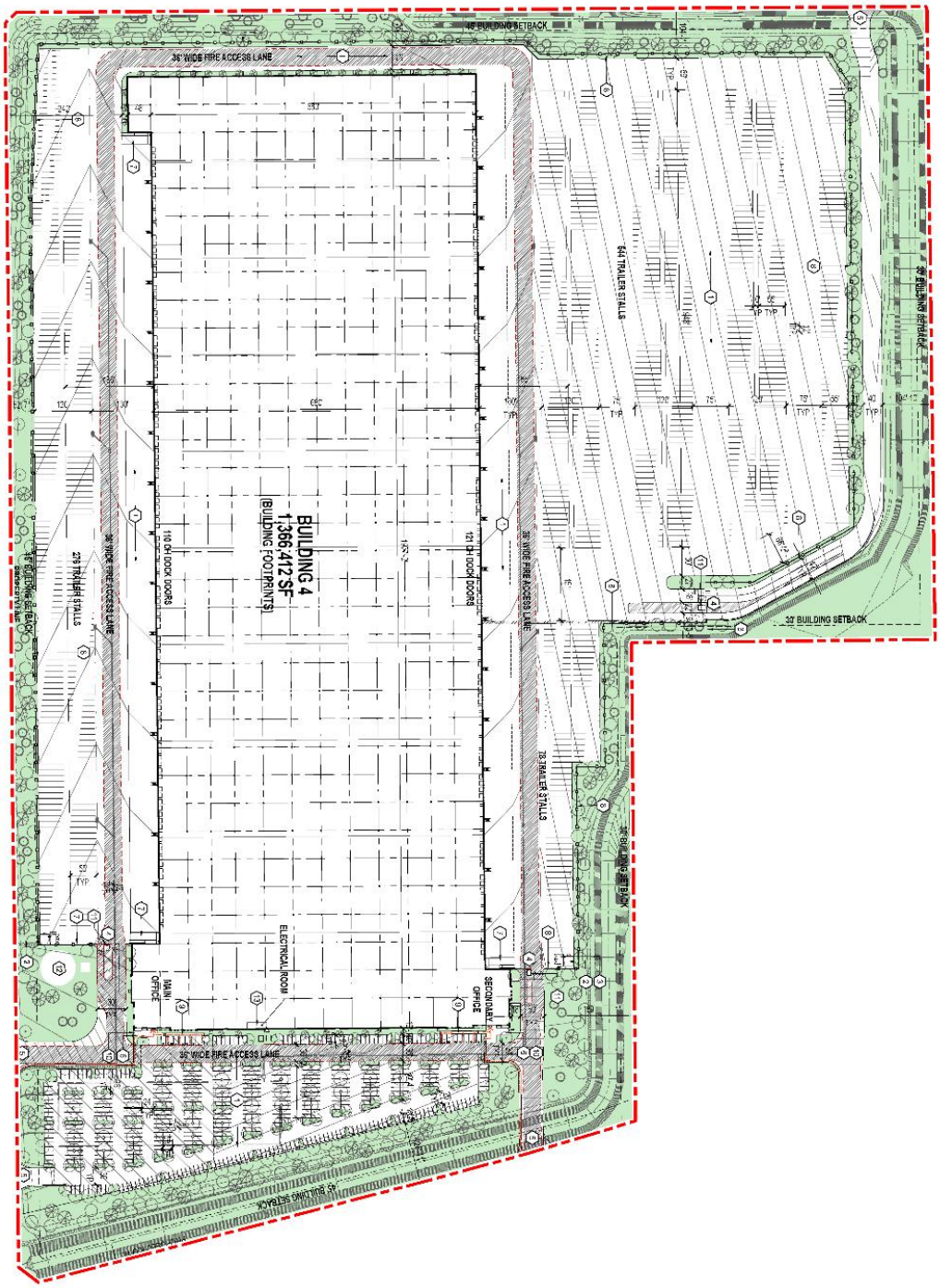
LEGEND:

Site Boundary

EXHIBIT 1-2: PRELIMINARY SITE PLAN



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LEGEND:

Site Boundary

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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 2-1 presents a summary of the typical noise levels and their subjective loudness and effects that are described in more detail below.

EXHIBIT 2-1: 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. (2) 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 1,000 feet, which can cause serious discomfort. (3) 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 typically based on average noise levels over time, rather than instantaneous measurements. The most commonly used metric is the equivalent continuous sound level (L_{eq}). Rather than being measured directly, L_{eq} is calculated from A-weighted sound pressure levels (dBA) recorded over a specified period. The L_{eq} represents the constant sound level that, over a given time, would contain the same acoustic energy as the actual fluctuating sound levels. As such, it is widely used to describe average environmental noise exposure. Importantly, while sound pressure levels (e.g., L_{eq}) express the intensity of sound at a specific location and are affected by distance and environmental conditions, sound power levels (L_w) are intrinsic properties of the sound source itself. Unlike sound pressure, sound power is independent of distance and unaffected by obstacles, air absorption, or weather conditions. In contrast, sound pressure levels decrease with distance due to factors such as geometric spreading, absorption by air and surfaces, intervening barriers or obstacles, and meteorological conditions (e.g., wind, humidity).

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. 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 Leq sound levels in the evening from 7:00 p.m. to 10:00 p.m., and the addition of 10 decibels to dBA Leq 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 noise can become more intrusive. CNEL does not represent the actual sound level heard at any time but rather represents the total sound exposure. The Town of Apple Valley 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. (2)

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, 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. (4)

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. (2)

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)

2.4 Noise Control

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

2.5 Noise Barrier Attenuation

Effective noise barriers can reduce noise levels by 10 to 15 dBA, cutting the loudness of traffic noise in half. A noise barrier is most effective when placed close to the noise source or receiver. Noise barriers, however, do have limitations. For a noise barrier to work, it must block the line-of-sight path of sound from the noise source.

2.6 Land Use Compatibility With Noise

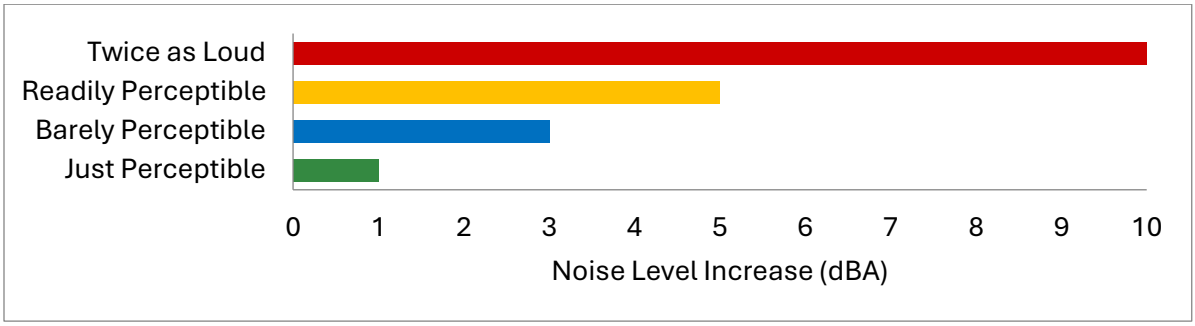
Some land uses are more tolerant of noise than others. For example, schools, hospitals, churches, and residences are more sensitive to noise intrusion than commercial or industrial developments and related activities. As ambient noise levels affect the perceived amenity or livability of a development, 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

Approximately sixteen 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 may occur. Twenty to thirty percent of the population will not complain even in very severe noise environments. (7 pp. 8-6) Thus, a variety of reactions can be expected from people exposed to any given noise environment.

Surveys have shown that community response to noise varies from no reaction to vigorous action for newly introduced noises averaging from 10 dB below existing to 25 dB above existing. (8) According to research originally published in the Noise Effects Handbook (7), the percentage of high annoyance ranges from approximately 0 percent at 45 dB or less, 10 percent are highly annoyed around 60 dB, and increases rapidly to approximately 70 percent being highly annoyed at approximately 85 dB or greater. 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 2-2. A change of 3 dBA is considered barely perceptible, and changes of 5 dBA are considered readily perceptible. (4)

Exhibit 2-2: Noise Level Increase Perception



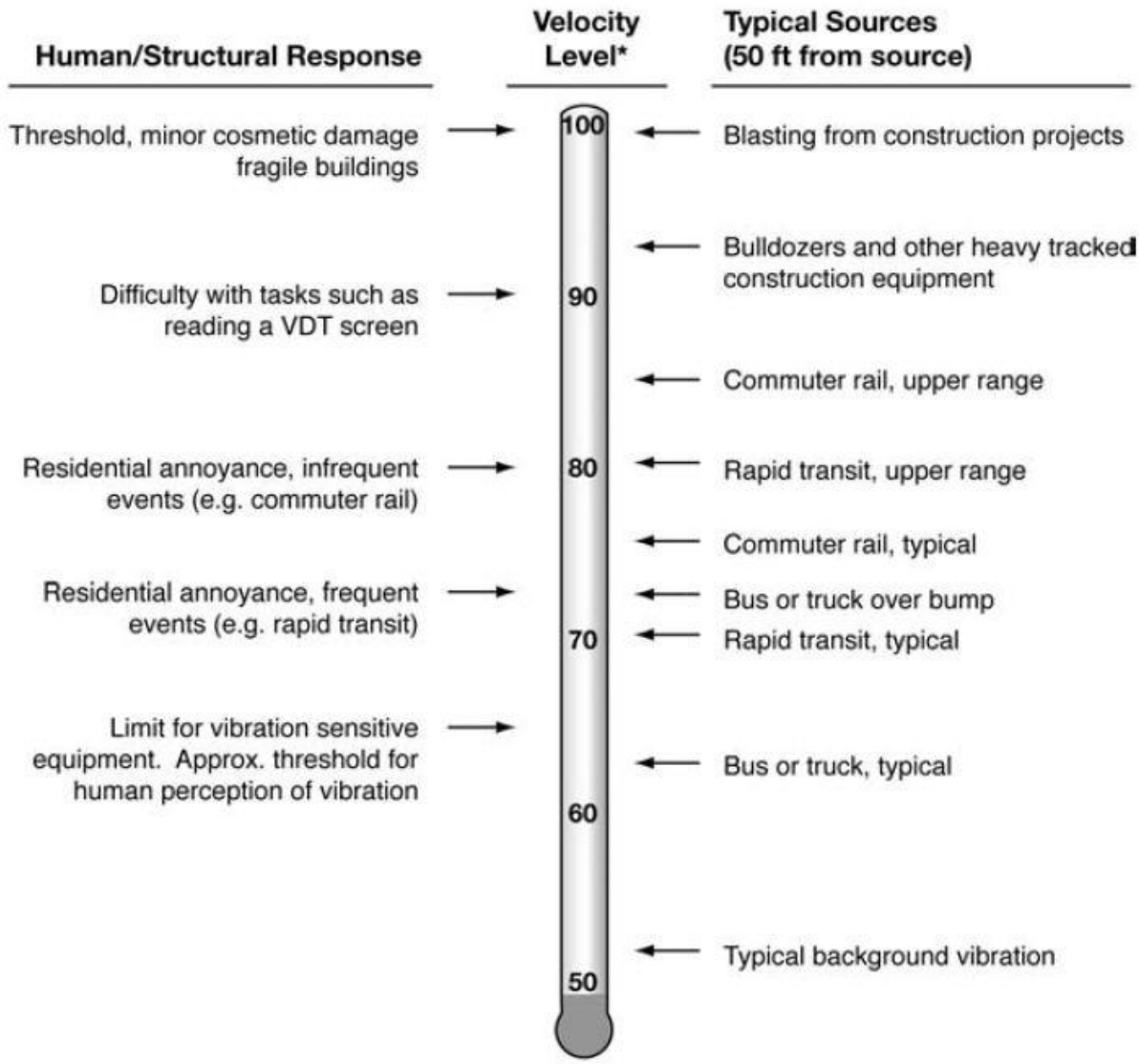
2.8 VIBRATION

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 in 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. (8) 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 2-3 illustrates common vibration sources and the human and structural response to ground-borne vibration.

EXHIBIT 2-3: 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.

3 REGULATORY SETTING

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

3.1 STATE OF CALIFORNIA NOISE REQUIREMENTS

The State of California regulates freeway noise, sets standards for sound transmission, provides occupational noise control criteria, identifies noise standards, and provides guidance for local land use compatibility. State law requires that each county and city adopt a General Plan that includes a Noise Element which is to be prepared per guidelines adopted by the Governor's Office of Planning and Research (OPR). (10) The purpose of the Noise Element is to limit the exposure of the community to excessive noise levels. In addition, the California Environmental Quality Act (CEQA) requires that all known environmental effects of a project be analyzed, including environmental noise impacts.

3.2 TOWN OF APPLE VALLEY GENERAL PLAN NOISE ELEMENT

The Town of Apple Valley has adopted a Noise Element of the General Plan to consider the land use patterns of the Land Use Element in the context of the noise it will generate. (13) The state and federal government regulate sources of noise from transportation sources or the workplace. Therefore, the Town of Apple Valley works to control noise through the following policies:

Policy 1.A *The Town shall adhere to the standards of "Land Use Compatibility for Community Environments."*

Policy 1.B *New development projects shall assure that exterior noise levels in back yards and/or usable open space do not exceed 65 dBA CNEL, and that interior noise levels are consistent with the requirements of the Building Code.*

Policy 1.C *The Town shall assure low levels of traffic within neighborhoods by assigning truck routes to major roadways only.*

Policy 1.D *The development review and environmental review process shall require all development proposals within the noise impact area of U.S. I-15, State Route 18, the High Desert Corridor or the railroads to mitigate both noise and vibration to acceptable levels through the preparation of focused studies.*

Policy 1.E *The Town shall coordinate with adjoining jurisdictions to ensure noise-compatible land uses across jurisdictional boundaries.*

Policy 1.F *The Town shall ensure that flight paths and airport improvements adhere to all local, state and federal noise regulations.*

Policy 1.G *The Town shall monitor bus route expansions to assure that any expansion on a collector or local street does not significantly impact the noise levels of adjacent sensitive receptors.*

Policy 1.H *The Town shall coordinate, to the greatest extent possible, with the owners of the two rail lines to assure that significant increases in train activity do not occur.*

3.2.1 Land Use Compatibility

The *Land Use Compatibility for Community Noise Environments* identified in the Town of Apple Valley Noise Element (Table IV-4) provides the guidelines used to evaluate land use compatibility of transportation related noise. The compatibility criteria, shown in Exhibit 3-1, provides the Town with a planning tool to gauge the compatibility of land uses relative to existing and future exterior noise levels. The *Land Use Compatibility for Community Noise Environments* matrix describes categories of compatibility and not specific noise standards. Noise sensitive residential designated land uses in the Project study area are considered *normally acceptable* with exterior noise levels below 60 dBA CNEL, and *conditionally acceptable* with exterior noise levels of up to 70 dBA CNEL. The non-noise sensitive Project warehouse/industrial land use is considered *normally acceptable* with unmitigated exterior noise levels of less than 75 dBA CNEL and *conditionally acceptable* with exterior noise levels ranging from 70 to 80 dBA CNEL based on the *Industrial, Manufacturing, Utilities, Agriculture* land use as shown on Exhibit 3-A. (13)

3.3 Operational Noise Standards

To analyze noise impacts originating from a designated fixed location or private property such as the Apple Valley 84 Project, stationary-source (operational) noise such as the expected cold storage loading dock activity, tractor trailer storage activity, truck movements, trash enclosure activity, roof-top air conditioning units, and parking lot vehicle movements are typically evaluated against standards established under a jurisdiction's Municipal Code or General Plan. The Town of Apple Valley Municipal Code (AVMC), Table 9.73.050-A, establishes the exterior noise level limits by the receiving land use as shown on Table 3-1.

For noise-sensitive residential properties, the AVMC Table 9.73.050-A, identifies a base daytime (7:00 a.m. to 10:00 p.m.) exterior noise level limit of 50 dBA L_{eq} and 40 dBA L_{eq} during the nighttime (10:00 p.m. to 7:00 a.m.) hours. In addition, Section 9.73.050 [A][1][c], states that in the event the measured ambient noise level exceeds the base exterior noise level limit, the allowable noise exposure standard shall be adjusted in five dBA increments in each category as appropriate to encompass or reflect said ambient noise level. In effect, when the ambient noise levels exceed the base exterior noise level limits, the noise level standard shall be adjusted as appropriate to encompass or reflect the ambient noise level.

EXHIBIT 3-1: LAND USE COMPATIBILITY FOR COMMUNITY NOISE ENVIRONMENTS

Land Uses	CNEL (dBA)						
	50	55	60	65	70	75	80
Residential - Single Family Dwellings, Duplex, Mobile Homes	A	B			C		D
Residential – Multiple Family	A		B		C		D
Transient Lodging: Hotels and Motels	A		B		C		D
School Classrooms, Libraries, Churches, Hospitals, Nursing Homes and Convalescent Hospitals	A		B		C		D
Auditoriums, Concert Halls, Amphitheaters	B					C	
Sports Arenas, Outdoor Spectator Sports	B						C
Playgrounds, Neighborhood Parks	A				C		D
Golf Courses, Riding Stables, Water Recreation, Cemeteries	A				C		D
Office Buildings, Business, Commercial and Professional	A				B		D
Industrial, Manufacturing, Utilities, Agriculture	A				B		D

Source: *California Department of Health Services, "Guidelines for the Preparation and Content of the Noise Element of the General Plan," 1990*

A Normally Acceptable: With no special noise reduction requirements assuming standard construction.

B Conditionally Acceptable: New construction or development should be undertaken only after a detailed analysis of the noise reduction requirement is made and needed noise insulation features included in the design

C **Normally Unacceptable**: New construction is discouraged. If new construction does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise insulation features included in the design.

D **Clearly Unacceptable**: New construction or development should generally not be undertaken.

Source: Town of Apple Valley General Plan Noise Element, Table IV-4.

TABLE 3-1: TOWN OF APPLE VALLEY OPERATIONAL NOISE STANDARDS

Receiving Land Use	Time Period	Base Noise Level Limit (dBA L_{eq})[1]	Exterior Noise Standards (dBA)[2]				
			L_{50} (30 mins)	L_{25} (15 mins)	L_8 (5 mins)	L_2 (1 min)	L_{max} (0 min)
Single-Family Residential	Daytime	50	50	55	60	65	70
	Nighttime	40	40	45	50	55	60
Multi-Family Residential	Daytime	50	50	55	60	65	70
	Nighttime	45	45	50	55	60	65
Commercial & Office	Daytime	60	60	65	70	75	80
	Nighttime	55	55	60	65	70	75
General Commercial	Daytime	65	65	70	75	80	85
	Nighttime	60	60	65	70	75	80
Light Industrial	Anytime	70	70	75	80	85	90
Heavy Industrial	Anytime	75	75	80	85	90	95

[1] Section 9.73.050 base exterior noise level limits of the Town of Apple Valley Municipal Code.
[2] Noise levels shall not exceed for the duration periods specified in Town of Apple Valley Municipal Code Section 9.73.050[A][1][b]. The percent noise level is the level exceeded "n" percent of the time during the measurement period. L_{50} is the noise level exceeded 50% of the time. "Daytime" = 7:00 a.m. to 10:00 p.m.; "Nighttime" = 10:00 p.m. to 7:00 a.m.

The Town of Apple Valley percentile noise descriptors are provided to ensure that the duration of the noise source is fully considered. However, due to the relatively constant intensity of the Project stationary operational activities, the (base exterior noise level limit) or the average L_{eq} noise level metric best describes the cold storage loading dock activity, tractor trailer storage activity, truck movements, trash enclosure activity, roof-top air conditioning units, and parking lot vehicle movements. The equivalent L_{eq} noise level metric accounts for noise fluctuations over time by averaging louder and quieter events and giving more weight to louder events. In addition, a review of the existing ambient noise level measurements shows that the L_{eq} is generally greater than the L_{50}. Therefore, this noise study conservatively relies on the average L_{eq} sound level limits to describe the Project stationary operational noise levels.

3.4 CONSTRUCTION NOISE STANDARDS

The Town of Apple Valley has set restrictions to control noise impacts associated with the construction of the proposed Project. AVMC Section 9.73.060[F][1], Construction/Demolition indicates that *operating or causing the operation of any tools or equipment used in construction, drilling, repair, alteration, or demolition work between weekday hours of 7 p.m. and 7 a.m., or at any time on weekends or holidays, such that the sound therefrom creates a noise disturbance across a residential or commercial real property line, except for emergency work of public service utilities or by variance issued by the Town.* In addition, AVMC Section 9.73.060[F][2] requires construction activities to be conducted in such a manner that the noise levels at affected residential properties will not exceed the daytime (7:00 a.m. to 7:00 p.m.) mobile exterior noise level limit of 75 dBA L_{eq} and 60 dBA L_{eq} during the nighttime hours of 7:00 p.m. to 7:00 a.m.

Construction projects involve various stages, and activities frequently shift from one location to another. For example, during the initial stages, noise-generating activities might concentrate in one area, and then move to another section as construction progresses. The mobile construction noise level threshold captures these changes and ensures that noise impacts are assessed accurately throughout the entire Project site.

3.5 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 is generally associated with pile driving and rock blasting. Other construction equipment such as air compressors, light trucks, hydraulic loaders, etc., generates little or no ground vibration. (10) To analyze vibration impacts originating from the operation and construction of the Apple Valley 84, vibration-generating activities are appropriately evaluated against standards established under the Municipal Code.

The AVMC, Section 9.73.060[G], states that *operating or permitting the operation of any device that creates a vibration which is above the vibration perception threshold of an individual at or beyond the property boundary of the source if on private property or at one hundred fifty (150) feet (46 meters) from the source if on a public space or public right-of-way.* The AVMC Section 9.73.020[34] defines the vibration perception threshold to be a motion velocity of 0.01 RMS inches per second (in/sec) over the range of one to 100 Hz. An RMS of 0.01 in/sec is equivalent to a peak particle velocity (PPV) level of 0.04 in/sec.

3.6 APPLE VALLEY AIRPORT (APV)

The Apple Valley Airport (APV) is located approximately 3.3 miles east of the Project Site. According to the Town of Apple Valley General Plan Noise Element, aircraft noise associated with the operation of the Apple Valley Airport, which is owned and operated by the County of San Bernardino, is limited to general aviation aircraft. The 60 dBA noise contour boundary for the airport has been identified as occurring within the Airport's property, and noise levels on surrounding lands are not significantly affected. While aircraft overflights may be heard within the Town, aircraft noise does not create significant noise impacts outside the immediate area.

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4 SIGNIFICANCE CRITERIA

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

A. Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?

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

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

4.1 NOISE LEVEL INCREASES (THRESHOLD A)

Noise level increases resulting from the Project are evaluated based on the Appendix G CEQA Guidelines. Under CEQA, consideration must be given to the magnitude of the increase, the existing baseline ambient noise levels, and the location of receivers to determine if a noise increase represents a significant adverse environmental impact. This approach recognizes that there is no single noise increase that renders the noise impact significant. (13) This is primarily because of the wide variation in individual thresholds of annoyance and differing individual experiences with noise. Thus, an important way of determining a person's subjective reaction to a new noise is the comparison of it to the existing environment to which one has adapted—the so-called *ambient* environment. The AVMC Section 9.73.020[A][3] defines the *ambient noise level* as the composite of noise from all sources near and far representing the normal or existing level of environmental noise at a given location. In general, the more a new noise level exceeds the previously existing ambient noise level, the less acceptable the new noise level will typically be judged.

Sensitive receivers are areas where humans are participating in activities that may be subject to the stress of significant interference from noise and often include residential dwellings, mobile homes, hotels, motels, hospitals, nursing homes, educational facilities, and libraries. Other receivers include office and industrial buildings, which are not considered as sensitive as single-family homes, but are still protected by the Town of Apple Valley land use compatibility standards, as discussed below.

4.1.1 Noise Sensitive Receivers (Substantial Permanent Noise Level Increase)

The Federal Interagency Committee on Noise (FICON) (16) developed guidance to be used for the assessment of project-generated increases in noise levels that consider the ambient noise level. The FICON recommendations are based on studies that relate aircraft noise levels to the percentage of persons highly annoyed by aircraft noise. Although the FICON recommendations were specifically developed to assess aircraft noise impacts, these recommendations are often used in environmental noise impact assessments involving the use of cumulative noise exposure metrics, such as the average-daily noise level (CNEL) and equivalent continuous noise level (Leq). In general, the more a new noise level exceeds the previously existing ambient noise level, the less acceptable the new noise level will typically be judged.

As previously stated, the approach used in this noise study recognizes that there is no single noise increase that renders a noise impact significant, based on a 2008 California Court of Appeal ruling on Gray v. County of Madera. (15) For example, if the ambient noise environment is quiet (<60 dBA) and the new noise source greatly increases the noise levels, an impact may occur if the noise criteria may be exceeded. Therefore, for this analysis, a readily perceptible 5 dBA or greater project-related noise level increase is considered a significant impact when the without project noise levels are below 60 dBA. Per the FICON, in areas where the without project noise levels range from 60 to 65 dBA, a 3 dBA barely perceptible noise level increase appears to be appropriate for most people. When the without project noise levels already exceed 65 dBA, any increase in community noise louder than 1.5 dBA or greater is considered a significant impact if the noise criteria for a given land use is exceeded, since it likely contributes to an existing noise exposure exceedance.

The FICON guidance provides an established source of criteria to assess the impacts of substantial temporary or permanent increase in baseline ambient noise levels. Based on the FICON criteria, the amount to which a given noise level increase is considered acceptable is reduced when the without Project (baseline) noise levels are already shown to exceed certain land-use specific exterior noise level criteria. The specific levels are based on typical responses to noise level increases of 5 dBA or readily perceptible, 3 dBA or barely perceptible, and 1.5 dBA depending on the underlying without Project noise levels for noise-sensitive uses. These levels of increases and their perceived acceptance are consistent with guidance provided by both the Federal Highway Administration (4 p. 9) and Caltrans (17 p. 2_48).

4.1.2 Non-Noise Sensitive Receivers (Substantial Permanent Noise Level Increase)

The Town of Apple Valley General Plan Noise Element, Table IV-4, *Land Use Compatibility for Community Noise Environments* was used to establish the satisfactory noise levels of significance for non-noise-sensitive land uses in the Project study area. As previously shown on Exhibit 3-A, the *normally acceptable* exterior noise level for non-noise-sensitive land use is 75 dBA CNEL. Non-noise sensitive noise levels greater than 75 dBA CNEL are considered *conditionally acceptable* per the *Land Use Compatibility for Community Noise Environments*. (13) To determine if Project-related traffic noise level increases are significant at off-site non-noise-sensitive warehouse/industrial land uses, a *barely perceptible* 3 dBA criteria is used. When the without Project noise levels are greater than the *normally acceptable* 75 dBA CNEL land use compatibility criteria, a *barely perceptible* 3 dBA or greater noise level increase is considered a significant impact since the noise level criteria is already exceeded. The noise level increases used to determine significant impacts for non-noise-sensitive land uses is generally consistent with the FICON noise level increase thresholds for noise-sensitive land uses but instead rely on the Town of Apple Valley General Plan Noise Element, Table IV-4, *Land Use Compatibility for Community Noise Environments* 75 dBA CNEL *normally acceptable* exterior noise level criteria for warehouse/industrial land uses.

4.1.3 Construction Noise (Substantial Temporary Noise Level Increase)

To control the noise-generating construction activities, the temporary noise level increases over the existing ambient conditions must be considered under CEQA Significance Threshold A. Although noise ordinances vary across jurisdictions, many cities and counties in California, including Los Angeles, San Diego, and San Francisco, set construction noise limits between 75 and 80 dBA L_{eq} and typically restrict construction activities to the daytime hours. In contrast, everyday operational noise regulations are more stringent because they apply to continuous, long-term noise sources that can

significantly impact the quality of life. As a result, many jurisdictions establish daytime residential noise limits around 55 dBA L_{eq} (or 50 dBA L_{eq} in the Town of Apple Valley). This suggests that 20 to 30 dBA increase over the daytime noise limit can be reasonably tolerated without significant adverse effects. In addition, increases of up to 20 dBA L_{eq} are permitted according to Section 9.73.050[A][1][5] of the AVMC. This is also illustrated in the adoption of many CEQA documents statewide that use an 80 dBA L_{eq} limit for assessing construction impacts while using everyday noise level limits of local noise ordinances in assessing on-site operational impacts.

While this analysis relies on the 20 dBA L_{eq} *substantial* noise increase threshold, it is important to recognize that many jurisdictions within the State including the City of Los Angeles no longer maintain any daytime noise increase thresholds. The City of Los Angeles found the 10 dBA daytime construction noise increase thresholds previously employed in the City of Los Angeles to be overly conservative, especially in the context of impacts on public health that often results in significant impact determination, even for routine construction activities that are expected to occur in an urban environment. (16 p. 7) Based on these findings, the updated City of Los Angeles CEQA Thresholds Guide identifies a 5 dBA nighttime construction noise increase threshold but no longer maintains a numerical threshold above ambient noise levels for daytime construction activities. Therefore, if the Project-related construction noise levels generate a temporary noise level increase over the existing daytime ambient noise levels more than 20 dBA L_{eq} consistent with Section 9.73.050[A][1][5] of the AVMC or 5 dBA L_{eq} over the existing nighttime ambient noise levels, then the Project construction noise increases will be considered a *significant* impact.

4.2 VIBRATION (THRESHOLD B)

As described in Section 3.5, the vibration generating activities originating from the construction of Apple Valley 84, vibration-generating activities are appropriately evaluated using a peak particle velocity (PPV) level of 0.04 in/sec.

4.3 CEQA GUIDELINES NOT FURTHER ANALYZED (THRESHOLD C)

The closest airport which would require additional noise analysis under CEQA guideline C is the Apple Valley Airport (APV) which is located west of the Project Site. As previously indicated in Section 3.6, the 60 dBA noise contour boundary for the airport has been identified as occurring within the Airport's property, and noise levels on surrounding lands are not significantly affected. While aircraft overflights may be heard within the Town, aircraft noise does not create significant noise impacts outside the immediate area. Therefore, airport noise impacts are considered *less than significant,* and no further noise analysis is provided under Guideline C.

4.4 SIGNIFICANCE CRITERIA SUMMARY

Noise impacts shall be considered significant if any of the following occur as a direct result of the proposed development. Table 4-1 shows the significance criteria summary matrix that includes the allowable criteria used to identify potentially significant incremental noise level increases.

TABLE 4-1: SIGNIFICANCE CRITERIA SUMMARY

Analysis	Receiving Land Use	Condition(s)	Significance Criteria	
			Daytime	Nighttime
Off-Site Traffic	Noise-Sensitive	If ambient is < 60 dBA CNEL[1]	≥ 5 dBA CNEL Project increase	
		If ambient is 60 - 65 dBA CNEL[1]	≥ 3 dBA CNEL Project increase	
		If ambient is > 65 dBA CNEL[1]	≥ 1.5 dBA CNEL Project increase	
Off-Site Traffic	Non-Noise-Sensitive	If ambient is > 75 dBA CNEL[2]	≥ 3 dBA CNEL Project increase	
Operational	Noise-Sensitive	Residential Exterior Noise Level[3]	50 dBA L_{eq}	40 dBA L_{eq}
		If ambient is < 60 dBA L_{eq}[1]	≥ 5 dBA L_{eq} Project increase	
		If ambient is 60 - 65 dBA L_{eq}[1]	≥ 3 dBA L_{eq} Project increase	
		If ambient is > 65 dBA L_{eq}[1]	≥ 1.5 dBA L_{eq} Project increase	
Construction	Noise-Sensitive	Exterior Noise Level Threshold[4]	75 dBA L_{eq}	60 dBA L_{eq}
		Exterior Noise Level Increase[5]	20 dBA L_{eq}[5]	5 dBA L_{eq}[6]
		Vibration Level Threshold[7]	0.04 PPV (in/sec)	

[1] FICON, 1992.
[2] Town of Apple Valley General Plan Noise Element Table IV-4 (See Exhibit 3-A)
[3] Town of Apple Valley Municipal Code, Table 9.73.050-A, Single-Family Residential (Table 3-1, Appendix 3.1)
[4] Town of Apple Valley Municipal Code Section 9.73.060[F][2], (Appendix 3.1)
[5] Reasonable daytime increase that can be tolerated without significant adverse effects.
[6] City of Los Angeles Department of City Planning, Construction Noise and Vibration Updates to Thresholds and Methodology.
[7] Town of Apple Valley Municipal Code 9.73.020[34], (Appendix 3.1)
Operational: "Daytime" = 7:00 a.m. to 10:00 p.m.; "Nighttime" = 10:00 p.m. to 7:00 a.m. (Table 9.73.050-A)
Construction: "Daytime" = 7:00 a.m. to 7:00 p.m.; "Nighttime" = 7:00 p.m. to 7:00 a.m. (Section 9.73.060[F][2])

5 EXISTING NOISE LEVEL MEASUREMENTS

To assess the existing noise level environment, 24-hour noise level measurements were taken at four locations in the Project study area. The receiver locations were selected to describe and document the existing noise environment within the Project study area. Exhibit 5-1 provides the boundaries of the Project study area and the noise level measurement locations. To fully describe the existing noise conditions, long-term noise level measurements were collected by Urban Crossroads, Inc. on Thursday, May 29, 2025. Appendix 5.1 includes study area photos.

5.1 MEASUREMENT PROCEDURE AND CRITERIA

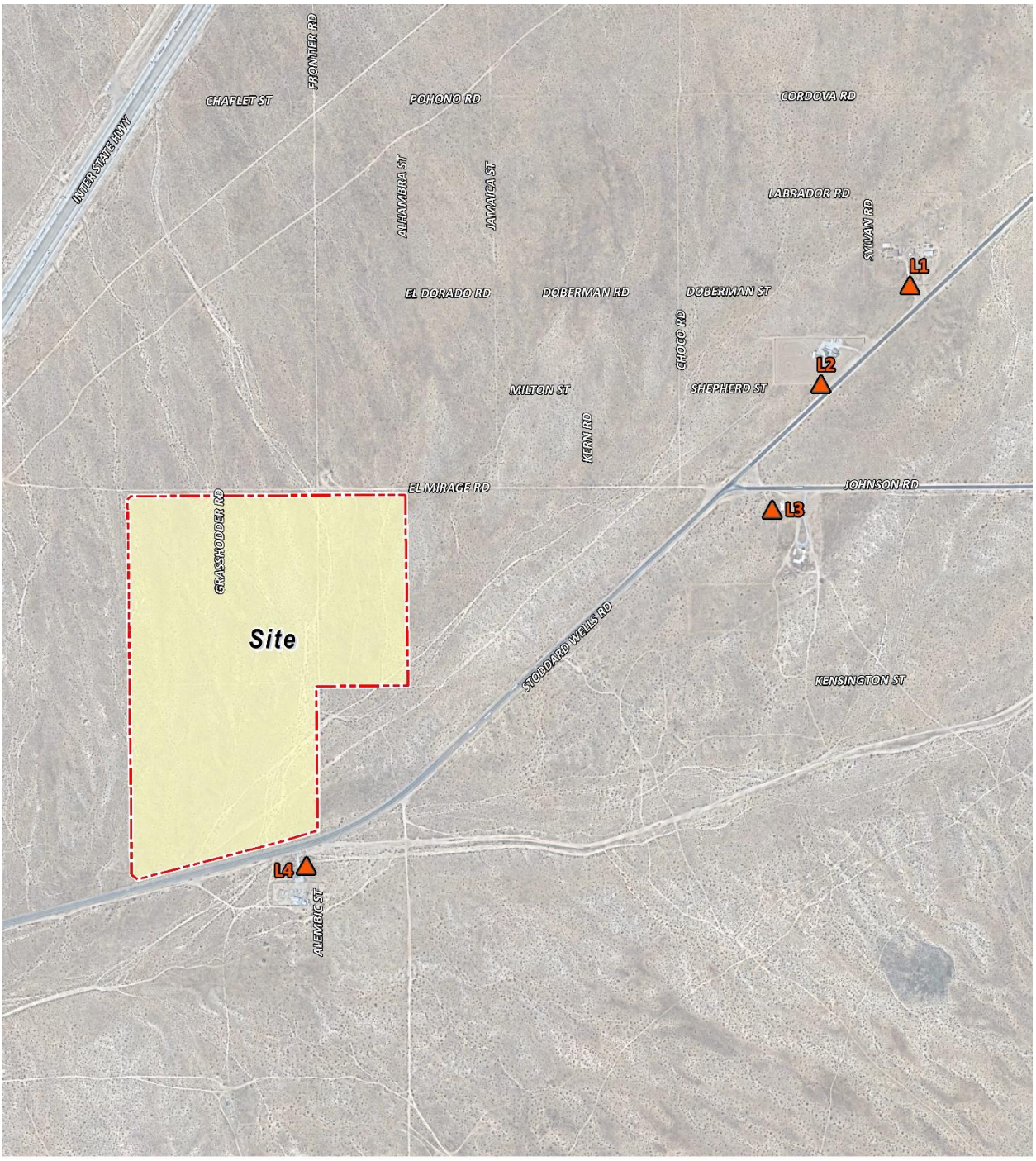
To describe the existing noise environment, the hourly noise levels were measured during typical weekday conditions over a 24-hour period. By collecting individual hourly noise level measurements, it is possible to describe the equivalent daytime and nighttime hourly noise levels and calculate the 24-hour 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. (18)

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 equivalent hourly noise levels surrounding the Project site. Both Caltrans and the FTA recognize that it is not reasonable to collect noise level measurements that can fully represent every part of a private yard, patio, deck, or balcony normally used for human activity when estimating impacts for new development projects. This is demonstrated in the Caltrans general site location guidelines which indicate that sites must be free of noise contamination by sources other than sources of interest. Avoid sites located near sources such as barking dogs, lawnmowers, pool pumps, and air conditioners unless it is the express intent of the analyst to measure these sources. (2) Further, FTA guidance states, that 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. (8)

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. (8) 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.

EXHIBIT 5-1: NOISE MEASUREMENT LOCATIONS



Collecting 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 increase due to the Project's contribution to the ambient noise levels. This approach is necessary to calculate the temporary or permanent increase in ambient noise levels as required by the CEQA Guidelines Environmental Checklist.

5.3 Noise Measurement Results

The noise measurements presented below focus on the equivalent or the hourly energy average sound levels (Leq) to describe the existing ambient conditions. Table 5-1 provides the (energy average) noise levels used to describe 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. The equivalent sound level (Leq) represents a steady state sound level containing the same total energy as a time varying signal over a given sample period. The daytime and nighttime equivalent noise levels represent the average of all hourly noise levels observed during these time periods expressed as a single number.

Table 5-1: Ambient Noise Level Measurements

Location[1]	Description	Energy Average Noise Level (dBA L_{eq})[2]		CNEL
		Daytime	Nighttime	
L1	Located northeast of the site near the residence at 19934 Doberman St.	72.1	66.3	74.5
L2	Located northeast of the site near the residence at 19414 Stoddard Wells Rd.	71.8	65.7	74.1
L3	Located east of the site near the residence at 19823 Johnson Rd.	65.1	60.3	68.1
L4	Located south of the site near the residence at 19277 Stoddard Wells Rd.	69.8	63.9	72.2

[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 equivalent noise levels used to describe the daytime and nighttime ambient conditions for each of the measurements. Appendix 5.2 provides summary worksheets of the noise levels for each hour as well as the minimum, maximum, L1, L2, L5, L8, L25, L50, L90, L95, and L99 percentile noise levels observed during the daytime and nighttime periods.

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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 the Town of Apple Valley General Plan Noise Element, Table IV-4, *Land Use Compatibility for Community Noise Environments* (see Exhibit 3-1), all transportation related noise levels are presented in terms of the 24-hour CNEL's. Unlike a simple arithmetic average noise level, CNEL represents the logarithmic summation of the equivalent hourly noise levels with evening and nighttime noise penalties recognizing that noise may have different impacts on people depending on when it occurs.

6.1 FHWA TRAFFIC NOISE PREDICTION MODEL

The expected roadway noise level increases from vehicular traffic were calculated by Urban Crossroads, Inc. using a computer program that replicates the Federal Highway Administration (FHWA) Traffic Noise Prediction Model- FHWA-RD-77-108. (19) This methodology is commonly used to describe the off-site traffic noise levels throughout southern California. The FHWA Model arrives at a predicted noise level through a series of adjustments to the Reference Energy Mean Emission Level (REMEL) by vehicle type. REMEL represents the maximum sound level (L_{max}) of individual vehicle "pass by" events by vehicle type when measured at a "reference distance" of 50 feet from the center of the travel lane.

In California the national REMELs are substituted with the California Vehicle Noise (Calveno) Emission Levels. (17) Adjustments are then made to the REMEL to account for: the roadway classification (e.g., collector, secondary, major or arterial), the roadway active width (i.e., the distance between the center of the outermost travel lanes on each side of the roadway), the total average daily traffic (ADT), the travel speed, the percentages of automobiles, medium trucks, and heavy trucks in the traffic volume, the roadway grade, the angle of view (e.g., whether the roadway view is blocked), the site conditions ("hard" or "soft" relates to the absorption of the ground, pavement, or landscaping), and the percentage of total ADT which flows each hour throughout a 24-hour period. Research conducted by Caltrans has shown that the use of soft site conditions is appropriate for the application of the FHWA traffic noise prediction model used in this analysis. (20)

6.2 OFF-SITE TRAFFIC NOISE PREDICTION MODEL INPUTS

Table 6-1 presents the roadway parameters used to assess the Project's off-site dBA CNEL transportation noise impacts. Table 6-1 identifies the 6 off-site study area roadway segments, the distance from the centerline to adjacent land use based on the functional roadway classifications per the Town of Apple Valley General Plan Circulation Element, and the vehicle speeds. It is expected that the Project related off-site traffic noise level contributions on other roadway segments outside the Project study area will dissipate as traffic disperses on the roadway network. The ADT volumes used in this study area presented on Table 6-2 are based on the *Apple Valley 84 Traffic Analysis* prepared by Urban Crossroads, Inc. for the following traffic scenarios (19):

- Existing without Project (E)
- Existing with Project (EP)
- Opening Year Cumulative (OYC) 2028 without Project
- Opening Year Cumulative (OYC) 2028 with Project

TABLE 6-1: OFF-SITE ROADWAY PARAMETERS

ID	Roadway	Segment	Receiving Land Use[1]	Classification[2]	Distance from Centerline to Receiving Land Use (Feet)[3]	Vehicle Speed (mph)
1	Quarry Rd.	n/o Stoddard Wells Rd.	Non-Sensitive	Major Divided	64'	55
2	Stoddard Wells Rd.	w/o Quarry Rd.	Non-Sensitive	Major Divided	64'	55
3	Stoddard Wells Rd.	e/o Quarry Rd.	Non-Sensitive	Major Divided	64'	55
4	Stoddard Wells Rd.	e/o I-15 NB Ramps	Non-Sensitive	Major Divided	64'	55
5	Stoddard Wells Rd.	e/o Wrangler Rd.	Non-Sensitive	Major Divided	64'	55
6	Stoddard Wells Rd.	e/o Dwy. 1	Sensitive	Major Divided	64'	55

[1] Based on a review of existing aerial imagery.
[2] Bell Mountain Commerce Center Traffic Analysis, Urban Crossroads, Inc.
[3] Distance to receiving land use is based upon the right-of-way distances.

TABLE 6-2: AVERAGE DAILY TRAFFIC VOLUMES

ID	Roadway	Segment	Average Daily Traffic Volumes (Actual Vehicles)[1]			
			Existing Without Project	Existing With Project	OYC (2028) Without Project	OYCP (2028) With Project
1	Quarry Rd.	n/o Stoddard Wells Rd.	1,887	3,227	16,619	17,960
2	Stoddard Wells Rd.	w/o Quarry Rd.	534	556	924	947
3	Stoddard Wells Rd.	e/o Quarry Rd.	2,089	3,130	17,192	18,233
4	Stoddard Wells Rd.	e/o I-15 NB Ramps	3,303	6,062	32,520	35,279
5	Stoddard Wells Rd.	e/o Wrangler Rd.	3,561	3,908	26,429	26,776
6	Stoddard Wells Rd.	e/o Dwy. 1	3,561	3,612	30,759	30,809

[1] Bell Mountain Commerce Center Traffic Analysis, Urban Crossroads, Inc.

To describe the Project off-site traffic impacts, the receiving land use adjacent to each roadway segment is identified as a sensitive or non-sensitive land use. Sensitive land uses are limited to the existing noise sensitive residential uses based on a review of aerial imagery. It is expected that only the existing receivers will experience a change in the ambient noise levels over time. The ADT volumes vary for each roadway segment based on the existing traffic volumes and the combination of project traffic distributions. This analysis relies on a comparative evaluation of the off-site traffic noise impacts at the boundary of the right-of-way of the receiving adjacent land use, without and with project ADT traffic volumes from the Project traffic analysis. Consistent with the *Apple Valley 84 Traffic Analysis*, the Project is anticipated to generate a net total of 2,798 two-way trips per day (actual vehicles) that includes 558 truck trips.

To quantify the off-site noise levels, Project-related truck trips were added to the heavy truck category in the FHWA noise prediction model. The addition of the Project related truck trips increases the percentage of heavy trucks in the vehicle mix. This approach recognizes that the FHWA noise prediction model is significantly influenced by the number of heavy trucks in the vehicle mix. The unadjusted daily Project truck trip-ends were assigned to the individual off-site study area roadway segments based on the Project truck trip distribution percentages documented in the traffic analysis. Consistent with *Apple Valley 84 Traffic Analysis*, the off-site traffic noise analysis maintains a peak hour to average daily traffic (peak-to-daily) relationship of approximately 10.87%.

Table 6-3 provides the time of day (daytime, evening, and nighttime) vehicle splits and the traffic flow by vehicle type (vehicle mix) used for all without Project traffic scenarios. Tables 6-4 to 6-5 show the with Project vehicle mix. Due to the added Project truck trips, the increase in Project traffic volumes and the distributions of trucks on the study area road segments, the percentage of autos, medium trucks and heavy trucks will vary for each of the traffic scenarios. This explains why the existing and future traffic volumes and vehicle mixes vary between seemingly identical study area roadway segments.

TABLE 6-3: TIME OF DAY VEHICLE SPLITS

Time of Day	Vehicle Mix[1]			Time of Day Split[1]
	Autos[2]	Medium Trucks[3]	Heavy Trucks[4]	
Daytime	56.90%	2.33%	11.39%	70.62%
Evening	5.51%	0.15%	0.94%	6.60%
Nighttime	19.41%	0.33%	3.03%	22.77%
Daily	81.83%	2.82%	15.35%	100.00%

[1] Based on the 24-hour directional vehicle classification count collected on Stoddard Wells Road east of the I-15 NB Ramps on April 22, 2025 (Bell Mountain Commerce Center Traffic Analysis, Urban Crossroads, Inc.)
[2] All vehicles with two axles and four wheels designed primarily for transportation of nine or fewer passengers (automobiles) or transportation of cargo (light trucks).
[3] All vehicles with two axles and six wheels designed for transportation of cargo.
[4] All vehicles with three or more axles designed for the transportation of cargo.

TABLE 6-4: EXISTING WITH PROJECT VEHICLE MIX

ID	Roadway	Segment	With Project[1]			
			Autos	Medium Trucks	Heavy Trucks	Total[2]
1	Quarry Rd.	n/o Stoddard Wells Rd.	81.16%	3.29%	15.55%	100.00%
2	Stoddard Wells Rd.	w/o Quarry Rd.	82.56%	2.70%	14.74%	100.00%
3	Stoddard Wells Rd.	e/o Quarry Rd.	80.74%	3.31%	15.95%	100.00%
4	Stoddard Wells Rd.	e/o I-15 NB Ramps	81.35%	3.28%	15.36%	100.00%
5	Stoddard Wells Rd.	e/o Wrangler Rd.	80.59%	3.14%	16.28%	100.00%
6	Stoddard Wells Rd.	e/o Dwy. 1	81.31%	2.93%	15.76%	100.00%

[1] Total of vehicle mix percentage values rounded to the nearest one-hundredth.

TABLE 6-5: OYC (2028) WITH PROJECT VEHICLE MIX

ID	Roadway	Segment	With Project[1]			
			Autos	Medium Trucks	Heavy Trucks	Total[2]
1	Quarry Rd.	n/o Stoddard Wells Rd.	81.71%	2.90%	15.39%	100.00%
2	Stoddard Wells Rd.	w/o Quarry Rd.	82.26%	2.75%	14.99%	100.00%
3	Stoddard Wells Rd.	e/o Quarry Rd.	81.64%	2.90%	15.46%	100.00%
4	Stoddard Wells Rd.	e/o I-15 NB Ramps	81.75%	2.90%	15.36%	100.00%
5	Stoddard Wells Rd.	e/o Wrangler Rd.	81.65%	2.86%	15.49%	100.00%
6	Stoddard Wells Rd.	e/o Dwy. 1	81.77%	2.83%	15.40%	100.00%

[1] Total of vehicle mix percentage values rounded to the nearest one-hundredth.

7 OFF-SITE TRAFFIC NOISE ANALYSIS

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 development of the Project, noise contours were developed for each of the Project scenarios outlined in the *Apple Valley 84 Traffic Analysis* prepared by Urban Crossroads, Inc. (19)

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 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 for each traffic condition. Appendix 7.1 includes a summary of the dBA CNEL traffic noise level contour worksheets for each of the traffic conditions.

7.2 OFF-SITE TRUCK TRAFFIC

Consistent with the *Apple Valley 84 Traffic Analysis,* the Project truck trips will be primarily limited to the major roadways. The noise level calculations included in Appendix 7.1, present the maximum sound levels (L_{max}) of individual "pass by" events (REMEL) by vehicle type for each of the study area roadway segments. To demonstrate compliance with the Town of Apple Valley *Land Use Compatibility for Community Noise Environments* guidelines, all exterior noise levels are first expressed using the equivalent hourly noise levels for the peak, daytime, evening, and nighttime hours. This approach permits the calculation of the 24-hour CNEL necessary to demonstrate compliance with the established thresholds of significance.

CNEL is commonly used for planning purposes and to assess changes in the long-term traffic noise exposure in a way that reflects its impact on communities over time, considering both daytime and nighttime periods when people may be more sensitive to noise. Since the CNEL noise levels include penalties for the evening and nighttime hours, the CNEL level will always be higher than any of the equivalent hourly noise levels. Both the Town of Apple Valley Noise Element and the *General Plan Guidelines* published by the Governor's Office of Planning and Research (OPR) (12) rely on the CNEL noise metric to assess land use noise compatibility.

TABLE 7-1: EXISTING WITHOUT PROJECT CONTOURS

ID	Road	Segment	Receiving Land Use[1]	CNEL at Receiving Land Use (dBA)[2]	Distance to Contour from Centerline (Feet)		
					70 dBA CNEL	65 dBA CNEL	60 dBA CNEL
1	Quarry Rd.	n/o Stoddard Wells Rd.	Non-Sensitive	68.6	56	122	262
2	Stoddard Wells Rd.	w/o Quarry Rd.	Non-Sensitive	63.2	RW	111	240
3	Stoddard Wells Rd.	e/o Quarry Rd.	Non-Sensitive	69.1	RW	75	161
4	Stoddard Wells Rd.	e/o I-15 NB Ramps	Non-Sensitive	71.1	75	162	350
5	Stoddard Wells Rd.	e/o Wrangler Rd.	Non-Sensitive	71.4	75	161	347
6	Stoddard Wells Rd.	e/o Dwy. 1	Sensitive	71.4	170	367	790

[1] Based on a review of existing aerial imagery.
[2] The CNEL is calculated at the boundary of the right-of-way of the receiving adjacent land use.
"RW" = Location of the respective noise contour falls within the right-of-way of the road.

TABLE 7-2: EXISTING WITH PROJECT CONTOURS

ID	Road	Segment	Receiving Land Use[1]	CNEL at Receiving Land Use (dBA)[2]	Distance to Contour from Centerline (Feet)		
					70 dBA CNEL	65 dBA CNEL	60 dBA CNEL
1	Quarry Rd.	n/o Stoddard Wells Rd.	Non-Sensitive	71.0	56	122	262
2	Stoddard Wells Rd.	w/o Quarry Rd.	Non-Sensitive	63.2	RW	111	240
3	Stoddard Wells Rd.	e/o Quarry Rd.	Non-Sensitive	71.0	RW	75	161
4	Stoddard Wells Rd.	e/o I-15 NB Ramps	Non-Sensitive	73.7	75	162	350
5	Stoddard Wells Rd.	e/o Wrangler Rd.	Non-Sensitive	72.0	75	161	347
6	Stoddard Wells Rd.	e/o Dwy. 1	Sensitive	71.6	170	367	790

[1] Based on a review of existing aerial imagery.
[2] The CNEL is calculated at the boundary of the right-of-way of the receiving adjacent land use.
"RW" = Location of the respective noise contour falls within the right-of-way of the road.

TABLE 7-3: OYC (2028) WITHOUT PROJECT CONTOURS

ID	Road	Segment	Receiving Land Use[1]	CNEL at Receiving Land Use (dBA)[2]	Distance to Contour from Centerline (Feet)		
					70 dBA CNEL	65 dBA CNEL	60 dBA CNEL
1	Quarry Rd.	n/o Stoddard Wells Rd.	Non-Sensitive	78.1	56	122	262
2	Stoddard Wells Rd.	w/o Quarry Rd.	Non-Sensitive	65.5	RW	111	240
3	Stoddard Wells Rd.	e/o Quarry Rd.	Non-Sensitive	78.2	RW	75	161
4	Stoddard Wells Rd.	e/o I-15 NB Ramps	Non-Sensitive	81.0	75	162	350
5	Stoddard Wells Rd.	e/o Wrangler Rd.	Non-Sensitive	80.1	75	161	347
6	Stoddard Wells Rd.	e/o Dwy. 1	Sensitive	80.8	170	367	790

1 Based on a review of existing aerial imagery.
[2] The CNEL is calculated at the boundary of the right-of-way of the receiving adjacent land use.
"RW" = Location of the respective noise contour falls within the right-of-way of the road.

TABLE 7-4: OYC (2028) WITH PROJECT CONTOURS

ID	Road	Segment	Receiving Land Use[1]	CNEL at Receiving Land Use (dBA)[2]	Distance to Contour from Centerline (Feet)		
					70 dBA CNEL	65 dBA CNEL	60 dBA CNEL
1	Quarry Rd.	n/o Stoddard Wells Rd.	Non-Sensitive	78.4	56	122	262
2	Stoddard Wells Rd.	w/o Quarry Rd.	Non-Sensitive	65.6	RW	111	240
3	Stoddard Wells Rd.	e/o Quarry Rd.	Non-Sensitive	78.5	RW	75	161
4	Stoddard Wells Rd.	e/o I-15 NB Ramps	Non-Sensitive	81.4	75	162	350
5	Stoddard Wells Rd.	e/o Wrangler Rd.	Non-Sensitive	80.2	75	161	347
6	Stoddard Wells Rd.	e/o Dwy. 1	Sensitive	80.8	170	367	790

1 Based on a review of existing aerial imagery.
[2] The CNEL is calculated at the boundary of the right-of-way of the receiving adjacent land use.
"RW" = Location of the respective noise contour falls within the right-of-way of the road.

7.3 EXISTING PROJECT TRAFFIC NOISE INCREASES

An analysis of existing traffic noise levels plus traffic noise generated by the proposed Project has been included in this report to fully analyze all the existing traffic scenarios identified in the traffic study. This condition is provided solely for informational purposes and will not occur, since the Project will not be fully developed and occupied under Existing conditions. Table 7-1 shows the Existing without Project conditions CNEL noise levels. The Existing without Project exterior noise levels is expected to range from 63.2 to 71.4 dBA CNEL, without accounting for any noise attenuation features such as noise barriers or topography. Table 7-2 shows the Existing with Project conditions will range from 63.2 to 73.7 dBA CNEL. Table 7-5 shows that the Project off-site traffic noise level impacts will range from 0.0 to 2.6 dBA CNEL. Based on the significance criteria for off-site traffic noise presented in Table 4-1, land uses adjacent to the study area roadway segments would experience *less than significant* noise level impacts due to unmitigated Project-related traffic noise levels.

TABLE 7-5: 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	Limit	Exceeded?
1	Quarry Rd.	n/o Stoddard Wells Rd.	Non-Sensitive	68.6	71.0	2.4	n/a	No
2	Stoddard Wells Rd.	w/o Quarry Rd.	Non-Sensitive	63.2	63.2	0.0	n/a	No
3	Stoddard Wells Rd.	e/o Quarry Rd.	Non-Sensitive	69.1	71.0	1.9	n/a	No
4	Stoddard Wells Rd.	e/o I-15 NB Ramps	Non-Sensitive	71.1	73.7	2.6	n/a	No
5	Stoddard Wells Rd.	e/o Wrangler Rd.	Non-Sensitive	71.4	72.0	0.6	n/a	No
6	Stoddard Wells Rd.	e/o Dwy. 1	Sensitive	71.4	71.6	0.2	1.5	No

[1] Based on a review of existing aerial imagery. Noise sensitive uses 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)?
"n/a" Per the Town of Apple Valley Noise Element, Table IV-4, Land Use Compatibility for Community Noise Environments, unmitigated normally acceptable exterior noise levels of less than 75 dBA CNEL are considered less than significant and a barely perceptible 3 dBA or greater noise level increase is considered a significant impact when the non-noise sensitive noise level is greater than the normally acceptable 75 dBA CNEL land use compatibility guidelines.

7.4 OYC (2028) Project Traffic Noise Increases

Table 7-3 presents the Opening Year Cumulative (2028) without Project conditions CNEL noise levels. The OYC (2028) without Project exterior noise levels are expected to range from 65.5 to 81.0 dBA CNEL, without accounting for any noise attenuation features such as noise barriers or topography. Table 7-4 shows the OYC (2028) with Project conditions will range from 65.6 to 81.4 dBA CNEL. Table 7-6 shows that the Project off-site traffic noise level increases will range from 0.0 to 0.4 dBA CNEL. Based on the significance criteria for off-site traffic noise presented in Table 4-1, land uses adjacent to the study area roadway segments would experience *less than significant* noise level impacts due to unmitigated Project-related traffic noise levels.

TABLE 7-6: EACP (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	Limit	Exceeded?
1	Quarry Rd.	n/o Stoddard Wells Rd.	Non-Sensitive	78.1	78.4	0.3	3.0	No
2	Stoddard Wells Rd.	w/o Quarry Rd.	Non-Sensitive	65.5	65.6	0.1	n/a	No
3	Stoddard Wells Rd.	e/o Quarry Rd.	Non-Sensitive	78.2	78.5	0.3	3.0	No
4	Stoddard Wells Rd.	e/o I-15 NB Ramps	Non-Sensitive	81.0	81.4	0.4	3.0	No
5	Stoddard Wells Rd.	e/o Wrangler Rd.	Non-Sensitive	80.1	80.2	0.1	3.0	No
6	Stoddard Wells Rd.	e/o Dwy. 1	Sensitive	80.8	80.8	0.0	1.5	No

[1] Based on a review of existing aerial imagery. Noise sensitive uses 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)?
"n/a" Per the Town of Apple Valley Noise Element, Table IV-4, Land Use Compatibility for Community Noise Environments, unmitigated normally acceptable exterior noise levels of less than 75 dBA CNEL are considered less than significant and a barely perceptible 3 dBA or greater noise level increase is considered a significant impact when the non-noise sensitive noise level is greater than the normally acceptable 75 dBA CNEL land use compatibility guidelines.

8 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 8-1, were identified as representative locations for analysis. The selection of receiver locations is based on FHWA guidelines and is consistent with additional guidance provided by Caltrans and the FTA, as previously described in Section 5.2. Sensitive receivers are generally defined as locations where people reside or where the presence of unwanted sound could otherwise adversely affect the use of the land. Noise-sensitive land uses are generally considered to include schools, hospitals, single-family dwellings, mobile home parks, churches, libraries, and recreation areas. Moderately noise-sensitive land uses typically include multi-family dwellings, hotels, motels, dormitories, out-patient clinics, cemeteries, golf courses, country clubs, athletic/tennis clubs, and equestrian clubs. Land uses that are considered relatively insensitive to noise include business, commercial, and professional developments. Land uses that are typically not affected by noise include: industrial, manufacturing, utilities, agriculture, undeveloped land, parking lots, warehousing, liquid and solid waste facilities, salvage yards, and transit terminals.

To describe the potential off-site Project noise levels, four receiver locations in the vicinity of the Project site were identified. Other sensitive land uses in the Project study area that are located at greater distances than those identified in this noise study will experience lower noise levels than those presented in this report due to the additional attenuation from distance and the shielding of intervening structures. Distance is measured in a straight line from the Project boundary to each receiver location.

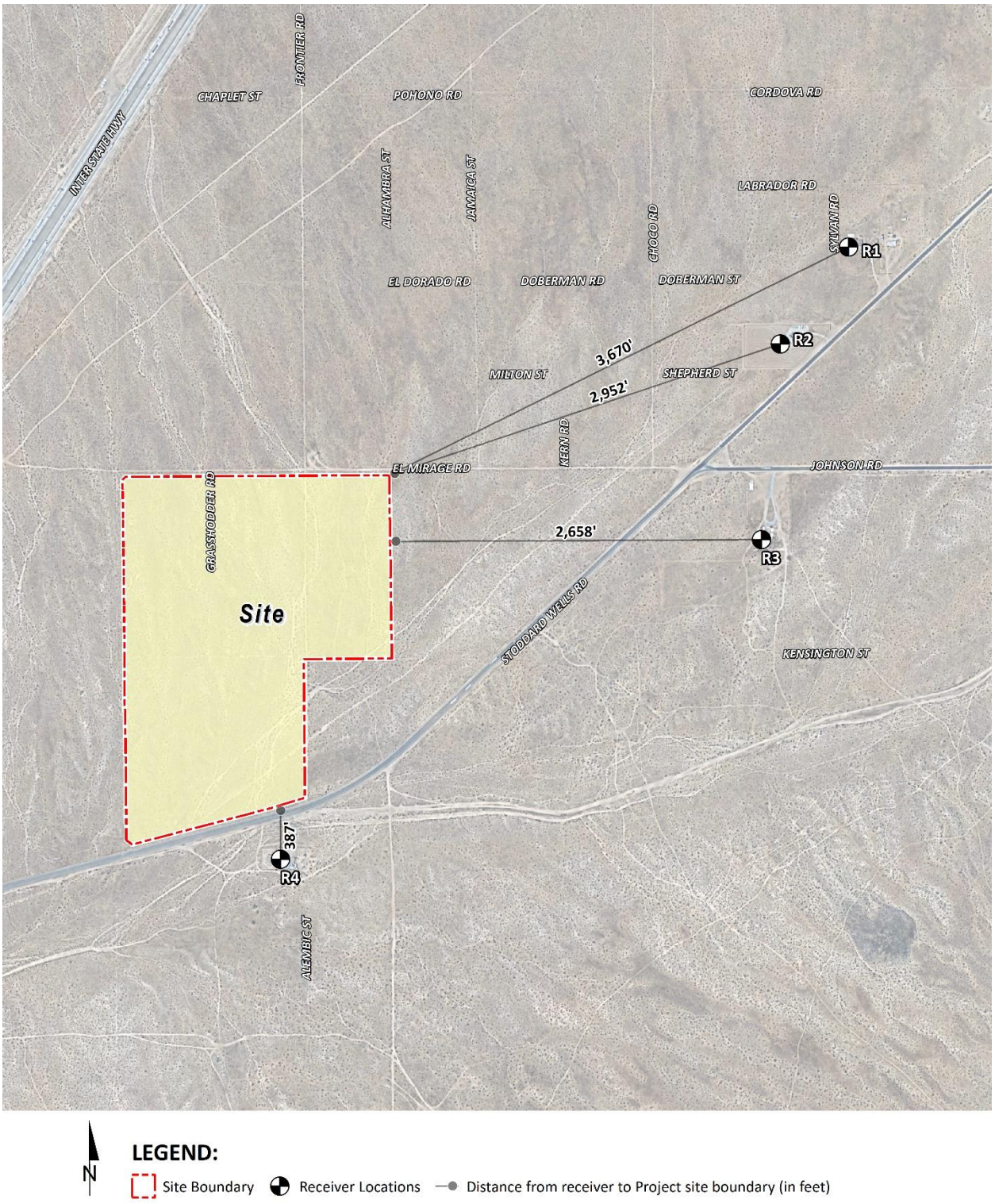
R1: Location R1 represents the existing residence at 19934 Doberman Street, approximately 3,670 feet northeast of the Project site. Since there are no private outdoor living areas (backyards) facing the Project site, receptor R1 is placed at the building façade. A 24-hour noise measurement was taken near this location, L1, to describe the existing ambient noise environment.

R2: Location R2 represents the existing residence at 19414 Stoddard Wells Road, approximately 2,952 feet northeast of the Project site. Since there are no private outdoor living areas (backyards) facing the Project site, receptor R2 is placed at the building façade. A 24-hour noise measurement was taken near this location, L2, to describe the existing ambient noise environment.

R3: Location R3 represents the existing residence at 19823 Johnson Road, approximately 2,658 feet east of the Project site. Since there are no private outdoor living areas (backyards) facing the Project site, receptor R3 is placed at the building façade. A 24-hour noise measurement was taken near this location, L3, to describe the existing ambient noise environment.

R4: Location R4 represents the existing residence at 19277 Stoddard Wells Road, approximately 388 feet south of the Project site. Since there are no private outdoor living areas (backyards) facing the Project site, receptor R4 is placed at the building façade. A 24-hour noise measurement was taken near this location, L4, to describe the existing ambient noise environment.

EXHIBIT 8-1: RECEIVER LOCATIONS



9 OPERATIONAL NOISE ANALYSIS

This section analyzes the potential stationary-source operational noise impacts at the nearby receiver locations, identified in Section 8, resulting from the operation of the proposed Apple Valley 84 Project. To conservatively describe the potential worst-case noise environment, Exhibit 9-1 presents the 18 individual noise sources used to assess the operational noise levels.

9.1 OPERATIONAL NOISE SOURCES

This operational noise analysis is intended to describe noise level impacts associated with the expected typical daytime and nighttime activities at the Project site. To present the potential worst-case noise conditions, this analysis assumes the Project would be operational 24 hours per day, seven days per week. Consistent with similar warehouse and industrial uses, the Project business operations would primarily be conducted within the enclosed building, except for traffic movement, parking, as well as loading and unloading of trucks at designated loading bays. The on-site Project-related noise sources are expected to include: cold storage loading dock activity, tractor trailer storage activity, truck movements, trash enclosure activity, roof-top air conditioning units, and parking lot vehicle movements.

9.2 REFERENCE NOISE LEVELS

To estimate the Project operational noise impacts, reference noise level measurements were collected from similar types of activities to represent the noise levels expected with the development of the proposed Project. This section provides a detailed description of the reference noise level measurements shown on Table 9-1 used to estimate the Project operational noise impacts. It is important to note that the following projected noise levels assume the worst-case noise environment with all noise source activity all operating at the same time. These sources of noise activity will likely vary throughout the day.

9.2.1 Measurement Procedures

The reference noise level measurements presented in this section were collected using a Larson Davis LxT Type 1 precisions sound level meter (serial number 01146). The LxT sound level meter was calibrated using a Larson-Davis calibrator, Model CAL 200, was programmed in "slow" mode to record noise levels in "A" weighted form and was located at approximately five feet above the ground elevation for each measurement. The sound level meters and microphones were equipped with a windscreen during all measurements. All noise level measurement equipment satisfies the American National Standards Institute (ANSI) standard specifications for sound level meters ANSI S1.4-2014/IEC 61672-1:2013. (18)

EXHIBIT 9-1: OPERATIONAL NOISE SOURCE LOCATIONS

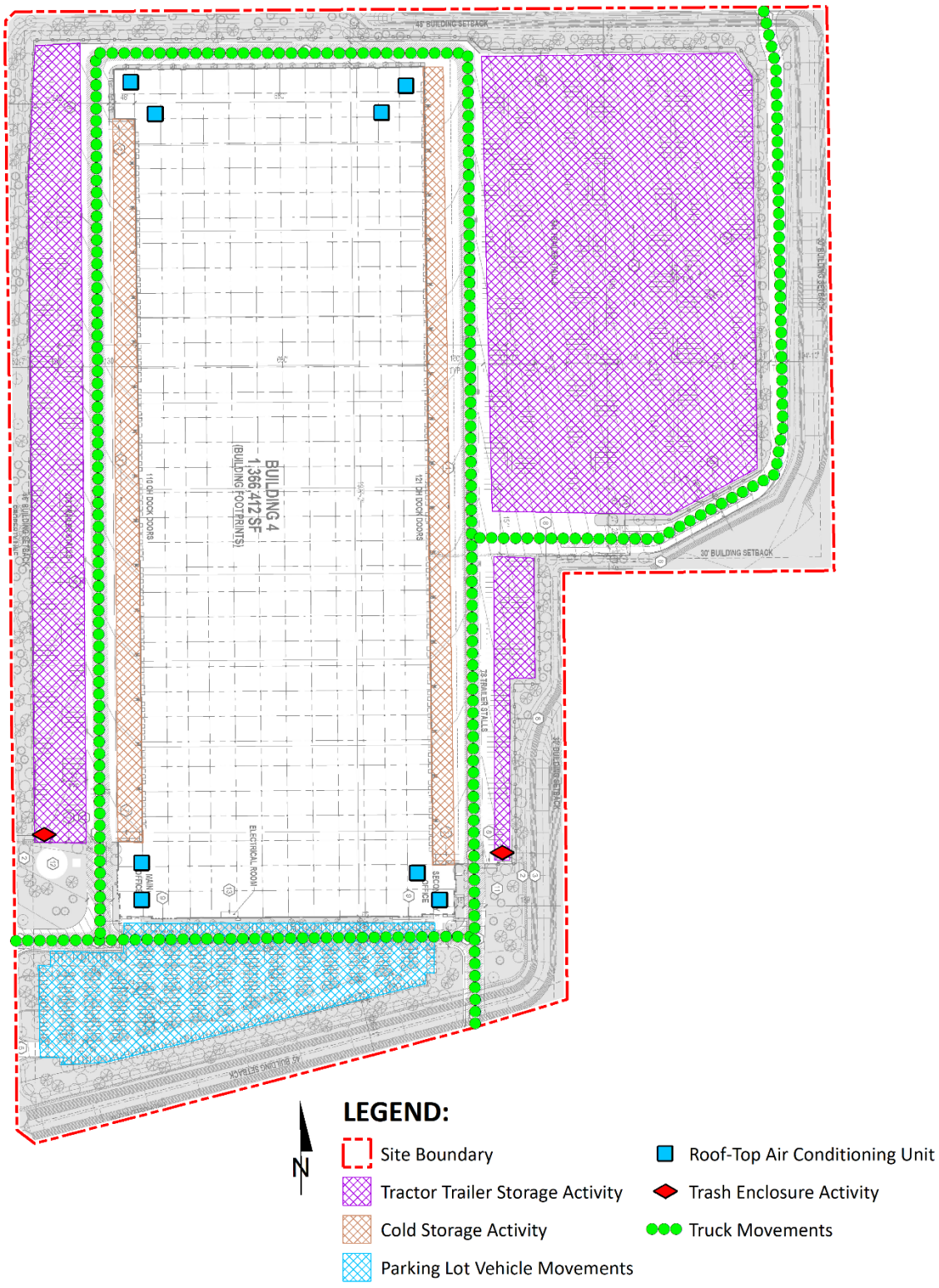


TABLE 9-1: REFERENCE NOISE LEVEL MEASUREMENTS

Reference Noise Source	Noise Source Height (Feet)	Min./ Hour[1]		Reference Noise Level (dBA L_{eq}) @ 50 Feet	Sound Power Level (dBA)[2]
		Day	Night		
Cold Storage Loading Dock Activity	8'	60	60	65.7	111.5
Tractor Trailer Storage Activity	8'	60	60	62.8	103.4
Truck Movements	8'	60	60	59.8	93.2
Trash Enclosure Activity	5'	60	30	57.3	89.0
Roof-Top Air Conditioning Units	5'	39	28	57.2	88.9
Parking Lot Vehicle Movements	5'	60	60	52.6	81.1

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

9.2.2 Cold Storage Loading Dock Activity

The reference cold storage loading dock activities are intended to describe the typical outdoor operational noise activities associated with the Project. This includes truck idling, reefer activity (refrigerator truck/cold storage), deliveries, backup alarms, trailer docking including a combination of tractor trailer semi-trucks, two-axle delivery trucks, and background operation activities. Since the noise levels generated by cold storage loading dock activity can be higher due to the use of refrigerated trucks or reefers, this reference noise level conservatively assumes that all loading dock activity is associated with cold storage facilities even though only 15 percent cold storage is anticipated. (19) The reference noise level measurement was taken in the center of the loading dock activity area and represents multiple concurrent noise sources resulting in a combined noise level of 65.7 dBA L_{eq} at a uniform distance of 50 feet. Specifically, the reference noise level measurement represents one truck located approximately 30 feet from the noise level meter with another truck passing by to park roughly 20 feet away, both with their engines idling. Throughout the reference noise level measurement, a separate docked and running reefer truck was located approximately 50 feet east of the measurement location. Additional background noise sources included truck pass-by noise, truck drivers talking to each other next to docked trucks, and air brake release noise when trucks parked.

9.2.3 Tractor Trailer Storage Activity

To evaluate the noise levels associated with truck idling, backup alarms, trailer movements and storage activities, Urban Crossroads collected a reference noise level measurement at an existing parcel hub facility to describe the potential operational noise levels associated with Project tractor trailer storage activities. The measured reference noise level at 50 feet from activity was measured at 62.8 dBA L_{eq}. The reference noise level measurement includes a semi-truck with trailer pass-by event, background switcher cab trailer towing, drop-off, idling, and backup alarm events. Tractor trailer activity is estimated during all the daytime, evening, and nighttime hours.

9.2.3 Truck Movements

The truck movements reference noise level measurement was collected over a period of 1 hour and 28 minutes and represent multiple heavy trucks entering and exiting the outdoor loading dock area producing a reference noise level of 59.8 dBA L_{eq} at 50 feet. The noise sources included at this measurement location account for trucks entering and existing the Project driveways and maneuvering in and out of the outdoor loading dock activity area.

9.2.4 Trash Enclosure Activity

To describe the noise levels associated with a trash enclosure activity, Urban Crossroads collected a reference noise level measurement at an existing trash enclosure containing two dumpster bins. The trash enclosure noise levels describe metal gates opening and closing, metal scraping against concrete floor sounds, dumpster movement on metal wheels, and trash dropping into the metal dumpster. The reference noise levels describe trash enclosure noise activities when trash is dropped into an empty metal dumpster, as would occur at the Project Site. The measured reference noise level at the uniform 50-foot reference distance is 57.3 dBA L_{eq} for the trash enclosure activity. The reference noise level describes the expected noise source activities associated with the trash enclosures for the Project's proposed building.

9.2.5 Roof-Top Air Conditioning Units

The noise level measurements describe a single mechanical roof-top air conditioning unit. The reference noise level represents a Lennox SCA120 series 10-ton model packaged air conditioning unit. At the uniform reference distance of 50 feet, the reference noise level is 57.2 dBA Leq. Based on the typical operating conditions observed over a four-day measurement period, the roof-top air conditioning units are estimated to operate for and average 39 minutes per hour during the daytime hours, and 28 minutes per hour during the nighttime hours. These operating conditions reflect peak summer cooling requirements with measured temperatures approaching 96 degrees Fahrenheit (°F) with average daytime temperatures of 82°F. For this noise analysis, the air conditioning units are expected to be located on the roof of the Project building.

9.2.6 Parking Lot Vehicle Movements

To describe the on-site parking lot activity, a long-term reference noise level measurement was collected in the center of activity within the staff parking lot of a warehouse distribution center. At 50 feet from the center of activity, the parking lot produced a reference noise level of 52.6 dBA L_{eq}. Parking activities are expected to take place during the full hour (60 minutes) throughout the daytime and evening hours. The parking lot noise levels are mainly due to cars pulling in and out of parking spaces in combination with car doors opening and closing.

9.3 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 9613-2 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 9613-2 protocol, the CadnaA noise prediction model relies on the reference sound power level (Lw) 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 because of intervening obstacles and barriers, air absorption, wind, and other factors. Sound power is the acoustical energy emitted by the sound source and is an absolute value that is not affected by the environment. The operational noise level calculations provided in this noise study account for the distance attenuation provided due to geometric spreading, when sound from a localized stationary source (i.e., a point source) propagates uniformly outward in a spherical pattern. A default 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. This approach ensures a reasonable approximation in environments where both hard and soft surfaces exist, aligning with typical real-world conditions. Appendix 9.1 includes the detailed noise dBA L_{eq} model inputs used to estimate the Project operational noise levels presented in this section.

9.4 PROJECT OPERATIONAL NOISE LEVELS

Using the reference noise levels to represent the Project operations that include cold storage loading dock activity, tractor trailer storage activity, truck movements, trash enclosure activity, roof-top air conditioning units, and parking lot vehicle movements, Urban Crossroads, Inc. calculated the operational source noise levels that are expected to be generated at the Project site and the Project-related noise level increases that would be experienced at each of the sensitive receiver locations. Table 9-2 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 35.6 to 47.1 dBA L_{eq}.

TABLE 9-2: DAYTIME PROJECT OPERATIONAL NOISE LEVELS

Noise Source[1]	Operational Noise Levels by Receiver Location (dBA Leq)			
	R1	R2	R3	R4
Cold Storage Loading Dock Activity	34.0	35.9	37.4	45.0
Tractor Trailer Storage Activity	29.8	31.7	33.3	41.5
Truck Movements	19.1	21.2	22.9	35.1
Trash Enclosure Activity	10.2	11.9	14.0	28.7
Roof-Top Air Conditioning Units	16.8	18.4	19.7	29.5
Parking Lot Vehicle Movements	0.0	0.0	0.0	20.8
Total (All Noise Sources)	35.6	37.5	39.0	47.1

[1] See Exhibit 9-1 for the noise source locations. CadnaA noise model calculations are included in Appendix 9.1.

Table 9-3 shows the Project operational noise levels during the nighttime hours from 10:00 p.m. to 7:00 a.m. The nighttime hourly noise levels at the existing off-site receiver locations are expected to range from 35.5 to 47.0 dBA L_{eq}. The differences between the daytime and nighttime noise levels are largely related to the estimated duration of noise activity as outlined in Table 9-1. Appendix 9.1 includes the detailed noise model inputs.

TABLE 9-3: NIGHTTIME PROJECT OPERATIONAL NOISE LEVELS

Noise Source[1]	Operational Noise Levels by Receiver Location (dBA Leq)			
	R1	R2	R3	R4
Cold Storage Loading Dock Activity	34.0	35.9	37.4	45.0
Tractor Trailer Storage Activity	29.8	31.7	33.3	41.5
Truck Movements	19.1	21.2	22.9	35.1
Trash Enclosure Activity	6.3	8.0	10.0	24.7
Roof-Top Air Conditioning Units	14.4	16.0	17.3	27.0
Parking Lot Vehicle Movements	0.0	0.0	0.0	19.8
Total (All Noise Sources)	35.5	37.4	39.0	47.0

[1] See Exhibit 9-1 for the noise source locations. CadnaA noise model calculations are included in Appendix 9.1.

9.5 PROJECT OPERATIONAL NOISE LEVEL COMPLIANCE

To demonstrate compliance with local noise regulations, the unmitigated Project-only operational noise levels are evaluated against exterior noise level thresholds based on the Town of Apple Valley exterior noise level standards at nearby noise-sensitive receiver locations. Table 9-4 shows the unmitigated operational noise levels associated with Apple Valley 84 will not exceed the exterior noise level standards, adjusted in five dBA increments to reflect the ambient noise levels (see Table 5-1) per the AVMC Section 9.73.050[A][1][c]. Therefore, the stationary operational noise impacts are considered *less than significant* at the nearest noise-sensitive receiver locations.

TABLE 9-4: 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	Nighttime	Daytime	Nighttime	Daytime	Nighttime
R1	35.6	35.5	75.0	70.0	No	No
R2	37.5	37.4	75.0	70.0	No	No
R3	39.0	39.0	70.0	65.0	No	No
R4	47.1	47.0	70.0	65.0	No	No

[1] See Exhibit 8-1 for the receiver locations.
[2] Proposed Project unmitigated operational noise levels as shown on Tables 9-2 and 9-3.
[3] Exterior noise level standards, adjusted in five (5) dBA increments to reflect the ambient noise levels (see Table 5-1) per Town of Apple Valley Municipal Code Section 9.73.050[A][1][c].
[4] Do the estimated Project operational noise source activities exceed the noise level standards?
"Daytime" = 7:00 a.m. - 10:00 p.m.; "Nighttime" = 10:00 p.m. - 7:00 a.m.

9.6 PROJECT OPERATIONAL NOISE INCREASES

To describe the Project operational noise level increases, the Project operational noise levels are combined with the existing ambient noise levels measurements for the nearby receiver locations that may be 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. (2) 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. Noise levels that would be experienced at receiver locations when Project-source noise is added to the daytime and nighttime ambient conditions are presented on Tables 9-5 and 9-6, respectively. As indicated on Tables 9-5 and 9-6, the Project will generate operational noise increases ranging from 0.0 to 0.1 dBA L_{eq} at the nearest receiver locations. Project-related operational noise level increases would not exceed the operational noise level increase significance criteria presented in Table 4-1. Therefore, Project related operational noise level increases at the sensitive receiver locations will be *less than significant.*

TABLE 9-5: DAYTIME PROJECT OPERATIONAL NOISE INCREASES

Receiver Location[1]	Total Project Operational Noise Level[2]	Measurement Location[3]	Reference Ambient Noise Levels[4]	Combined Project and Ambient[5]	Project Increase[6]	Increase Criteria[7]	Increase Criteria Exceeded?
R1	35.6	L1	72.1	72.1	0.0	1.5	No
R2	37.5	L2	71.8	71.8	0.0	1.5	No
R3	39.0	L3	65.1	65.1	0.0	1.5	No
R4	47.1	L4	69.8	69.8	0.0	1.5	No

[1] See Exhibit 8-1 for the receiver locations.
[2] Total Project daytime operational noise levels as shown on Table 9-2.
[3] Reference noise level measurement locations as shown on Exhibit 5-A.
[4] Observed daytime ambient noise levels as shown on Table 5-1.
[5] Represents the combined ambient conditions plus the Project activities.
[6] The noise level increase expected with the addition of the proposed Project activities.
[7] Significance increase criteria as shown on Table 4-1.

TABLE 9-6: NIGHTTIME OPERATIONAL NOISE INCREASES

Receiver Location[1]	Total Project Operational Noise Level[2]	Measurement Location[3]	Reference Ambient Noise Levels[4]	Combined Project and Ambient[5]	Project Increase[6]	Increase Criteria[7]	Increase Criteria Exceeded?
R1	35.5	L1	66.3	66.3	0.0	1.5	No
R2	37.4	L2	65.7	65.7	0.0	1.5	No
R3	39.0	L3	60.3	60.3	0.0	5.0	No
R4	47.0	L4	63.9	64.0	0.1	5.0	No

[1] See Exhibit 8-A for the receiver locations.
[2] Total Project nighttime operational noise levels as shown on Table 9-3.
[3] Reference noise level measurement locations as shown on Exhibit 5-A.
[4] Observed nighttime ambient noise levels as shown on Table 5-1.
[5] Represents the combined ambient conditions plus the Project activities.
[6] The noise level increase expected with the addition of the proposed Project activities.
[7] Significance increase criteria as shown on Table 4-1.

10 CONSTRUCTION IMPACTS

This section analyzes potential impacts resulting from the short-term construction activities associated with the development of the Project. Exhibit 10-A shows the on-site construction noise source activity in relation to the nearest sensitive receiver locations previously described in Section 7. Section 9.73.060[F][1] of the AVMC, provided in Appendix 3.2, indicates that *operating or causing the operation of any tools or equipment used in construction, drilling, repair, alteration, or demolition work between weekday hours of 7 p.m. and 7 a.m., or at any time on weekends or holidays, such that the sound therefrom creates a noise disturbance across a residential or commercial real property line, except for emergency work of public service utilities or by variance issued by the Town.* In addition, AVMC Section 9.73.060[F][2] require construction activities to be conducted in such a manner that the noise levels at affected residential properties will not exceed the daytime (7:00 a.m. to 7:00 p.m.) mobile exterior noise level limit of 75 dBA L_{eq} and 60 dBA L_{eq} during the nighttime hours of 7:00 p.m. to 7:00 a.m.

10.1 CONSTRUCTION NOISE LEVELS

The FTA *Transit Noise and Vibration Impact Assessment Manual* recognize that construction projects are accomplished in several different stages and outlines the procedures for assessing noise impacts during construction. Each stage has a specific equipment mix, depending on the work to be completed during that stage. As a result of the equipment mix, each stage has its own noise characteristics; some stages have higher continuous noise levels than others, and some have higher impact noise levels than others. The Project construction activities are expected to occur in the following stages:

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

10.2 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. (22) The RCNM equipment database provides a comprehensive list of the noise-generating characteristics of specific types of construction equipment. 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. According to the EPA, FTA, and FHWA, the overall construction noise level is governed primarily by the noisiest pieces of equipment. The quieter pieces do not affect the overall level, but they do reduce the magnitude of the fluctuations in the noise level. Therefore, a rough estimate of the noise level need only include the noisiest pieces of equipment expected at the site. (8) (23) (24) Consistent with FHWA and FTA guidance for detailed construction noise assessment, Table 10-1 presents the combined noise levels for the loudest construction activities expected for each stage, assuming all equipment operates simultaneously.

EXHIBIT 10-1: CONSTRUCTION NOISE SOURCE LOCATIONS

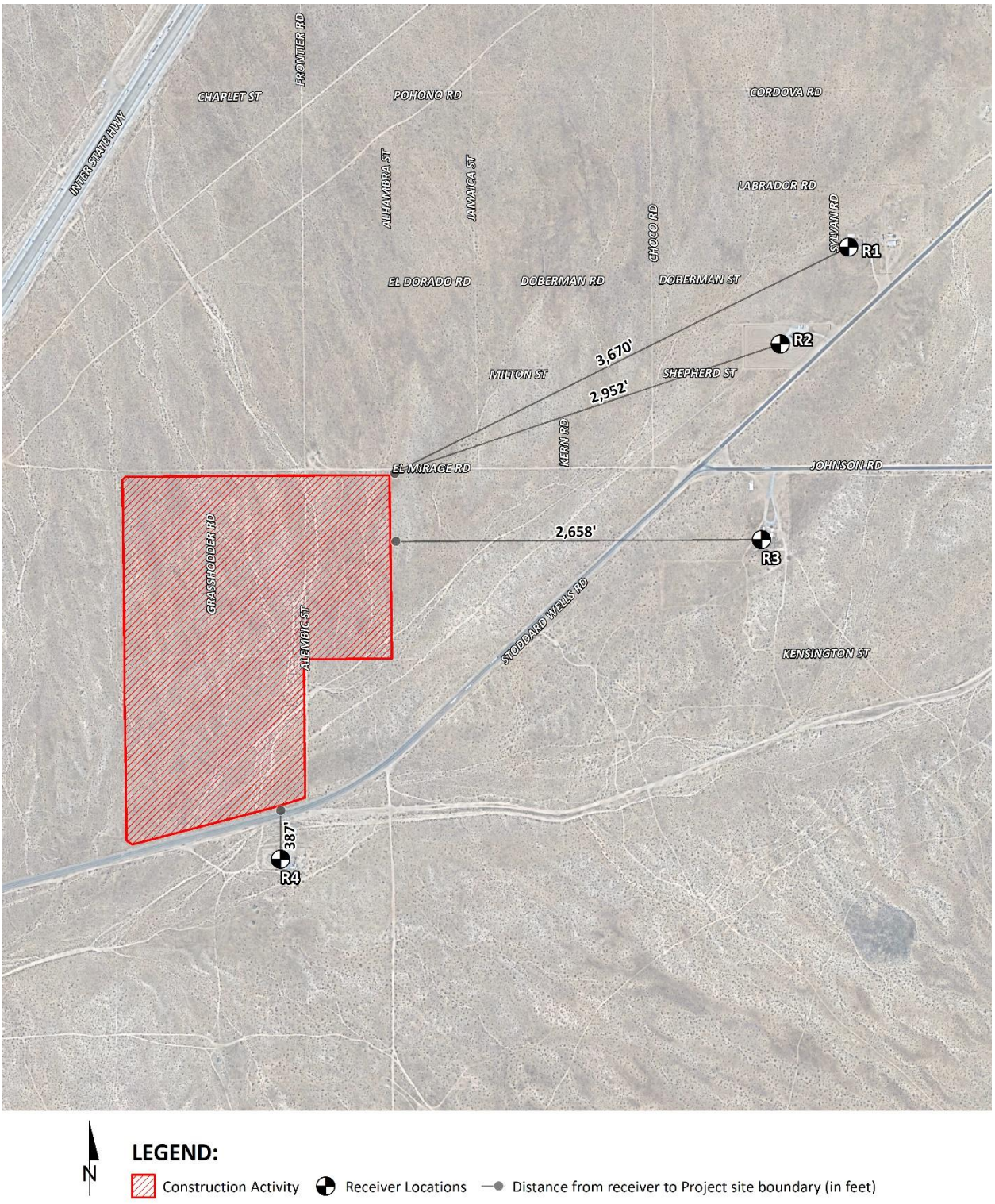


TABLE 10-1: CONSTRUCTION REFERENCE NOISE LEVELS

Construction Stage	Reference Construction Equipmnet[1]	Reference Noise Level @ 50 Feet (dBA L_{eq})	Composite Reference Noise Level (dBA L_{eq})[2]	Reference Power Level (dBA L_w)[3]
Site Preparation	Tractor	80	84.0	115.6
	Backhoe	74		
	Grader	81		
Grading	Scraper	80	83.3	114.9
	Excavator	77		
	Dozer	78		
Building Construction	Crane	73	81.1	112.8
	Tractor	80		
	Welder/Torch	70		
Paving	Paver	74	77.8	109.5
	Dump Truck	72		
	Roller	73		
Architectural Coating	Man Lift	68	79.8	111.4
	Compressor (air)	74		
	Generator	78		

[1] FHWA Road Construction Noise Model.
[2] Represents the combined noise level for all equipment assuming they operate at the same time.
[3] The total amount of acoustical energy produced by a sound source independent of distance or surroundings.

10.3 CONSTRUCTION NOISE ANALYSIS

Construction projects involve various stages, and activities frequently shift from one location to another. For example, during site preparation and grading, noise-generating activities may concentrate in an area for a short period to remove an obstruction, while the majority of the grading involves the equipment moving back and forth in a predictable pattern throughout the site; building construction and foundation work generally concentrate near the building footprint, while paving generally involves a predictable pattern of movement throughout the site. Therefore, construction activities are best evaluated as multiple moving point sources within the construction area since the speed and power of the equipment vary, and the equipment constantly changes position in terms of its distance and direction relative to the receivers. (25) Using the reference construction equipment noise levels and the CadnaA noise prediction model, calculations of the Project construction noise level impacts by phase at the nearby sensitive receiver locations were completed. To account for the dynamic nature of construction activities, the CadnaA construction noise analysis evaluates the noise source activities as multiple moving point sources, or construction crews, within the limits of construction. Construction impacts are based on the loudest activity and the highest noise level calculated at each receiver location. As shown on Table 10-2, the construction noise levels are expected to range from 42.6 to 56.4 dBA L_{eq} at the nearby receiver locations. Appendix 10.1 includes the detailed CadnaA construction noise model inputs.

TABLE 10-2: 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	42.6	41.9	39.7	36.5	38.4	42.6
R2	44.5	43.8	41.6	38.4	40.3	44.5
R3	46.1	45.4	43.2	40.0	41.9	46.1
R4	56.4	55.7	53.5	50.3	52.2	56.4

[1] Construction noise source and receiver locations are shown on Exhibit 10-1.
[2] Construction noise level calculations based on distance from the construction activity, which is measured from the Project site boundary to the nearest receiver locations. CadnaA construction noise model inputs are included in Appendix 10.1.

10.4 PROJECT SITE CONSTRUCTION NOISE COMPLIANCE

To evaluate whether the Project will generate potentially significant short-term noise levels at nearest receiver locations, a construction-related daytime noise level threshold of 75 dBA L_{eq} is used as a reasonable threshold to assess the daytime construction noise level impacts. The construction noise analysis shows that the nearest receiver locations will satisfy the reasonable daytime 75 dBA L_{eq} significance threshold during Project construction activities as shown on Table 10-3. Therefore, the noise impacts due to Project construction noise are considered *less than significant* at all receiver locations.

TABLE 10-3: CONSTRUCTION NOISE COMPLIANCE

Receiver Location[1]	Construction Noise Levels (dBA L_{eq})		
	Highest Construction Noise Levels[2]	Threshold[3]	Threshold Exceeded?[4]
R1	42.6	75	No
R2	44.5	75	No
R3	46.1	75	No
R4	56.4	75	No

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

10.5 Temporary Construction Noise Increases

To describe the temporary Project construction noise contributions to the existing ambient noise environment, the Project construction noise levels were combined with the existing ambient noise levels measurements at the nearest off-site receiver locations. The difference between the combined Project-construction and ambient noise levels is used to describe the construction noise level contributions. Temporary noise level increases that would be experienced at sensitive receiver locations when Project construction-source noise is added to the ambient daytime conditions are presented on Table 10-4. As previously outlined in Section 4.1.3, a temporary noise level increase of 20 dBA L_{eq} is considered *significant*.

As indicated in Table 10-4, the Project will contribute construction noise increases ranging from 0.0 to 0.2 dBA L_{eq} during the daytime hours at the nearest receiver locations. The unmitigated construction noise analysis shows that the nearest receiver locations will not exceed the 20 dBA L_{eq} noise increase significance threshold during Project construction activities. The temporary construction noise increase analysis shows that the noise impacts due to Project construction noise are considered *less than significant*.

Table 10-4: Daytime Construction Noise Increases

Receiver Location[1]	Typical Project Construction Noise Level[2]	Measurement Location[3]	Reference Ambient Noise Levels[4]	Combined Project and Ambient[5]	Project Increase[6]	Increase Criteria[7]	Increase Criteria Exceeded?
R1	42.6	L1	72.1	72.1	0.0	20	No
R2	44.5	L2	71.8	71.8	0.0	20	No
R3	46.1	L3	65.1	65.2	0.1	20	No
R4	56.4	L4	69.8	70.0	0.2	20	No

[1] Construction noise source and receiver locations are shown on Exhibit 10-1.
[2] Typical Project daytime construction noise levels as shown on Table 10-3.
[3] Reference noise level measurement locations as shown on Exhibit 5-A.
[4] Observed daytime ambient noise levels as shown on Table 5-1.
[5] Represents the combined ambient conditions plus the Project construction activities.
[6] The noise level increase expected with the addition of the proposed Project construction activities.
[7] Temporary construction noise increases that can be tolerated without significant adverse effects.

10.6 Nighttime Concrete Pour Noise Analysis

It is our understanding that nighttime concrete pouring activities will occur as a part of Project building construction activities. Nighttime concrete pouring activities are often used to support reduced concrete mixer truck transit times and lower air temperatures than during the daytime hours and are generally limited to the actual building pad area. Since the nighttime concrete pours will take place outside the hours permitted by AVMC Section 9.73.060, the Project Applicant will be required to obtain authorization for nighttime work from the Town of Apple Valley. Any nighttime construction noise activities are evaluated against the exterior construction noise level threshold of 60 dBA L_{eq} for noise sensitive residential land use.

10.6.1 Nighttime Concrete Pour Reference Noise Level Measurements

To estimate the noise levels due to nighttime concrete pour activities, sample reference noise level measurements were taken during a nighttime concrete pour at an unrelated construction site. Urban Crossroads, Inc. collected short-term nighttime concrete pour reference noise level measurements during the noise-sensitive nighttime hours between 1:00 a.m. to 2:00 a.m. at 27334 San Bernardino Avenue in the City of Redlands. The reference noise levels describe the expected concrete pour noise sources that may include concrete mixer truck movements and pouring activities, concrete paving equipment, rear mounted concrete mixer truck backup alarms, engine idling, air brakes, generators, and workers communicating/whistling. To describe the nighttime concrete pour noise levels associated with the construction of the Apple Valley 84, this analysis relies on reference sound pressure level of 67.7 dBA L_{eq} at 50 feet represented by a sound power level (L_w) of 100.3 dBA L_w. While the Project noise levels will depend on the actual duration of activities and specific equipment fleet in use at the time of construction, the reference sound power level of 100.3 dBA L_w is used to describe the expected Project nighttime concrete pour noise activities.

10.6.2 Nighttime Concrete Pour Noise Level Compliance

As shown on Table 10-5, the noise levels associated with the nighttime concrete pour activities are estimated to range from 27.3 to 41.1 dBA L_{eq} and will satisfy the Town of Apple Valley stationary-source 60 dBA L_{eq} nighttime exterior threshold at all the receiver locations. Therefore, the noise impacts due to Project construction nighttime concrete pour noise activity are considered *less than significant* at all receiver locations with prior authorization for nighttime work from the Town of Apple Valley. Appendix 10.3 includes the CadnaA nighttime concrete pour noise model inputs.

TABLE 10-5: NIGHTTIME CONCRETE POUR NOISE LEVEL COMPLIANCE

Receiver Location[1]	Concrete Pour Construction Noise Levels (dBA L_{eq})		
	Exterior Noise Levels[2]	Threshold[3]	Threshold Exceeded?[4]
R1	27.3	60	No
R2	29.2	60	No
R3	30.8	60	No
R4	41.1	60	No

[1] Construction noise source and receiver locations are shown on Exhibit 10-1.
[2] Nighttime Concrete Pour noise model inputs are included in Appendix 10.2.
[3] Construction noise level thresholds as shown on Table 4-1.
[4] Do the estimated Project construction noise levels exceed the construction noise level threshold?

10.6.3 Temporary Concrete Pour Noise Increases

To describe the temporary concrete pour noise contributions, the concrete pour noise levels were combined with the existing nighttime ambient noise levels measurements at the nearest off-site receiver locations. The difference between the combined Project-construction and ambient noise levels is used to describe the construction noise level increases. As indicated in Table 10-6, the Project nighttime concrete pour activities will not contribute to measurable noise increases during the nighttime hours at the nearest receiver locations. The unmitigated construction noise analysis shows that the nearest receiver locations will not exceed the nighttime 5 dBA noise increase threshold during nighttime concrete pour activities. Therefore, the temporary concrete pour construction noise increase analysis shows that the noise impacts due to Project construction noise are *less than significant*.

TABLE 10-6: NIGHTTIME CONCRETE POUR NOISE INCREASES

Receiver Location[1]	Typical Project Construction Noise Level[2]	Measurement Location[3]	Reference Ambient Noise Levels[4]	Combined Project and Ambient[5]	Project Increase[6]	Increase Criteria[7]	Increase Criteria Exceeded?
R1	27.3	L1	66.3	66.3	0.0	5	No
R2	29.2	L2	65.7	65.7	0.0	5	No
R3	30.8	L3	60.3	60.3	0.0	5	No
R4	41.1	L4	63.9	63.9	0.0	5	No

[1] Construction noise source and receiver locations are shown on Exhibit 10-1.
[2] Concrete pour construction noise levels calculations are included in Appendix 10.2
[3] Reference noise level measurement locations as shown on Exhibit 5-A.
[4] Observed daytime ambient noise levels as shown on Table 5-1.
[5] Represents the combined ambient conditions plus the Project construction activities.
[6] The noise level increase expected with the addition of the proposed Project construction activities.
[7] City of Los Angeles Department of City Planning, Construction Noise and Vibration Updates to Thresholds and Methodology.

10.7 CONSTRUCTION VIBRATION ANALYSIS

Construction activity can result in varying degrees of ground vibration, depending on the equipment and methods employed. Operation of construction equipment causes ground vibrations that spread through the ground and diminish in strength with distance. Ground vibration levels associated with various types of construction equipment are summarized on Table 10-7. Based on the representative vibration levels presented for various construction equipment types, it is possible to estimate the potential for human response (annoyance) and building damage using the following vibration assessment methods defined by the FTA. To describe the vibration impacts the FTA provides the following equation: $PPV_{equip} = PPV_{ref} \times (25/D)^{1.5}$

TABLE 10-7: 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
Vibratory Roller	0.210

Federal Transit Administration, Transit Noise and Vibration Impact Assessment Manual

Using the vibration source level of construction equipment provided on Table 10-7 and the construction vibration assessment methodology published by the FTA, it is possible to estimate the Project vibration impacts. Table 10-8 presents the expected Project related vibration levels at the nearby receiver locations. At distances ranging from 387 to 3,670 feet from Project construction activities, construction vibration velocity levels are estimated to range from 0.000 to 0.003 PPV in/sec. Based on maximum acceptable continuous vibration threshold of 0.04 PPV (in/sec), the typical Project construction vibration levels will fall below the vibration thresholds at all the sensitive receiver locations. Therefore, the Project-related vibration impacts are considered *less than significant* during typical construction activities at the Project site.

TABLE 10-8: PROJECT CONSTRUCTION VIBRATION LEVELS

Location[1]	Distance to Const. Activity (Feet)[2]	Typical Construction Vibration Levels PPV (in/sec)[3]						Thresholds PPV (in/sec)[4]	Thresholds Exceeded?[5]
		Small bulldozer	Jack-hammer	Loaded Trucks	Large bulldozer	Vibratory Roller	Highest Vibration Level		
R1	3,670'	0.000	0.000	0.000	0.000	0.000	0.000	0.04	No
R2	2,952'	0.000	0.000	0.000	0.000	0.000	0.000	0.04	No
R3	2,658'	0.000	0.000	0.000	0.000	0.000	0.000	0.04	No
R4	387'	0.000	0.001	0.001	0.001	0.003	0.003	0.04	No

[1] Construction noise source and receiver locations are shown on Exhibit 10-1.
[2] Distance from receiver building facade to Project construction boundary (Project site boundary).
[3] Based on the Vibration Source Levels of Construction Equipment (Table 10-7).
[4] Town of Apple Valley Municipal Code 9.73.020[34], (Appendix 3.1)
[5] Does the peak vibration exceed the acceptable vibration thresholds?
"PPV" = Peak Particle Velocity

11 REFERENCES

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2. **California Department of Transportation Environmental Program.** *Technical Noise Supplement - A Technical Supplement to the Traffic Noise Analysis Protocol.* Sacramento, CA : s.n., September 2013.
3. **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.* March 1974. EPA/ONAC 550/9/74-004.
4. **U.S. Department of Transportation, Federal Highway Administration, Office of Environment and Planning, Noise and Air Quality Branch.** *Highway Traffic Noise Analysis and Abatement Policy and Guidance.* December 2011.
5. **U.S. Department of Transportation Federal Highway Administration.** *Highway Noise Barrier Design Handbook.* 2001.
6. **U.S. Department of Transportation, Federal Highway Administration.** *Highway Traffic Noise in the United States, Problem and Response.* April 2000. p. 3.
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12. **California Court of Appeal.** *Gray v. County of Madera, F053661.* 167 Cal.App.4th 1099; - Cal.Rptr.3d, October 2008.
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15. **City of Los Angeles Department of City Planning.** *Construction Noise and Vibration Updates to Thresholds and Methodology.* August 2024.
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17. **U.S. Department of Transportation, Federal Highway Administration.** *FHWA Highway Traffic Noise Prediction Model.* December 1978. FHWA-RD-77-108.
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19. **Urban Crossroads, Inc.** *Bell Mountain Commerce Center Traffic Analysis.* September 2025.
20. **U.S. Department of Transportation, Federal Highway Administration, Office of Environment and Planning.** *FHWA Roadway Construction Noise Model.* January, 2006.
21. **U.S. Environmental Protection Agency.** *Noise from Construction Equipment and Operations, Building Equipment, and Home Appliances.* 1971. NTID300.1.

22. **U.S. Department of Transportation, Federal Highway Administration.** Special Report - Measurement, Prediction, and Mitigation. *Office of Planning, Environment, and Realty - Environment - Noise.* [Online] 2017. https://www.fhwa.dot.gov/environment/noise/construction_noise/special_report/hcn00.cfm.

23. —. *FHWA Highway Construction Noise Handbook.* Final Report August 2006.

12 CERTIFICATION

The contents of this noise study report represent an accurate depiction of the noise environment and impacts associated with the proposed Apple Valley 84 Project. The information contained in this noise study report is based on the best available data at the time of preparation. If you have any questions, please contact me directly at (949) 584-3148.

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Education

Master of Science in Civil and Environmental Engineering
California Polytechnic State University, San Luis Obispo • December, 1993
Bachelor of Science in City and Regional Planning
California Polytechnic State University, San Luis Obispo • June, 1992

Professional Registrations

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

Professional Affiliations

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

Professional Certifications

Certified Acoustical Consultant – County of San Diego • March, 2018
Certified Acoustical Consultant – County of Orange • February, 2011
FHWA-NHI-142051 Highway Traffic Noise Certificate of Training • February, 2013

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APPENDIX 3.1:

TOWN OF APPLE VALLEY MUNICIPAL CODE

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Chapter 9.73 Noise Control

9.73.010 Purpose

A. **Purpose.**

The purpose of this Chapter is to reduce unnecessary, excessive and annoying noise and vibration within the Town. The Town Council finds that this Chapter is necessary to prohibit such noise and vibration generated from or by all sources as specified in this Chapter. Further, the Town Council finds that this Chapter is necessary to maintain quiet in those areas which exhibit low noise levels and to implement programs aimed at reducing noise in those areas within the Town where noise levels are above acceptable values.

The Town Council also finds that certain noise levels and vibrations are detrimental to the public health, safety and welfare, and are contrary to the public interest. Therefore, the Town Council does ordain and declare that creating, maintaining, causing or allowing to be created, caused or maintained, any noise or vibration in a manner prohibited by or not in conformity with the provisions of this Chapter, shall be an infraction or misdemeanor and shall be punishable as such.

9.73.020 Definitions

A. **Definitions.** All terminology used in this ordinance, not defined below, shall be in conformance with applicable publications of the American National Standards Institute (ANSI) or its successor body.

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

1. **A Weighted Sound Level.** The sound level in decibels as measured on a sound level meter using the A-weighting network. The level so read is designated dBA.
2. **Agricultural Property.** A parcel of real property of not less than ten (10) contiguous acres in size, which is undeveloped for any use other than agricultural purposes.
3. **Ambient Noise Level.** The composite of noise from all sources near and far. In this context, the ambient noise level constitutes the normal of existing level of environmental noise at a given location.
4. **Commercial Area.** Property which is zoned for commercial purposes, including, but not limited to, retail and wholesale businesses, personal services, and professional offices.
5. **Construction.** Any site preparation, assembly, erection, substantial repair, alteration, or similar action, for or of public or private rights-of-way, structures, utilities or similar property.
6. **Cumulative Period.** An additive period of time composed of individual time segments which may be continuous or interrupted.
7. **Decibel.** A unit for measuring the amplitude of a sound, equal to twenty (20) times the logarithm to the ratio of the sound measured to the reference pressure, which is 20 micropascals.
8. **Demolition.** Any dismantling, intentional destruction or removal of structures, utilities, public or private rights-of-way surfaces, or similar property.
9. **Emergency Work.** Any work performed for the purpose of preventing or alleviating the physical trauma or property damage threatened or caused by an emergency.

10. **Fixed Noise Source.** A stationary device which creates sounds while fixed or motionless, including, but not limited to, residential, agricultural, industrial and commercial machinery and equipment, pumps, fans, compressors, air conditioners, and refrigeration units.

11. **Gross Vehicle Weight Rating (GVWR).** The value specified by the manufacturer as the recommended maximum loaded weight of a single motor vehicle. In cases where trailers and tractors are separable the gross combination weight rating, which is the value specified by the manufacturer as the recommended maximum loaded weight of the combination vehicle, shall be used.

12. **Impulsive Sound.** Sound of short duration, usually less than one (1) second, with an abrupt onset and rapid decay. Examples of sources of impulsive sound include explosions, drop forge impacts, and the discharge of firearms.

13. **Industrial Area.** Property which is zoned for manufacturing and related uses.

14. **Intrusive Noise.** That noise which intrudes over and above the existing ambient noise at a given location. The relative intrusiveness of a sound depends upon its amplitude, duration, frequency and time of occurrence, tonal or informational content, as well as the prevailing ambient noise level.

15. **Licensed.** The possession of a formal license or a permit issued by the appropriate licensing or permitting agency; or, where no licenses or permits are issued, the sanctioning of the activity by such agency as noted in public record.

16. **Mobile Noise Source.** Any noise source other than a fixed source.

17. **Motor Vehicle.** Motor vehicle shall include any and all self-propelled vehicles as defined in the California Motor Vehicle Code, including all on-highway type motor vehicles subject to registration under said Code, and all off-highway type motor vehicles subject to identification under said Code.

18. **Motorboat.** Any vessel propelled by machinery, whether or not such machinery is the principal source of propulsion, but shall not include a vessel which has a valid marine document issued by the Bureau of Customs of the United States government or any Federal agency successor thereto (Section 651(d), Harbors and Navigation Code).

19. **Muffler or Sound Dissipating Device.** A device consisting of a series of chambers or baffle plates, or other mechanical design, for the purpose of receiving exhaust gas from an internal combustion engine, and effective in reducing noise.

20. **Noise Control Officer (NCO).** Person or persons designated by the Director of Community Development as responsible for the enforcement of this Chapter.

21. **Noise Disturbance.** Any sound which, as judged by the NCO, (a) endangers or injures the safety or health of human beings or animals, or (b) annoys or disturbs reasonable persons of normal sensitivities, or (c) endangers or injures personal or real property, or (d) violates the factors set forth in Section 9.73.040 of this Chapter. Compliance with the quantitative standards as listed herein shall constitute elimination of a noise disturbance.

22. **Noise Sensitive Zone.** Any area designated in accordance with Section 9.73.060 of this Chapter for the purpose of ensuring exceptional quiet.

23. **Noise Zone.** Any defined areas or regions of a generally consistent land use wherein the ambient noise levels are within a range of five (5) dBA.

24. **Person.** Any individual, association, partnership, or corporation, and includes any officer, employee, department, agency or instrumentality of a State or any political subdivision of a State.

25. **Powered Model Vehicle.** Any self-propelled, airborne, waterborne, or landborne plane, vessel, or vehicle, which is not designed to carry persons, including, but not limited to, any model airplane, boat, car, or rocket.

26. **Public Right-of-Way.** Any street, avenue, boulevard, highway, sidewalk or alley or similar place which is owned or controlled by a governmental entity.

27. **Public Space.** Any real property, or structures thereon, which are owned or controlled by a governmental entity.

28. **Pure Tone.** Any sound which can be judged as audible as a single pitch or a set of single pitches by the Noise Control Officer. For the purposes of this Chapter, a pure tone shall exist if the one-third (1/3) octave band sound pressure level in the band with the tone exceeds the arithmetic average of the sound pressure levels of the two (2) contiguous one-third (1/3) octave bands by five (5) dBA for center frequencies of 500 Hz and above, and by eight (8) dBA for center frequencies between 160 and 400 Hz, and by fifteen (15) dBA for center frequencies less than or equal to 125 Hz.

29. **Real Property Boundary.** An imaginary line along the ground surface, and its vertical extension, which separates the real property owned by one person from that owned by another person, but not including intra-building real property divisions.

30. **Residential Area.** Property which is zoned for residential uses.

31. **Sound Amplifying Equipment.** Any device for the amplification of the human voice, music, or any other sound, excluding standard automobile radios when used and heard only by the occupants of the vehicle in which the radio is installed, warning devices on authorized emergency vehicles, or horns or other warning devices on any vehicle used only for traffic safety purposes.

32. **Sound Level Meter.** An instrument, including a microphone, an amplifier, an output meter, and frequency weighting networks for the measurement of sound levels. Such instrument shall meet or exceed the pertinent requirements for type S2A meters contained in the American National Standards Institute specifications for sound level meters, S1.4-1971, or the most recent revision thereof.

33. **Sound Truck.** 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.

34. **Vibration Perception Threshold.** The minimum ground- or structure-borne vibrational motion necessary to cause a normal person to be aware of the vibration by such direct means as, but not limited to, sensation by touch or visual observation of moving objects. The perception threshold shall be presumed to be a motion velocity of 0.01 in/sec over the range of 1 to 100 Hz.

35. **Weekday.** Any day, Monday through Friday, which is not a legal holiday.

9.73.030 Noise Control Officer

A. **Authority and Duties of the Noise Control Officer (NCO)**

1. **Lead Agency.** The Director shall designate a Noise Control Officer (NCO) who shall be responsible for administering the noise control program established by this Chapter.

2. **Powers.** In order to implement and enforce this Chapter and for the general purpose of noise abatement and control, NCO shall have, in addition to any other vested authority, the power to:

   a. Conduct, or cause to be conducted, studies, research, and monitoring related to noise, including joint cooperative investigation with public or private agencies, and the application for, and acceptance of, grants;

b. Review all public and private projects which are likely to cause noise in violation of this ordinance and which are subject to mandatory review or approval by other departments.

1) Review for compliance with the intent and provisions of this ordinance.

2) Require sound analyses which identify existing and projected noise sources and associated noise levels.

3) Require the usage of adequate mitigation measures to avoid violation of any provision of this ordinance.

c. Upon presentation of proper credentials, enter and/or inspect any private property, place, report, or records at any time when granted permission by the owner or by some other person with authority to act for the owner. When permission is refused or cannot be obtained, a search warrant may be obtained from a court of competent jurisdiction upon a showing of probable cause to believe that a violation of this ordinance may exist. Such inspection may include the administration of any necessary tests.

d. Prepare recommendations, based upon noise survey data and analytical studies, to be approved by the Town Council, for the designation of zones of similar ambient environmental noise within regions of generally consistent land use. These zones shall be identified in terms of their day and nighttime ambient noise levels and their land use classifications as given in Table 9.73.050-A.

9.73.040 General Noise Regulations

A. **General Noise Regulations.** Notwithstanding any other provision of this chapter, and in addition thereto, it shall be unlawful for any person to willfully or negligently make or continue, or cause to be made or continued, any loud, unnecessary, or unusual noise which disturbs the peace and quiet enjoyment of any neighborhood or which causes any discomfort or annoyance to any reasonable person of normal sensitivity residing in the area.

The factors which shall be considered in determining whether a violation of the provisions of this section exists shall include, but not be limited to, the following:

1. The sound level of the objectionable noise;
2. The sound level of the ambient noise;
3. The proximity of the noise to residential sleeping facilities;
4. The nature and zoning of the area within which the noise emanates;
5. The number of persons affected by the noise source;
6. The time of day or night the noise occurs;
7. The duration of the noise and its tonal, informational or musical content;
8. Whether the noise is continuous, recurrent, or intermittent;
9. Whether the noise is produced by a commercial or noncommercial activity.

B. **Noise Measurement Procedure**

1. **Receipt of Complaint.** Upon receipt of a complaint from a citizen, the NCO shall, equipped with the appropriate sound level measurement equipment, investigate the complaint. The investigation shall consist of a measurement of the offending noise and the gathering of data to adequately define the noise problem and shall include the following:

a. Type of noise source;

b. Location of noise source relative to complainant's property;

c. Time period during which noise source is considered by complainant to be intrusive;

d. Total duration of noise produced by noise source;

e. Date and time of noise measurement survey.

2. **Noise Measurement Procedure**

a. Utilizing the "A" weighting scale of the sound level meter and the "slow" meter response (use "fast" response for impulsive type sounds), the noise level shall be measured at a position or positions at any point on the receiver's property.

b. In general, the microphone shall be located four to five feet above the ground; ten feet or more from the nearest reflective surface where possible. However, in those cases where another elevation is deemed appropriate, the latter shall be utilized. If the noise complaint is related to interior noise levels, interior noise measurements shall be made within the affected residential unit. The measurements shall be made at a point at least four feet from the wall, ceiling, or floor nearest the noise source, with windows in the normal seasonal configuration. Calibration of the measurement equipment, utilizing an acoustic calibration, shall be performed immediately prior to recording any noise data.

9.73.050 External and Internal Noise Standards

A. **External Noise Standards**

1. **Maximum Permissible Sound Levels by Receiving Land Use**

a. The noise standards for the various categories of land use identified by the Noise Control Officer as presented in Table 9.73.050-A shall, unless otherwise specifically indicated, apply to all such property within a designated zone.

b. No person shall produce or cause to be produced any sound at any location within the incorporated Town or allow the creation of any noise on property owned, leased, occupied or otherwise controlled by such person, which causes the noise level when measured on any other property, either incorporated or unincorporated, to exceed:

1) The noise standard for that land use as specified in Table 9.73.050-A for a cumulative period of more than thirty (30) minutes in any hour; or

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

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

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

5) The noise standard plus twenty (20) dBA or the maximum measured ambient level, for any period of time.

c. If the measured ambient level differs from that permissible within any of the first four noise limit categories above, the allowable noise exposure standard shall be adjusted in five (5) dBA increments in each category as appropriate to encompass or reflect said ambient noise level.

In the event the ambient noise level exceeds the fifth noise limit category, the maximum allowable noise level under this category shall be increased to reflect the maximum ambient noise level.

d. If the measurement location is on a boundary between two different zones, the noise level limit applicable to the lower noise zone plus five (5) dBA shall apply.

e. If possible, the ambient noise shall be measured at the same location along the property line utilized in paragraph 9.73.050.A.1.b of this Chapter with the alleged offending noise source inoperative. If, for any reason, the alleged offending noise source cannot be shut down, the ambient noise must be estimated by performing a measurement in the same general area of the source but at a sufficient distance such that the noise from the source is at least ten (10) dBA below the ambient in order that only the ambient level be measured. If the difference between the ambient and the noise source is five (5) to ten (10) dBA, then the level of the ambient itself can be reasonably determined by subtracting a one decibel correction to account for the contribution of the source.

2. **Correction for Character of Sound.** In the event the alleged offensive noise, as judged by the NCO, contains a steady, audible tone such as a whine, screech, or hum, or is a repetitive noise such as hammering or riveting, or contains music or speech conveying informational content, the standard limits set forth in Table 9.73.050-A shall be reduced by five (5) dBA.

Table 9.73.050-A Exterior Noise Limits

EXTERIOR NOISE LIMITS (Levels Not To Be Exceeded More Than 30 Minutes In Any Hour)		
Receiving Land Use Category	Time Period	Noise Level (dBA)
Single Family Residential	10 p.m. - 7 a.m. 7 a.m. - 10 p.m.	40 50
Multiple Dwelling Residential, Public Space	10 p.m. - 7 a.m. 7 a.m. - 10 p.m.	45 50
Limited Commercial & Office	10 p.m. - 7 a.m. 7 a.m. - 10 p.m.	55 60
General Commercial	10 p.m. - 7 a.m. 7 a.m. - 10 p.m.	60 65
Light Industrial Heavy Industrial	Any Time Any Time	70 75

B. **Interior Noise Standards**

1. **Maximum Permissible Dwelling Interior Sound Levels**

a. The interior noise standards for multi-family residential dwellings as presented in Table 9.73.050-B shall apply, unless otherwise specifically indicated, within all such dwellings with windows in their normal seasonal configuration.

Table 9.73.050-B Interior Noise Limits

INTERIOR NOISE LIMITS			
Noise Zone	Type of Land Use	Time Interval	Allowable Interior Noise Level (dBA)

All	Multi-Family	10 p.m. - 7 a.m.	35
	Residential	7 a.m. - 10 p.m.	45

b. No person shall operate or cause to be operated within a dwelling unit any source of sound or allow the creation of any noise which causes the noise level, when measured inside a neighboring receiving dwelling unit, to exceed:

1) The noise standard as specified in Table 9.73.050-B for a cumulative period of more than five (5) minutes in any hour; or

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

3) The noise standard plus ten (10) dBA or the maximum measured ambient, for any period of time.

c. If the measured ambient level differs from that permissible within any of the noise limit categories above, the allowable noise exposure standard shall be adjusted in five (5) dBA increments in each category as appropriate to reflect said ambient noise level.

2. **Correction for Character of Sound.** In the event the alleged offensive noise, as judged by the NCO, contains a steady, audible tone such as a whine, screech, or hum, or is a repetitive noise such as hammering or riveting, or contains music or speech conveying informational content, the standard limits set forth in Table 9.73.050-B shall be reduced by five (5) dBA.

9.73.060 Prohibited Noise and Vibration

No person shall unnecessarily make, continue, or cause to be made or continued, any noise disturbance. The following acts, and the causing or permitting thereof, are declared to be in violation of this ordinance:

A. Operating, playing or permitting the operation or playing of any radio, television, phonograph, drum, musical instrument, or similar device which produces or reproduces sound:

1. Between the hours of 10 p.m. and 7 a.m. in such a manner as to create a noise disturbance across a residential or commercial real property line or at any time to violate the provisions of Section 9.73.050.A.1., except for cases in which an exception has been issued by the Town.

2. In such a manner as to exceed the levels set forth for public space in Table 9.73.050-A, measured at a distance of at least fifty (50) feet from such device operating on a public right-of-way or public space.

B. Using or operating for any purpose any loudspeaker, loudspeaker system, or similar device between the hours of 10 p.m. and 7 a.m., such that the sound therefrom creates a noise disturbance across a residential real property line, or at any time violates the provisions of Section 9.73.050.A.1., except for any noncommercial public speaking, public assembly or other activity for which an exception has been issued by the Town.

C. Offering for sale, selling anything, or advertising by shouting or outcry within any residential or commercial area or noise sensitive zone of the Town except by variance issued by the Town. The provisions of this Section shall not be construed to prohibit the selling by outcry of merchandise, food, and beverages at licensed sporting events, parades, fairs, circuses, or other similar licensed public entertainment events.

D. Owning, possessing or harboring any animal or bird which frequently or for long duration, howls, barks, meows, squawks, or makes other sounds which create a noise disturbance across a residential or commercial real property line or within a noise sensitive zone. This provision shall not apply to public zoos.

E. Loading, unloading, opening, closing or other handling of boxes, crates, containers, building materials, garbage cans, or similar objects between the hours of 10 p.m. and 7 a.m. in such a manner as to cause a noise disturbance across a residential real property line or at any time to violate the provisions of 9.73.050.A.1.

F. **Construction/Demolition**

1. Operating or causing the operation of any tools or equipment used in construction, drilling, repair, alteration, or demolition work between weekday hours of 7 p.m. and 7 a.m., or at any time on weekends or holidays, such that the sound therefrom creates a noise disturbance across a residential or commercial real property line, except for emergency work of public service utilities or by variance issued by the Town.

2. **Noise Restrictions at Affected Properties.** Where technically and economically feasible, construction activities shall be conducted in such a manner that the maximum noise levels at affected properties will not exceed those listed in the following schedule:

Table 9.73.060-A Maximum Noise Levels

AT RESIDENTIAL PROPERTIES			
Mobile Equipment: Maximum noise levels for nonscheduled intermittent, short-term operation (less than 10 days) of mobile equipment:			
	TYPE I AREAS SINGLE-FAMILY RESIDENTIAL	**TYPE II AREAS MULTI-FAMILY RESIDENTIAL**	**TYPE III AREAS SEMI-RESIDENTIAL/ COMMERCIAL**
Daily, except Sundays and Legal Holidays, 7 a.m. to 7 p.m.	75 dBA	80 dBA	85 dBA
Daily, 7 p.m. to 7 a.m. and all day Sunday and Legal Holidays	60 dBA	65 dBA	70 dBA
Stationary Equipment: Maximum noise levels for repetitively scheduled and relatively long-term operation (periods of 10 days or more) of stationary equipment:			
	TYPE I AREAS SINGLE FAMILY RESIDENTIAL	**TYPE II AREAS MULTI-FAMILY RESIDENTIAL**	**TYPE III AREAS SEMI-RESIDENTIAL/ COMMERCIAL**
Daily, except Sundays and Legal Holidays, 7 a.m. to 7. p.m.	60 dBA	65 dBA	70 dBA
Daily, 7 p.m. to 7 a.m. and all day Sunday and Legal Holidays	50 dBA	55 dBA	60 dBA
Mobile Equipment: Maximum noise levels for nonscheduled, intermittent, short-term operation of mobile equipment: Daily, including Sundays and legal holidays, all hours: maximum of 85 dBA.			
Stationary Equipment: Maximum noise levels for repetitively scheduled and relatively long-term operation of stationary equipment:			
Daily, including Sundays and legal holidays, all hours: maximum of 75 dBA.			

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

G. **Vibration.** Operating or permitting the operation of any device that creates a vibration which is above the vibration perception threshold of an individual at or beyond the property boundary of the source if on private property or at one hundred fifty (150) feet (46 meters) from the source if on a public space or public right-of-way.

H. **Powered Model Vehicles.** Operating or permitting the operation of powered model vehicles:

1. Between the hours of 7 p.m. and 7 a.m. so as to create a noise disturbance across a residential or commercial real property line or at any time to violate the provisions of paragraph 9.73.050.A.1.

2. In such a manner as to exceed the levels set forth for public space land use in Table 9.73.050-A, measured at a distance not less than 100 feet from any point on the path of a vehicle operating on public space or public right-of-way.

I. **Stationary Nonemergency Signaling Devices**

1. Sounding or permitting the sounding of any electronically-amplified signal from any stationary bell, chime, siren, whistle, or similar device, intended primarily for nonemergency purposes, from any place for more than 10 seconds in any hourly period. Houses of religious worship shall be exempt from this provision.

2. Sound sources covered by this provision and not exempted under subsection 1 above may be exempted by an exception issued by the Town.

J. **Emergency Signaling Devices**

1. The intentional sounding or permitting the sounding outdoors of any fire, burglar, or civil defense alarm, siren, whistle, or similar stationary emergency signaling device, except for emergency purposes or for testing. as provided in subsection 2 below.

2. **Testing**

a. Testing of a stationary emergency signaling device shall not occur before 7 a.m. or after 7 p.m. Any such testing shall use only the minimum cycle test time. In no case shall such test time exceed 60 seconds.

b. Testing of the complete emergency signaling system, including the functioning of the signaling device and the personnel response to the signaling device, shall not occur more than once in each calendar month. Such testing shall not occur before 7 a.m. or after 10 p.m. The time limit specified in subsection b.(1) above shall not apply to such complete system testing.

3. Sounding or permitting the sounding of any exterior burglar or fire alarm or any motor vehicle burglar alarm unless such alarm is terminated within 15 minutes of activation.

K. **Noise Sensitive Zones**

1. Creating or causing the creation of any sound within any noise sensitive zone, so as to exceed the specified land use noise standards set forth in Section 9.73.050.A.1., provided that conspicuous signs are displayed indicating the zone; or

2. Creating or causing the creation of any sound within or adjacent to any noise sensitive zone containing a hospital, nursing home, school, court or other designated area, so as to interfere with the functions of such activity or annoy the occupants in the activity, provided that conspicuous signs are displayed indicating the presence of the zone.

L. **Domestic Power Tools, Machinery**

1. Operating or permitting the operation of any mechanically powered saw, sander, drill, grinder, lawn or garden tool, or similar tool between 10 p.m. and 7 a.m., so as to create a noise disturbance across a residential or commercial real property line.

2. Any motor, machinery, pump, such as swimming pool equipment, etc., shall be sufficiently enclosed or muffled and maintained so as not to create a noise disturbance in accordance with Section 9.73.050.

M. **Residential Air-Conditioning or Air-Handling Equipment.** Operating or permitting the operation of any air-conditioning or air-handling equipment in such a manner as to exceed any of the following sound levels:

Table 9.73.060-B Air Conditioning/Air Handling Equipment

Measurement Location	Units Installed Before 1-1-80	Units Installed On Or After 1-1-80
Any point on neighboring property line, 5 feet above grade level, no closer than 3 feet from any wall	60 dBA	55 dBA
Center of neighboring patio, 5 feet above grade level, no closer than 3 feet from any wall	55 dBA	50 dBA
Outside the neighboring living area window nearest the equipment location, not more than 3 feet from the window opening, but at least 3 feet from any other surface	55 dBA	50 dBA

N. **Places of Public Entertainment.** Operating or permitting the operation or playing of any loudspeaker, musical instrument, motorized racing vehicle, or other source of sound in any place of public entertainment that exceeds 95 dBA as read on the "slow" response of a sound level meter at any point normally occupied by a customer, without a conspicuous and legible sign stating: "WARNING! SOUND LEVELS WITHIN MAY CAUSE HEARING IMPAIRMENT!"

9.73.070 Motor Vehicles Operating on Public Right-Of-Way

Motor vehicle noise limits on a public rights-of-way are regulated as set forth in the California Motor Vehicle Code, Sections 23130 and 23130.5. Equipment violations which create noise problems are covered under Sections 27150 and 27151. Any peace officer of any jurisdiction in California may enforce these provisions. Therefore, it shall be the policy of the Town to enforce these sections of the California Motor Vehicle Code.

A. **Refuse Collection Vehicles**

1. No person shall collect refuse with a refuse collection vehicle between the hours of 7 p.m. and 7 a.m. within or adjacent to a residential area or noise sensitive zone.

2. No person authorized to engage in waste disposal service or garbage collection shall operate any truck-mounted waste or garbage loading and/or compacting equipment or similar device in any manner so as to create any noise which exceed4ing 80 dBA's. the following levels, measured at a distance of fifty (50) feet from the equipment in an open area.

   a. New equipment purchased or leased on or after December 24, 1994: 80 dBA.

   b. New equipment purchased or leased on or after September 24, 1994: 75 dBA.

   c. Existing equipment, on or after June 24, 1999: 80 dBA.

B. **Motor Vehicle Horns.** It is unlawful for any person to sound a vehicular horn except as a warning signal (Motor Vehicle Code, Section 27001).

C. **Motorized Recreational Vehicles Operating Off Public Rights-of-Way.** No person shall operate or cause to be operated any motorized recreational vehicle off a public right-of-way in such a manner that the sound levels emitted therefrom violate the provisions of paragraph 9.73.050.A.1 of this Chapter. This Section shall apply to all motorized recreational vehicles whether or not duly licensed and registered, including but not limited to commercial or noncommercial racing vehicles, motorcycles, go carts, amphibious craft, campers, snowmobiles and dune buggies, but not including motorboats.

D. **Motorboats.** Operating or permitting the operation of any motorboat in any lake, river, stream, or other waterway in such a manner as to cause a noise disturbance across a residential or commercial real property line or at any time to violate the provisions of paragraph 9.73.050.A.1 of this Chapter.

E. **Standing Motor Vehicles.** No person shall operate or permit the operation of any motor vehicle with a gross vehicle weight rating (GVWR) in excess of ten thousand (10,000) pounds, or any auxiliary equipment attached to such a vehicle, for a period longer than fifteen (15) minutes in any hour while the vehicle is stationary, for reasons other than traffic congestion on a public right-of-way or public space within 150 feet of a residential area or designated noise sensitive zone, between the hours of 10 p.m. and 7 a.m.

9.73.080 Exemptions

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

A. The emission of sound for the purpose of alerting persons to the existence of an emergency;

B. The emission of sound in the performance of emergency work;

C. Warning devices necessary for the protection of public safety; for example, police, fire and ambulance sirens, and train horns;

D. Regularly scheduled school bands, school athletic and school entertainment events between the hours of 8:45 a.m. and 10:00 p.m., provided a Special Events permit is obtained for band activities on Town streets;

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

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

G. Mobile noise sources associated with agricultural operations, provided such operations take place on Monday through Friday, excepting legal holidays, between the hours of 7:00 a.m. and 6:00 p.m., or on holidays and weekends between the hours of 9:00 a.m. and 6:00 p.m. All other operations shall comply with this chapter;

H. Any activity to the extent that regulation thereof has been preempted by State or Federal law.

9.73.090 Exceptions

A. The NCO is authorized to grant exceptions from any provision of this ordinance, subject to limitations as to area, noise levels, time limits, and other terms and conditions as the NCO determines are appropriate to protect the public health, safety, and welfare from the noise emanating therefrom. This Section shall in no way affect the duty to obtain any permit or license required by law for such activities.

B. Any person seeking an exception to this Section shall file an application with the NCO. The application shall contain information which demonstrates that bringing the source of sound or activity for which the exception is sought into compliance with this ordinance would constitute an unreasonable hardship on the applicant, on the community, or on other persons. The application shall be accompanied by a fee. A separate application shall be filed for each noise source; provided, however, that several mobile sources under common ownership, or several fixed sources on a single property, may be combined into one application. Notice of an application for an exception shall be noticed according to Town Code. Any individual who claims to be adversely affected by allowance of the exception may file a statement with the NCO containing any information to support his claim. If at any time the NCO finds that a sufficient controversy exists regarding an application, such application shall be scheduled for a public hearing by the Planning Commission.

C. In determining whether to grant or deny the application, the NCO shall balance the hardship on the applicant, the community, and other persons of not granting the variance against the adverse impact on the health, safety, and welfare of persons affected, and any other adverse impacts of granting the variance. Applicants for exceptions and persons contesting exceptions may be required to submit such information as the NCO may reasonably require. In granting or denying an application, the NCO shall keep on public file a copy of the decision and the reasons for denying or granting the exception.

D. Exceptions shall be granted by notice to the applicant containing all necessary conditions, including a time limit on the permitted activity. The exception shall not become effective until all conditions are agreed to by the applicant. Noncompliance with any condition of the exception shall terminate such exception and subject the person holding it to those provisions of this ordinance for which the exception was granted.

E. An exception shall expire 365 days from the date on which it was granted. Application for extension of time limits specified in exceptions or for modification of other substantial conditions shall be treated like applications for initial exceptions under subsection B above.

APPENDIX 5.1:

STUDY AREA PHOTOS

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JN:16408

16407_L1_A 1.North
34, 36' 16.340000", 117, 13' 40.680000"

16407_L1_A 2.South
34, 36' 16.250000", 117, 13' 40.840000"

16407_L1_A 3.East
34, 36' 16.240000", 117, 13' 40.820000"

16407_L1_A 4.West
34, 36' 16.240000", 117, 13' 40.790000"

JN:16408

16408_L2_C 1.North
34, 36' 12.460000", 117, 13' 45.680000"

16408_L2_C 2.South
34, 36' 12.350000", 117, 13' 45.760000"

16408_L2_C 3.East
34, 36' 12.370000", 117, 13' 45.760000"

16408_L2_C 4.West
34, 36' 12.350000", 117, 13' 45.840000"

JN:16408

16408_L3_E 1.North
34, 36' 3.290000", 117, 13' 51.360000"

16408_L3_E 2.South
34, 36' 3.130000", 117, 13' 51.500000"

16408_L3_E 3.East
34, 36' 3.030000", 117, 13' 51.450000"

16408_L3_E 4.West
34, 36' 3.060000", 117, 13' 51.450000"

JN:16408

16408_L4_F 1.North
34, 35' 39.440000", 117, 14' 32.480000"

16408_L4_F 2.South
34, 35' 39.440000", 117, 14' 32.670000"

16408_L4_F 3.East
34, 35' 39.480000", 117, 14' 32.510000"

16408_L4_F 4.West
34, 35' 39.490000", 117, 14' 32.530000"

APPENDIX 5.2:

NOISE LEVEL MEASUREMENT WORKSHEETS

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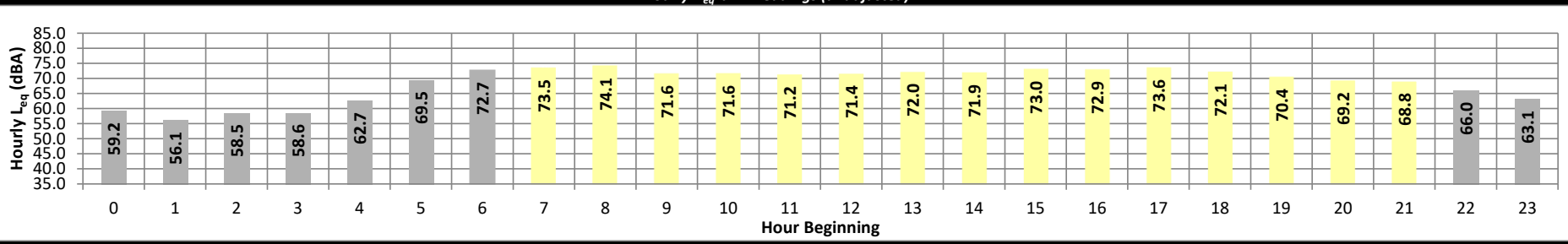
24-Hour Noise Level Measurement Summary

Date: Thursday, May 29, 2025 *Location:* L1 - Located northeast of the site near the residence at 19934 *Meter:* Piccolo II *JN:* 16408

Project: Bell Mountain Commerce Center *Source:* Doberman St. *Analyst:* Z. Ibrahim

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	59.2	73.1	47.5	72.5	71.3	66.4	62.3	52.7	49.3	48.1	47.9	47.6	59.2	10.0	69.2
	1	56.1	68.1	48.9	67.7	66.8	63.2	60.3	52.8	50.6	49.5	49.4	49.1	56.1	10.0	66.1
	2	58.5	72.3	46.0	71.9	70.8	66.2	61.8	49.4	47.4	46.5	46.3	46.1	58.5	10.0	68.5
	3	58.6	72.0	45.7	71.5	70.5	66.5	62.9	51.3	48.0	46.4	46.1	45.8	58.6	10.0	68.6
	4	62.7	77.3	40.7	76.7	75.3	70.1	65.5	52.6	43.8	41.4	41.1	40.8	62.7	10.0	72.7
	5	69.5	82.4	42.4	81.7	80.6	77.0	74.8	66.1	57.4	46.2	44.7	42.6	69.5	10.0	79.5
	6	72.7	84.7	49.7	84.1	82.9	79.6	77.8	71.7	64.9	53.8	51.8	49.9	72.7	10.0	82.7
Day	7	73.5	83.5	56.7	82.9	81.9	79.7	78.4	73.9	69.4	61.1	59.1	57.0	73.5	0.0	73.5
	8	74.1	84.9	56.5	84.3	83.1	80.3	79.0	74.4	69.2	60.2	58.5	56.8	74.1	0.0	74.1
	9	71.6	82.3	53.0	81.7	80.6	78.3	76.9	71.4	65.9	56.7	54.9	53.3	71.6	0.0	71.6
	10	71.6	82.8	50.4	82.3	81.1	78.5	76.9	71.1	65.7	54.6	52.4	50.6	71.6	0.0	71.6
	11	71.2	82.2	49.0	81.6	80.6	78.1	76.7	70.7	64.4	52.8	50.8	49.2	71.2	0.0	71.2
	12	71.4	82.7	49.9	82.0	80.8	78.1	76.6	71.2	65.0	53.9	51.9	50.2	71.4	0.0	71.4
	13	72.0	83.2	51.7	82.7	81.5	78.7	77.0	71.8	66.2	55.3	53.6	52.1	72.0	0.0	72.0
	14	71.9	82.4	52.5	81.9	80.8	78.5	77.0	72.1	66.5	56.8	54.8	52.7	71.9	0.0	71.9
	15	73.0	82.7	54.7	82.2	81.2	79.3	78.2	73.6	68.4	59.4	57.2	55.1	73.0	0.0	73.0
	16	72.9	82.8	54.3	82.2	81.1	79.1	77.9	73.6	68.4	58.7	56.5	54.7	72.9	0.0	72.9
	17	73.6	84.7	54.2	83.9	82.7	79.9	78.1	73.7	68.7	59.1	56.7	54.5	73.6	0.0	73.6
	18	72.1	82.3	53.2	81.7	80.7	78.9	77.6	72.3	66.5	56.8	55.1	53.5	72.1	0.0	72.1
	19	70.4	81.2	52.1	80.6	79.6	77.3	75.8	70.3	64.4	54.7	53.4	52.3	70.4	5.0	75.4
	20	69.2	80.6	51.8	80.1	79.0	76.3	74.6	68.0	62.4	53.5	52.4	51.9	69.2	5.0	74.2
	21	68.8	81.6	49.3	81.0	79.8	76.3	73.9	65.9	59.1	50.6	49.9	49.4	68.8	5.0	73.8
Night	22	66.0	77.9	48.2	77.4	76.4	73.8	71.7	63.6	56.2	48.9	48.6	48.4	66.0	10.0	76.0
	23	63.1	76.3	42.8	75.7	74.6	70.8	68.2	58.4	49.9	43.5	43.2	42.9	63.1	10.0	73.1

Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%
Day	Min	68.8	80.6	49.0	80.1	79.0	76.3	73.9	65.9	59.1	50.6	49.9	49.2
	Max	74.1	84.9	56.7	84.3	83.1	80.3	79.0	74.4	69.4	61.1	59.1	57.0
Energy Average		72.1	Average:		82.1	81.0	78.5	77.0	71.6	66.0	56.3	54.5	52.9
Night	Min	56.1	68.1	40.7	67.7	66.8	63.2	60.3	49.4	43.8	41.4	41.1	40.8
	Max	72.7	84.7	49.7	84.1	82.9	79.6	77.8	71.7	64.9	53.8	51.8	49.9
Energy Average		66.3	Average:		75.5	74.4	70.4	67.2	57.6	51.9	47.1	46.6	45.9

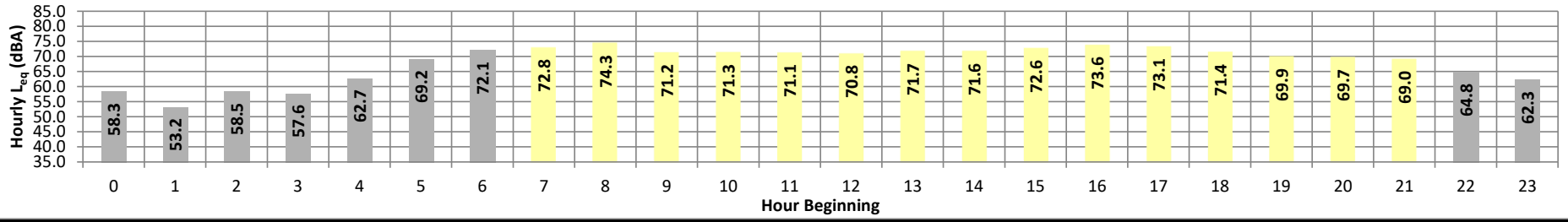
24-Hour CNEL	Leq (dBA) Daytime (7am-10pm)	Leq (dBA) Nighttime (10pm-7am)
74.5	**72.1**	**66.3**

24-Hour Noise Level Measurement Summary

Date: Thursday, May 29, 2025 *Location:* L2 - Located northeast of the site near the residence at 19414 *Meter:* Piccolo II *JN:* 16408

Project: Bell Mountain Commerce Center *Source:* Stoddard Wells Rd. *Analyst:* Z. Ibrahim

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	58.3	72.9	29.8	72.2	70.9	66.0	61.5	48.7	37.8	30.2	30.1	29.9	58.3	10.0	68.3
	1	53.2	66.7	29.4	66.2	65.2	61.4	57.5	46.6	36.0	29.8	29.6	29.5	53.2	10.0	63.2
	2	58.5	72.9	29.0	72.4	71.0	66.0	61.9	49.0	38.0	29.3	29.2	29.1	58.5	10.0	68.5
	3	57.6	71.3	29.4	70.8	69.7	65.7	62.1	49.5	41.0	29.9	29.7	29.5	57.6	10.0	67.6
	4	62.7	77.6	29.5	76.7	75.3	70.2	65.8	52.2	40.5	30.3	29.9	29.7	62.7	10.0	72.7
	5	69.2	82.1	43.5	81.4	80.2	76.9	74.5	65.7	57.7	45.8	44.6	43.7	69.2	10.0	79.2
	6	72.1	83.8	49.2	83.1	82.0	79.3	77.7	71.2	63.3	51.9	50.3	49.4	72.1	10.0	82.1
Day	7	72.8	83.6	53.8	83.0	81.9	79.3	78.1	72.9	66.6	57.0	55.2	54.0	72.8	0.0	72.8
	8	74.3	85.7	53.6	85.2	84.4	81.2	78.8	73.9	67.8	57.0	55.3	54.0	74.3	0.0	74.3
	9	71.2	82.4	50.3	81.8	80.6	78.1	76.6	70.7	64.7	54.1	52.0	50.6	71.2	0.0	71.2
	10	71.3	82.8	49.3	82.1	81.0	78.4	76.7	70.4	63.4	52.9	51.1	49.6	71.3	0.0	71.3
	11	71.1	82.8	49.4	82.1	80.9	78.2	76.7	70.2	62.8	53.0	50.9	49.8	71.1	0.0	71.1
	12	70.8	81.4	50.1	80.8	79.9	77.8	76.4	70.7	63.8	53.8	52.2	50.5	70.8	0.0	70.8
	13	71.7	83.1	50.9	82.4	81.2	78.4	76.8	71.3	64.7	54.3	52.8	51.1	71.7	0.0	71.7
	14	71.6	82.5	51.2	81.9	80.9	78.6	77.0	71.5	64.9	54.2	52.7	51.5	71.6	0.0	71.6
	15	72.6	82.5	53.7	81.9	80.9	79.0	77.9	73.4	67.1	57.2	55.3	54.0	72.6	0.0	72.6
	16	73.6	85.5	52.0	84.8	83.7	80.3	78.4	73.2	66.8	56.1	54.3	52.3	73.6	0.0	73.6
	17	73.1	84.3	51.9	83.6	82.3	79.4	78.0	73.3	67.1	55.5	53.6	52.1	73.1	0.0	73.1
	18	71.4	81.8	48.9	81.2	80.2	78.4	77.1	71.4	64.1	53.2	50.9	49.2	71.4	0.0	71.4
	19	69.9	81.0	46.3	80.4	79.5	77.4	75.8	68.9	60.5	49.3	47.9	46.6	69.9	5.0	74.9
	20	69.7	82.5	44.9	81.8	80.6	77.6	74.8	66.7	57.9	47.9	46.3	45.1	69.7	5.0	74.7
	21	69.0	81.7	41.2	81.2	80.5	76.9	73.9	64.8	56.1	44.5	42.8	41.6	69.0	5.0	74.0
Night	22	64.8	77.4	36.6	76.8	75.9	72.9	70.5	60.8	51.6	39.0	37.6	36.8	64.8	10.0	74.8
	23	62.3	75.5	34.6	74.9	73.9	70.5	67.5	56.0	46.5	37.2	35.4	34.7	62.3	10.0	72.3

Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%
Day	Min	69.0	81.0	41.2	80.4	79.5	76.9	73.9	64.8	56.1	44.5	42.8	41.6
	Max	74.3	85.7	53.8	85.2	84.4	81.2	78.8	73.9	67.8	57.2	55.3	54.0
Energy Average		71.8	Average:		82.3	81.2	78.6	76.9	70.9	63.9	53.3	51.5	50.1
Night	Min	53.2	66.7	29.0	66.2	65.2	61.4	57.5	46.6	36.0	29.3	29.2	29.1
	Max	72.1	83.8	49.2	83.1	82.0	79.3	77.7	71.2	63.3	51.9	50.3	49.4
Energy Average		65.7	Average:		75.0	73.8	69.9	66.6	55.5	45.8	35.9	35.2	34.7

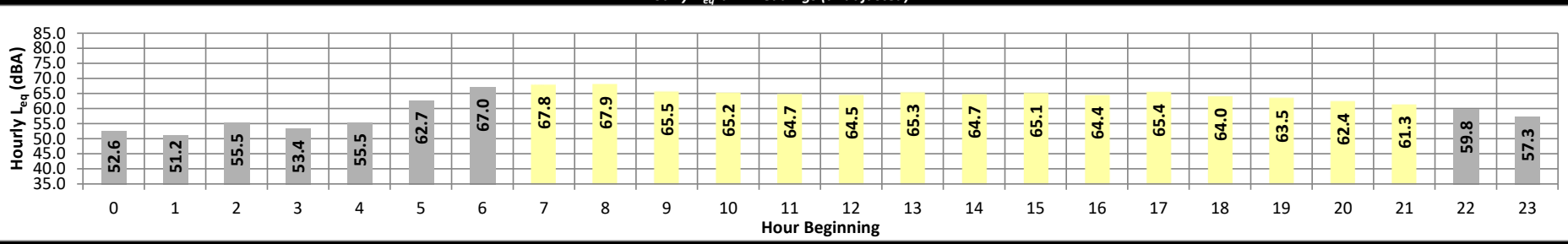
24-Hour CNEL	*Leq (dBA) Daytime (7am-10pm)*	*Leq (dBA) Nighttime (10pm-7am)*
74.1	**71.8**	**65.7**

24-Hour Noise Level Measurement Summary

Date: Thursday, May 29, 2025 *Location:* L3 - Located east of the site near the residence at 19823 *Meter:* Piccolo II *JN:* 16408

Project: Bell Mountain Commerce Center *Source:* Johnson Rd. *Analyst:* Z. Ibrahim

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	52.6	66.8	32.4	65.8	64.7	60.3	56.5	45.6	37.5	33.1	32.8	32.5	52.6	10.0	62.6
	1	51.2	62.2	31.6	61.8	61.4	59.4	57.3	49.1	37.6	32.2	31.9	31.7	51.2	10.0	61.2
	2	55.5	66.8	32.0	66.5	66.1	64.2	62.3	50.6	39.6	33.5	32.7	32.3	55.5	10.0	65.5
	3	53.4	64.9	32.1	64.7	64.2	61.9	59.6	48.4	39.9	33.5	32.8	32.3	53.4	10.0	63.4
	4	55.5	68.7	33.6	68.3	67.6	63.9	60.2	47.6	39.1	34.8	34.3	33.8	55.5	10.0	65.5
	5	62.7	74.1	41.1	73.8	73.1	70.5	68.4	60.6	53.4	42.8	41.9	41.2	62.7	10.0	72.7
	6	67.0	78.0	46.4	77.5	76.8	74.1	72.1	66.8	60.0	49.0	47.7	46.6	67.0	10.0	77.0
Day	7	67.8	76.7	51.3	76.4	75.8	73.8	72.4	68.9	64.2	55.0	53.0	51.5	67.8	0.0	67.8
	8	67.9	77.2	49.8	76.8	76.1	73.9	72.6	68.9	64.4	53.5	51.4	50.0	67.9	0.0	67.9
	9	65.5	75.6	47.3	75.0	74.2	72.0	70.5	66.2	60.8	49.9	48.6	47.5	65.5	0.0	65.5
	10	65.2	74.8	45.6	74.4	73.7	71.8	70.5	65.8	60.1	48.5	47.3	45.8	65.2	0.0	65.2
	11	64.7	74.8	45.5	74.5	73.8	71.6	70.0	65.0	58.6	48.1	46.9	45.7	64.7	0.0	64.7
	12	64.5	74.2	47.7	73.8	73.1	71.1	69.8	65.0	59.1	49.9	48.8	47.9	64.5	0.0	64.5
	13	65.3	75.7	48.0	75.3	74.5	72.1	70.2	65.5	59.7	50.3	49.1	48.3	65.3	0.0	65.3
	14	64.7	74.3	48.3	74.0	73.3	71.2	69.9	65.1	59.7	51.3	49.9	48.5	64.7	0.0	64.7
	15	65.1	73.8	48.3	73.5	72.8	71.1	70.2	66.2	61.1	51.1	49.7	48.7	65.1	0.0	65.1
	16	64.4	73.4	48.0	73.1	72.4	70.7	69.6	65.5	59.8	50.5	49.3	48.2	64.4	0.0	64.4
	17	65.4	75.0	47.6	74.6	73.9	71.6	70.4	66.3	60.5	50.0	48.8	47.8	65.4	0.0	65.4
	18	64.0	73.0	45.6	72.8	72.2	70.6	69.4	64.7	59.0	48.0	46.9	45.9	64.0	0.0	64.0
	19	63.5	73.3	46.3	72.8	72.2	70.3	69.0	63.8	57.1	48.4	47.4	46.5	63.5	5.0	68.5
	20	62.4	72.6	45.3	72.3	71.7	69.6	68.1	62.2	54.6	46.9	46.0	45.4	62.4	5.0	67.4
	21	61.3	72.0	43.9	71.7	71.1	68.6	66.8	60.5	53.7	46.0	44.9	44.2	61.3	5.0	66.3
Night	22	59.8	71.0	41.2	70.7	70.2	67.8	65.8	57.1	49.6	42.9	42.1	41.3	59.8	10.0	69.8
	23	57.3	69.0	38.2	68.7	68.0	65.2	62.8	54.3	47.7	40.7	39.6	38.5	57.3	10.0	67.3

Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%
Day	Min	61.3	72.0	43.9	71.7	71.1	68.6	66.8	60.5	53.7	46.0	44.9	44.2
	Max	67.9	77.2	51.3	76.8	76.1	73.9	72.6	68.9	64.4	55.0	53.0	51.5
Energy Average		65.1	Average:		74.1	73.4	71.3	70.0	65.3	59.5	49.8	48.5	47.5
Night	Min	51.2	62.2	31.6	61.8	61.4	59.4	56.5	45.6	37.5	32.2	31.9	31.7
	Max	67.0	78.0	46.4	77.5	76.8	74.1	72.1	66.8	60.0	49.0	47.7	46.6
Energy Average		60.3	Average:		68.7	68.0	65.3	62.8	53.3	44.9	38.0	37.3	36.7

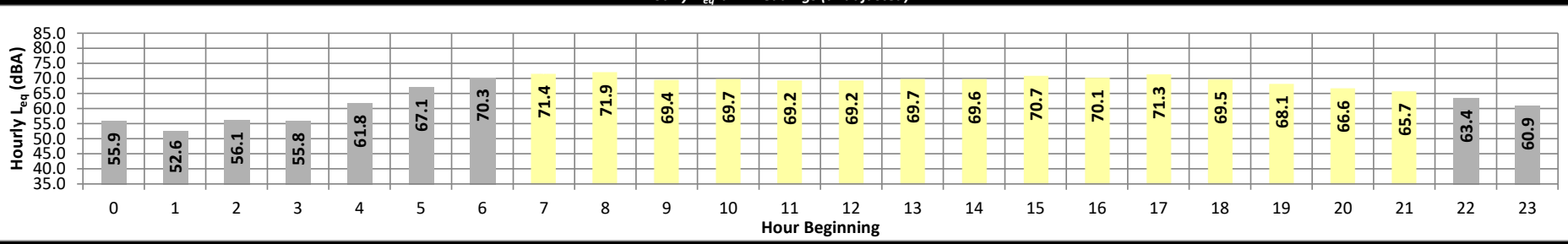
24-Hour CNEL	Leq (dBA) Daytime (7am-10pm)	Leq (dBA) Nighttime (10pm-7am)
68.1	**65.1**	**60.3**

24-Hour Noise Level Measurement Summary

Date: Thursday, May 29, 2025 *Location:* L4 - Located south of the site near the residence at 19277 *Meter:* Piccolo II *JN:* 16408

Project: Bell Mountain Commerce Center *Source:* Stoddard Wells Rd. *Analyst:* Z. Ibrahim

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	55.9	68.7	36.1	68.3	67.5	64.3	60.9	50.5	41.4	37.4	36.9	36.4	55.9	10.0	65.9
	1	52.6	64.0	35.2	63.8	63.2	60.6	58.0	49.8	43.5	36.9	36.1	35.6	52.6	10.0	62.6
	2	56.1	68.9	34.6	68.6	67.7	64.2	60.9	51.0	42.6	35.8	35.4	34.9	56.1	10.0	66.1
	3	55.8	68.3	33.5	68.0	67.3	63.9	61.2	50.3	41.6	35.0	34.5	33.8	55.8	10.0	65.8
	4	61.8	75.8	34.8	75.2	74.2	69.9	65.5	51.1	40.2	35.9	35.5	35.0	61.8	10.0	71.8
	5	67.1	79.2	44.0	78.8	77.8	74.8	72.5	64.0	56.1	46.0	44.8	44.2	67.1	10.0	77.1
	6	70.3	81.3	48.8	80.8	79.9	77.4	75.7	69.8	63.4	52.2	50.4	48.9	70.3	10.0	80.3
Day	7	71.4	80.9	53.8	80.4	79.6	77.8	76.4	72.3	67.0	57.7	55.5	54.0	71.4	0.0	71.4
	8	71.9	81.6	52.1	81.1	80.3	78.0	76.9	72.6	67.7	57.9	55.2	52.3	71.9	0.0	71.9
	9	69.4	79.4	50.0	79.0	78.0	75.9	74.7	69.8	64.4	53.7	51.8	50.3	69.4	0.0	69.4
	10	69.7	80.6	48.4	79.9	78.8	76.4	75.0	69.6	63.6	52.8	50.6	48.9	69.7	0.0	69.7
	11	69.2	79.8	47.8	79.4	78.5	76.2	74.8	69.1	62.3	50.9	49.3	48.0	69.2	0.0	69.2
	12	69.2	79.9	49.3	79.3	78.3	75.7	74.4	69.4	63.1	52.9	51.2	49.7	69.2	0.0	69.2
	13	69.7	80.6	49.1	80.1	79.1	76.6	75.0	69.8	62.9	52.9	51.1	49.4	69.7	0.0	69.7
	14	69.6	79.7	50.1	79.3	78.5	76.2	74.9	70.1	63.9	53.2	51.8	50.4	69.6	0.0	69.6
	15	70.7	80.4	50.4	79.9	78.9	76.9	75.9	71.7	65.6	54.9	52.8	50.7	70.7	0.0	70.7
	16	70.1	79.5	48.7	79.1	78.2	76.5	75.4	71.1	64.6	52.1	50.2	49.0	70.1	0.0	70.1
	17	71.3	81.9	49.4	81.5	80.6	77.9	76.3	71.8	65.5	52.8	50.9	49.6	71.3	0.0	71.3
	18	69.5	79.4	48.7	79.0	78.2	76.4	75.1	70.0	63.6	51.9	50.1	48.9	69.5	0.0	69.5
	19	68.1	78.4	48.3	78.0	77.2	75.1	73.7	68.2	61.2	50.5	49.4	48.5	68.1	5.0	73.1
	20	66.6	77.5	45.7	77.1	76.2	74.0	72.4	65.7	58.6	47.7	46.6	45.9	66.6	5.0	71.6
	21	65.7	77.4	45.0	76.9	76.0	73.3	71.4	63.5	56.5	47.4	46.2	45.3	65.7	5.0	70.7
Night	22	63.4	75.0	41.7	74.7	73.9	71.1	69.2	61.1	53.6	44.1	42.6	41.9	63.4	10.0	73.4
	23	60.9	72.8	40.9	72.3	71.4	68.7	66.3	58.5	51.4	42.8	41.8	41.1	60.9	10.0	70.9

Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%
Day	Min	65.7	77.4	45.0	76.9	76.0	73.3	71.4	63.5	56.5	47.4	46.2	45.3
	Max	71.9	81.9	53.8	81.5	80.6	78.0	76.9	72.6	67.7	57.9	55.5	54.0
Energy Average		69.8	Average:		79.3	78.4	76.2	74.8	69.6	63.4	52.6	50.8	49.4
Night	Min	52.6	64.0	33.5	63.8	63.2	60.6	58.0	49.8	40.2	35.0	34.5	33.8
	Max	70.3	81.3	48.8	80.8	79.9	77.4	75.7	69.8	63.4	52.2	50.4	48.9
Energy Average		63.9	Average:		72.3	71.4	68.3	65.6	56.2	48.2	40.7	39.8	39.1

24-Hour CNEL	*Leq (dBA) Daytime (7am-10pm)*	*Leq (dBA) Nighttime (10pm-7am)*
72.2	**69.8**	**63.9**

APPENDIX 7.1:

OFF-SITE TRAFFIC NOISE LEVEL CALCULATIONS

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (9/12/2021)

Scenario: E
Road Name: Quarry Rd.
Road Segment: n/o Stoddard Wells Rd.
Project Name: Bell Mountain
Job Number: 16408

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	1,887 vehicles
Peak Hour Percentage:	10.87%
Peak Hour Volume:	205 vehicles
Vehicle Speed:	55 mph
Near/Far Lane Distance:	76 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	64.0 feet
Centerline Dist. to Observer:	64.0 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:	69.5%	6.7%	23.7%	81.83%
Medium Trucks:	82.8%	5.4%	11.8%	2.82%
Heavy Trucks:	74.2%	6.1%	19.7%	15.35%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	51.740
Medium Trucks:	51.568
Heavy Trucks:	51.585

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	71.78	-10.46	-0.33	-1.20	-4.70	0.000	0.000
Medium Trucks:	82.40	-25.09	-0.30	-1.20	-4.88	0.000	0.000
Heavy Trucks:	86.40	-17.73	-0.31	-1.20	-5.31	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:	59.8	57.1	52.9	53.6	60.6	60.8
Medium Trucks:	55.8	53.8	48.0	46.6	54.8	55.0
Heavy Trucks:	67.2	64.7	59.9	60.2	67.4	67.6
Vehicle Noise:	68.2	65.7	60.9	61.2	68.4	68.6

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	50	109	234	504
CNEL:	52	112	241	520

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (9/12/2021)

Scenario: EP
Road Name: Quarry Rd.
Road Segment: n/o Stoddard Wells Rd.
Project Name: Bell Mountain
Job Number: 16408

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	3,227 vehicles
Peak Hour Percentage:	10.87%
Peak Hour Volume:	351 vehicles
Vehicle Speed:	55 mph
Near/Far Lane Distance:	76 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	64.0 feet
Centerline Dist. to Observer:	64.0 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:	69.5%	6.7%	23.7%	81.16%
Medium Trucks:	82.8%	5.4%	11.8%	3.29%
Heavy Trucks:	74.2%	6.1%	19.7%	15.55%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	51.740
Medium Trucks:	51.568
Heavy Trucks:	51.585

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	71.78	-8.16	-0.33	-1.20	-4.70	0.000	0.000
Medium Trucks:	82.40	-22.09	-0.30	-1.20	-4.88	0.000	0.000
Heavy Trucks:	86.40	-15.34	-0.31	-1.20	-5.31	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:	62.1	59.4	55.2	55.9	62.9	63.1
Medium Trucks:	58.8	56.8	51.0	49.6	57.8	58.0
Heavy Trucks:	69.5	67.1	62.3	62.6	69.8	70.0
Vehicle Noise:	70.6	68.1	63.3	63.6	70.8	71.0

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	73	157	338	728
CNEL:	75	162	349	751

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (9/12/2021)

Scenario: OYC 2028
Road Name: Quarry Rd.
Road Segment: n/o Stoddard Wells Rd.
Project Name: Bell Mountain
Job Number: 16408

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	16,619 vehicles
Peak Hour Percentage:	10.87%
Peak Hour Volume:	1,807 vehicles
Vehicle Speed:	55 mph
Near/Far Lane Distance:	76 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	64.0 feet
Centerline Dist. to Observer:	64.0 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:	69.5%	6.7%	23.7%	81.83%
Medium Trucks:	82.8%	5.4%	11.8%	2.82%
Heavy Trucks:	74.2%	6.1%	19.7%	15.35%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	51.740
Medium Trucks:	51.568
Heavy Trucks:	51.585

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	71.78	-1.01	-0.33	-1.20	-4.70	0.000	0.000
Medium Trucks:	82.40	-15.64	-0.30	-1.20	-4.88	0.000	0.000
Heavy Trucks:	86.40	-8.28	-0.31	-1.20	-5.31	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:	69.2	66.5	62.4	63.1	70.0	70.2
Medium Trucks:	65.3	63.3	57.4	56.1	64.2	64.5
Heavy Trucks:	76.6	74.2	69.3	69.7	76.9	77.1
Vehicle Noise:	77.6	75.1	70.4	70.7	77.9	78.1

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	215	463	997	2,148
CNEL:	222	477	1,029	2,216

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (9/12/2021)

Scenario: OYCP 2028
Road Name: Quarry Rd.
Road Segment: n/o Stoddard Wells Rd.
Project Name: Bell Mountain
Job Number: 16408

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	17,960 vehicles
Peak Hour Percentage:	10.87%
Peak Hour Volume:	1,952 vehicles
Vehicle Speed:	55 mph
Near/Far Lane Distance:	76 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	64.0 feet
Centerline Dist. to Observer:	64.0 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:	69.5%	6.7%	23.7%	81.71%
Medium Trucks:	82.8%	5.4%	11.8%	2.90%
Heavy Trucks:	74.2%	6.1%	19.7%	15.39%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	51.740
Medium Trucks:	51.568
Heavy Trucks:	51.585

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	71.78	-0.68	-0.33	-1.20	-4.70	0.000	0.000
Medium Trucks:	82.40	-15.18	-0.30	-1.20	-4.88	0.000	0.000
Heavy Trucks:	86.40	-7.93	-0.31	-1.20	-5.31	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:	69.6	66.8	62.7	63.4	70.4	70.6
Medium Trucks:	65.7	63.7	57.9	56.5	64.7	64.9
Heavy Trucks:	77.0	74.5	69.7	70.0	77.2	77.4
Vehicle Noise:	78.0	75.5	70.7	71.0	78.2	78.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	227	488	1,052	2,267
CNEL:	234	504	1,085	2,338

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (9/12/2021)

Scenario: E
Road Name: Stoddard Wells Rd.
Road Segment: w/o Quarry Rd.
Project Name: Bell Mountain
Job Number: 16408

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	534 vehicles
Peak Hour Percentage:	10.87%
Peak Hour Volume:	58 vehicles
Vehicle Speed:	55 mph
Near/Far Lane Distance:	76 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	64.0 feet
Centerline Dist. to Observer:	64.0 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:	69.5%	6.7%	23.7%	81.83%
Medium Trucks:	82.8%	5.4%	11.8%	2.82%
Heavy Trucks:	74.2%	6.1%	19.7%	15.35%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	51.740
Medium Trucks:	51.568
Heavy Trucks:	51.585

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	71.78	-15.94	-0.33	-1.20	-4.70	0.000	0.000
Medium Trucks:	82.40	-30.58	-0.30	-1.20	-4.88	0.000	0.000
Heavy Trucks:	86.40	-23.21	-0.31	-1.20	-5.31	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:	54.3	51.6	47.5	48.2	55.1	55.3
Medium Trucks:	50.3	48.3	42.5	41.1	49.3	49.5
Heavy Trucks:	61.7	59.2	54.4	54.7	61.9	62.1
Vehicle Noise:	62.7	60.2	55.4	55.7	63.0	63.2

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	22	47	101	217
CNEL:	22	48	104	224

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (9/12/2021)

Scenario: EP
Road Name: Stoddard Wells Rd.
Road Segment: w/o Quarry Rd.
Project Name: Bell Mountain
Job Number: 16408

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	556 vehicles
Peak Hour Percentage:	10.87%
Peak Hour Volume:	60 vehicles
Vehicle Speed:	55 mph
Near/Far Lane Distance:	76 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	64.0 feet
Centerline Dist. to Observer:	64.0 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:	69.5%	6.7%	23.7%	82.56%
Medium Trucks:	82.8%	5.4%	11.8%	2.70%
Heavy Trucks:	74.2%	6.1%	19.7%	14.74%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	51.740
Medium Trucks:	51.568
Heavy Trucks:	51.585

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	71.78	-15.73	-0.33	-1.20	-4.70	0.000	0.000
Medium Trucks:	82.40	-30.58	-0.30	-1.20	-4.88	0.000	0.000
Heavy Trucks:	86.40	-23.21	-0.31	-1.20	-5.31	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:	54.5	51.8	47.7	48.4	55.3	55.5
Medium Trucks:	50.3	48.3	42.5	41.1	49.3	49.5
Heavy Trucks:	61.7	59.2	54.4	54.7	61.9	62.1
Vehicle Noise:	62.7	60.2	55.5	55.8	63.0	63.2

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	22	47	101	218
CNEL:	23	49	105	225

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (9/12/2021)

Scenario: OYC 2028
Road Name: Stoddard Wells Rd.
Road Segment: w/o Quarry Rd.
Project Name: Bell Mountain
Job Number: 16408

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	924 vehicles
Peak Hour Percentage:	10.87%
Peak Hour Volume:	100 vehicles
Vehicle Speed:	55 mph
Near/Far Lane Distance:	76 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	64.0 feet
Centerline Dist. to Observer:	64.0 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:	69.5%	6.7%	23.7%	81.83%
Medium Trucks:	82.8%	5.4%	11.8%	2.82%
Heavy Trucks:	74.2%	6.1%	19.7%	15.35%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	51.740
Medium Trucks:	51.568
Heavy Trucks:	51.585

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	71.78	-13.56	-0.33	-1.20	-4.70	0.000	0.000
Medium Trucks:	82.40	-28.19	-0.30	-1.20	-4.88	0.000	0.000
Heavy Trucks:	86.40	-20.83	-0.31	-1.20	-5.31	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:	56.7	54.0	49.8	50.5	57.5	57.7
Medium Trucks:	52.7	50.7	44.9	43.5	51.7	51.9
Heavy Trucks:	64.1	61.6	56.8	57.1	64.3	64.5
Vehicle Noise:	65.1	62.6	57.8	58.1	65.3	65.5

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	31	67	145	313
CNEL:	32	70	150	323

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (9/12/2021)

Scenario: OYCP 2028
Road Name: Stoddard Wells Rd.
Road Segment: w/o Quarry Rd.
Project Name: Bell Mountain
Job Number: 16408

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	947 vehicles
Peak Hour Percentage:	10.87%
Peak Hour Volume:	103 vehicles
Vehicle Speed:	55 mph
Near/Far Lane Distance:	76 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	64.0 feet
Centerline Dist. to Observer:	64.0 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:	69.5%	6.7%	23.7%	82.26%
Medium Trucks:	82.8%	5.4%	11.8%	2.75%
Heavy Trucks:	74.2%	6.1%	19.7%	14.99%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	51.740
Medium Trucks:	51.568
Heavy Trucks:	51.585

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	71.78	-13.43	-0.33	-1.20	-4.70	0.000	0.000
Medium Trucks:	82.40	-28.19	-0.30	-1.20	-4.88	0.000	0.000
Heavy Trucks:	86.40	-20.83	-0.31	-1.20	-5.31	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:	56.8	54.1	50.0	50.7	57.6	57.8
Medium Trucks:	52.7	50.7	44.9	43.5	51.7	51.9
Heavy Trucks:	64.1	61.6	56.8	57.1	64.3	64.5
Vehicle Noise:	65.1	62.6	57.8	58.2	65.4	65.6

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	31	68	146	314
CNEL:	32	70	150	324

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (9/12/2021)

Scenario: E | Project Name: Bell Mountain
Road Name: Stoddard Wells Rd. | Job Number: 16408
Road Segment: e/o Quarry Rd.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	2,089 vehicles
Peak Hour Percentage:	10.87%
Peak Hour Volume:	227 vehicles
Vehicle Speed:	55 mph
Near/Far Lane Distance:	76 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	64.0 feet
Centerline Dist. to Observer:	64.0 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:	69.5%	6.7%	23.7%	81.83%
Medium Trucks:	82.8%	5.4%	11.8%	2.82%
Heavy Trucks:	74.2%	6.1%	19.7%	15.35%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	51.740
Medium Trucks:	51.568
Heavy Trucks:	51.585

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	71.78	-10.02	-0.33	-1.20	-4.70	0.000	0.000
Medium Trucks:	82.40	-24.65	-0.30	-1.20	-4.88	0.000	0.000
Heavy Trucks:	86.40	-17.29	-0.31	-1.20	-5.31	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:	60.2	57.5	53.4	54.1	61.0	61.2
Medium Trucks:	56.2	54.3	48.4	47.1	55.2	55.5
Heavy Trucks:	67.6	65.2	60.3	60.6	67.9	68.1
Vehicle Noise:	68.6	66.1	61.4	61.7	68.9	69.1

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	54	116	250	539
CNEL:	56	120	258	556

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (9/12/2021)

Scenario: EP | Project Name: Bell Mountain
Road Name: Stoddard Wells Rd. | Job Number: 16408
Road Segment: e/o Quarry Rd.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	3,130 vehicles
Peak Hour Percentage:	10.87%
Peak Hour Volume:	340 vehicles
Vehicle Speed:	55 mph
Near/Far Lane Distance:	76 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	64.0 feet
Centerline Dist. to Observer:	64.0 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:	69.5%	6.7%	23.7%	80.74%
Medium Trucks:	82.8%	5.4%	11.8%	3.31%
Heavy Trucks:	74.2%	6.1%	19.7%	15.95%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	51.740
Medium Trucks:	51.568
Heavy Trucks:	51.585

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	71.78	-8.32	-0.33	-1.20	-4.70	0.000	0.000
Medium Trucks:	82.40	-22.20	-0.30	-1.20	-4.88	0.000	0.000
Heavy Trucks:	86.40	-15.36	-0.31	-1.20	-5.31	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:	61.9	59.2	55.1	55.8	62.7	62.9
Medium Trucks:	58.7	56.7	50.9	49.5	57.7	57.9
Heavy Trucks:	69.5	67.1	62.3	62.6	69.8	70.0
Vehicle Noise:	70.5	68.1	63.3	63.6	70.8	71.0

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	72	156	335	723
CNEL:	75	161	346	746

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (9/12/2021)

Scenario: OYC 2028 | Project Name: Bell Mountain
Road Name: Stoddard Wells Rd. | Job Number: 16408
Road Segment: e/o Quarry Rd.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	17,192 vehicles
Peak Hour Percentage:	10.87%
Peak Hour Volume:	1,869 vehicles
Vehicle Speed:	55 mph
Near/Far Lane Distance:	76 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	64.0 feet
Centerline Dist. to Observer:	64.0 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:	69.5%	6.7%	23.7%	81.83%
Medium Trucks:	82.8%	5.4%	11.8%	2.82%
Heavy Trucks:	74.2%	6.1%	19.7%	15.35%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	51.740
Medium Trucks:	51.568
Heavy Trucks:	51.585

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	71.78	-0.86	-0.33	-1.20	-4.70	0.000	0.000
Medium Trucks:	82.40	-15.50	-0.30	-1.20	-4.88	0.000	0.000
Heavy Trucks:	86.40	-8.13	-0.31	-1.20	-5.31	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:	69.4	66.7	62.5	63.2	70.2	70.4
Medium Trucks:	65.4	63.4	57.6	56.2	64.4	64.6
Heavy Trucks:	76.8	74.3	69.5	69.8	77.0	77.2
Vehicle Noise:	77.8	75.3	70.5	70.8	78.0	78.2

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	220	473	1,020	2,197
CNEL:	227	488	1,052	2,267

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (9/12/2021)

Scenario: OYCP 2028 | Project Name: Bell Mountain
Road Name: Stoddard Wells Rd. | Job Number: 16408
Road Segment: e/o Quarry Rd.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	18,233 vehicles
Peak Hour Percentage:	10.87%
Peak Hour Volume:	1,982 vehicles
Vehicle Speed:	55 mph
Near/Far Lane Distance:	76 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	64.0 feet
Centerline Dist. to Observer:	64.0 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:	69.5%	6.7%	23.7%	81.64%
Medium Trucks:	82.8%	5.4%	11.8%	2.90%
Heavy Trucks:	74.2%	6.1%	19.7%	15.46%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	51.740
Medium Trucks:	51.568
Heavy Trucks:	51.585

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	71.78	-0.62	-0.33	-1.20	-4.70	0.000	0.000
Medium Trucks:	82.40	-15.11	-0.30	-1.20	-4.88	0.000	0.000
Heavy Trucks:	86.40	-7.85	-0.31	-1.20	-5.31	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:	69.6	66.9	62.8	63.5	70.4	70.6
Medium Trucks:	65.8	63.8	58.0	56.6	64.8	65.0
Heavy Trucks:	77.0	74.6	69.8	70.1	77.3	77.5
Vehicle Noise:	78.0	75.6	70.8	71.1	78.3	78.5

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	229	494	1,065	2,295
CNEL:	237	510	1,099	2,367

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (9/12/2021)

Scenario: E
Road Name: Stoddard Wells Rd.
Road Segment: e/o I-15 NB Ramps
Project Name: Bell Mountain
Job Number: 16408

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	3,303 vehicles
Peak Hour Percentage:	10.87%
Peak Hour Volume:	359 vehicles
Vehicle Speed:	55 mph
Near/Far Lane Distance:	76 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	64.0 feet
Centerline Dist. to Observer:	64.0 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:	69.5%	6.7%	23.7%	81.83%
Medium Trucks:	82.8%	5.4%	11.8%	2.82%
Heavy Trucks:	74.2%	6.1%	19.7%	15.35%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	51.740
Medium Trucks:	51.568
Heavy Trucks:	51.585

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	71.78	-8.03	-0.33	-1.20	*-4.70*	0.000	0.000
Medium Trucks:	82.40	-22.66	-0.30	-1.20	*-4.88*	0.000	0.000
Heavy Trucks:	86.40	-15.30	-0.31	-1.20	*-5.31*	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:	62.2	59.5	55.4	56.1	63.0	63.2
Medium Trucks:	58.2	56.3	50.4	49.1	57.2	57.5
Heavy Trucks:	69.6	67.1	62.3	62.6	69.9	70.1
Vehicle Noise:	70.6	68.1	63.3	63.7	70.9	71.1

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	73	158	340	732
CNEL:	75	163	350	755

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (9/12/2021)

Scenario: EP
Road Name: Stoddard Wells Rd.
Road Segment: e/o I-15 NB Ramps
Project Name: Bell Mountain
Job Number: 16408

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	6,062 vehicles
Peak Hour Percentage:	10.87%
Peak Hour Volume:	659 vehicles
Vehicle Speed:	55 mph
Near/Far Lane Distance:	76 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	64.0 feet
Centerline Dist. to Observer:	64.0 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:	69.5%	6.7%	23.7%	81.35%
Medium Trucks:	82.8%	5.4%	11.8%	3.28%
Heavy Trucks:	74.2%	6.1%	19.7%	15.36%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	51.740
Medium Trucks:	51.568
Heavy Trucks:	51.585

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	71.78	-5.42	-0.33	-1.20	*-4.70*	0.000	0.000
Medium Trucks:	82.40	-19.36	-0.30	-1.20	*-4.88*	0.000	0.000
Heavy Trucks:	86.40	-12.66	-0.31	-1.20	*-5.31*	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	62.1	58.0	58.7	65.6	65.8
Medium Trucks:	61.5	59.6	53.7	52.4	60.5	60.8
Heavy Trucks:	72.2	69.8	65.0	65.3	72.5	72.7
Vehicle Noise:	73.3	70.8	66.0	66.3	73.5	73.7

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	110	237	511	1,102
CNEL:	114	245	527	1,136

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (9/12/2021)

Scenario: OYC 2028
Road Name: Stoddard Wells Rd.
Road Segment: e/o I-15 NB Ramps
Project Name: Bell Mountain
Job Number: 16408

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	32,520 vehicles
Peak Hour Percentage:	10.87%
Peak Hour Volume:	3,535 vehicles
Vehicle Speed:	55 mph
Near/Far Lane Distance:	76 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	64.0 feet
Centerline Dist. to Observer:	64.0 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:	69.5%	6.7%	23.7%	81.83%
Medium Trucks:	82.8%	5.4%	11.8%	2.82%
Heavy Trucks:	74.2%	6.1%	19.7%	15.35%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	51.740
Medium Trucks:	51.568
Heavy Trucks:	51.585

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	71.78	1.90	-0.33	-1.20	*-4.70*	0.000	0.000
Medium Trucks:	82.40	-12.73	-0.30	-1.20	*-4.88*	0.000	0.000
Heavy Trucks:	86.40	-5.36	-0.31	-1.20	*-5.31*	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:	72.2	69.4	65.3	66.0	73.0	73.2
Medium Trucks:	68.2	66.2	60.3	59.0	67.2	67.4
Heavy Trucks:	79.5	77.1	72.3	72.6	79.8	80.0
Vehicle Noise:	80.5	78.1	73.3	73.6	80.8	81.0

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	336	724	1,560	3,361
CNEL:	347	747	1,609	3,467

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (9/12/2021)

Scenario: OYCP 2028
Road Name: Stoddard Wells Rd.
Road Segment: e/o I-15 NB Ramps
Project Name: Bell Mountain
Job Number: 16408

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	35,279 vehicles
Peak Hour Percentage:	10.87%
Peak Hour Volume:	3,835 vehicles
Vehicle Speed:	55 mph
Near/Far Lane Distance:	76 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	64.0 feet
Centerline Dist. to Observer:	64.0 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:	69.5%	6.7%	23.7%	81.75%
Medium Trucks:	82.8%	5.4%	11.8%	2.90%
Heavy Trucks:	74.2%	6.1%	19.7%	15.36%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	51.740
Medium Trucks:	51.568
Heavy Trucks:	51.585

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	71.78	2.25	-0.33	-1.20	*-4.70*	0.000	0.000
Medium Trucks:	82.40	-12.25	-0.30	-1.20	*-4.88*	0.000	0.000
Heavy Trucks:	86.40	-5.01	-0.31	-1.20	*-5.31*	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:	72.5	69.8	65.7	66.4	73.3	73.5
Medium Trucks:	68.6	66.7	60.8	59.5	67.6	67.9
Heavy Trucks:	79.9	77.4	72.6	72.9	80.1	80.4
Vehicle Noise:	80.9	78.4	73.6	73.9	81.2	81.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	355	765	1,648	3,551
CNEL:	366	789	1,700	3,663

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (9/12/2021)

Scenario: E | Project Name: Bell Mountain
Road Name: Stoddard Wells Rd. | Job Number: 16408
Road Segment: e/o Wrangler Rd.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	3,561 vehicles
Peak Hour Percentage:	10.87%
Peak Hour Volume:	387 vehicles
Vehicle Speed:	55 mph
Near/Far Lane Distance:	76 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	64.0 feet
Centerline Dist. to Observer:	64.0 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:	69.5%	6.7%	23.7%	81.83%
Medium Trucks:	82.8%	5.4%	11.8%	2.82%
Heavy Trucks:	74.2%	6.1%	19.7%	15.35%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	51.740
Medium Trucks:	51.568
Heavy Trucks:	51.585

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	71.78	-7.70	-0.33	-1.20	-4.70	0.000	0.000
Medium Trucks:	82.40	-22.33	-0.30	-1.20	-4.88	0.000	0.000
Heavy Trucks:	86.40	-14.97	-0.31	-1.20	-5.31	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:	62.6	59.8	55.7	56.4	63.4	63.5
Medium Trucks:	58.6	56.6	50.7	49.4	57.5	57.8
Heavy Trucks:	69.9	67.5	62.7	63.0	70.2	70.4
Vehicle Noise:	70.9	68.5	63.7	64.0	71.2	71.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	77	166	357	769
CNEL:	79	171	368	794

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (9/12/2021)

Scenario: EP | Project Name: Bell Mountain
Road Name: Stoddard Wells Rd. | Job Number: 16408
Road Segment: e/o Wrangler Rd.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	3,908 vehicles
Peak Hour Percentage:	10.87%
Peak Hour Volume:	425 vehicles
Vehicle Speed:	55 mph
Near/Far Lane Distance:	76 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	64.0 feet
Centerline Dist. to Observer:	64.0 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:	69.5%	6.7%	23.7%	80.59%
Medium Trucks:	82.8%	5.4%	11.8%	3.14%
Heavy Trucks:	74.2%	6.1%	19.7%	16.28%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	51.740
Medium Trucks:	51.568
Heavy Trucks:	51.585

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	71.78	-7.36	-0.33	-1.20	-4.70	0.000	0.000
Medium Trucks:	82.40	-21.46	-0.30	-1.20	-4.88	0.000	0.000
Heavy Trucks:	86.40	-14.31	-0.31	-1.20	-5.31	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:	62.9	60.2	56.0	56.7	63.7	63.9
Medium Trucks:	59.4	57.5	51.6	50.3	58.4	58.7
Heavy Trucks:	70.6	68.1	63.3	63.6	70.8	71.0
Vehicle Noise:	71.5	69.1	64.3	64.6	71.8	72.0

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	85	182	392	846
CNEL:	87	188	405	872

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (9/12/2021)

Scenario: OYC 2028 | Project Name: Bell Mountain
Road Name: Stoddard Wells Rd. | Job Number: 16408
Road Segment: e/o Wrangler Rd.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	26,429 vehicles
Peak Hour Percentage:	10.87%
Peak Hour Volume:	2,873 vehicles
Vehicle Speed:	55 mph
Near/Far Lane Distance:	76 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	64.0 feet
Centerline Dist. to Observer:	64.0 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:	69.5%	6.7%	23.7%	81.83%
Medium Trucks:	82.8%	5.4%	11.8%	2.82%
Heavy Trucks:	74.2%	6.1%	19.7%	15.35%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	51.740
Medium Trucks:	51.568
Heavy Trucks:	51.585

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	71.78	1.00	-0.33	-1.20	-4.70	0.000	0.000
Medium Trucks:	82.40	-13.63	-0.30	-1.20	-4.88	0.000	0.000
Heavy Trucks:	86.40	-6.26	-0.31	-1.20	-5.31	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:	71.3	68.5	64.4	65.1	72.1	72.3
Medium Trucks:	67.3	65.3	59.4	58.1	66.3	66.5
Heavy Trucks:	78.6	76.2	71.4	71.7	78.9	79.1
Vehicle Noise:	79.6	77.2	72.4	72.7	79.9	80.1

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	293	631	1,359	2,927
CNEL:	302	651	1,402	3,020

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (9/12/2021)

Scenario: OYCP 2028 | Project Name: Bell Mountain
Road Name: Stoddard Wells Rd. | Job Number: 16408
Road Segment: e/o Wrangler Rd.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	26,776 vehicles
Peak Hour Percentage:	10.87%
Peak Hour Volume:	2,911 vehicles
Vehicle Speed:	55 mph
Near/Far Lane Distance:	76 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	64.0 feet
Centerline Dist. to Observer:	64.0 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:	69.5%	6.7%	23.7%	81.65%
Medium Trucks:	82.8%	5.4%	11.8%	2.86%
Heavy Trucks:	74.2%	6.1%	19.7%	15.49%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	51.740
Medium Trucks:	51.568
Heavy Trucks:	51.585

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	71.78	1.05	-0.33	-1.20	-4.70	0.000	0.000
Medium Trucks:	82.40	-13.50	-0.30	-1.20	-4.88	0.000	0.000
Heavy Trucks:	86.40	-6.17	-0.31	-1.20	-5.31	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:	71.3	68.6	64.5	65.2	72.1	72.3
Medium Trucks:	67.4	65.4	59.6	58.2	66.4	66.6
Heavy Trucks:	78.7	76.3	71.5	71.8	79.0	79.2
Vehicle Noise:	79.7	77.2	72.5	72.8	80.0	80.2

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	297	639	1,377	2,967
CNEL:	306	659	1,421	3,061

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (9/12/2021)

Scenario: E
Road Name: Stoddard Wells Rd.
Road Segment: e/o Dwy. 1
Project Name: Bell Mountain
Job Number: 16408

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	3,561 vehicles
Peak Hour Percentage:	10.87%
Peak Hour Volume:	387 vehicles
Vehicle Speed:	55 mph
Near/Far Lane Distance:	76 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	64.0 feet
Centerline Dist. to Observer:	64.0 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:	69.5%	6.7%	23.7%	81.83%
Medium Trucks:	82.8%	5.4%	11.8%	2.82%
Heavy Trucks:	74.2%	6.1%	19.7%	15.35%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	51.740
Medium Trucks:	51.568
Heavy Trucks:	51.585

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	71.78	-7.70	-0.33	-1.20	-4.70	0.000	0.000
Medium Trucks:	82.40	-22.33	-0.30	-1.20	-4.88	0.000	0.000
Heavy Trucks:	86.40	-14.97	-0.31	-1.20	-5.31	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:	62.6	59.8	55.7	56.4	63.4	63.5
Medium Trucks:	58.6	56.6	50.7	49.4	57.5	57.8
Heavy Trucks:	69.9	67.5	62.7	63.0	70.2	70.4
Vehicle Noise:	70.9	68.5	63.7	64.0	71.2	71.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	77	166	357	769
CNEL:	79	171	368	794

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (9/12/2021)

Scenario: EP
Road Name: Stoddard Wells Rd.
Road Segment: e/o Dwy. 1
Project Name: Bell Mountain
Job Number: 16408

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	3,612 vehicles
Peak Hour Percentage:	10.87%
Peak Hour Volume:	393 vehicles
Vehicle Speed:	55 mph
Near/Far Lane Distance:	76 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	64.0 feet
Centerline Dist. to Observer:	64.0 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:	69.5%	6.7%	23.7%	81.31%
Medium Trucks:	82.8%	5.4%	11.8%	2.93%
Heavy Trucks:	74.2%	6.1%	19.7%	15.76%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	51.740
Medium Trucks:	51.568
Heavy Trucks:	51.585

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	71.78	-7.67	-0.33	-1.20	-4.70	0.000	0.000
Medium Trucks:	82.40	-22.10	-0.30	-1.20	-4.88	0.000	0.000
Heavy Trucks:	86.40	-14.79	-0.31	-1.20	-5.31	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:	62.6	59.9	55.7	56.4	63.4	63.6
Medium Trucks:	58.8	56.8	51.0	49.6	57.8	58.0
Heavy Trucks:	70.1	67.6	62.8	63.1	70.4	70.6
Vehicle Noise:	71.1	68.6	63.8	64.1	71.4	71.6

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	79	170	366	788
CNEL:	81	175	377	813

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (9/12/2021)

Scenario: OYC 2028
Road Name: Stoddard Wells Rd.
Road Segment: e/o Dwy. 1
Project Name: Bell Mountain
Job Number: 16408

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	30,759 vehicles
Peak Hour Percentage:	10.87%
Peak Hour Volume:	3,344 vehicles
Vehicle Speed:	55 mph
Near/Far Lane Distance:	76 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	64.0 feet
Centerline Dist. to Observer:	64.0 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:	69.5%	6.7%	23.7%	81.83%
Medium Trucks:	82.8%	5.4%	11.8%	2.82%
Heavy Trucks:	74.2%	6.1%	19.7%	15.35%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	51.740
Medium Trucks:	51.568
Heavy Trucks:	51.585

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	71.78	1.66	-0.33	-1.20	-4.70	0.000	0.000
Medium Trucks:	82.40	-12.97	-0.30	-1.20	-4.88	0.000	0.000
Heavy Trucks:	86.40	-5.60	-0.31	-1.20	-5.31	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:	71.9	69.2	65.1	65.8	72.7	72.9
Medium Trucks:	67.9	66.0	60.1	58.8	66.9	67.2
Heavy Trucks:	79.3	76.8	72.0	72.3	79.6	79.8
Vehicle Noise:	80.3	77.8	73.0	73.3	80.6	80.8

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	324	698	1,503	3,239
CNEL:	334	720	1,551	3,341

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (9/12/2021)

Scenario: OYCP 2028
Road Name: Stoddard Wells Rd.
Road Segment: e/o Dwy. 1
Project Name: Bell Mountain
Job Number: 16408

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	30,809 vehicles
Peak Hour Percentage:	10.87%
Peak Hour Volume:	3,349 vehicles
Vehicle Speed:	55 mph
Near/Far Lane Distance:	76 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	64.0 feet
Centerline Dist. to Observer:	64.0 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:	69.5%	6.7%	23.7%	81.77%
Medium Trucks:	82.8%	5.4%	11.8%	2.83%
Heavy Trucks:	74.2%	6.1%	19.7%	15.40%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	51.740
Medium Trucks:	51.568
Heavy Trucks:	51.585

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	71.78	1.67	-0.33	-1.20	-4.70	0.000	0.000
Medium Trucks:	82.40	-12.94	-0.30	-1.20	-4.88	0.000	0.000
Heavy Trucks:	86.40	-5.58	-0.31	-1.20	-5.31	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:	71.9	69.2	65.1	65.8	72.7	72.9
Medium Trucks:	68.0	66.0	60.1	58.8	66.9	67.2
Heavy Trucks:	79.3	76.9	72.0	72.4	79.6	79.8
Vehicle Noise:	80.3	77.8	73.1	73.4	80.6	80.8

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	325	700	1,507	3,248
CNEL:	335	722	1,555	3,350

APPENDIX 9.1:

CADNAA OPERATIONAL NOISE CALCULATIONS

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16408 - Bell Mountain Commerce Center

CadnaA Noise Prediction Model: 16408-02.cna
Date: 18.09.25
Analyst: B. Lawson

Calculation Configuration

Configuration	
Parameter	**Value**
General	
Max. Error (dB)	**0.00**
Max. Search Radius (ft)	**10000.00**
Min. Dist Src to Rcvr	**0.00**
Partition	
Raster Factor	**0.50**
Max. Length of Section (ft)	**3280.80**
Min. Length of Section (ft)	**3.30**
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	**328.08**
Search Radius Rcvr	**328.08**
Max. Distance Source - Rcvr	**3280.84 3280.84**
Min. Distance Rvcr - Reflector	**3.28 3.28**
Min. Distance Source - Reflector	**0.33**
Industrial (ISO 9613 (1996))	
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 (°F)	**50**
rel. Humidity (%)	**70**
Ground Absorption G	**0.50**
Wind Speed for Dir. (mph)	**6.7**
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	Night	CNEL	Day	Night	CNEL	Type	Auto	Noise Type			X	Y	Z
			(dBA)	(dBA)	(dBA)	(dBA)	(dBA)	(dBA)				(ft)		(ft)	(ft)	(ft)
RECEIVERS		R1	35.5	35.5	42.2	50.0	40.0	0.0				5.00	a	6793736.53	2043580.41	5.00
RECEIVERS		R2	37.4	37.4	44.1	50.0	40.0	0.0				5.00	a	6793248.70	2042886.39	5.00
RECEIVERS		R3	39.0	39.0	45.7	50.0	40.0	0.0				5.00	a	6793113.10	2041486.20	5.00
RECEIVERS		R4	47.1	47.0	53.7	50.0	40.0	0.0				5.00	a	6789670.74	2039199.43	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)
POINTSOURCE		AC01	88.9	88.9	88.9	Lw	88.9		585.00	0.00	252.00	5.00	g	6789413.84	2041702.40	60.00
POINTSOURCE		AC02	88.9	88.9	88.9	Lw	88.9		585.00	0.00	252.00	5.00	g	6789471.13	2041764.90	60.00
POINTSOURCE		AC03	88.9	88.9	88.9	Lw	88.9		585.00	0.00	252.00	5.00	g	6788887.80	2041699.80	60.00
POINTSOURCE		AC04	88.9	88.9	88.9	Lw	88.9		585.00	0.00	252.00	5.00	g	6788830.51	2041772.71	60.00
POINTSOURCE		AC05	88.9	88.9	88.9	Lw	88.9		585.00	0.00	252.00	5.00	g	6789549.26	2039871.67	60.00
POINTSOURCE		AC06	88.9	88.9	88.9	Lw	88.9		585.00	0.00	252.00	5.00	g	6789497.17	2039934.17	60.00
POINTSOURCE		AC07	88.9	88.9	88.9	Lw	88.9		585.00	0.00	252.00	5.00	g	6788856.55	2039871.67	60.00
POINTSOURCE		AC08	88.9	88.9	88.9	Lw	88.9		585.00	0.00	252.00	5.00	g	6788856.55	2039957.61	60.00
POINTSOURCE		TRASH01	89.0	89.0	89.0	Lw	89		900.00	0.00	270.00	5.00	a	6788629.07	2040022.71	5.00
POINTSOURCE		TRASH02	89.0	89.0	89.0	Lw	89		900.00	0.00	270.00	5.00	a	6789694.18	2039981.05	5.00

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)	
LINESOURCE		TRUCK01	93.2	93.2	93.2	68.1	68.1	68.1	Lw	93.2									8	a
LINESOURCE		TRUCK02	93.2	93.2	93.2	61.2	61.2	61.2	Lw	93.2									8	a
LINESOURCE		TRUCK03	93.2	93.2	93.2	65.7	65.7	65.7	Lw	93.2									8	a

Name	ID	Height				Coordinates			
		Begin		End		x	y	z	Ground
		(ft)		(ft)		(ft)	(ft)	(ft)	(ft)
LINESOURCE	TRUCK01	8.00	a			6788561.18	2039776.25	8.00	0.00
						6789629.99	2039786.60	8.00	0.00
LINESOURCE	TRUCK02	8.00	a			6788760.22	2039778.18	8.00	0.00
						6788749.78	2041840.42	8.00	0.00
						6789614.36	2041840.42	8.00	0.00
						6789632.01	2039575.11	8.00	0.00
LINESOURCE	TRUCK03	8.00	a			6789623.14	2040712.80	8.00	0.00
						6790054.46	2040710.21	8.00	0.00
						6790327.90	2040861.25	8.00	0.00
						6790346.13	2040970.63	8.00	0.00
						6790330.51	2041806.57	8.00	0.00
						6790299.17	2041947.38	8.00	0.00

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)		
AREASOURCE		COLD01	111.5	111.5	111.5	72.2	72.2	72.2	Lw	111.5					8	a
AREASOURCE		COLD02	111.5	111.5	111.5	72.3	72.3	72.3	Lw	111.5					8	a
AREASOURCE		DRY01	103.4	103.4	103.4	60.2	60.2	60.2	Lw	103.4					8	a
AREASOURCE		DRY02	103.4	103.4	103.4	55.6	55.6	55.6	Lw	103.4					8	a
AREASOURCE		DRY03	103.4	103.4	103.4	67.6	67.6	67.6	Lw	103.4					8	a
AREASOURCE		CAR01	81.1	81.1	81.1	38.2	38.2	38.2	Lw	81.1		900.00	0.00	540.00	5	a

Name	ID	Height				Coordinates			
		Begin		End		x	y	z	Ground
		(ft)		(ft)		(ft)	(ft)	(ft)	(ft)
AREASOURCE	COLD01	8.00	a			6788838.25	2041684.68	8.00	0.00
						6788859.09	2040003.69	8.00	0.00
						6788800.49	2040007.59	8.00	0.00
						6788788.77	2041687.28	8.00	0.00
AREASOURCE	COLD02	8.00	a			6789510.06	2041808.41	8.00	0.00
						6789556.71	2041808.41	8.00	0.00
						6789583.04	2039952.91	8.00	0.00
						6789532.26	2039951.61	8.00	0.00
AREASOURCE	DRY01	8.00	a			6788608.38	2041857.56	8.00	0.00
						6788712.47	2041863.34	8.00	0.00
						6788726.93	2040002.82	8.00	0.00
						6788606.94	2040005.71	8.00	0.00
						6788592.48	2041549.64	8.00	0.00
AREASOURCE	DRY02	8.00	a			6789646.34	2041832.98	8.00	0.00
						6790236.16	2041840.21	8.00	0.00
						6790275.19	2041786.72	8.00	0.00
						6790286.75	2040874.53	8.00	0.00
						6790085.81	2040767.56	8.00	0.00
						6789670.92	2040774.79	8.00	0.00
AREASOURCE	DRY03	8.00	a			6789675.26	2040669.25	8.00	0.00
						6789767.78	2040666.36	8.00	0.00
						6789770.67	2040387.36	8.00	0.00
						6789711.40	2040385.91	8.00	0.00
						6789711.40	2039963.79	8.00	0.00
						6789676.70	2039963.79	8.00	0.00
AREASOURCE	CAR01	5.00	a			6788643.08	2039752.73	5.00	0.00
						6788813.66	2039746.95	5.00	0.00
						6788815.11	2039817.78	5.00	0.00
						6789537.92	2039817.78	5.00	0.00
						6789536.48	2039700.69	5.00	0.00
						6789514.79	2039702.13	5.00	0.00
						6789516.24	2039676.11	5.00	0.00
						6788770.29	2039492.52	5.00	0.00
						6788667.65	2039488.18	5.00	0.00
						6788676.33	2039504.08	5.00	0.00
						6788619.95	2039504.08	5.00	0.00
						6788615.61	2039719.48	5.00	0.00
						6788644.52	2039716.59	5.00	0.00

Building(s)

Name	Sel.	M.	ID	RB	Residents	Absorption	Height		Coordinates			
							Begin		x	y	z	Ground
							(ft)		(ft)	(ft)	(ft)	(ft)
BUILDING			BUILDING00004	x	0		55.00	a	6788787.73	2041804.27	55.00	0.00
									6789510.06	2041808.41	55.00	0.00
									6789532.26	2039951.61	55.00	0.00
									6789583.04	2039952.91	55.00	0.00
									6789584.35	2039834.42	55.00	0.00
									6788803.10	2039827.91	55.00	0.00
									6788800.49	2040007.59	55.00	0.00
									6788859.09	2040003.69	55.00	0.00
									6788838.25	2041684.68	55.00	0.00
									6788788.77	2041687.28	55.00	0.00

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APPENDIX 10.1:

CONSTRUCTION NOISE CALCULATIONS

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16408 - Bell Mountain Commerce Center

CadnaA Noise Prediction Model: 16408-02_Construction.cna
Date: 18.09.25
Analyst: B. Lawson

Calculation Configuration

Configuration	
Parameter	**Value**
General	
Max. Error (dB)	**0.00**
Max. Search Radius (ft)	**10000.00**
Min. Dist Src to Rcvr	**0.00**
Partition	
Raster Factor	**0.50**
Max. Length of Section (ft)	**3280.80**
Min. Length of Section (ft)	**3.30**
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	**328.08**
Search Radius Rcvr	**328.08**
Max. Distance Source - Rcvr	**3280.84 3280.84**
Min. Distance Rvcr - Reflector	**3.28 3.28**
Min. Distance Source - Reflector	**0.33**
Industrial (ISO 9613 (1996))	
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 (°F)	**50**
rel. Humidity (%)	**70**
Ground Absorption G	**0.50**
Wind Speed for Dir. (mph)	**6.7**
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	Night	CNEL	Day	Night	CNEL	Type	Auto	Noise Type			X	Y	Z
			(dBA)	(dBA)	(dBA)	(dBA)	(dBA)	(dBA)				(ft)		(ft)	(ft)	(ft)
RECEIVERS		R1	42.6	-62.1	39.6	50.0	40.0	0.0				5.00	a	6793736.53	2043580.41	5.00
RECEIVERS		R2	44.5	-60.2	41.5	50.0	40.0	0.0				5.00	a	6793248.70	2042886.39	5.00
RECEIVERS		R3	46.1	-58.7	43.1	50.0	40.0	0.0				5.00	a	6793113.10	2041486.20	5.00
RECEIVERS		R4	56.4	-48.4	53.4	50.0	40.0	0.0				5.00	a	6789670.74	2039199.43	5.00

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)		
SITEBOUNDARY		CONSTRUCTION	120.4	15.6	15.6	64.7	-40.1	-40.1	PWL-Pt	115.6					8	a

Name	ID	Height				Coordinates			
		Begin		End		x	y	z	Ground
		(ft)		(ft)		(ft)	(ft)	(ft)	(ft)
SITEBOUNDARY	CONSTRUCTION	8.00	a			6790449.26	2041948.33	8.00	0.00
						6790466.04	2040636.97	8.00	0.00
						6789836.75	2040630.39	8.00	0.00
						6789845.25	2039639.55	8.00	0.00
						6789622.33	2039572.19	8.00	0.00
						6789415.55	2039516.31	8.00	0.00
						6788606.83	2039304.64	8.00	0.00
						6788565.94	2039335.89	8.00	0.00
						6788561.06	2039787.39	8.00	0.00
						6788553.25	2040301.06	8.00	0.00
						6788548.07	2041046.67	8.00	0.00

Name	ID	Height		Coordinates			
		Begin	End	x	y	z	Ground
		(ft)	(ft)	(ft)	(ft)	(ft)	(ft)
				6788538.30	2041855.05	8.00	0.00
				6788538.76	2041914.65	8.00	0.00
				6788560.90	2041936.35	8.00	0.00

APPENDIX 10.2:

NIGHTTIME CONCRETE POUR NOISE CALCULATIONS

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16408 - Bell Mountain Commerce Center

CadnaA Noise Prediction Model: 16408-02_Pour.cna
Date: 18.09.25
Analyst: B. Lawson

Calculation Configuration

Configuration	
Parameter	**Value**
General	
Max. Error (dB)	**0.00**
Max. Search Radius (ft)	**10000.00**
Min. Dist Src to Rcvr	**0.00**
Partition	
Raster Factor	**0.50**
Max. Length of Section (ft)	**3280.80**
Min. Length of Section (ft)	**3.30**
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	**328.08**
Search Radius Rcvr	**328.08**
Max. Distance Source - Rcvr	**3280.84 3280.84**
Min. Distance Rvcr - Reflector	**3.28 3.28**
Min. Distance Source - Reflector	**0.33**
Industrial (ISO 9613 (1996))	
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 (°F)	**50**
rel. Humidity (%)	**70**
Ground Absorption G	**0.50**
Wind Speed for Dir. (mph)	**6.7**
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	Night	CNEL	Day	Night	CNEL	Type	Auto	Noise Type			X	Y	Z
			(dBA)	(dBA)	(dBA)	(dBA)	(dBA)	(dBA)				(ft)		(ft)	(ft)	(ft)
RECEIVERS		R1	27.3	-75.6	24.3	50.0	40.0	0.0				5.00	a	6793736.53	2043580.41	5.00
RECEIVERS		R2	29.2	-74.3	26.2	50.0	40.0	0.0				5.00	a	6793248.70	2042886.39	5.00
RECEIVERS		R3	30.8	-73.1	27.8	50.0	40.0	0.0				5.00	a	6793113.10	2041486.20	5.00
RECEIVERS		R4	41.1	-63.6	38.1	50.0	40.0	0.0				5.00	a	6789670.74	2039199.43	5.00

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)		
SITEBOUNDARY		CONSTRUCTION	105.1	0.3	0.3	49.4	-55.4	-55.4	PWL-Pt	100.3					8	a

Name	ID	Height				Coordinates			
		Begin		End		x	y	z	Ground
		(ft)		(ft)		(ft)	(ft)	(ft)	(ft)
SITEBOUNDARY	CONSTRUCTION	8.00	a			6790449.26	2041948.33	8.00	0.00
						6790466.04	2040636.97	8.00	0.00
						6789836.75	2040630.39	8.00	0.00
						6789845.25	2039639.55	8.00	0.00
						6789622.33	2039572.19	8.00	0.00
						6789415.55	2039516.31	8.00	0.00
						6788606.83	2039304.64	8.00	0.00
						6788565.94	2039335.89	8.00	0.00
						6788561.06	2039787.39	8.00	0.00
						6788553.25	2040301.06	8.00	0.00
						6788548.07	2041046.67	8.00	0.00

Name	ID	Height		Coordinates			
		Begin	End	x	y	z	Ground
		(ft)	(ft)	(ft)	(ft)	(ft)	(ft)
				6788538.30	2041855.05	8.00	0.00
				6788538.76	2041914.65	8.00	0.00
				6788560.90	2041936.35	8.00	0.00